UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☐ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the Fiscal Year Ended December 31, 2021

OR ☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from to .

Commission File No. 001-33093

LIGAND PHARMACEUTICALS INCORPORATED

(Exact name of registrant as specified in its charter)

Delaware	**77-0160744**
(State or other jurisdiction of incorporation or organization)	**(IRS Employer Identification No.)**
5980 Horton Street, Suite 405	
Emeryville	
CA	**94608**
(Address of Principal Executive Offices)	**(Zip Code)**

Registrant's telephone number, including area code: (858) 550-7500

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock, par value $.001 per share	**LGND**	**The Nasdaq Global Market**

Securities registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934. Yes ☐ No ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definition of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer ☒ Accelerated Filer ☐ Non-accelerated Filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Exchange Act Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of the Registrant's voting and non-voting stock held by non-affiliates was approximately $ 1.8 billion based on the last sales price of the Registrant's Common Stock on the Nasdaq Global Market of the Nasdaq Stock Market LLC on June 30, 2021. For purposes of this calculation, shares of Common Stock held by directors, officers and 10% stockholders known to the Registrant have been deemed to be owned by affiliates which should not be construed to indicate that any such person possesses the power, direct or indirect, to direct or cause the direction of the management or policies of the Registrant or that such person is controlled by or under common control with the Registrant.

As of February 23, 2022, the Registrant had 16,852,650 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement for the Registrant's 2021 Annual Meeting of Stockholders to be filed with the Commission within 120 days of December 31, 2021 are incorporated by reference in Part III of this Annual Report on Form 10-K. With the exception of those portions that are specifically incorporated by reference in this Annual Report on Form 10-K, such Proxy Statement shall not be deemed filed as part of this Report or incorporated by reference herein.

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GLOSSARY OF TERMS AND ABBREVIATIONS

Abbreviation	Definition
2019 Notes	$245.0 million aggregate principal amount of convertible senior unsecured notes due 2019
2023 Notes	$750.0 million aggregate principal amount of convertible senior unsecured notes due 2023
Ab Initio	Ab Initio Biotherapeutics, Inc.
Abvivo	Abvivo, LLC
Aldeyra	Aldeyra Therapeutics, Inc.
Amgen	Amgen, Inc.
ANDA	Abbreviated New Drug Application
API	Active pharmaceutical ingredient
Aptevo	Aptevo Therapeutics
Arcus	Arcus Biosciences, Inc.
ASC	Accounting Standards Codification
ASCO	American Society of Clinical Oncology
ASCT	Autologous Stem Cell Transplantation
ASU	Accounting Standards Update
Aurobindo	Aurobindo Pharma Ltd
Aziyo	Aziyo Med, LLC
Baxter	Baxter International, Inc.
BendaRx	BendaRx Corp.
Bexson Biomedical	Bexson Biomedical, Inc.
BLA	Biologics license application
CStone	CStone Pharmaceuticals (Suzhou) Co., Ltd.
CASI	CASI Pharmaceuticals, Inc.
CI-AKI	Contrast-induced acute kidney injury
Code of Conduct	Code of Conduct and Ethics Policy
CoM	Composition of Matter
Company	Ligand Pharmaceuticals Incorporated, including subsidiaries
Convertible Note	Senior Convertible Promissory Note
COPD	Chronic obstructive pulmonary disease
Cormatrix	Cormatrix Cardiovascular, Inc.
Corvus	Corvus Pharmaceuticals, Inc.
COSO	Committee of Sponsoring Organizations of the Treadway Commission
CRO	Contract Research Organization
Crystal	Crystal Bioscience, Inc.
Cumulus	Cumulus Oncology, Ltd.
CVR	Contingent value right
CyDex	CyDex Pharmaceuticals, Inc.
Daiichi Sankyo	Daiichi Sankyo Company, Ltd.
Dianomi	Dianomi Therapeutics, Inc.
DMF	Drug Master File
ESG	Environmental, Social and Governance
Eisai	Eisai Inc.
Eli Lilly	Eli Lilly and Company
ECM	Extracellular matrix
EPA	Environmental Protection Agency
ESPP	Employee Stock Purchase Plan, as amended and restated

EU	European Union
Exelixis	Exelixis, Inc.
FASB	Financial Accounting Standards Board
FDA	U.S. Food and Drug Administration
FSGS	Focal segmental glomerulosclerosis
GAAP	Generally accepted accounting principles in the United States
Genagon	Genagon Therapeutics AB
GCSF	Granulocyte-colony stimulating factor
GigaGen	GigaGen, Inc.
Gilead	Gilead Sciences, Inc.
GPCR	G-protein coupled receptor
GRA	Glucagon receptor antagonist
HanAll	HanAll Biopharma Co., Ltd.
Harbour	Harbour BioMed Shanghai Co., Ltd.
HBV	Hepatitis B Virus
Hikma	Hikma Pharmaceuticals PLC
Hovione	Hovione FarmCiencia, S.A.
Icagen	Icagen, Inc.
IPR&D	In-Process Research and Development
IRS	Internal Revenue Service
IV	Intravenous
Immunovant	Immunovant Sciences GmbH
IND	Investigational New Drug
Jazz	Jazz Pharmaceuticals, Inc.
Ligand	Ligand Pharmaceuticals Incorporated, including subsidiaries
LTP	Liver targeting prodrug
Lundbeck	Lundbeck A/S
Marinus	Marinus Pharmaceuticals, Inc.
Melinta	Melinta Therapeutics, Inc.
Merck	Merck & Co., Inc.
Metabasis	Metabasis Therapeutics, Inc.
Millennium	Millennium Pharmaceuticals, Inc.
NASH	Non-alcoholic steatohepatitis
NDA	New Drug Application
NOLs	Net Operating Losses
Novan	Novan, Inc.
Novartis	Novartis AG
Nucorion	Nucorion Pharmaceuticals, Inc.
OMT	Open Monoclonal Technology, Inc.
Ono	Ono Pharmaceutical Co., Ltd.
Opthea	Opthea Limited
Orange Book	Publication identifying drug products approved by the FDA based on safety and effectiveness
Original Interest Purchase Agreement	Interest Purchase Agreement, dated May 3, 2016, between the Company and CorMatrix Cardiovascular, Inc.
Palvella	Palvella Therapeutics, Inc.
Par	Par Pharmaceutical, Inc.
Pfenex	Pfenex Inc.

Pfizer	Pfizer, Inc.
PFS	Progression-free Survival
Pharmacopeia	Pharmacopeia, Inc.
Phoenix Tissue	Phoenix Tissue Repair
PPD	Post-Partum Depression
PSU	Performance stock unit
R&D	Research and Development
Roivant	Roivant Sciences GMBH
RSU	Restricted stock unit
SAGE	Sage Therapeutics, Inc.
SARM	Selective Androgen Receptor Modulator
SEC	Securities and Exchange Commission
Sedor	Sedor Pharmaceuticals, Inc., or RODES, Inc.
Seelos	Seelos Therapeutics, Inc.
Selexis	Selexis, SA
Sermonix	Sermonix Pharmaceuticals, LLC
SII	Serum Institute of India
SQ Innovation	SQ Innovation, Inc.
Sunshine Lake Pharma	Sunshine Lake Pharma Co., Ltd.
Takeda	Takeda Pharmaceuticals Company Limited
Talem	Talem Therapeutics LLC
Taurus	Taurus Biosciences LLC
Tax Act	The Tax Cuts and Jobs Act
Teva	Teva Pharmaceuticals USA, Inc., Teva Pharmaceutical Industries Ltd. and Actavis, LLC
Travere	Travere Inc.
TR-Beta	Thyroid hormone receptor beta
Valanbio	Valanbio Therapeutics, Inc.
VDP	Vernalis Design Platform
VentiRx	VentiRx Pharmaceuticals, Inc.
Vernalis	Vernalis plc
Verona	Verona Pharma plc
Viking	Viking Therapeutics
WuXi	WuXi Biologics Ireland Limited
WuXi Agreement	The Platform License Agreement, dated March 23, 2015, by and between Ligand and WuXi, as amended
Xi'an Xintong	Xi'an Xintong Medicine Research
X-ALD	X-linked adrenoleukodystrophy
xCella Biosciences	xCella Biosciences, Inc.
Zydus Cadila	Zydus Cadila Healthcare, Ltd

PART I

Cautionary Note Regarding Forward-Looking Statements:

You should read the following report together with the more detailed information regarding our company, our common stock and our financial statements and notes to those statements appearing elsewhere in this document.

This report contains forward-looking statements that involve a number of risks and uncertainties. Although our forward-looking statements reflect the good faith judgment of our management, these statements can only be based on facts and factors currently known by us. Consequently, these forward-looking statements are inherently subject to risks and uncertainties, and actual results and outcomes may differ materially from results and outcomes discussed in the forward-looking statements.

Forward-looking statements can be identified by the use of forward-looking words such as "believes," "expects," "may," "will," "plan," "intends," "estimates," "would," "continue," "seeks," "pro forma," or "anticipates," or other similar words (including their use in the negative), or by discussions of future matters such as those related to our future results of operations and financial position, royalties and milestones under license agreements, Captisol material sales, product development, and product regulatory filings and approvals, and the timing thereof, as well as other statements that are not historical. You should be aware that the occurrence of any of the events discussed under the caption "Risk Factors" could negatively affect our results of operations and financial condition and the trading price of our stock.

The cautionary statements made in this report are intended to be applicable to all related forward-looking statements wherever they may appear in this report. We urge you not to place undue reliance on these forward-looking statements, which speak only as of the date of this report. Except as required by law, we assume no obligation to update our forward-looking statements, even if new information becomes available in the future. This caution is made under the safe harbor provisions of Section 21E of the Securities Exchange Act of 1934, as amended.

References to "Ligand Pharmaceuticals Incorporated," "Ligand," the "Company," "we," "our" and "us" include Ligand Pharmaceuticals Incorporated and our wholly-owned subsidiaries.

Partner Information

Information regarding partnered products and programs comes from information publicly released by our partners and licensees.

Trademarks

Our trademarks, trade names and service marks referenced herein include Ligand®, 3 Species, 1 License®, Absolutely Omniab™, Advasep®, Animal Intelligence™, BEPro™, Biological Intelligence™, Bonsity®, Captisol®, CyDex®, Icagen®, LTP®, LTP Technology™, Naturally Optimized Human Antibodies®, OmniAb®, OmniChicken®, OmniClic®, OmniDab™, OmniDeep®, OmniFlic®, OmniMouse®, OmniRat®, OmniTaur™, Pelican Expression Technology™, PeliCRM™, Pfenex Expression Technology™, Picobodies™, Three Species, One License®, xCella Biosciences®, XPloration® and XRPro®, which are protected under applicable intellectual property laws and are our property. All other trademarks, trade names and service marks including Kyprolis®, Evomela®, Veklury®, Livogiva®, Zulresso®, Rylaze™, VAXNEUVANCE™, Pneumosil®, Minnebro®, Baxdela®, Carnexiv™, Conbriza®, Nexterone®, Noxafil® and Duavee®, are the property of their respective owners. Solely for convenience, trademarks, trade names and service marks referred to in this report may appear without the ®, ™ or SM symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the right of the applicable licensor to such trademarks, trade names and service marks. Use or display by us of other parties' trademarks, trade dress or products is not intended to and does not imply a relationship with, or endorsement or sponsorship of, us by the trademark or trade dress owners.

Item 1. Business

Overview

We are a biopharmaceutical company focused on developing or acquiring technologies that help pharmaceutical companies discover and develop medicines. We employ research technologies such as antibody discovery technologies, ion channel discovery technology, *Pseudomonas fluorescens* protein expression technology, formulation science and liver targeted pro-drug technologies to assist companies in their work toward securing prescription drug and biologic approvals. We currently have partnerships and license agreements with over 140 pharmaceutical and biotechnology companies. Over 400 programs are in various stages of commercialization, development or research and are fully funded by our collaboration partners and licensees. We have contributed novel research and technologies for approved medicines that treat cancer, osteoporosis, fungal infections and postpartum depression, among others. Our collaboration partners and licensees have programs currently in clinical development targeting cancer, seizure, diabetes, cardiovascular disease, muscle wasting, liver disease, and kidney disease, among others. We have over 1,600 issued patents worldwide.

We have assembled our large portfolio of fully-funded programs either by licensing our own proprietary drug development programs, licensing our platform technologies such as Captisol or OmniAb to partners for use with their proprietary programs, or acquiring existing partnered programs from other companies. Fully-funded programs, which we refer to as "shots on goal," are those for which our partners pay all of the development and commercialization costs. For our internal programs, we generally plan to advance drug candidates through early-stage drug development or clinical proof-of-concept and then seek partners to continue development and potential commercialization.

Our business model creates value for stockholders by providing a diversified portfolio of biotech and pharmaceutical product revenue streams that are supported by an efficient and low corporate cost structure. Our goal is to offer investors an opportunity to participate in the promise of the biotech industry in a profitable, diversified and lower-risk business, in contrast to a typical biotech company. Our business model is based on doing what we do best: drug discovery, early-stage drug development, product reformulation and partnering. We partner with other pharmaceutical companies to leverage what they do best (late-stage development, regulatory management and commercialization) to ultimately generate our revenue. We believe that focusing on discovery and early-stage drug development while benefiting from our partners' development and commercialization expertise will reduce our internal expenses and allow us to have a larger number of drug candidates progress to later stages of drug development.

Our revenue consists of three primary elements: royalties from commercialized products, sales of Captisol material, and contract revenue from license, milestone and other service payments. In addition to discovering and developing our own proprietary drugs, we selectively pursue acquisitions to bring in new assets, pipelines, and technologies to aid in generating additional potential new revenue streams.

Impact of COVID-19 Pandemic

Please see impact of COVID-19 pandemic described in Item 8. Consolidated Financial Statements -Note 1, "*Basis of Presentation and Summary of Significant Accounting Policies*". For additional information on the various risks posed by COVID-19 pandemic, please read *Item 1A. Risk Factors* included in this report.

Technologies

A variety of technology platforms that enable elements of drug discovery or development form the basis of our portfolio of fully-funded shots on goal. Platform technologies or individual drugs discovered by Ligand are related to a broad estate of intellectual property that includes over 1,600 patents issued worldwide.

OmniAb Technologies

The OmniAb platform creates and screens diverse antibody pools and is designed to quickly identify optimal antibodies for our partners' drug development efforts. We harness the power of Biological Intelligence, which we built into our proprietary transgenic animals and paired with our high-throughput screening technologies, to enable the discovery of high-quality, fully-human antibody therapeutic candidates. We believe these antibodies are high quality because they are naturally optimized in our proprietary host systems for affinity, specificity, developability and functional performance. Our partners have access to these antibody therapeutic candidates that are based on unmatched biological diversity and optimized through integration across a full range of technologies, including antigen design, transgenic animals, deep screening and characterization. We provide our partners both integrated end-to-end capabilities and highly customizable offerings, which address critical industry challenges and provide optimized antibody discovery solutions.

As of December 31, 2021, OmniAb had 57 partners and over 250 active discovery programs, including 25 OmniAb-derived antibodies in clinical development and two approved products, including zimberelimab, which was approved in China for the treatment of recurrent or refractory classical Hodgkin's lymphoma, and sugemalimab, which was approved in China for the first-line treatment of metastatic (stage IV) nonsmall cell lung cancer in combination with chemotherapy.

Pelican Expression Technology™ Platform

The Pelican Expression Technology platform is a robust, validated, cost-effective and scalable platform for recombinant protein production, and is especially well-suited for complex, large-scale protein production. Global manufacturers have demonstrated consistent success with the platform and the technology is currently out-licensed for multiple commercial and development-stage programs. The versatility of the platform has been demonstrated in the production of enzymes, peptides, antibody derivatives and engineered non-natural proteins. Partners seek the platform as it contributes significant value to biopharmaceutical development programs by reducing timelines and costs associated with research and development through commercial manufacturing of therapeutics and vaccines. Given pharmaceutical industry trends toward large molecules with increased structural complexities, the Pelican Expression Technology platform is well positioned to meet these growing needs as the most comprehensive and broadly available, commercially validated protein production platform in the industry.

We acquired the Pelican Expression Technology through our acquisition of Pfenex in October 2020. As of December 31, 2021, we have agreements with more than 20 partners using this technology in more than 30 active programs. Several of our partners have commercial products and late stage clinical product candidates utilizing Pelican Expression Technology.

Captisol Technology

Captisol is a patent-protected, chemically modified cyclodextrin with a structure designed to optimize the solubility and stability of drugs. Captisol was invented and initially developed by scientists in the laboratories of Dr. Valentino Stella, University Distinguished Professor at the University of Kansas' Higuchi Biosciences Center for specific use in drug development and formulation. This unique technology has enabled several FDA-approved products, including Gilead's Veklury®, Amgen's Kyprolis®, Baxter International's Nexterone®, Acrotech Biopharma L.L.C.'s and CASI Pharmaceuticals' Evomela®, Melinta Therapeutics' Baxdela® and Sage Therapeutics' Zulresso® There are many Captisol-enabled products currently in various stages of development. We maintain a broad global patent portfolio for Captisol with approximately 440 issued patents worldwide relating to the technology (including 45 in the U.S.) and with the latest expiration date in 2035. Other patent applications covering methods of making Captisol, if issued, extend to 2041.

In addition to solid Captisol powder, we offer our partners access to cGMP manufactured aqueous Captisol concentrate. This product offering was established in 2017 to reduce cycle time and increase Captisol production capacity for large volume drug products. We maintain both Type IV and Type V DMFs with the FDA. These DMFs contain manufacturing and safety information relating to Captisol that our licensees can reference when developing Captisol-enabled drugs. We also have active DMFs in Japan, China and Canada. As of December 31, 2021, Captisol-enabled drugs were being marketed in more than 70 countries, and over 50 partners had Captisol-enabled drugs in development.

HepDirect, LTP, and BEPro Technology Platform

The HepDirect and LTP platforms are our proprietary liver-targeting prodrug technologies that can deliver many different chemical classes of drugs to the liver by using a chemical modification that renders an API biologically inactive until cleaved by a liver-specific enzyme. These technologies may improve the efficacy and/or safety of certain drugs and can be applied to marketed or new drug products to treat liver diseases or diseases caused by hemostasis imbalance of circulating molecules controlled by the liver. As of December 31, 2021, we had active HepDirect/LTP programs with three partners using these technologies across five programs.

The BEPro technology platform is a next generation prodrug technology distinct from HepDirect and LTP prodrug technologies, expanding use to non-liver related diseases. BEPro is specifically applicable to nucleotides and nucleotide analogs for the development of compounds with improved product profiles. Ligand has demonstrated improvements in cell penetration and oral, intravenous and inhaled pharmacokinetics with BEPro-enabled nucleotide analogs. As of December 31, 2021, we have one partner using this technology.

SUREtechnology Platform (owned by Selexis)

We acquired economic rights to various SURE*technology* Platform programs from Selexis. The SURE*technology* Platform, developed and owned by Selexis, is a novel technology that improves the way that cells are utilized in the development and manufacturing of recombinant proteins and drugs. As of December 31, 2021, we are entitled to certain economic rights to SUREtechnology Platform license agreements with 11 partners developing or having commercialized 17 programs.

2021 and Recent Major Business Highlights

The Separation and Distribution of OmniAb Business

In November 2021, we announced plans to explore multiple paths for OmniAb to become a stand-alone public company, with the leading option under consideration at that time being an IPO and eventual distribution of OmniAb shares to Ligand shareholders. We now expect to pursue separation of OmniAb through a direct spin-off of 100% of OmniAb equity to shareholders with Ligand capitalizing the OmniAb business directly with $70 million. OmniAb expects to file a Form 10 with the Securities and Exchange Commission and complete its separation in the first half of 2022. The distribution is expected to qualify as a tax-free transaction for U.S. federal income tax purposes to both Ligand and its shareholders. The separation remains subject to final approval by Ligand's Board of Directors, and Ligand will continue to evaluate other options to optimize value and ensure flexibility to invest in growth. There can be no assurance that this process will result in Ligand pursuing a particular transaction or consummating any such transaction, or that the anticipated benefits of a separation will materialize should the separation be completed.

OmniAb Technology Platform and Partner Updates

CStone Pharmaceuticals received approval from China's NMPA for Celjemy® (sugemalimab), an OmniAb-derived anti-PD-L1 monoclonal antibody for the first-line treatment of advanced non-small cell lung cancer (NSCLC) in combination with chemotherapy. Sugemalimab is the second OmniAb-derived antibody to receive regulatory approval. CStone announced complete enrollment in two Phase 3 registrational clinical trials investigating sugemalimab in combination with chemotherapy for the first-line treatment of metastatic gastric adenocarcinoma/gastro-esophageal junction adenocarcinoma or esophageal squamous cell carcinoma. CStone and its partner EQRx announced the publication of positive results from two Phase 3 trials with sugemalimab in Stage III and Stage IV NSCLC in *The Lancet Oncology*. CStone also announced that its Phase 2 GEMSTONE-201 trial met the primary endpoint of objective response rate in patients with relapsed/refractory (R/R) extranodal natural killer/T-cell lymphoma.

Janssen submitted a BLA to the U.S. FDA in December 2021 seeking approval for teclistamab in R/R multiple myeloma. Teclistamab is an OmniAb-derived bispecific antibody targeting BCMA and CD3. Janssen also presented new data at the American Society of Hematology 2021 conference (ASH) from the MajesTEC-1 study, which showed continued deep and durable response in heavily pretreated patients with multiple myeloma. Janssen previously announced that teclistamab had received U.S. FDA Breakthrough Designation for treatment of R/R multiple myeloma.

Immunovant announced alignment with the FDA on the design of a Phase 3 trial for batoclimab in patients with myasthenia gravis. Immunovant plans to start the Phase 3 study in the first half of 2022, and also expects to initiate pivotal trials in two additional indications during 2022.

Ligand expanded an existing collaboration and license agreement with GlaxoSmithKline (GSK) to leverage Ligand's Icagen Ion Channel Technology to target neurological diseases. Ligand received an upfront payment of $10 million and is eligible for milestones of up to $247.5 million, and tiered royalties on net sales of any drug from the collaboration commercialized by GSK.

Pelican Platform Updates

Merck announced European Commission approval of VAXNEUVANCE™ for adults 18 years of age and older. VAXNEUVANCE is a 15-valent pneumococcal vaccine utilizing CRM197 vaccine carrier protein produced using the Pelican Expression Technology platform. Additionally, Merck announced the U.S. FDA accepted for priority review the supplemental Biologics License Application (sBLA) for VAXNEUVANCE in infants and children.

Jazz Pharmaceuticals announced submission of an sBLA to the FDA seeking approval for a Monday/Wednesday/Friday (M/W/F) intramuscular dosing schedule for Rylaze™, as a component of a multi-agent chemotherapeutic regimen for the treatment of acute lymphoblastic leukemia (ALL) and lymphoblastic lymphoma (LBL) in adult and pediatric patients one month and older who have developed hypersensitivity to E. coli-derived asparaginase. Jazz presented initial results at ASH from a Phase 2/3 study of Ryalze in adult and pediatric ALL and LBL patients showing Rylaze maintained clinically meaningful level of asparaginase activity throughout the entire duration of treatment on a M/W/F dosing schedule.

Arcellx recently announced the pricing of a $123.8 million initial public offering with proceeds planned to be used to advance their pipeline. Arcellx uses the Pelican Expression Technology platform for the expression of certain proprietary sparX proteins which are used in Arcellx's ARC-SparX platform.

Captisol Technology Updates

Amgen announced U.S. FDA approval of a new Kyprolis® combination regimen with DARZALEX FASPRO and dexamethasone for patients with multiple myeloma at first or subsequent relapse. Additionally, Amgen presented results from a

Phase 1b study at ASH showing Captisol-enabled Kyprolis in combination with vincristine, dexamethasone, PEG-asparaginase, daunorubicin (VXLD) induction therapy showed positive efficacy results in highly advanced relapsed/refractory pediatric ALL.

Gilead announced the U.S. FDA granted accelerated approval of a supplemental NDA for Veklury in non-hospitalized patients at high risk of disease progression.

Other Business Updates

Travere Therapeutics provided an update on their plans for regulatory submission of sparsentan. Travere plans to submit a NDA to the FDA seeking accelerated approval of sparsentan for IgA nephropathy in the first quarter of 2022 and for FSGS in mid-2022. Travere, in collaboration with its partner Vifor Pharma, plans to submit a combined IgA nephropathy and FSGS Marketing Authorization Application in mid-2022 seeking conditional marketing authorization in Europe.

Verona Pharma announced completion of enrollment in the Phase 3 ENHANCE-1 and ENHANCE-2 randomized trials evaluating ensifentrine for the maintenance treatment of COPD with top-line data expected by the end of 2022 and in the third quarter of 2022, respectively. Verona also reported ensifentrine met all safety objectives in a thorough QT study designed to evaluate effects, if any, of ensifentrine on cardiac conduction in healthy individuals. The results from these studies will support the planned NDA submission of ensifentrine for the maintenance treatment of COPD.

Sermonix Pharmaceuticals closed a $40 million financing with proceeds planned to advance lasofoxifene through late-stage clinical development as an oral SERM to treat women with ESR1 breast cancer mutations. Topline data are expected in the first half of 2022 for the Phase 2 ELAINE 1 trial assessing oral lasofoxifene versus intramuscular fulvestrant and the Phase 2 ELAINE 2 trial of oral lasofoxifene in combination with Eli Lilly and Company's CDK4 and 6 inhibitor Verzenio® (abemaciclib) for the treatment of ER+/HER2- breast cancer in patients with an ESR1 mutation.

Corporate and Governance Highlights

We are committed to policies and practices focused on environmental sustainability, positively impacting our social community and maintaining and cultivating good corporate governance. By focusing on such ESG policies and practices, we believe we can affect a meaningful and positive change in our community and maintain our open, collaborative corporate culture. We will continue our proactive shareholder and employee engagement in 2022. See www.ligand.com for information about our ESG policies and practices.

Partners and Licensees

We currently have partnerships and license agreements with over 140 pharmaceutical and biotechnology companies. Below is a list of our disclosed partners.

Big Pharma	Ticker
Abbott	ABT
AstraZeneca	AZN
Baxter	BAX
Boehringer Ingelheim	Private
Eisai	4523
GSK	GSK
Janssen	JNJ
Jazz	JAZZ
Merck	MRK
Merck KGaA	MRK.DE
Novartis	NVS
Ono	4528
Pfizer	PFE
Roche	RHHBY
Sanofi	SNY
Takeda	4502

Biotech	Ticker
ABBA	Private
Abvivo	Private
Adept	Private
Aldeyra	ALDX
ALX Oncology	ALXO
Amgen	AMGN
Anebulo	Private
Aptevo	APVO
Arcellx	ACLX
Arcus	RCUS
Asahi Kasei	3407
Ascella	Private
BendaRx	Private
Bexson Biomedical	Private
Biocity	Private
Cantex	Private
Corvus	CRVS
CStone	2616.HK

Biotech, continued	Ticker
Melinta	Private
Menarini	Private
Nanjing King-Friend	603707
Neuritek	Private
Novan	NOVN
Nucorion	Private
Ohara	Private
Oncternal	ONCT
OnKure	Private
Opthea	OPT
Outlook	OTLK
Palvella	Private
Pandion	MRK
Phoenix Tissue	Private
Pierre-Fabre	Private
Praxis	PRAX
Precision Biologics	Private
Revision	Private

Specialty Pharma	Ticker
Acrotech (Aurobindo)	AUROPHARMA
Genovac	Private
Aytu Bioscience	AYTU
Aziyo	AZYO
Beloteca	Private
BF Bioscience	Private
CASI	CASI
CorMatrix	Private
EQRx	EQRX
Ferring	Private
Gloria	2437
Goodness Growth	VRNOF
Lundbeck	LUN
Sedor	Private
Sermonix	Private
Shionogi	SGIOY
SQ Innovation	Private

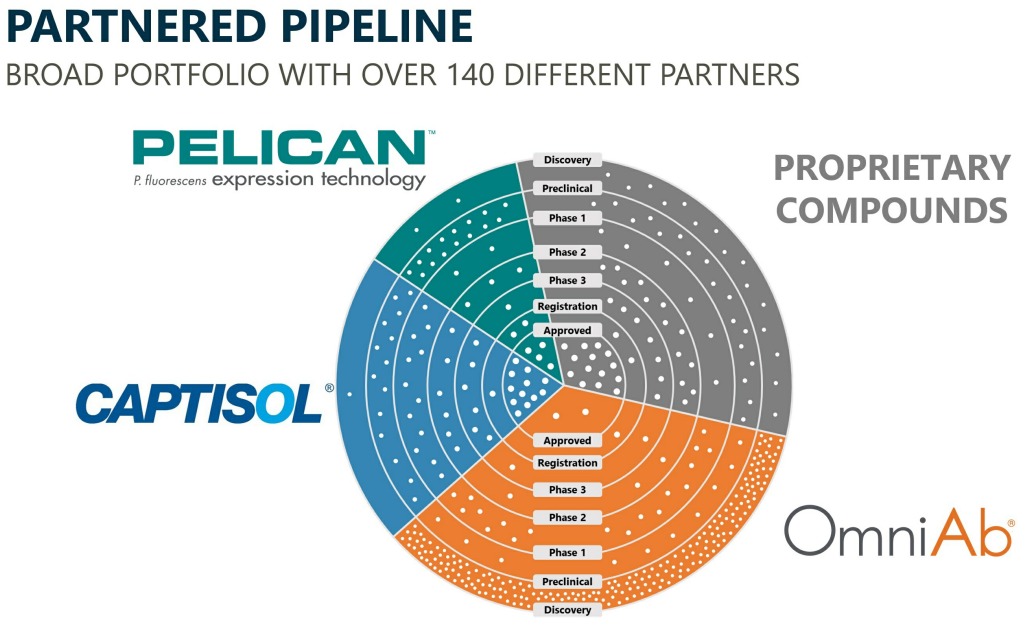
Generics	Ticker
Alvogen	Private
Adalvo	Private
Apotex	Private
BioCad	Private
Gufic	GUFICBIO
Hetero	Private
Hikma	HIK
Indofarma	INAF
Jubilant	Private
Mylan	VTRS
Par	Private
Zydus Cadila	CADILAHC

CSL	Private
CR Double-Crane	Private
Cumulus	Private
Curon	Private
Daxor	DXR
Denovo	Private
Electra	Private
Elevation	Private
Exelixis	EXEL
Foghorn	FHTX
Genmab	GMAB
Genagon	Private
Genentech (Roche)	RHHBY
Genovac	Private
GigaGen	Private
Gilead Sciences	GILD
Gordian	Private
Halo	Private
HanAll	9420
Harbour	2142
IBC Generium	Private
Ichnos	Private
iMetabolic	Private
Immunovant	IMVT
Innolake Biopharm	Private
Interventional Analgesix	Private
J-Pharma	Private
Jupiter	Private
Kangchen	Private
Kira	Private
Marinus	MRNS
MEI	MEIP

RubrYc	Private
Sage	SAGE
Salubris Bio	Private
Seagen	SGEN
Seelos	SEEL
Sepsia	Private
Servier	Private
Serum Inst. of India	Private
Softkemo	Private
Sunshine Lake	Private
Talem	Private
Tizona	Private
Travere	TVTX
Tremeau	Private
Unity	UBX
Valanbio	Private
Vaxxas	Private
Vega	Private
VenBio	Private
VentiRx	Private
Verona	VRNA
Viking	VKTX
Xi'an Xintong	Private
WuXi	2269
Zhilkang Hongyi	Private

Commercial and Clinical Stage Partnered Portfolio

We have a large portfolio of current and future potential revenue-generating programs, including over 400 fully-funded by our partners. Each white dot on our partnered pipeline chart below represents a fully-funded partnered program, with each section of the chart representing a major Ligand technology or platform.



Approved		
Partner Name	**Program**	**Therapeutic Area**
Acrotech/CASI	Evomela	Cancer
Alvogen/Adalvo	Teriparatide	Women's Health
Alvogen/Hikma/Nanjing King-Friend	Voriconazole	Infectious Disease
Amgen/Beigene/Ono	Kyprolis	Cancer
Aytu	Tuzistra	Infectious Disease
Aziyo	ECM portfolio	Medical device/Cardiology
Baxter	Nexterone	Cardiovascular
BendaRx	Bendamustine	Cancer
BF Bio/Gufic/Hetero/Indofarma/Jubilant/Zydus	Generic Remdesivir	Infectious Disease
Biocad	Teberif	Inflammatory/Metabolic
C-Stone/Pfizer	Sugemalimab	Cancer
Exelixis/Daiichi-Sankyo	Minnebro	Cardiovascular
Gilead	Veklury	Infectious Disease
Gloria/EQRx	Zimberelimab	Cancer
IBC Generium	GNR-008	Severe and Rare

Jazz	Rylaze	Cancer
Lundbeck	Carnexiv	Central Nervous System
Melinta	Baxdela	Infectious Disease
Menarini	Frovatriptan	Central Nervous System
Merck	Noxafil-IV	Infectious Disease
Merck	Vaxneuvance	Infectious Disease
Par	Posaconazole	Infectious Disease
Pfizer	Viviant/Conbriza	Inflammatory/Metabolic
Pfizer	Duavee	Inflammatory/Metabolic
Pfizer	Vfend-IV	Infectious Disease
SAGE	Zulresso	Central Nervous System
Sedor	Sesquient	Central Nervous System
Serum Institute of India	Pneumosil	Infectious Disease
Zydus Cadila	Vivitra	Cancer
Zydus Cadila	Bryxta/ZyBev	Cancer
Zydus Cadila	Maropitant	Central Nervous System
Zydus Cadila	Exemptia	Inflammatory/Metabolic
Zydus Cadila	Vortuxi	Inflammatory/Metabolic

Phase 3/Pivotal or Regulatory Submission Stage		
Partner Name	**Program**	**Therapeutic Area**
Aldeyra	Reproxalap	Other/Undisclosed
Arcus	Zimberelimab	Cancer
Aytu Bioscience	CCP-07 and CCP-08	Infectious disease
Eisai	FYCOMPA	Central Nervous System
Harbour	Batoclimab	Cancer
Janssen	Teclistamab	Cancer
Jazz	Rylaze	Cancer
Marinus	Ganaxalone IV	Central Nervous System
Novan	SB206	Infectious Disease
Novartis	Mekinist (CE-Trametinib)	Cancer
Opthea	OPT-302	Ophthalmology
Outlook Therapeutics	ONS-5010	Other/Undisclosed
Palvella	PTX-022	Other/Undisclosed
Sage	Zulresso	Infectious disease
Serum Institute	CRM197	Infectious Disease
SQ Innovation	CE-Furosemide	Cardiovascular disease
Sunshine Lake	Vilazodone	Central Nervous System
Takeda	Pevonedistat	Cancer
Travere	Sparsentan	Severe and Rare
Verona	Ensifentrine (RPL554)	Respiratory Disease
Various	Teriparatide	Women's Health
Xi'an Xintong	Pradefovir	Infectious Disease

Phase 2		
Partner Name	**Program**	**Therapeutic Area**
Cantex	CX-01	Cancer
Corvus	Ciforadenant	Cancer
DeNovo	Lisfensine	Neurology
Elevation Oncology	Seribantumab	Cancer
Genmab	Gen1046	Cancer
Immunovant	Batoclimab	Inflammatory/Metabolic
Janssen	Teclistimab	Cancer
Merck	Berzosertib	Cancer
Merck	V116	Infectious Disease
Novartis	ECF843	Inflammatory/Metabolic
Oncternal	Cirmtuzumab	Cancer
Palvella	PTX-022	Other/Undisclosed
Phoenix Tissue	PTR-01	Genetic Disease
Precision Biologics	NPC-1C	Cancer
Seelos	Aplindore	Central Nervous System
Sermonix	Lasofoxifene	Cancer
VentiRx	Motolimod	Cancer
Various	JPH-203	Cancer
Viking	VK5211	Inflammatory/Metabolic
Viking	VK2809	Inflammatory/Metabolic
Viking	VK0612	Inflammatory/Metabolic

Phase 1		
Partner Name	**Program**	**Therapeutic Area**
Amgen	AMG-330	Cancer
Apotex	Meloxicam	Migraine
Aptevo	APVO436	Cancer
Boehringer Ingelheim	Undisclosed	Other/Undisclosed
CSL	CSL-324	Immunology
Curon	CN1	Cancer
Daxor	I131	Cardiovascular disease
Foghorn	FHD-609/BRD9	Cancer
Halo	CE-Oleic acid	Infectious disease
Hanall	Batoclimab	Cancer
Janssen	JNJ-78306358	Cancer
Janssen	JNJ-67371244	Cancer
Janssen	JNJ-70218902	Cancer
Jupiter Bioscience	Viright	Cancer
MEI Pharma	ME-344	Cancer
Merck	M6233	Cancer

Novartis	MIK-665	Cancer
Novartis	BCL-201	Cancer
Nucorion	NUC-1010	Infectious disease
Revision Therapeutics	Rev0100	Ophthalmology
Sage	SAGE-689	Central Nervous System
SalubrisBio	SAL003	Metabolic disease
Symphogen/Servier	SYM022/SYM023/SYM024/S095029	Cancer
Takeda	TAK-925	Severe and Rare
Takeda	TAK-243	Cancer
Vaxxas	Nanopatch	Infectious Disease
Viking	VK-0214	Genetic Disease
Xi'an Xintong	MB07133	Cancer
Zhilkang Hongyi	Anti-4-1BB	Cancer

Selected Commercial Programs

We have multiple programs under license with other companies that have products that are already being commercialized. The following programs represent components of our current portfolio of revenue-generating assets and potential for near-term growth in royalty and other revenue. For information about the royalties owed to us for these programs, see “Royalties” later in this business section.

Kyprolis (Amgen)

We supply Captisol to Amgen for use with Kyprolis (carfilzomib), and granted Amgen an exclusive product-specific license under our patent rights with respect to Captisol. Kyprolis is formulated with Ligand’s Captisol technology and is approved in the United States for the following:

- In combination with dexamethasone, lenalidomide plus dexamethasone, daratumumab plus dexamethasone, or daratumumab and hyaluronidase-fihj and dexamethasone for the treatment of patients with relapsed or refractory multiple myeloma who have received one to three lines of therapy.
- As a single agent for the treatment of patients with relapsed or refractory multiple myeloma who have received one or more lines of therapy.

Kyprolis (Amgen)	
< $250 million	1.5%
$250 to $500 million	2.0%
$500 to $750 million	2.5%
>$750 million	3.0%

Our agreement with Amgen may be terminated by either party in the event of material breach or bankruptcy, or unilaterally by Amgen with prior written notice, subject to certain surviving obligations. Absent early termination, the agreement will terminate upon expiration of the obligation to pay royalties. Under this agreement, we are entitled to receive revenue from clinical and commercial Captisol material sales and royalties on annual net sales of Kyprolis.

Veklury (Gilead)

We supply Captisol to Gilead for sales of Veklury (remdesivir). Gilead received marketing approval from the FDA in October 2020. Veklury is the first and only antiviral treatment of COVID-19 that is FDA approved. The product has regulatory approvals for the treatment of moderate or severe COVID-19 in over 50 countries and is included in more than 60 ongoing clinical trials. We are supplying Captisol to Gilead under a recently signed 10-year supply agreement. We are also supplying Captisol to Gilead’s voluntary licensing generic partners who are manufacturing remdesivir for 127 low- and middle-income countries. We receive our commercial compensation for this program through the sale of Captisol.

Teriparatide Injection Product (PF708) (Alvogen/Adalvo/Kangchen)

We acquired the Teriparatide Injection product with the acquisition of Pfenex Inc. in October 2020. Teriparatide Injection is a drug indicated for uses including the treatment of osteoporosis in certain patients at high risk for fracture. Teriparatide Injection was developed using our Pelican Expression Technology and was approved by the FDA in 2019 in accordance with the 505(b)(2) regulatory pathway, with FORTEO as the reference product. Our partner, Alvogen launched the product in June 2020 in the United States. For information regarding the CVR issued to Pfenex equityholders, see note 1, "Basis of Presentation and Summary of Significant accounting Policies—Contingent Liabilities."

Outside the United States, PF708 received marketing authorization throughout the EU in August 2020 under the tradename Livogiva®, was approved in Saudi Arabia in December 2020 under the name Bonteo and is in various stages of regulatory and marketing application processes around the globe and, upon approval, may be marketed as Teriparatide Injection or under various tradenames, such as Bonsity or Livogiva.

Our partner Alvogen has exclusively licensed the rights to commercialize and manufacture the teriparatide injection product in the United States, while their Adalvo business has the rights to commercialize in the EU, certain countries in the Middle East and North Africa (MENA), and the rest of world (ROW) territories (the latter defined as all countries outside of the EU, U.S. and MENA, excluding Mainland China, Hong Kong, Singapore, Malaysia and Thailand). Kangchen has exclusively licensed to commercialize PF708, upon receipt of applicable marketing authorizations, in Mainland China, Hong Kong, Singapore, Malaysia and Thailand and granted a non-exclusive right to conduct development activities in such countries with respect to PF708. Kangchen is responsible for all regulatory submissions, development costs and costs associated with regulatory approvals in these countries.

In accordance with our agreements with Alvogen, we are eligible to receive tiered royalties on net sales between 25% and 40% prior to an "A" therapeutic equivalence designation, which increases to a flat 50% if an "A" rating is achieved.

In accordance with our EU, MENA and ROW agreements with Adalvo, we may be eligible to receive additional upfront and milestone payments of $1.5 million and may also be eligible to receive up to 60% of gross profit derived from product sales and regional license fees, if approved, depending on geography, cost of goods sold and sublicense fees.

In accordance with our agreement with Kangchen, we may be eligible to receive additional payments of up to $22.5 million upon the achievement of certain development, regulatory, and sales-related milestones. We may be eligible to receive double-digit royalties on any net sales of PF708 in Kangchen's territory.

Evomela (Acrotech and CASI)

We supply Captisol to Acrotech Biopharma for sales of Evomela in the U.S. and to CASI Pharmaceuticals for sales of Evomela in China. Evomela received market approval by the China National Medical Products Administration (NMPA). It is the only approved and commercially available melphalan product in China. Evomela is a Captisol-enabled melphalan IV formulation which is approved by the FDA for use in two indications:

- a high-dose conditioning treatment prior to ASCT in patients with multiple myeloma; and
- for the palliative treatment of patients with multiple myeloma for whom oral therapy is not appropriate.

Evomela has been granted Orphan Designation by the FDA for use as a high-dose conditioning regimen for patients with multiple myeloma undergoing ASCT. The Evomela formulation avoids the use of propylene glycol, which has been reported to cause renal and cardiac side-effects that limit the ability to deliver higher quantities of therapeutic compounds. The use of the Captisol technology to reformulate melphalan is anticipated to allow for longer administration durations and slower infusion rates, potentially enabling clinicians to safely achieve a higher dose intensity of pre-transplant chemotherapy.

Under the terms of the license agreement, Acrotech Biopharma has marketing rights worldwide excluding China and CASI Pharmaceuticals has rights to market in China. We are eligible to receive over $50 million in potential milestone payments under this agreement, royalties on global net sales of the Captisol-enabled melphalan product and revenue from Captisol material sales. Acrotech and CASI's obligation to pay royalties will expire at the end of the life of the relevant patents or when a competing product is launched, whichever is earlier, but in no event within ten years of the commercial launch. Our patents and applications relating to the Captisol component of melphalan are not expected to expire until 2033. As described herein, we have entered into a settlement agreement with Teva and Acrotech Biopharma (the holder of the NDA for Evomela) which will allow Teva to market a generic version of Evomela in the United States on June 1, 2026, or earlier under certain circumstances. Absent early termination, the agreement will terminate upon expiration of the obligation to pay royalties. The agreement may be terminated by either party for an uncured material breach or unilaterally by Acrotech and CASI by prior written notice.

Vaxneuvance (V114)

On July 16, 2021, Merck announced FDA approval of Vaxneuvance, a 15-valent pneumococcal conjugate vaccine, also

known as V114, for the prevention of invasive disease caused by Streptococcus pneumoniae serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F and 33F in adults 18 years of age and older. VAXNEUVANCE is a 15-valent pneumococcal vaccine utilizing CRM197 vaccine carrier protein, which is produced using the patent-protected Pelican Expression Technology™ platform. V114 previously received Breakthrough Therapy Designation from the FDA for the prevention of invasive pneumococcal disease in pediatric patients 6 weeks to 18 years of age and adults 18 years of age and older. Pneumococcal disease in adults is on the rise in many countries, and V114 consists of pneumococcal polysaccharides from 15 serotypes conjugated to CRM197 carrier protein, including serotypes 22F and 33F, which are commonly associated with invasive pneumococcal disease in older adults. On October 20, 2021, Merck announced that the CDC Advisory Committee on Immunization Practices (ACIP) unanimously voted in favor of updates to the pneumococcal vaccination recommendations for adults 65 years and older, and for adults ages 19 to 64 with certain underlying medical conditions or other disease risk factors. In both groups the ACIP voted to provisionally recommend vaccination with either a sequential regimen of Vaxneuvance™ and Pneumovax_23® or a single dose of 20-valent pneumococcal conjugate vaccine. On January 28, 2022, final recommendations were published in the CDC's Morbidity and Mortality Weekly Report (MMWR). On December 1, 2021, Merck announced the FDA accepted for priority review a sBLA for Vaxneuvance for the prevention of invasive pneumococcal disease in children 6 weeks through 17 years of age, with a PDUFA date of April 1, 2022.

On December 15, 2021, Merck announced the European Commission approval of Vaxneuvance for the prevention of invasive disease and pneumonia caused by Streptococcus pneumoniae in individuals 18 years and older. The approval allows marketing of VAXNEUVANCE in all 27 EU Member States plus Iceland, Norway and Lichtenstein. We are entitled to low single digit royalties derived from net sales, depending on the territory.

Pneumosil (Serum Institute of India, SII)

SII began commercialization of its 10-valent pneumococcal conjugate vaccine, Pneumosil, which is produced using CRM197 made in the Pelican Expression Technology platform, in the second quarter of 2020. Pneumosil is designed primarily to help fight against pneumococcal pneumonia among children, with an advantage of targeting the most prevalent serotypes of the bacterium causing serious illness in developing countries. Pneumosil achieved WHO Prequalification in December 2019, allowing the product to be procured by United Nations agencies and Gavi, the Vaccine Alliance, and subsequently achieved Indian Marketing Authorization in July 2020, and SII announced commercial launch of the product in India in December 2020.

Rylaze(JZP-458) (Jazz Pharmaceuticals)

In July 2021, Jazz announced the launch of Rylaze (asparaginase erwinia chrysanthemi (recombinant)-rywn), previously referred to as JZP458. Rylaze, which was approved by the FDA in June 2021, is a recombinant erwinia asparaginase used as a component of a multi-agent chemotherapeutic regimen for the treatment of ALL or LBL in adult and pediatric patients one month or older who have developed hypersensitivity to E. coli-derived asparaginase. Additionally, Jazz is utilizing our technology for the development of PF745 (JZP341), a long-acting Erwinia asparaginase for the treatment of acute lymphoblastic leukemia and other hematological malignancies. Jazz has worldwide rights to develop and commercialize PF745.

Ligand is eligible to receive up to an additional $155.5 million in milestone payments and tiered low to mid-single digit royalties based on worldwide net sales of any products resulting from this collaboration, including Rylaze.

Nexterone (Baxter)

We have a license agreement with Baxter, related to Baxter's Nexterone, a Captisol-enabled formulation of amiodarone, which is marketed in the United States and Canada. We supply Captisol to Baxter for use in accordance with the terms of the license agreement under a separate supply agreement. Under the terms of the license agreement, we will continue to earn milestone payments, royalties, and revenue from Captisol material sales. We are entitled to earn royalties on sales of Nexterone through early 2033.

Zulresso (SAGE)

We have a license agreement with SAGE, related to SAGE's Zulresso, a Captisol-enabled formulation of brexanolone for the treatment of postpartum depression (PPD). Under the terms of the agreement, we receive royalties and revenue from Captisol material sales.

Noxafil-IV (Merck)

We have a supply agreement with Merck related to Merck's NOXAFIL-IV, a Captisol-enabled formulation of posaconazole for IV use. NOXAFIL-IV is marketed in the United States, EU and Canada. We receive our commercial compensation for this program through the sale of Captisol.

Duavee or Duavive (bazedoxifene/conjugated estrogens) and Viviant/Conbriza (Pfizer)

Pfizer is marketing bazedoxifene, a selective estrogen receptor modulator, under the brand names Viviantand Conbriza in various territories for the treatment of postmenopausal osteoporosis. Pfizer is responsible for the marketing of bazedoxifene,

a synthetic drug specifically designed to reduce the risk of osteoporotic fractures while also protecting uterine tissue. Pfizer has combined bazedoxifene with the active ingredient in Premarin to create a combination therapy for the treatment of post-menopausal symptoms in women. Pfizer is marketing the combination treatment under the brand names Duavee and Duavive in various territories. Net royalties on annual net sales of Viviant/Conbriza and Duavee/Duavive are each payable to us through the life of the relevant patents or ten years from the first commercial sale, whichever is longer, on a country by country basis.

Aziyo Portfolio (Aziyo)

We receive a share of revenue from the currently marketed Aziyo portfolio of commercial pericardial repair and CanGaroo® Envelope ECM products. In addition, we have the potential to receive a share of revenue and potential milestones from the currently marketed CanGaroo® ECM Envelope for cardiac implantable electronic devices. Aziyo's products are medical devices that are designed to permit the development and regrowth of human tissue.

Exemptia, Vivitra, Zybev and Bryxta (Zydus Cadila)

Zydus Cadila's Exemptia (adalimumab biosimilar) is marketed in India for autoimmune diseases. Zydus Cadila uses the Selexis technology platform for Exemptia. We are entitled to earn royalties on sales by Zydus Cadila for ten years following the first commercial sale.

Zydus Cadila's Vivitra (trastuzumab biosimilar) is marketed in India for breast cancer. Zydus Cadila uses the Selexis technology platform for Vivitra. We are entitled to earn royalties on sales by Zydus Cadila for ten years following the first commercial sale.

Zydus Cadila's Bryxta and Zybev (bevacizumab biosimilar) is marketed in India for various indications. Zydus Cadila uses the Selexis technology platform for Bryxta and Zybev. We are entitled to earn royalties on sales by Zydus Cadila for ten years following the first commercial sale.

Minnebro (Exelixis)

Minnebro is marketed in Japan for the treatment of hypertension. Our partner, Exelixis, entered into a collaboration agreement with Daiichi Sankyo for the development of esaxerenone, a mineralocorticoid receptor antagonist. Under the terms of the agreement with Exelixis, we are entitled to receive a royalty on future sales.

Summary of Selected Development Stage Programs

We have multiple fully-funded partnered programs that are either in or nearing the regulatory approval process, or given the area of research or value of the license terms, we consider particularly noteworthy. We are eligible to receive milestone payments and royalties on these programs. This list does not include all of our partnered programs. For information about the royalties owed to Ligand for these programs, see "Royalties" later in this business section. In the case of Captisol-related programs, we are also eligible to receive revenue for the sale of Captisol material supply.

Sparsentan (Travere)

Our partner, Travere, is developing sparsentan for orphan indications of severe kidney diseases and is running an on-going global pivotal Phase 3 clinical trial (DUPLEX) for sparsentan for the treatment of FSGS. Additionally, Travere is running a global pivotal Phase 3 clinical trial (PROTECT) evaluating the long-term nephroprotective potential of sparsentan for the treatment of IgAN nephropathy, a rare, immune complex mediated chronic glomerular disease. Certain patient groups with severely compromised renal function, including those with FSGS and IgAN, exhibit extreme proteinuria resulting in progression to dialysis and a high mortality rate. Sparsentan, with its unique dual blockade of angiotensin and endothelin receptors, is expected to provide meaningful clinical benefits in mitigating proteinuria in indications where there are no approved therapies.

In February of 2021, Travere announced that sparsentan achieved its pre-specified interim FSGS partial remission of proteinuria endpoint (FPRE) in the DUPLEX Phase 3 study after 36 weeks of treatment. Sparsentan demonstrated a statistically significant response on FPRE compared to the active control, irbesartan ($p=0.0094$). Preliminary results from the interim analysis suggest that sparsentan has been generally well-tolerated and has shown a comparable safety profile to irbesartan. Travere plans to submit an NDA seeking accelerated approval of sparsentan for FSGS in the United States in mid-2022 after obtaining additional estimated glomerular filtration rate (eGFR) data from the DUPLEX Study.

In August of 2021, Travere announced positive topline interim results from the ongoing Phase 3 PROTECT study of sparsentan in IgAN. Sparsentan treatment demonstrated a statistically significant mean reduction of proteinuria from baseline after 36 weeks, more than threefold the reduction of active comparator irbesartan ($p<0.0001$). In the first quarter of 2022, Travere expects to submit an NDA seeking accelerated approval of sparsentan for IgAN in the United States.

Additionally, Travere and Vifor Pharma entered into a licensing agreement in September of 2021 for the commercialization of sparsentan in Europe, Australia and New Zealand. Traver and Vifor expect to submit a combined IgAN and FSGS Marketing Authorisation Application (MAA) in mid-2022 for conditional marketing authorization of sparsentan in Europe.

Under our license agreement with Travere, we may be entitled to receive potential milestones of over $70 million and net royalties on future worldwide sales by Travere. The royalty term is expected to be 10 years following the first commercial sale. Travere is responsible for all development costs related to the program.

TR-Beta - VK2809 and VK0214 (Viking)

Our partner, Viking, is developing VK2809, a novel selective TR-Beta agonist with potential in multiple indications, including hypercholesterolemia, dyslipidemia and NASH. VK2809 is currently in a Phase 2b clinical trial (the VOYAGE study) in patients with biopsy-confirmed NASH. Viking has previously announced positive results from a Phase 2a trial of VK2809 in hypercholesterolemia and fatty liver disease. VK0214 is currently in Phase 1 clinical development, and had been granted orphan drug study by the FDA for the treatment of X-ALD. Under the terms of the agreement with Viking, we may be entitled to up to $375 million of development, regulatory and commercial milestones and tiered royalties on potential future sales. Our TR Beta programs partnered with Viking are subject to CVR sharing and a portion of the cash received will be paid out to CVR holders.

TR-Beta - VK2809 and VK0214 (Viking)	
< $500 million	3.5%
$500 to $750 million	5.5%
>$750 million	7.5%

Batoclimab (HanAll, Immunovant, and Harbour)

Our partner, HanAll has granted Immunovant an exclusive license for the development, manufacture and marketing of Batoclimab for the treatment of pathogenic IgG-mediated autoimmune diseases in the U.S., Canada, Mexico, the EU, the United Kingdom, Switzerland, Latin America, the Middle East and North Africa. Immunovant recently announced the initiation of a Phase 3 trial in H2 in myasthenia gravis (MG) in the first half of 2022 and another one in another inflammatory disease while expanding into two new indications to be announced by Q3. Additionally, HanAll and Harbour BioMed, are collaborating to develop Batoclimab for similar treatment in China and Korea. Harbour is currently conducting three registrational Phase 2/3 trials in China in MG, thyroid eye disease and Primary Immune Thrombocytopenia. HanAll retains the rights to Batoclimab in Korea and Harbour will control the marketing in China. As part of our agreement with HanAll, we are entitled to development and regulatory milestones and royalties on potential future sales from HanAll and sublicense revenues from Immunovant and Harbour based on amounts received by HanAll.

CRM197

CRM197 is a non-toxic mutant of diphtheria toxin. It is a well characterized protein and functions as a carrier for polysaccharides and haptens, making them immunogenic. CRM197 is used in prophylactic and therapeutic vaccine candidates. We have developed CRM197 production strains using our Protein Expression Technology platform and supply preclinical grade and cGMP CRM197 (PeliCRM™) to several vaccine development focused pharmaceutical customers.

Our partners Merck and SII have exclusively licensed unique production strains for use in their conjugate vaccine products and candidates for pneumococcal and meningitis bacterial infections. Pneumococcus bacterium (Streptococcus pneumoniae) is a leading cause of severe pneumonia and major cause of morbidity and mortality worldwide. In accordance with our CRM197 commercial license agreements with Merck, we are eligible to earn an additional $8 million in development and regulatory milestones and low single digit royalties derived from net sales, depending on territory. CRM-197 made in the Pelican Expression Technology platform is also used by Merck in its investigational vaccine candidates, including the V116. Additionally, in 2021 SII completed a Phase 3 study of a pentavalent meningococcal conjugate vaccine candidate (NmCV-5) that utilizes CRM197 made in the Pelican Expression Technology platform. NmCV-5 prequalification by WHO is projected as early as the third quarter of 2022.

Ensifentrine – RPL554 (Verona)

Our partner, Verona, is currently conducting a comprehensive Phase 3 clinical trial to evaluate the efficacy and safety of nebulized ensifentrine in patients with moderate to severe COPD with top-line results expected in 2022. Under the terms of our agreement with Verona, we are entitled to development and regulatory milestones, including a £5.0 million payment upon the first approval by any regulatory authority, and royalties on potential future sales.

Teclistamab (Janssen)

Our partner, Janssen, is developing Teclistamab, an off-the-shelf T-cell redirecting , bispecific antibody targeting BCMAxCD3 that was discovered in part with the OmniAb platform technology. Janssen announced that it submitted a BLA on December 29, 2021 for the treatment of patients with relapsed or refractory multiple myeloma. The application was supported by the data from the MajesTEC-1 Phase 2 trial that showed continued deep and durable responses. Teclistamab is also currently conducting several Phase 1 trials in multiple myeloma, as a single agent and in combination with daratumumab or talquetamab or Tecentriq. We are entitled to receive a $25 million milestone payment upon first commercial sale of Teclistamab in the U.S.

JNJ-67371244 (Janssen)

Janssen is also developing JNJ-67371244, an anti-CD33xCD3 antibody discovered in part with the OmniAb platform technology. Janssen is currently conducting a Phase I trial for cancer therapy. We are entitled to earn development and regulatory milestones based on the development of JNJ-67371244.

JNJ-70218902 (Janssen)

Janssen is also developing JNJ-70218902, a T-cell redirecting agent antibody discovered in part with the OmniAb platform technology. Janssen is currently conducting a Phase I trial for cancer therapy for patients with metastatic castration resistant prostate cancer. We are entitled to earn development and regulatory milestones based on the development of JNJ-70218902.

JNJ-78306358 (Janssen)

Janssen is also developing JNJ-78306358, a T-cell redirecting bispecific antibody targeting HLA-G, discovered in part with the OmniAb platform technology. Janssen is currently conducting a Phase 1 trial in patients with advanced solid tumors. We are entitled to earn development and regulatory milestones based on the development of JNJ-78306358.

M6223 (Merck KGaA)

Our partner, Merck KGaA, is currently conducting a Phase 1 trial of M6223, an anti-TIGIT antibody discovered with the OmniAb platform, in patients with metastatic or locally advanced solid unresectable tumors in combination with bintrafusp alfa. Under the terms of the agreement, we are entitled to sublicense revenues, milestones and royalties on potential future net sales.

SARM - VK5211 (Viking)

Viking is also developing VK5211, a novel, potentially best-in-class SARM for patients recovering from hip-fracture. SARMs retain the beneficial properties of androgens without undesired side-effects of steroids or other less selective androgens. In a Phase 2 clinical trial, VK5211 demonstrated statistically significant, dose dependent increases in lean body mass. Under the terms of the agreement with Viking, we may be entitled to up to $270 million of development, regulatory and commercial milestones as well as tiered royalties on potential future sales.

SARM - VK5211 (Viking)	
< $500 million	7.25%
$500 to $750 million	8.25%
>$750 million	9.25%

Ganaxalone IV (Marinus)

Our partner, Marinus, is conducting Phase 3 clinical trials with Captisol-enabled ganaxolone IV in patients with refractory status epilepticus. Marinus has exclusive worldwide rights to Captisol-enabled ganaxolone, a $GABA_A$ receptor modulator, for use in humans. We are entitled to development and regulatory milestones, revenue from Captisol material sales, and royalties on potential future sales.

APVO436 (Aptevo)

Our partner, Aptevo, is currently conducting a Phase 1 trial of APVO436, a bispecific anti-CD123xCD3 for the treatment of acute myeloid leukemia and high-grade myelodysplastic syndrome. There is a high unmet medical need for targeted immunotherapies such as APVO436, that can potentially treat patients with relapsed or refractory disease, or patients who cannot tolerate traditional chemotherapy. Under the terms of the agreement with Aptevo, we are entitled to development and regulatory milestones and royalties on potential future net sales.

GEN1046 (GenMab)

Our partner, Genmab, in collaboration with BioNTech is currently conducting two Phase 2 trials of GEN1046, a bispecific targeting PD-L1 and 4-1BB, as monotherapy or in combination for use in patients with relapsed/refractory metastatic

non-small cell lung cancer (NSCLC) or malignant solid tumors. Under the terms of the agreement with Genmab, we are entitled to clinical and regulatory milestones and royalties on potential future sales.

GEN1047 (Genmab)

Genmab is also developing GEN1047, an anti-B7H4xCD3 bispecific antibody, in part isolated from OmniAb platform technology. Genmab is currently conducting a Phase 1/2 trial in solid tumors. Under the terms of the agreement with Genmab, we are entitled to clinical and regulatory milestones and royalties on potential future sales.

Sym022 and Sym023 (Symphogen/Servier)

Our partner, Symphogen (acquired by Servier), is currently conducting Phase 1 trials of SYM022 and SYM023 to determine if they are safe and tolerable for patients with locally advanced/unresectable or metastatic solid tumor malignancies or lymphomas that are refractory to available therapy for which no standard therapy is available. Under the terms of the agreement with Symphogen, we are entitled to sublicense revenues, milestones and royalties on potential future net sales.

Sym024 (Symphogen/Servier)

Symphogen/Servier is also developing an anti-CD73 antibody, developed with OmniAb platform technology, in Phase I trial to assess the safety and tolerability in patients with solid tumors as a monotherapy or in combination with Sym021 (anti-PD-1). Under the terms of the agreement with Symphogen, we are entitled to sublicense revenues, milestones and royalties on potential future net sales.

Sym025/S095029 (Symphogen/Servier)

Symphogen/Servier is also developing an anti-NKG2A antibody, developed with OmniAb platform technology, in Phase 1a/1b trial to assess the safety, tolerability and preliminary anti-neoplastic activity in patients with solid tumors as a monotherapy or in combination with Sym021 (anti-PD-1) or anti-HER2 or anti-EGFR. Under the terms of the agreement with Symphogen, we are entitled to sublicense revenues, milestones and royalties on potential future net sales.

WuXi Partnership

Pursuant to the WuXi Agreement, we have granted WuXi a non-exclusive license to use our OmniRat, OmniMouse and OmniFlic platforms solely to research, develop and make antibodies, and we have agreed to use commercially reasonable efforts to deliver to WuXi animals from such platforms to support WuXi's licensing rights under the WuXi Agreement. Further, WuXi has the right to out-license antibodies it discovers (whether for itself or at the direction of out-licensees) under the WuXi Agreement to out-licensees worldwide. We are entitled to royalties in the low single digits on net sales of products. Unless earlier terminated, the term of the WuXi Agreement shall continue indefinitely. Either party may terminate the WuXi Agreement upon specified notice of the other party's uncured material breach of the WuXi Agreement. In addition, we have the right to terminate the WuXi Agreement if WuXi or one of its out-licensees challenges the validity of one of our patents covering the platform and WuXi has the right to terminate the WuXi Agreement for convenience following a specified period after notice of termination.

In addition to other earlier stage programs, the following programs have been licensed pursuant to the WuXi Agreement:

Zimberelimab AB122/GLS010 (Arcus and Gloria)

Our partner, WuXi, has outlicensed the rights to certain programs using the OmniAb technology to Arcus and Gloria. Arcus is conducting multiple Phase 1 and Phase 2 trials to evaluate the safety and tolerability and efficacy of Zimberelimab in subjects with advanced solid tumors as monotherapy or in combination with Etrumadenant, domvanalimab. Additionally, Gloria, has announced approval in China for zimberelimab for the treatment of recurrent or refractory classical Hodgkin's lymphoma. Gloria is also conducting a Phase 2 of zimberelimab monotherapy in patients with recurrent or metastatic cervical cancer. Under the terms of our agreement with WuXi, we are entitled to royalties on potential future sales.

Sugemalimab CS1001 (CStone)

WuXi has also outlicensed the rights to certain programs using the OmniAb technology to CStone. CStone announced approval in China for Sugemalimab (brand name Cejemly®) for first-line treatment of metastatic NSCLC. Pfizer is responsible for the commercialization in China via a 2020 strategic collaboration with CStone while EQRx has licensed exclusive rights to sugemalimab for the development and commercialization outside of China. CStone is currently conducting multiple Phase 2 and Phase 3 trials to evaluate the efficacy and safety of Sugemalimab to treat patients with natural killer cell/T-cell lymphoma and classical Hodgkin's lymphoma, second line treatment in NSCLC, and gastric or esophageal cancers. Under the terms of our agreement with WuXi, we are entitled to royalties on potential future sales.

Ciforadenant – CPI-444 (Corvus)

Our partner, Corvus, is conducting a Phase 1b/2 clinical trial in patients with renal cell carcinoma and metastatic castration resistant prostate cancer to evaluate Ciforadenant, an antagonist of adenosine A2A, in combination with the immunotherapy drug atezolizumab. Positive preliminary data was presented in February at ASCO 2020 Genitourinary Cancers Symposium (ASCO-GU) and additional data was presented at ASCO 2020 in May/June. Ciforadenant is also being evaluated in a Phase 1b/2 trial in combination with atezolizumab in patients with non-small cell lung cancer who have failed no more than two prior regimens. Under the terms of our agreement with Corvus, we are entitled to development and regulatory milestones and tiered royalties on potential future sales. The aggregate potential milestone payments from Corvus are approximately $220 million for all indications.

FYCOMPA IV (Eisai)

Our partner, Eisai, recently completed an open-label, single group assignment, multicenter, Phase 2 study in Japan to evaluate the safety and tolerability of intravenous perampanel, formulated with Captisol, as substitute for oral tablets as an adjunctive therapy in patients with partial onset seizures (including secondarily generalized seizures) or primary generalized tonic-clonic seizures. The primary endpoint was the number of patients with adverse events and serious adverse events. We are entitled to revenue from Captisol material sales and tiered royalties on potential future sales.

Pevonedistat - TAK-924 (Millennium/Takeda)

Our partner, Millennium/Takeda, is currently conducting Phase 3 trials for the development of pevonedistat for the treatment of acute myeloid leukemia. Pevonedistat is a Captisol-enabled Nedd8-Activating Enzyme Inhibitor. Under the terms of the clinical-stage agreement, we may be entitled to over $25 million in regulatory and development milestones from Millennium/Takeda, revenue from Captisol material sales and royalties on potential future net sales.

SB206 (Novan)

We acquired certain economic rights to SB206 (KINSOLUS™) from Novan in May 2019. SB206 is a topical nitric-oxide antiviral gel for the treatment of viral skin infections, including molluscum contagiosum (MC). MC is an infection which causes skin lesions that affect approximately 6 million people in the United States annually, with the greatest incidence in children aged one to 14 years. In June of 2021, Novan reported positive topline efficacy and favorable safety data at Week 12 from the B-SIMPLE4 pivotal Phase 3 clinical study of SB206 for the treatment of MC, with primary endpoint achieving statistical significance (p-value < 0.0001) and no serious adverse events related to treatment with SB206. Novan intends to submit an NDA to the FDA for the treatment of MC in the fourth quarter of 2022.

PTX - 022 (Palvella)

We acquired the economic rights to PTX-022 from Palvella in December 2018. PTX-022 is a novel, topical formulation comprising high-strength rapamycin in development to treat pachyonychia congenita (PC). PC is a serious, chronically debilitating lifelong monogenic rare skin disease with no approved treatment. Palvella is conducting the Phase 3 VAPAUS study to evaluate the safety and efficacy of PTX-022 (QTORIN 3.9% rapamycin anhydrous gel) in the treatment of adults with PC.

PTX - 022 (Palvella)	
< $50 million	5.00%
$50 to $100 million	7.50%
>$100 million	9.80%

Lasofoxifene (Sermonix)

Lasofoxifene is a selective estrogen receptor modulator for osteoporosis treatment and other diseases, discovered through the research collaboration between Pfizer and us. Our partner, Sermonix has a license for the development of oral lasofoxifene for the United States and additional territories. Under the terms of the agreement, we are entitled to receive over $45 million in potential regulatory and commercial milestone payments as well as royalties on potential future net sales. Sermonix is conducting the Phase 2 ELAINE 1 trial assessing oral lasofoxifene versus intramuscular fulvestrant for the treatment of ER+/HER2- breast cancer in patients with an ESR1 mutation. Lasofoxifene is also being studied in ELAINE 2 trial in combination with Eli Lilly and Company's CDK4 and 6 inhibitor, Verzenio® (abemaciclib). Topline data are expected for both ELAINE trials in the first half of 2022.

Pradefovir (Xi'an Xintong)

Our Chinese licensee, Xi'an Xintong Medicine Research (following its acquisition of Chiva Pharmaceuticals), is developing pradefovir, an oral liver-targeting prodrug of the HBV DNA polymerase/reverse transcriptase inhibitor adefovir, for the potential treatment of HBV infection. Pradefovir was developed using Ligand's HepDirect technology. In September 2019, Xi'an Xintong Medicine Research reported positive results from a Phase 2 trial of pradefovir, showing good efficacy, safety and tolerability. At the dose of 75 mg, the reduction of DNA viral load, the percentage of no viral load detected, and HBeAg

negative conversion rate were better than tenofovir disoproxil fumarate (TDF) after 24 weeks of treatment. Overall incidence of side effects was less than TDF and there was no renal or skeletal toxicity. Xi'an Xintong Medicine Research is currently conducting a Phase 3 trial. We are entitled to an annual licensing maintenance fee and royalties on potential future sales.

MB07133 (Xi'an Xintong)

Chinese licensee Xi'an Xintong Medicine Research is also developing MB07133, a liver specific, HepDirect prodrug of cytarabine monophosphate, for the potential treatment of hepatocellular carcinoma and intrahepatic cholangiocarcinoma. MB07133 is currently in Phase 1 in China. We are entitled to an annual licensing maintenance fee and royalties on potential future sales.

Summary of Selected Collaborations

GSK Collaboration

In December 2020, we entered into a license and collaboration agreement with GSK to leverage our unique expertise in small molecule therapeutics targeting transmembrane proteins. The goal of this collaboration is to identify and develop inhibitors of a specific, genetically validated molecular target relevant to neurological diseases. Under the terms of the agreement, we received an upfront payment of $7.0 million and could receive additional development, regulatory and commercialization milestones of up to $154.5 million. We are also entitled to receive tiered royalties should any drug from the collaboration be commercialized. We will be responsible for the majority of preclinical activities up to lead optimization with both Ligand and GSK collaborating to identify candidates for IND-enabling studies. GSK has the exclusive option to license any identified inhibitors and will be responsible for further development and commercialization of any drug candidates identified through the collaboration. In December 2021, we entered into a second collaborative drug discovery program for a new genetically validated molecular target. We received an upfront payment of $10 million and could receive additional development, regulatory and commercialization milestones of up to $247.5 million. We are also entitled to receive tiered royalties should a drug from the collaboration on the second program be commercialized.

Roche Collaboration

In December 2018, we entered into a license and collaboration agreement with Roche to develop and commercialize small molecule ion channel modulators for the treatment of neurological disorders and in May 2020 amended the license and collaboration agreement to include a second target. These programs incorporate our technology platform for ion channel drug discovery and are directed at specific ion channel targets expressed in neurons. Under the terms of the agreement, Roche paid us on a per target basis an upfront payment for program exclusivity and research funding. In addition, we are eligible to potentially receive development and commercial milestone payments of up to $274 million per program and royalty payments if a drug is commercialized. We will be responsible for most preclinical activities up to lead optimization with both us and Roche applying resources to identify candidates for entry into late stage preclinical and IND enabling studies. Thereafter, Roche will be responsible for the further development and commercialization of the programs. In June 2021, we entered into a collaboration on a third program. We are eligible to potentially receive development and commercial milestone payments of $274 million on this program and royalty payments if a drug is commercialized. For all programs we will be responsible for most preclinical activities up to lead optimization with both us and Roche applying resources to identify candidates for entry into late stage preclinical and IND enabling studies. Thereafter, Roche will be responsible for the further development and commercialization of the programs.

Cystic Fibrosis Foundation Collaboration

In May 2018, we announced an award of up to $11 million from the Cystic Fibrosis Foundation for a project focused on the discovery of therapeutics to treat patients with cystic fibrosis (CF) caused by nonsense mutations. Nonsense mutations in the Cystic Fibrosis Transmembrane Conductance Regulator (“CFTR”) gene result in the premature termination of protein synthesis and the formation of truncated, non-functional CFTR. Patients with these mutations in both copies of their CFTR genes currently have no therapies that treat the underlying cause of their disease. The aim of this program is to provide these patients with a transformative therapeutic that will markedly improve their quality of life and lifespan. The award is to support an integrated, multi-year drug discovery initiative. At the North American Cystic Fibrosis Conference in October 2020, we reported the identification and characterization of a class of small molecule agents that enhance CFTR-PTC mutant readthrough and enable functional CFTR currents in combination with aminoglycosides.

Royalties

We have multiple programs under license with other companies that have products that are already being commercialized. In addition to the table below, we have generally described a typical Captisol and OmniAb royalty arrangement as low- to mid-single digit royalties. The following table represents substantially all of the disclosed information about our royalty arrangements:

Royalty Table

Ligand Licenses With Tiered Royalties

Program	Licensee	Royalty Rate
CE-Meloxicam	Sedor	8.0% - 10.0%
Ciforadenant	Corvus	Mid-single digit to low-teen royalty
DGAT-1	Viking	3.0% - 7.0%
Duavee	Pfizer	0.5% - 2.5%
Ensifentrine (RPL554)	Verona	Low to mid-single digit royalty
FBPase Inhibitor (VK0612)	Viking	7.5% - 9.5%
Kyprolis	Amgen	1.5% - 3.0%
Lasofoxifene	Sermonix	6.0% - 10.0%
OmniAb-Genagon	Genagon	4.0% - 6.0%
OmniAb-GigaGen	GigaGen	Mid-single digit royalty
OmniAb-iMetabolic	iMetabolic	<6%
OmniAb-Kira	Kira	Low to mid-single digit royalty
OmniAb-Takeda	Takeda	Low single digit royalty
Oral EPO	Viking	4.5% - 8.5%
PTX-022	Palvella	5.0% - 9.8%
SARM (VK5211)	Viking	7.25% - 9.25%
SB206	Novan	7.0% - 10.0%
TR Beta (VK2809 and VK0214)	Viking	3.5% - 7.5%
Viviant/Conbriza	Pfizer	0.5% - 2.5%
Various	Nucorion	4.0% - 9.0%
Various	Seelos	4.0% - 10.0%

Ligand Licenses With Fixed Royalties

Program	Licensee	Royalty Rate
4-1BB	Zhilkang Hongyi	Low single digit royalty
AB122	Arcus	Low single digit royalty
Baxdela	Melinta	2.5%
CE-Fosphenytoin	Sedor	11%
Sugemalimab	CStone	3%
Evomela	Acrotech/CASI	20%
V114	Merck	Low single digit royalty
Pneumosil	Serum Institute	Low single digit royalty
MB07133	Xi'an Xintong	6%
ME-344	MEI Pharma	Low single digit royalty
Pradefovir	Xi'an Xintong	9%
Reproxalap	Aldeyra Therapeutics	Low single digit royalty
Sparsentan	Travere	9%
Various	Gloria	Low single digit royalty
Zulresso	SAGE	3%

Milestone Payments

Our programs under license with our partners may generate milestone payments to us if our partners reach certain development, regulatory and commercial milestones. The following table represents the maximum value of our milestone payment pipeline by development stage, technology and partner (in thousands):

Technology*		Stage*		Partner*	
OmniAb	> $1,600,000	Preclinical	> $10,000	Viking	$1,500,000
Pelican	>$240,000	Clinical	> $530,000	Roche	$543,000
Captisol	> $220,000	Regulatory	> $1,900,000	GSK	$367,000
LTP/Hep Direct	> $280,000	Commercial	> $1,950,000	Janssen	$208,000
NCE/Other	> $2,100,000	Other	> $30,000	Neuritek	$246,000
Total	>$4,400,000	Total	>$4,400,000	Jazz	$150,000
				Seelos	$139,000
				Travere	$70,000
				Other	>$1,180,000
				Total	>$4,400,000

**All tables exclude any annual access fees and collaboration revenue for development work.*

Summary of Selected Internal Development Programs

We have a number of internal development or unpartnered programs focused on a wide-range of potential indications or disease.

The Captisol-enabled (CE)-Iohexol program was established in January 2018 to develop a next-generation contrast agent for diagnostic imaging with a reduced risk of renal toxicity. Contrast-induced acute kidney injury (CI-AKI) is the acute impairment of renal function following intravascular administration of an iodinated contrast agent, and occurs most frequently following coronary angiography, percutaneous coronary intervention and contrast-enhanced computed tomography, especially among patients at risk of renal injury such as those with advanced age, diabetes or heart failure. Currently no products are approved to prevent or treat CI-AKI in this setting, and therefore we believe a significant opportunity exists for a safer formulation of contrast agents. The goal is for CE-Iohexol to improve upon the limitations of existing contrast agents and enable a future partner to gain meaningful market share. In July 2019, we announced positive top-line results from a Phase 1 clinical trial CE-Iohexol conducted in Canada. The trial achieved the primary endpoint by demonstrating pharmacokinetic bioequivalence of CE-Iohexol injection and a reference Iohexol injection (OMNIPAQUE™) after IV administration in healthy adults. CE-Iohexol injection was well tolerated, and adverse events were in line with the known safety profile of OMNIPAQUE. We submitted an IND with the FDA in November and received a “Study May Proceed” letter in December 2020 along with feedback from the FDA on the clinical plan. Initiation of the Phase 2 clinical trial has been deferred as we assess potential partner interest.

The Luminespib/Hsp90 Inhibitor is a Phase 2-ready Hsp90 inhibitor, previously investigated in clinical trials for cancer. Third-party academic drug analyses suggest a potential role for heat shock protein 90 (Hsp90) inhibitors in treating COVID-19 infection. Based on these studies, we are evaluating potential collaborations or partnerships relating to intravenous luminespib (AUY-922) as a potential treatment for patients with COVID-19.

Our primary research and development efforts are led by our teams in Emeryville, California, San Diego, California, and Durham, North Carolina. The following table represents internal programs eligible for further development or partnership:

Program	Development Stage	Targeted Indication or Disease
CE-Iohexol	Phase 2	Diagnostics
Luminespib/Hsp90 Inhibitor	Phase 2	Oncology
CE-Sertraline, Oral Concentrate	Phase 1	Depression
PF530 Interferon Beta	Phase 1	Immunomodulatory
PF582 Ranibizumab	Phase 1	Ocular
CCR1 Antagonist	Preclinical	Oncology
CE-Busulfan	Preclinical	Oncology
CE-Cetirizine Injection	Preclinical	Allergy
CE-Silymarin for Topical formulation	Preclinical	Sun damage
FLT3 Kinase Inhibitors	Preclinical	Oncology
GCSF Receptor Agonist	Preclinical	Blood disorders
Anti-B7-H3	Preclinical	Oncology
Anti-TIM3	Preclinical	Oncology
Anti-TIGIT	Preclinical	Oncology
Anti-CD38	Preclinical	Oncology
Anti-BDNF	Preclinical	Oncology
PF529 Pegfilgrastim	Preclinical	Oncology
PF810 Recombinant Peptide	Preclinical	Endocrine System

Manufacturing

We contract with a third party manufacturer, Hovione, for Captisol production. Hovione operates FDA-inspected sites in the United States, Macau, Ireland and Portugal. Manufacturing and distribution operations for Captisol are performed primarily at Hovione's Portugal and Ireland facilities. We believe we maintain adequate inventory of Captisol to meet our current and future partner needs.

In the event of a Captisol supply interruption, we are permitted to designate and, with Hovione's assistance, qualify one or more alternate suppliers. If the supply interruption continues beyond a designated period, we may terminate the agreement. In addition, if Hovione cannot supply our requirements of Captisol due to an uncured force majeure event, we may also obtain Captisol from a third party and have previously identified such parties.

The current term of the agreement with Hovione is through December 2024. The agreement will automatically renew for successive two year renewal terms unless either party gives written notice of its intention to terminate the agreement no less than two years prior to the expiration of the initial term or renewal term. In addition, either party may terminate the agreement for the uncured material breach or bankruptcy of the other party or an extended force majeure event. We may terminate the agreement for extended supply interruption, regulatory action related to Captisol or other specified events. We have ongoing minimum purchase commitments under the agreement.

Competition

Some of the drugs we and our licensees and partners are developing may compete with existing therapies or other drugs in development by other companies. Furthermore, academic institutions, government agencies and other public and private organizations conducting research may seek patent protection with respect to potentially competing products or technologies and may establish collaborative arrangements with our competitors.

Our Captisol business may face competition from other suppliers of similar cyclodextrin excipients or other technologies that are aimed to increase solubility or stability of APIs. Our OmniAb antibody technology faces competition from suppliers of other transgenic animal systems that are also available for antibody drug discovery such as AbCellera Biologics.

Our competitive position also depends upon our ability to obtain patent protection or otherwise develop proprietary products or processes. For a discussion of the risks associated with competition, see below under *"Item 1A. Risk Factors."*

Environmental, Health and Safety (EHS)

We are committed to providing a safe and healthy workplace, promoting environmental excellence in our communities, and complying with all relevant regulations and industry standards. We establish and monitor programs to reduce pollution, prevent injuries, and maintain compliance with applicable regulations. By focusing on such practices, we believe we can affect a meaningful, positive change in our community and maintain a healthy and safe environment. Our animal health facility in Emeryville, California, has accreditation from the Association for Assessment and Accreditation of Laboratory Animal Care, a nonprofit organization that promotes the humane treatment of animals in science through voluntary accreditation and assessment programs. We expect to continue our effort and to refine our EHS policies and practices in 2022. More information on our EHS policies and initiatives is available on our website at www.ligand.com.

Government Regulation

The research and development, manufacturing and marketing of pharmaceutical products are subject to regulation by numerous governmental authorities in the United States and other countries. We and our partners, depending on specific activities performed, are subject to these regulations. In the United States, pharmaceuticals are subject to regulation by both federal and various state authorities, including the FDA. The Federal Food, Drug and Cosmetic Act and the Public Health Service Act govern the testing, manufacture, safety, efficacy, labeling, storage, record keeping, approval, advertising and promotion of pharmaceutical products. These activities are subject to additional regulations that apply at the state level. There are similar regulations in other countries as well. For both currently marketed products and products in development, failure to comply with applicable regulatory requirements can, among other things, result in delays, the suspension of regulatory approvals, as well as possible civil and criminal sanctions. In addition, changes in existing regulations could have a material adverse effect on us or our partners. For a discussion of the risks associated with government regulations, see below under "*Item 1A. Risk Factors.*"

Patents and Proprietary Rights

We believe that patents and other proprietary rights are important to our business. Our policy is to file patent applications to protect technology, inventions and improvements to our inventions that are considered important to the development of our business. We also rely upon trade secrets, know-how, continuing technological innovations and licensing opportunities to develop and maintain our competitive position.

Patents are issued or pending for the following key products or product families. The scope and type of patent protection provided by each patent family is defined by the claims in the various patents. Patent term may vary by jurisdiction and depend on a number of factors including potential patent term adjustments, patent term extensions, and terminal disclaimers. For each product or product family, the patents and/or applications referred to are in force in at least the United States, and for most products and product families, the patents and/or applications are also in force in European jurisdictions, Japan and other jurisdictions.

Captisol

Patents and pending patent applications covering Captisol and methods of making Captisol are owned by us. The patents covering the Captisol product with the latest expiration date is set to be in 2033 (*see, e.g.*, U.S. Patent No. 9,493,582 (expires Feb. 27, 2033)). Other patent applications covering methods of making Captisol, if issued, potentially have terms to 2041. We have asserted U.S. Patents 8,410,077, 9,200,088, and 9,493,582 against Teva in connection with their attempt to obtain FDA approval to manufacture and sell a generic version of Evomela®. We also own several patents and pending patent applications covering drug products containing Captisol as a component. Globally, we own approximately 440 issued patents covering all of the foregoing Captisol compositions, methods and related technology.

Seven Captisol patents in several families are listed in the Orange Book in connection with numerous prescription drugs currently on the market. These Captisol-enabled drugs include Nexterone (Baxter), Kyprolis (Amgen), Noxafil (Merck), Evomela (Acrotech/CASI), Baxdela (Melinta) and Zulresso (Sage). These patents are listed in the table below, and each patent family containing these patents has pending and/or granted counterparts in Europe, China and Japan.

Orange Book-listed Captisol Patents and Selected Foreign Patents			
Country	**Patent No.**	**Title**	**Expiration (nominal)‡**
United States	7635773	Sulfoalkyl Ether Cyclodextrin Compositions	03/13/2029
United States	8410077	Sulfoalkyl Ether Cyclodextrin Compositions	03/13/2029
United States	9200088	Sulfoalkyl Ether Cyclodextrin Compositions	03/13/2029
United States	10117951	Sulfoalkyl Ether Cyclodextrin Compositions	03/13/2029
United States	9750822	Sulfoalkyl Ether Cyclodextrin Compositions	03/13/2029

United States	9493582	Alkylated Cyclodextrin Compositions And Processes For Preparing And Using The Same	2/27/2033
United States	10040872	Alkylated Cyclodextrin Compositions And Processes For Preparing And Using The Same	10/21/2033

‡ Expiration dates are calculated as 20 years from the earliest nonprovisional filing date to which priority is claimed, and do not take into account disclaimers or extensions that are or may be available in these jurisdictions.

Subject to compliance with the terms of the respective agreements, our rights to receive royalty payments under our licenses with our exclusive licensors typically extend for the life of the patents covering such developments. For a discussion of the risks associated with patent and proprietary rights, see below under *"Item 1A. Risk Factors."*

Kyprolis

Patents protecting Kyprolis include those owned by Amgen and those owned by us. The United States patent listed in the Orange Book relating to Kyprolis with the latest expiration date is not expected to expire until 2029. Patents and applications owned by Ligand relating to the Captisol component of Kyprolis are not expected to expire until 2033. Amgen filed suit against several generic drug companies over their applications to make generic versions of Kyprolis. Several generics have settled with Amgen on confidential terms. However, it has been publicly reported that the U.S. launch date for at least Breckenridge Pharmaceuticals' generic product will be on a date that is held as confidential in 2027 or sooner, depending on certain occurrences. One generic company, Cipla Limited/Cipla USA, Inc. chose not to settle the litigation with Amgen, and proceeded to trial. The District Court upheld the validity of patent claims from three of the patents and the judgment was upheld on appeal.

OmniAb

At the heart of the OmniAb technology stack are our proprietary transgenic animals, including OmniRat, OmniMouse and OmniChicken, which have been genetically modified to generate antibodies with human sequences to facilitate development of human therapeutic candidates. OmniFlic and OmniClic are common light-chain rats and chickens, respectively, designed to generate bispecific antibodies. OmniTaur provides cow-inspired antibodies with unique structural characteristics for challenging targets. To our knowledge, we are the industry's only four-species in vivo antibody discovery platform, making OmniAb the most diverse host system available in the industry.

We have received patent protection on OmniAb animals and methods in over 40 jurisdictions, including the United States, multiple countries throughout Europe, Japan and China. These platform patents and applications owned by us are expected to expire between 2028 and 2039 and partners are able to use the OmniAb patented technology to generate novel antibodies, which may be entitled to additional patent protection.

OmniAb's business will include the Ab Initio computational antigen design technology, Icagen's ion channel technology, the xPloration high-throughput screening technology, in addition to the suite of OmniAb transgenic animals used for antibody discovery. Ab Initio owns a portfolio of issued patents and pending patent applications directed to SIRP-gamma polypeptides and apelin (APJ) receptor binding domains that includes issued patents in the United States and Europe and patent applications in the United States and multiple other countries. The patents and applications in Ab Initio's owned portfolio are expected to expire between 2036 and 2040. Icagen owns a portfolio of issued patent and pending patent applications directed to X-ray fluorescence-based detection of binding events and transport across barriers and related inventions, including 22 issued patents in the Unites States and patents issued in Europe, Japan and China as well as pending patent applications in the U.S. and Europe. The patents and applications in Icagen's portfolio are expected to expire between 2023 and 2040. xCella's technology includes a microcapillary platform that can screen single B cells for specificity and bioactivity, which expand our existing single-B cell assay capabilities in the OmniAb technology platform. xCella owns a patent portfolio that includes three issued patents in the United States and pending patent applications in the U.S. and multiple other countries. The patents and applications in xCella's owned portfolio are expected to expire between 2036 and 2040.

OmniAb's intellectual property will remain with OmniAb following the planned separation of OmniAb into a new public company. For more information regarding the OmniAb separation, see "*Business—2021 and Recent Major Business Highlights—The Separation and Distribution of OmniAb Business*."

Ligand UK Development Limited

Under the terms of our sale of Vernalis (R&D) Limited to HitGen in December 2020, Ligand retained a portfolio of fully-funded shots on goal, which now include S65487, a Bcl-2 inhibitor, and S64315, an Mcl-1 inhibitor for treatment of cancers, both of which are partnered with Servier in collaboration with Novartis, VER250840 (an oral, selective Chk1 inhibitor for treatment of cancer), and V158866, a novel, oral, selective fatty acid amide hydrolase (FAAH) inhibitor for CNS disorders, partnered with Neuritek Therapeutics. These programs and their IP are now owned by Ligand UK Development Limited, which

has a worldwide patent portfolio of over 200 granted patents in over 70 countries. This patent portfolio is mature, with expected expiry dates between 2022 and 2033.

Pelican Expression Technology Platform

We acquired the Pelican Expression Technology platform through acquisition of Pfenex Inc. in October 2020. This acquisition brought a robust portfolio of patents and patent applications along with substantial know-how and trade secrets which protect various aspects of our core Pelican Expression Technology business. As of December 31, 2021, we were the sole owner of a patent portfolio that consisted of over 200 patents and 50 pending patent applications worldwide that provide material coverage for our platform technology, licensed products and product candidates. Our U.S. issued patents expire during the time period beginning in 2025 and ending in 2038. Our owned and exclusively licensed patent portfolio includes claims directed to methods for recombinant protein production and methods for rapid screening of an array of expression systems, tools for protein expression such as P. fluorescens promoters, secretion leaders, plasmid maintenance systems, improved methods for non-standard amino acid incorporation and fusion partners for peptide production. In addition, our IP covers methods for producing certain classes of proteins such as cytokines, growth factors and antibody derivatives, as well as expression strains and methods for production, purification and formulation of certain vaccine antigens, peptides, therapeutic enzymes, human cytokines, etc.

Human Capital Management

We recognize and take care of our employees by offering a wide range of competitive pay, recognition, and benefit programs. We are proud to provide our employees the opportunity to grow and advance as we invest in their education and career development. As of December 31, 2021, we have 154 employees, of whom 118 are involved directly in scientific research and development activities.

We rely on skilled, experienced, and innovative employees to conduct the operations of our company. Our key human capital objectives include identifying, recruiting, retaining, incentivizing and integrating our existing and new employees. We frequently benchmark our compensation practices and benefits programs against those of comparable industries and in the geographic areas where our facilities are located. We believe that our compensation and employee benefits are competitive and allow us to attract and retain skilled labor throughout our organization. Our notable health, welfare and retirement benefits include:

- equity awards through our 2002 Stock Incentive Plan;
- subsidized health insurance;
- 401(k) Plan with matching contributions;
- tuition assistance program; and
- paid time off.

We strive to maintain an inclusive environment free from discrimination of any kind, including sexual or other discriminatory harassment. Our employees have multiple avenues available through which inappropriate behavior can be reported, including a confidential hotline. All reports of inappropriate behavior are promptly investigated with appropriate action taken to stop such behavior.

Investor Information

Financial and other information about us is available on our website at www.ligand.com. We make available on our website, without charge, copies of our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. You may obtain copies of these documents by visiting the SEC's website at www.sec.gov. In addition, we use Twitter (@Ligand_LGND) and our investor relations website as a means of disclosing material non-public information and for complying with our disclosure obligations under Regulation FD. Investors should monitor our Twitter account and our website, in addition to following our press releases, SEC filings, public conference calls and webcasts. These website addresses and the information accessible through out Twitter account are not intended to function as hyperlinks, and the information contained in our website and in the SEC's website is not intended to be a part of this filing.

ITEM 1A. RISK FACTORS

The following is a summary description of some of the many risks we face in our business. You should carefully review these risks in evaluating our business, including the businesses of our subsidiaries. You should also consider the other information described in this report. Additional risks not presently known to us or that we currently deem immaterial also may impair our business.

Risks Related to Our Business Operations and Reliance on Third Parties:

Future revenue based on Kyprolis and Evomela, as well as royalties from our other partnered products, may be lower than expected.

A significant portion of our royalty revenue is based on sales of Kyprolis by Amgen and sales of Evomela by Acrotech Biopharma. Royalties, including payments from Amgen and Acrotech Biopharma, are expected to be a substantial portion of our ongoing revenues for the foreseeable future. Any setback that may occur with respect to any of our partners' products, and in particular Kyprolis, could significantly impair our operating results and/or reduce our revenue and the market price of our stock. Setbacks for the products could include problems with shipping, distribution, manufacturing, product safety, marketing, government regulation or reimbursement, licenses and approvals, intellectual property rights, including Amgen's or Acrotech Biopharma's failure to enforce their respective intellectual property rights, competition with existing or new products and physician or patient acceptance of the products, as well as higher than expected total rebates, returns, discounts, or unfavorable exchange rates. These products also are or may become subject to generic competition. For example, we entered into a settlement agreement with Teva and Acrotech Biopharma (the holder of the NDA for Evomela) which will allow Teva to market a generic version of Evomela in the United States on June 1, 2026, or earlier under certain circumstances. The entry of generic competition for Evomela may materially and adversely affect the revenue we derive from Evomela sales. Also, Amgen has settled patent litigation related to Kyprolis on confidential terms with several parties, but it has been publicly reported that the U.S. launch date for at least Breckenridge Pharmaceuticals' applicable generic product will be "on a date that is held as confidential in 2027 or sooner, depending on certain occurrences."

Future revenue from sales of Captisol material to our license partners may be lower than expected.

Revenues from sales of Captisol material to our collaborative partners, including Amgen, Gilead and the Gilead consortium, represent a significant portion of our current revenues. Any setback that may occur with respect to Captisol could significantly impair our operating results and/or reduce the market price of our stock. Setbacks for Captisol could include problems with shipping, distribution, manufacturing, product safety, marketing, government regulation or reimbursement, licenses and approvals, intellectual property rights, competition with existing or new products and physician or patient acceptance of the products using Captisol. In addition, revenue from Captisol sales related to remdesivir may not continue or materially increase due to a number of factors, including: if Gilead successfully develops or manufactures an alternative formulation of remdesivir that does not incorporate Captisol or uses less Captisol in such formulation; if remdesivir is later shown to not be effective or safe for the treatment of COVID-19; the FDA revises or revokes its approval of remdesivir; if alternative therapies or vaccines are approved, including potential treatments for COVID-19 in pill or other forms that are being developed or which may be developed by other companies; or the risk of COVID-19 infection significantly diminishes, in which case the commercial opportunity could be materially and adversely affected. For example, Gilead has announced plans to develop an inhaled dosage form of remdesivir that uses less Captisol than the current formulation and expects results from an ongoing proof-of-concept study later this year.

If products or product candidates incorporating Captisol material were to cause any unexpected adverse events, the perception of Captisol safety could be seriously harmed. If this were to occur, we may not be able to sell Captisol unless and until we are able to demonstrate that the adverse event was unrelated to Captisol, which we may not be able to do. Further, the FDA could require us to submit additional information for regulatory review or approval, including data from extensive safety testing or clinical testing of products using Captisol. This would be expensive and it may delay the marketing of Captisol-enabled products and receipt of revenue related to those products, which could significantly impair our operating results and/or reduce the market price of our stock.

We obtain Captisol from Hovione, our third party manufacturer, primarily at their facilities in Ireland and Portugal.If Hovione were to cease to be able, for any reason, to supply Captisol to us in the amounts we require, or decline to supply Captisol to us, we would be required to seek an alternative source, which could potentially take a considerable length of time and impact our revenue and customer relationships. In the event of a Captisol supply interruption, we are permitted to designate and, with Hovione's assistance, qualify one or more alternate suppliers, although there is no assurance that we could do so timely or at an acceptable costs, if at all. In addition to manufacturing at Hovione's facilities in Ireland and Portugal, we have now added final step processing capacity for Captisol in both the United States and England.

We maintain inventory of Captisol, which has a five year shelf life, at three geographically dispersed storage locations in the United States and Europe. If we were to encounter problems maintaining our inventory, such as natural disasters, at one or more of these locations, it could lead to supply interruptions. In addition, we will rely on Hovione to expand manufacturing capacity of Captisol and any failure by Hovione to timely implement such increased capacity could adversely affect our ability to supply Captisol to our partners. While we believe we maintain adequate inventory of Captisol to meet our current partner needs, and our planned expansion of Captisol capacity will be sufficient to meet future partner needs, our estimates and projections for Captisol demand may not be correct and any supply interruptions could materially adversely impact our operating results. In addition, our plan to invest additional capital for the expansion of Captisol manufacturing capacity may not yield a return on investment if future Captisol sales fall below our expectations.

We currently depend on our arrangements with our partners and licensees to sell products using our Captisol technology. These agreements generally provide that our partners may terminate the agreements at will. If our partners discontinue sales of products using Captisol, fail to obtain regulatory approval for products using Captisol, fail to satisfy their obligations under their agreements with us, choose to utilize a competing product, or if we are unable to establish new licensing and marketing relationships, our financial results and growth prospects would be materially affected. Furthermore, we maintain significant accounts receivable balances with certain customers purchasing Captisol materials, which may result in the concentration of credit risk. We generally do not require any collateral from our customers to secure payment of these accounts receivable. If any of our major customers were to default in the payment of their obligations to us, our business, operating results and cash flows could be adversely affected.

Further, under most of our Captisol outlicenses, the amount of royalties we receive will be reduced or will cease when the relevant patent expires. Our low-chloride patents and foreign equivalents are not expected to expire until 2033, our high purity patents and foreign equivalents, are not expected to expire until 2029 and our morphology patents and foreign equivalents, are not expected to expire until 2026 in the United States, but the initially filed patents relating to Captisol expired starting in 2010 in the United States and in 2016 in most countries outside the United States. If our other intellectual property rights are not sufficient to prevent a generic form of Captisol from coming to market and if in such case our partners choose to terminate their agreements with us, our Captisol revenue may decrease significantly.

We rely heavily on collaboration relationships to generate milestone and royalty payments and our collaboration partners have significant discretion when deciding whether to pursue any development program, and any failure by our partners to successfully develop a product candidate or a termination or breach of any of the related agreements could reduce our milestone and license fee revenue, and potentially reduce future royalties.

Our strategy for developing and commercializing many of our product candidates includes entering into collaboration agreements, outlicenses, and development funding and royalty purchase agreements with corporate partners and others. These agreements give our collaboration partners significant discretion when deciding whether or not to pursue any development program. Our existing collaborations may not continue or be successful, and we may be unable to enter into future collaboration arrangements to develop and commercialize our unpartnered assets.

In addition, our collaborators may develop products, either alone or with others that compete with the types of products they are developing with us (or that we are developing on our own). This would result in increased competition for our or our partners' programs. If product candidates are approved for marketing under our collaboration programs, revenues we receive will depend on the manufacturing, marketing and sales efforts of our collaboration partners, who generally retain commercialization rights under the collaboration agreements. Generally, our current collaboration partners also have the right to terminate their collaborations at will or under specified circumstances. If any of our collaboration partners breach (for example, by not making required payments when due, or at all) or terminate their agreements with us or otherwise fail to conduct their collaboration activities successfully, including due to insolvency events, ongoing product development under these agreements will be delayed or terminated. Disputes or litigation may also arise with our collaborators (with us and/or with one or more third parties), including those over ownership rights to intellectual property, know-how or technologies developed with our collaborators. Such disputes or litigation could adversely affect our rights to one or more of our product candidates. Any such dispute or litigation could delay, interrupt or terminate the collaboration research, development and commercialization of certain potential products, create uncertainty as to ownership rights of intellectual property, or could result in litigation or arbitration. The occurrence of any of these problems could be time-consuming and expensive and could adversely affect our business.

Our collaboration partners may change their strategy or the focus of their development and commercialization efforts with respect to our partnered programs, and the success of our partnered programs could be adversely affected.

If our collaboration partners terminate their collaborations with us or do not commit sufficient resources to the development, manufacture, marketing or distribution of our partnered programs, we could be required to devote additional resources to our partnered programs, seek new collaboration partners or abandon such partnered programs, all of which could reduce our revenues and otherwise have an adverse effect on our business. For example, several of our collaboration partners

using our OmniAb antibody platform have terminated their contracts or substantially reduced their investment in the antibodies discovered based on the platform. Although we expect growth in the net number of partners with one more active programs based on antibodies discovered using our OmniAb platform, there can be no assurance that our partners will continue their programs or that we will be able to find new collaboration partners interested in discovering antibodies based on our OmniAb platform.

In addition, biopharmaceutical development is inherently uncertain and very few therapeutic candidates ultimately progress through clinical development and receive approval for commercialization. If our partners do not receive regulatory approval for a sufficient number of therapeutic candidates originating from our partnerships, we may not be able to sustain our business model.

Our product candidates, and the product candidates of our partners, face significant development and regulatory hurdles prior to partnering and/or marketing which could delay or prevent licensing, sales-based royalties and/or milestone revenue.

Before we or our partners obtain the approvals necessary to sell any of our unpartnered assets or partnered programs, we must show through preclinical studies and human testing that each potential product is safe and effective. We and/or our partners have a number of partnered programs and unpartnered assets moving toward or currently awaiting regulatory action. Failure to show any product's safety and effectiveness could delay or prevent regulatory approval of a product and could adversely affect our business. The product development and clinical trials process is complex and uncertain. For example, the results of preclinical studies and initial clinical trials may not necessarily predict the results from later large-scale clinical trials. In addition, clinical trials may not demonstrate a product's safety and effectiveness to the satisfaction of the regulatory authorities. A number of companies have suffered significant setbacks in advanced clinical trials or in seeking regulatory approvals, despite promising results in earlier trials. The FDA may also require additional clinical trials after regulatory approvals are received. Such additional trials may be expensive and time-consuming, and failure to successfully conduct those trials could jeopardize continued commercialization of a product.

The speed at which we and our partners complete our scientific studies and clinical trials depends on many factors, including, but not limited to, the ability to obtain adequate supplies of the products to be tested and patient enrollment. Patient enrollment is a function of many factors, including the size of the patient population, the proximity of patients to clinical sites, the eligibility criteria for the trial and other potential drug candidates being studied. Delays in patient enrollment for our or our partners' trials may result in increased costs and longer development times. In addition, our partners have rights to control product development and clinical programs for products developed under our collaborations. As a result, these partners may conduct these programs more slowly or in a different manner than expected. Moreover, even if clinical trials are completed, we or our partners still may not apply for FDA or foreign regulatory approval in a timely manner or the FDA or foreign regulatory authority still may not grant approval.

Our product candidate discovery, early-stage development, and product reformulation programs may require substantial additional capital to complete successfully. Our partners' development programs may require substantial additional capital to complete successfully, arising from costs to: conduct research, preclinical testing and human studies; establish pilot scale and commercial scale manufacturing processes and facilities; and establish and develop quality control, regulatory, marketing, sales and administrative capabilities to support these programs. While we expect to fund our research and development activities from cash generated from operations to the extent possible, if we are unable to do so, we may need to complete additional equity or debt financings or seek other external means of financing. These financings could depress our stock price. If additional funds are required to support our operations and we are unable to obtain them on terms favorable to us, we may be required to cease or reduce further development or commercialization of our products, to sell some or all of our technology or assets or to merge with another entity.

Our OmniAb antibody platform faces specific risks, including the quality of our antibody discovery platform and technological capabilities and their acceptance by new and existing partners in our market.

We utilize our OmniAb technology platform to discover antibodies for further development and potential commercialization by our partners. As a result, the quality and sophistication of our platform is critical to our ability to conduct our research discovery activities and to deliver more promising antibodies and other drugs and to accelerate and lower the costs of discovery as compared to traditional methods for our partnerships. Failure of antibodies discovered using our platform can occur at any stage of discovery, preclinical or clinical development, and any such failures may reduce our partners' confidence in our platform. We also believe that pharmaceutical and biotechnology companies are likely to be particularly sensitive to defects and errors in the use of our platform, including if our platform fails to deliver meaningful acceleration of certain research timelines accompanied by results at least as good as the results generated using legacy or other alternative technologies. There can be no guarantee that our platform will meet the expectations of pharmaceutical and biotechnology companies. If we are unsuccessful in achieving and maintaining market acceptance of our platform, our business, financial condition, results of operations and prospects could be adversely affected.

Further, we face significant competition from other companies selling human antibody-generating rodents, especially mice which compete with our OmniMouse platform, including the VelocImmune mouse, the AlivaMab mouse, the Alloy mouse and the Kymouse. Many of our competitors have greater financial, technical and human resources than we do and may be better equipped to develop, manufacture and market competing antibody platforms. Our competitors may render our OmniAb antibody platform obsolete, or limit the commercial value of any product candidates developed using our platform, by advances in existing technological approaches or the development of new or different approaches, potentially eliminating the advantages that we believe our platform offers.

The OmniAb antibody platform could become subject to more extensive government regulation than we currently anticipate, and regulatory compliance obligations and the investigational exemption and approval processes to which our animals may become subject are expensive, time-consuming and uncertain both in timing and in outcome.

We believe our OmniAb platform operations are currently subject to limited direct regulation by the FDA, EMA, comparable foreign authorities or other regulatory bodies. However, our business could in future become subject to more direct oversight by the FDA, EMA or other comparable domestic or international agencies. For example, we may be subject to evolving and variable regulations governing the production of genetically engineered organisms. In particular, the FDA regulates animals whose genomes have been intentionally altered, and the FDA considers such alterations to be new animal drugs that may require approvals or exemptions in order to be commercially marketed or for investigational use in the United States. For example, we have been in communication with the FDA regarding the regulatory requirements applicable to our OmniChickens designed to produce human immunoglobulins, and the FDA has advised us that such approvals or exemptions are not required in light of the early stage of our research. However, the FDA may determine that we are not in compliance with the conditions imposed upon us to avoid the requirement for such approvals or exemptions at present or we may later become subject to such approvals or exemptions. Furthermore, while we have no active plans to operate a manufacturing facility designed to comply with current good manufacturing practices (cGMPs), future market pressures or the lack of available capacity at cGMP manufacturing facilities may necessitate our entry into this market. Complying with such regulations may be expensive, time-consuming and uncertain, and if we fail to comply with any applicable requirements enforced by the FDA with respect to our intentionally genetically altered animals or otherwise, we may be subject to administratively or judicially imposed sanctions, including restrictions on our products or operations, warning or untitled letters, civil or criminal penalties, injunctions, product seizures, product detentions, import bans, product recalls, or adverse publicity requirements, any of which could have an adverse effect on our business, financial condition and operating results.

Our OmniAb antibody platform utilizes various species of animals that could contract disease or die and could otherwise subject us to controversy and adverse publicity, which may interrupt our business operations or harm our reputation.

Our OmniAb platform utilizes animals to discover and produce antibodies. We cannot completely eliminate the risks of animals contracting disease, which from time to time has occurred, or a natural or manmade disaster that could cause death to valuable production animals, in our vivarium facilities, which house our chickens, or those of the contract research organizations (CROs) that maintain our mouse and rat colonies. We cannot make any assurance that we or our CROs will be able to contain or reverse any such instance of disease. Although we maintain backup colonies of our animals, disease or death on a broad scale could materially interrupt business operations as animals are a key part of our antibody discovery programs, which could have a material adverse effect on our results of operations and financial condition.

Further, genetic engineering and testing of animals has been the subject of controversy and adverse publicity. Animal rights groups and other organizations and individuals have attempted to stop animal testing activities by pressing for legislation and regulation in these areas and by disrupting these activities through protests and other means. To the extent the activities of these groups are successful, our research and development activities and the ability for us and our partners to use our technology platform could be interrupted or delayed, our costs could increase and our reputation could be harmed.

Our plan to separate into two independent, publicly traded companies is subject to various risks and uncertainties and may not be completed in accordance with the expected plans or anticipated timeline, or at all and may not achieve the intended benefits, and will involve significant time, expense and management attention, any of which could negatively impact our businesses, financial condition and results of operations.

In November 2021, we announced our intention to split Ligand into two separate, publicly traded companies with one featuring the OmniAb business, including Ab Initio computational antigen design, Icagen's ion channel technology, xPloration high-throughput screening technology, and the suite of OmniAb animals used for antibody discovery and the other featuring Ligand's existing collection of core royalties, technologies, pipeline and contracts associated with the Pelican protein expression platform and the Captisol business. Although an IPO and eventual distribution of OmniAb shares to Ligand shareholders was the leading option under consideration at that time, due to market conditions and further review from management and advisors, we expect to achieve the separation through a direct spin of 100% of OmniAb equity to shareholders with Ligand capitalizing the OmniAb business directly. Although we currently are pursuing a direct spin, we will continue to evaluate other options to optimize value and ensure flexibility to invest in growth, including keeping the business together. We

expect OmniAb to file a Form 10 with the SEC and complete its separation in the first half of 2022. The separation, if pursued, will be subject to market, tax and legal considerations, final approval by our Board of Directors and other customary requirements, and may not occur on the expected timeframe, or at all. Unanticipated developments, including difficulty in separating the assets and resources of our OmniAb business from the rest of our assets and resources, changes to the competitive environment for OmniAb's or our respective businesses, possible delays in obtaining or failure to obtain tax opinions, regulatory or other approvals or clearances to approve or facilitate the separation, uncertainty in financial markets and other challenges in executing the separation, as planned, could delay or cause the separation to occur on terms or conditions that are different or less favorable than expected.

Executing the proposed separation also requires significant time and attention from management and other employees, which could distract them from other tasks in operating our business. Our plans to pursue the separation may also have negative effects on relationships with our employees, partners, suppliers, and other third parties, disruptions in operations and ultimately harm our businesses, financial condition, results of operations and prospects. Even if the separation is completed, we may not realize some or all of the anticipated strategic, operational and financial benefits from the separation. Following the proposed separation, the combined value of the common stock of the two publicly-traded companies may not be equal to or greater than what the value of our common stock would have been had the proposed separation not occurred.

Our business is subject to risks arising from epidemic diseases, such as the recent COVID-19 pandemic, which has impacted and could continue to impact our business.

The current COVID-19 worldwide pandemic has presented substantial public health and economic challenges and is affecting our employees and partners, patients, communities and business operations, as well as the U.S. and global economy and financial markets. International and U.S. governmental authorities in impacted regions continue to take actions in an effort to slow the spread of COVID-19, including issuing varying forms of "stay-at-home" orders, and restricting business functions outside of one's home. In response, at various times during the pandemic, we have restricted in-person access to our executive offices, our administrative employees are mostly working remotely, and we have limited the number of staff in our research and development laboratories and other facilities. Although we have since lifted most of the restrictions we previously imposed and currently do not believe the COVID-19 pandemic is having a material impact on our business, we cannot guarantee that the COVID-19 pandemic, or a similar event, will not impact our operations in the future.

Several of our partners have reported that their operations have been impacted including delays in research and development programs and deprioritizing clinical trials in favor of treating patients who have contracted the virus or to prevent the spread of the virus. This may lead to clinical trial protocol deviations or to discontinuation of treatment for patients who are currently enrolled in the clinical trials being conducted by us or our partners. In addition, certain of our partners have reported negative impacts on product sales which will impact our royalty revenues. Although we believe that we and our partners have adjusted our business practices to the impacts of the COVID-19 pandemic, we may experience disruptions that could severely impact our business, drug manufacturing and supply chain, nonclinical activities and clinical trials and our partners' business may be impacted in similar ways, including due to:

- delays or difficulties in enrolling patients in clinical trials;
- delays or difficulties in clinical site initiation, including difficulties in recruiting or supporting clinical site investigators and clinical site staff;
- diversion of healthcare resources away from the conduct of clinical trials, including the diversion of hospitals serving as clinical trial sites and hospital staff supporting the conduct of clinical trials;
- interruption of key clinical trial activities, such as clinical trial site monitoring, due to limitations on travel imposed or recommended by federal or state governments, employers and others or interruption of clinical trial subject visits and study procedures, which may impact the integrity of subject data and clinical study endpoints;
- interruption or delays in the operations of the FDA or other regulatory authorities, which may impact review and approval timelines;
- interruption of, or delays in receiving, supplies of Captisol or other product or product candidates from contract manufacturing organizations due to staffing shortages, production slowdowns or stoppages and disruptions in delivery systems, which may result in cancellations of Captisol orders or refunds if we fail to deliver Captisol timely;
- delays in clinical sites receiving the supplies and materials needed to conduct clinical trials and interruption in global shipping that may affect the transport of clinical trial materials;
- interruptions in nonclinical studies due to restricted or limited operations at laboratory facility or those of outsourced service providers;

- limitations on employee resources that would otherwise be focused on the conduct of nonclinical studies or clinical trials, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people;
- delays in receiving approval from local regulatory authorities to initiate planned clinical trials;
- changes in local regulations as part of a response to COVID-19 which may require us to change the ways in which clinical trials are conducted, which may result in unexpected costs, or to discontinue the clinical trials altogether;
- delays in necessary interactions with local regulators, ethics committees and other important agencies and contractors due to limitations in employee resources or forced furlough of government employees;
- refusal of the FDA to accept data from clinical trials in affected geographies outside the United States;
- interruption or delays to discovery and development pipelines; and
- difficulties launching or commercializing products, including due to reduced access to doctors as a result of social distancing protocols.

In addition, if COVID-19 infects our genetically modified animals which form the basis of our OmniAb platform, or if there is an outbreak among our employees who maintain and care for these animals, we and our partners may be unable to produce antibodies for development. Further, the spread of COVID-19 has had and may continue to severely impact the trading price of shares of our common stock and could further severely impact our ability to raise additional capital on a timely basis or at all.

The COVID-19 pandemic continues to evolve. The extent to which the COVID-19 may impact our business, including our drug manufacturing and supply chain, nonclinical activities, clinical trials and financial condition, including due to impacts on our partners' businesses, will depend on future developments, which are highly uncertain and cannot be predicted with confidence, the duration of the pandemic, travel restrictions and social distancing in the United States and other countries, business closures or business disruptions and the effectiveness of actions taken in the United States and other countries to contain and treat the disease.

Risks Related to Intellectual Property:

Third party intellectual property may prevent us or our partners from developing our potential products; our and our partners' intellectual property may not prevent competition; and any intellectual property issues may be expensive and time consuming to resolve.

The manufacture, use or sale of our potential products or our licensees' products or potential products may infringe the patent rights of others. If others obtain patents with conflicting claims, we may be required to obtain licenses to those patents or to develop or obtain alternative technology. We may not be able to obtain any such licenses on acceptable terms, or at all. Any failure to obtain such licenses could delay or prevent us from pursuing the development or commercialization of our potential products.

Generally, our success will depend on our ability and the ability of our partners to obtain and maintain patents and other intellectual property rights for our and their potential products. Our patent position is uncertain and involves complex legal and technical questions for which legal principles are unresolved. Even if we or our partners do obtain patents, such patents may not adequately protect the technology we own or have licensed.

We permit our partners to list our patents that cover their branded products in the Orange Book. If a third party submits an NDA or ANDA for a generic drug product that relies in whole or in part on studies contained in our partner's NDA for their branded product, the third party will have the option to certify to the FDA that, in the opinion of that third party, the patents listed in the Orange Book for our partner's branded product are invalid, unenforceable, or will not be infringed by the manufacture, use or sale of the third party's generic drug product. A third party certification that a new product will not infringe Orange Book-listed patents, or that such patents are invalid, is called a paragraph IV patent certification. If the third party submits a paragraph IV patent certification to the FDA, a notice of the paragraph IV patent certification must be sent to the NDA owner and the owner of the patents that are subject to the paragraph IV patent certification notice once the third-party's NDA or ANDA is accepted for filing by the FDA. A lawsuit may then be initiated to defend the patents identified in the notice. The filing of a patent infringement lawsuit within 45 days of the receipt of notice of a paragraph IV patent certification automatically prevents the FDA from approving the generic NDA or ANDA until the earlier of the expiration of a 30-month period, the expiration of the patents, the entry of a settlement order stating that the patents are invalid or not infringed, a decision in the infringement case that is favorable to the NDA or ANDA applicant, or such shorter or longer period as the court may order. If a patent infringement lawsuit is not initiated within the required 45-day period, the third-party's NDA or ANDA will not be subject to the 30-month stay.

Several third-parties have challenged, and additional third parties may challenge, the patents covering our partner's branded products, including Kyprolis and Evomela, which could result in the invalidation or unenforceability of some or all of the relevant patent claims. We may from time to time become party to litigation or other proceedings as a result of Paragraph IV certifications. For example, as a result of the settlement of one such matter, Teva will be permitted to market a generic version of Evomela® in the United States on June 1, 2026 or earlier under certain circumstances. The terms of the settlement agreement are otherwise confidential. Also, as noted above, Amgen has settled patent litigation related to Kyprolis on confidential terms with several parties, but it has been publicly reported that the U.S. launch date for at least Breckenridge Pharmaceuticals' applicable generic product will be "on a date that is held as confidential in 2027 or sooner, depending on certain occurrences."

In addition, we cannot assure you that all of the potentially relevant prior art information that was or is deemed available to a person of skill in the relevant art prior to the priority date of the claimed invention-relating to our and our partners' patents and patent applications has been found. If such prior art exists, it can invalidate a patent or prevent a patent from issuing from a pending patent application, and we or our partners may be subject to a third party pre-issuance submission of prior art to the United States Patent and Trademark Office. Even if patents do successfully issue and even if such patents cover our or our partner's products or potential products, third parties may initiate litigation or opposition, interference, re-examination, post-grant review, *inter partes* review, nullification or derivation action in court or before patent offices, or similar proceedings challenging the validity, enforceability or scope of such patents, which may result in the patent claims being narrowed or invalidated, may allow third parties to commercialize our or our partners' products and compete directly with us and our partners, without payment to us or our partners, or limit the duration of the patent protection of our and our partners' technology and products.

Litigation or other proceedings to enforce or defend intellectual property rights are often very complex in nature, may be very expensive and time-consuming, may divert our management's attention from our core business, and may result in unfavorable results that could adversely impact our ability to prevent third parties from competing with our partner's products. Any adverse outcome of such litigation or other proceedings could result in one or more or our patents being held invalid or unenforceable, which could adversely affect our ability to successfully execute our business strategy and negatively impact our financial condition and results of operations. However, given the unpredictability inherent in litigation, we cannot predict or guarantee the outcome of these matters or any other litigation. Regardless of how these matters are ultimately resolved, these matters may be costly, time-consuming and distracting to our management, which could have a material adverse effect on our business.

In addition, periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and or applications will be due to the U.S. and various foreign patent offices at various points over the lifetime of our and our licensees' patents and/or applications. We have systems in place to remind us to pay these fees, and we rely on our outside patent annuity service to pay these fees when due. Additionally, the U.S. and various foreign patent offices require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with rules applicable to the particular jurisdiction. However, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. If such an event were to occur, it could have a material adverse effect on our business.

Any conflicts with the patent rights of others could significantly reduce the coverage of our patents or limit our ability to obtain meaningful patent protection. For example, our European patent related to Agglomerated forms of Captisol was limited during an opposition proceeding, and the rejection of our European patent application related to High Purity Captisol was upheld on appeal. In addition, any determination that our patent rights are invalid may result in early termination of our agreements with our license partners and could adversely affect our ability to enter into new license agreements. We also rely on unpatented trade secrets and know-how to protect and maintain our competitive position. We require our employees, consultants, licensees and others to sign confidentiality agreements when they begin their relationship with us. These agreements may be breached, and we may not have adequate remedies for any breach. In addition, our competitors may independently discover our trade secrets.

We may also need to initiate litigation, which could be time-consuming and expensive, to enforce our proprietary rights or to determine the scope and validity of others' rights. If this occurs, a court may find our patents or those of our licensors invalid or may find that we have infringed on a competitor's rights. In addition, if any of our competitors have filed patent applications in the United States which claim technology we also have invented, the United States Patent and Trademark Office may require us to participate in expensive interference proceedings to determine who has the right to a patent for the technology.

The occurrence of any of the foregoing problems could be time-consuming and expensive and could adversely affect our financial position, liquidity and results of operations.

The validity, scope and enforceability of any patents that cover our partners' biologic product candidate can be challenged by third parties.

For biologics, the Biologics Price Competition and Innovation Act of 2009, BPCIA, provides a mechanism for one or more third parties to seek FDA approval to manufacture or sell biosimilar or interchangeable versions of brand name biological products. Due to the large size and complexity of biological products, as compared to small molecules, a biosimilar must be "highly similar" to the reference product with "no clinically meaningful differences between the two." The BPCIA does not require reference product sponsors to list patents in an Orange Book and does not include an automatic 30-month stay of FDA approval upon the timely filing of a lawsuit. The BPCIA, however, does require a formal pre-litigation process which includes the exchange of information between a biosimilar applicant and a reference biologic sponsor that includes the identification of relevant patents and each parties' basis for infringement and invalidity. After the exchange of this information, sponsors may then initiate a lawsuit within 30 days to defend the patents identified in the exchange. If the biosimilar applicant successfully challenges the asserted patent claims it could result in the invalidation of, or render unenforceable, some or all of the relevant patent claims or result in a finding of non-infringement. Such litigation or other proceedings to enforce or defend intellectual property rights are often very complex in nature, may be very expensive and time-consuming, may divert our management's attention from our core business, and may result in unfavorable results that could limit our partners' ability to prevent third parties from competing with their products or product candidates.

Risks Related to Government Regulation and Legal Proceedings:

Market acceptance and sales of any approved product will depend significantly on the availability and adequacy of coverage and reimbursement from third-party payors and may be affected by existing and future healthcare reform measures.

Sales of the products we license to our collaboration partners and the royalties we receive will depend in large part on the extent to which coverage and reimbursement is available from government and health administration authorities, private health maintenance organizations and health insurers, and other healthcare payors. Significant uncertainty exists as to the reimbursement status of healthcare products. Healthcare payors, including Medicare, are challenging the prices charged for medical products and services. Government and other healthcare payors are increasingly attempting to contain healthcare costs by limiting both coverage and the level of reimbursement for medical products. Even if a product is approved by the FDA, insurance coverage may not be available, and reimbursement levels may be inadequate, to cover the costs associated with the research, development, marketing and sale of the product. If government and other healthcare payors do not provide adequate coverage and reimbursement levels for any product, market acceptance and any sales could be reduced.

From time to time, legislation is implemented to reign in rising healthcare expenditures. By way of example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively, the ACA, was enacted, which included a number of provisions affecting the pharmaceutical industry, including, among other things, annual, non-deductible fees on any entity that manufactures or imports some types of branded prescription drugs and increases in Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program. Since its enactment, there have been judicial, executive and Congressional challenges to certain aspects of the ACA. On June 17, 2021, the U.S. Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. Prior to the Supreme Court's decision, President Biden had issued an executive order to initiate a special enrollment period from February 15, 2021 through August 15, 2021 for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA.

Other legislative changes have been proposed and adopted since the ACA was enacted, including aggregate reductions of Medicare payments to providers of 2% per fiscal year, which was temporarily suspended from March 1, 2020 through March 31, 2022, and reduced payments to several types of Medicare providers. Moreover, there has recently been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed bills designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. Individual states in the United States have also become increasingly active in implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. We cannot predict whether other legislative changes will be adopted, if any, or how such changes would affect our operations or financial condition.

If we or our commercialization partners market products in a manner that violates healthcare laws, we may be subject to civil or criminal penalties.

We and our collaboration partners are subject to federal and state healthcare laws, including fraud and abuse, anti-kickback, false claims, physician payment transparency and civil monetary penalties. These laws may impact, among other things, financial arrangements with physicians, sales, marketing and education programs and the manner in which any of those activities are implemented. If our operations or those of our collaboration partners are found to be in violation of any of those laws or any other applicable governmental regulations, we or our collaboration partners may be subject to penalties, including civil and criminal penalties, damages, fines, imprisonment, exclusion from government healthcare programs or the curtailment or restructuring of operations, any of which could adversely affect our ability to operate our business and our financial condition.

Changes in and actual or perceived failures to comply with applicable data privacy, security and protection laws, regulations, standards and contractual obligations may adversely affect our business, operations and financial performance.

We and our partners may be subject to federal, state, and foreign laws and regulations that govern data privacy and security. The legislative and regulatory landscape for privacy and data protection continues to evolve, and there has been an increasing focus on privacy and data protection issues, which may affect our business and may increase our compliance costs and exposure to liability. In the United States, numerous federal and state laws and regulations govern the collection, use, disclosure, and protection of personal information, including state data breach notification laws, federal and state health information privacy laws, and federal and state consumer protection laws. Each of these laws is subject to varying interpretations by courts and government agencies, creating complex compliance issues. If we fail to comply with applicable laws and regulations we could be subject to penalties or sanctions, including criminal penalties if we knowingly obtain or disclose individually identifiable health information from a covered entity in a manner that is not authorized or permitted by HIPAA or applicable state laws.

We are also or may become subject to rapidly evolving data protection laws, rules and regulations in foreign jurisdictions. For example, the European Union General Data Protection Regulation (GDPR) governs certain collection and other processing activities involving personal data about individuals in the European Economic Area (EEA). Among other requirements, the GDPR regulates transfers of personal data subject to the GDPR to third countries that have not been found to provide adequate protection to such personal data, including the United States; in July 2020, the Court of Justice of the European Union (CJEU) limited how organizations could lawfully transfer personal data from the EU/EEA to the United States by invalidating the Privacy Shield for purposes of international transfers and imposing further restrictions on the use of standard contractual clauses (SCCs). The European Commission issued revised SCCs on June 4, 2021 to account for the decision of the CJEU and recommendations made by the European Data Protection Board. The revised SCCs must be used for relevant new data transfers from September 27, 2021; existing standard contractual clauses arrangements must be migrated to the revised clauses by December 27, 2022. The new SCCs apply only to the transfer of personal data outside of the EEA and not the United Kingdom; the UK's Information Commissioner's Office launched a public consultation on its draft revised data transfers mechanisms in August 2021 and laid its proposal before Parliament, with the UK SCCs expected to come into force in March 2022, with a two-year grace period. There is some uncertainty around whether the revised clauses can be used for all types of data transfers, particularly whether they can be relied on for data transfers to non-EEA entities subject to the GDPR. As supervisory authorities issue further guidance on personal data export mechanisms, including circumstances where the SCCs cannot be used, and/or start taking enforcement action, we could suffer additional costs, complaints and/or regulatory investigations or fines, and/or if we are otherwise unable to transfer personal data between and among countries and regions in which we operate, it could affect the manner in which we provide our services, the geographical location or segregation of our relevant systems and operations, and could adversely affect our financial results.

Compliance with applicable data privacy and security laws, rules and regulations could require us to take on more onerous obligations in our contracts, require us to engage in costly compliance exercises, restrict our ability to collect, use and disclose data, or in some cases, impact our or our partners' ability to operate in certain jurisdictions. Each of these constantly evolving laws can be subject to varying interpretations. If we fail to comply with any such laws, rules or regulations, we may face government investigations and/or enforcement actions, fines, civil or criminal penalties, private litigation or adverse publicity that could adversely affect our business, financial condition and results of operations.

Changes in funding for the FDA and other government agencies could hinder their ability to hire and retain key leadership and other personnel, or otherwise prevent new products and services from being developed or commercialized in a timely manner, which could negatively impact our business or the business of our partners.

The ability of the FDA to review and approve new products can be affected by a variety of factors, including government budget and funding levels, ability to hire and retain key personnel and accept the payment of user fees, and statutory, regulatory, and policy changes. Average review times at the FDA have fluctuated in recent years as a result. In addition, government funding of other government agencies that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable.

Disruptions at the FDA and other agencies may also slow the time necessary for new drugs and biologics to be reviewed and/or approved by necessary government agencies, which would adversely affect our business or the business of our partners. For example, over the last several years, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical FDA employees and stop critical activities. If a prolonged government shutdown occurs, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business. If the timing of FDA's review and approval of new products is delayed, the timing of our or our partners' development process may be delayed which would result in delayed milestone revenues and materially harm our operations of business.

Separately, in response to the COVID-19 pandemic, in March 2020, the FDA announced its intention to postpone most inspections of foreign manufacturing facilities, and on March 18, 2020, the FDA temporarily postponed routine surveillance inspections of domestic manufacturing facilities. Subsequently, in July 2020, the FDA resumed certain on-site inspections of domestic manufacturing facilities subject to a risk-based prioritization system. The FDA utilized this risk-based assessment system to assist in determining when and where it was safest to conduct prioritized domestic inspections. Additionally, on April 15, 2021, the FDA issued a guidance document in which the FDA described its plans to conduct voluntary remote interactive evaluations of certain drug manufacturing facilities and clinical research sites, among other facilities. According to the guidance, the FDA may request such remote interactive evaluations where the FDA determines that remote evaluation would be appropriate based on mission needs and travel limitations. In May 2021, the FDA outlined a detailed plan to move toward a more consistent state of inspectional operations, and in July 2021, the FDA resumed standard inspectional operations of domestic facilities and was continuing to maintain this level of operation as of September 2021. More recently, the FDA has continued to monitor and implement changes to its inspectional activities to ensure the safety of its employees and those of the firms it regulates as it adapts to the evolving COVID-19 pandemic. Regulatory authorities outside the United States may adopt similar restrictions or other policy measures in response to the COVID-19 pandemic. If a prolonged government shutdown occurs, or if global health concerns continue to hinder or prevent the FDA or other regulatory authorities from conducting their regular inspections, reviews, or other regulatory activities, it could significantly impact the ability of the FDA or other regulatory authorities to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

If plaintiffs bring product liability lawsuits against us or our partners, we or our partners may incur substantial liabilities and may be required to limit commercialization of our approved products and product candidates.

As is common in our industry, our partners and we face an inherent risk of product liability as a result of the clinical testing of our product candidates in clinical trials and face an even greater risk for commercialized products. Although we are not currently a party to product liability litigation, if we are sued, we may be held liable if any product or product candidate we develop causes injury or is found otherwise unsuitable during product testing, manufacturing, marketing or sale. Regardless of merit or eventual outcome, liability claims may result in decreased demand for any product candidates, partnered products or products that we may develop, injury to our reputation, discontinuation of clinical trials, costs to defend litigation, substantial monetary awards to clinical trial participants or patients, loss of revenue and product recall or withdrawal from the market and the inability to commercialize any products that we develop. We have product liability insurance that covers our clinical trials up to a $10.0 million annual limit. Our insurance coverage may not be sufficient to cover all of our product liability related expenses or losses and may not cover us for any expenses or losses we may suffer. If we are sued for any injury caused by our product candidates, partnered products or any future products, our liability could exceed our total assets.

We face risks related to handling of hazardous materials and other regulations governing environmental safety.

Our operations are subject to complex and stringent environmental, health, safety and other governmental laws and regulations that both public officials and private individuals may seek to enforce. Our activities that are subject to these regulations include, among other things, our use of hazardous materials and the generation, transportation and storage of waste. Although we have secured clearance from the EPA historically, and currently are operating in material compliance with applicable EPA rules and regulations, our business could be adversely affected if we discover that we or an acquired business is not in material compliance with these rules and regulations. In the future, we may pursue the use of other surfactant substances that will require clearance from the EPA, and we may fail to obtain such clearance. Existing laws and regulations may also be revised or reinterpreted, or new laws and regulations may become applicable to us, whether retroactively or prospectively, that may have a negative effect on our business and results of operations. It is also impossible to eliminate completely the risk of accidental environmental contamination or injury to individuals. In such an event, we could be liable for any damages that result, which could adversely affect our business.

Risk Related to Our Strategic Transactions:

Any difficulties from strategic acquisitions could adversely affect our stock price, operating results and results of operations.

We may acquire companies, businesses and products that complement or augment our existing business. We may not be able to integrate any acquired business successfully or operate any acquired business profitably. Integrating any newly acquired business could be expensive and time-consuming. Integration efforts often take a significant amount of time, place a significant strain on managerial, operational and financial resources and could prove to be more difficult or expensive than we predict. The diversion of our management's attention and any delay or difficulties encountered in connection with any future acquisitions we may consummate could result in the disruption of our ongoing business or inconsistencies in standards and controls that could negatively affect our ability to maintain third-party relationships. Moreover, we may need to raise additional funds through public or private debt or equity financing, or issue additional shares, to acquire any businesses or products, which may result in dilution for stockholders or the incurrence of indebtedness.

As part of our efforts to acquire companies, business or product candidates or to enter into other significant transactions, we conduct business, legal and financial due diligence with the goal of identifying and evaluating material risks involved in the transaction. Despite our efforts, we ultimately may be unsuccessful in ascertaining or evaluating all such risks and, as a result, might not realize the intended advantages of the transaction. If we fail to realize the expected benefits from acquisitions we may consummate in the future or have consummated in the past, whether as a result of unidentified risks, integration difficulties, regulatory setbacks, litigation with current or former employees and other events, our business, results of operations and financial condition could be adversely affected. If we acquire product candidates, we will also need to make certain assumptions about, among other things, development costs, the likelihood of receiving regulatory approval and the market for such product candidates. Our assumptions may prove to be incorrect, which could cause us to fail to realize the anticipated benefits of these transactions.

In addition, we will likely experience significant charges to earnings in connection with our efforts, if any, to consummate acquisitions. For transactions that are ultimately not consummated, these charges may include fees and expenses for investment bankers, attorneys, accountants and other advisors in connection with our efforts. Even if our efforts are successful, we may incur, as part of a transaction, substantial charges for closure costs associated with elimination of duplicate operations and facilities and acquired IPR&D charges. In either case, the incurrence of these charges could adversely affect our results of operations for particular quarterly or annual periods.

We recently acquired Pfenex, as well as Taurus and xCella. We may not be able to integrate these acquired businesses successfully, achieve the expected growth prospects and synergies, expected royalties and other economics or operate such businesses profitably. In addition, such acquisitions may disrupt our current plans and operations, we may not be able to retain key personnel or preserve existing business relationships following such acquisitions, and may incur unexpected costs, charges or expenses resulting from completion of the acquisitions.

We also recently announced the disposition of Vernalis (R&D) Limited. We may not realize expected future benefits from the Vernalis transaction, including from retained licenses and collaboration economics and as a result of indemnification claims under the Vernalis Purchase Agreement and our retention of certain liabilities associated with the Vernalis business.

If we fail to realize the expected benefits from these acquisitions and Vernalis disposition, our business, results of operations and financial condition could be adversely affected.

Other Risks:

Our operating results may fluctuate significantly, which makes our future operating results difficult to predict and could cause our operating results to fall below expectations or any guidance we may provide.

Our quarterly and annual operating results may fluctuate significantly, which makes it difficult for us to predict our future operating results. These fluctuations may occur due to a variety of factors, many of which are outside of our control, including, but not limited to:

- the royalties from the sales of Kyprolis, Evomela and other products sold by our partners;
- the success of our collaboration partners' preclinical and clinical programs;
- the timing of Captisol purchases for use in clinical trials and commercial products;
- the timing and cost of, and level of investment in, research, development, regulatory approval and commercialization activities relating to our internal development programs, which may change from time to time;
- expenditures that we may incur to acquire or develop additional product candidates and platform technologies; and
- future accounting pronouncements or changes in our accounting policies.

The cumulative effects of these factors could result in large fluctuations and unpredictability in our quarterly and annual operating results and revenues. This variability and unpredictability could result in our failing to meet the expectations of industry or financial analysts or investors for any period. If our revenue or operating results fall below the expectations of analysts or investors or below any forecasts we may provide to the market, or if the forecasts we provide to the market are below the expectations of analysts or investors, the price of our common stock could decline substantially. Such a stock price decline could occur even when we have met any previously publicly stated revenue or earnings guidance we may provide.

Changes or modifications in financial accounting standards, including those related to revenue recognition, may harm our results of operations.

From time to time, the FASB either alone or jointly with other organizations, promulgates new accounting principles that could have an adverse impact on our results of operations. For example, in May 2014, FASB issued an accounting standard for revenue recognition-Accounting Standards Codification Topic 606, *Revenue from Contracts with Customers*, or ASC 606-that supersedes most current revenue recognition guidance. The guidance requires a company to recognize revenue upon transfer of goods or services to a customer at an amount that reflects the expected consideration to be received in exchange for those goods or services. The guidance became effective in fiscal 2018.

Under ASC 606, Ligand estimates and books royalties in the same quarter that our partners report the sale of the underlying product. We rely on our partners' earning releases and other information from our partners to determine the sales of our partners' products and to estimate the related royalty revenues. If our partners report incorrect sales, or if our partners delay reporting of their earnings release, our royalty estimates may need to be revised and/or our financial reporting may be delayed.

Our ability to use our net operating loss carryforwards and certain other tax attributes to offset future taxable income may be subject to certain limitations.

As of December 31, 2021, we had U.S. federal and state net operating loss carryforwards (NOLs) of approximately $119.6 million and $176.3 million, respectively. Our federal NOLs expire through 2037 and our state NOLs begin to expire in 2032, if not utilized. Under the Tax Act, any federal NOLs arising in taxable years ending after December 31, 2017 will carry forward indefinitely. As of December 31, 2021, we had federal and California research and development tax credit carryforwards of approximately $9.8 million and $29.7 million, respectively. The federal research and development tax credit carryforwards expire in various years through 2041, if not utilized. The California research and development credit will carry forward indefinitely. Under Sections 382 and 383 of Internal Revenue Code of 1986, as amended (Code) if a corporation undergoes an "ownership change," the corporation's ability to use its pre-change NOLs and other pre-change tax attributes, such as research tax credits, to offset its future post-change income and taxes may be limited. In general, an "ownership change" occurs if there is a cumulative change in our ownership by "5% shareholders" that exceeds 50 percentage points over a rolling three-year period. Similar rules may apply under state tax laws. We believe we have experienced certain ownership changes in the past and have reduced our deferred tax assets related to NOLs and research and development tax credit carryforwards accordingly. In the event that it is determined that we have in the past experienced additional ownership changes, or if we experience one or more ownership changes as a result future transactions in our stock, then we may be further limited in our ability to use our NOLs and other tax assets to reduce taxes owed on the net taxable income that we earn in the event that we attain profitability. Furthermore, under the Tax Act, although the treatment of tax losses generated in tax years beginning before December 31, 2017 has generally not changed, tax losses generated in tax years beginning after December 31, 2017 may only offset 80% of our taxable income. This change may require us to pay federal income taxes in future years despite having potentially generated a loss for federal income tax purposes in prior years. Any such limitations on the ability to use our NOLs and other tax assets could adversely impact our business, financial condition and operating results.

The occurrence of a catastrophic disaster could disrupt our business, damage our facilities beyond insurance limits or increase our costs and expenses.

We are vulnerable to damage and business disruptions from natural or man-made disasters, such as earthquakes, tornadoes, severe weather conditions, power loss, fire, floods and similar events, as well as from accidental loss or destruction. If any disaster were to occur, our ability to operate our business could be seriously impaired. We have property, liability, and business interruption insurance which may not be adequate to cover our losses resulting from disasters or other similar significant business interruptions, and we do not plan to purchase additional insurance to cover such losses due to the cost of obtaining such coverage. Any significant losses that are not recoverable under our insurance policies could seriously impair our business, financial condition and prospects. Our ability to obtain Captisol supply from our third-party manufactures could be disrupted if the operations of these manufacturers were affected by a natural or man-made disaster or other business interruption. In addition, we rely on our partners to generate most of our revenues through royalties, Captisol sales and development activities and any disruptions to their business as a result of such disasters could negatively impact our revenues.

We rely on information technology and any failure, inadequacy, interruption or security lapse of that technology, including any cyber security incidents, could harm our ability to operate our business effectively.

Our business is increasingly dependent on critical, complex and interdependent information technology systems, including internet-based systems, to support business processes as well as internal and external communications. We operate some of these systems and networks, but we also rely on third-party providers for various products and services across our operations. Despite the implementation of security measures, our information technology systems and those of our partners and third party service providers are vulnerable to damage from cyber-attacks, computer viruses and malware (e.g. ransomware), security breaches, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures.

Attacks upon information technology systems are increasing in their frequency, levels of persistence, sophistication and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of motives and expertise. Furthermore, because the technologies used to obtain unauthorized access to, or to sabotage or disrupt, systems change frequently and often are not recognized until launched against a target, we may be unable to anticipate these techniques or implement adequate preventative measures. We may also experience security breaches that may remain undetected for an extended period. Even if identified, we may be unable to adequately investigate or remediate incidents or breaches due to attackers increasingly using tools and techniques that are designed to circumvent controls, to avoid detection, and to remove or obfuscate forensic evidence. As a result of the COVID-19 pandemic, we may also face increased cybersecurity risks due to our reliance on internet technology and the number of our and our service providers' employees who are (and may continue to be) working remotely, which may create additional opportunities for cybercriminals to exploit vulnerabilities. The White House, SEC and other regulators have also increased their focus on companies' cybersecurity vulnerabilities and risks.

We and certain of our service providers are from time to time, subject to cyberattacks and security incidents. While we do not believe that we have experienced any significant system failures, accidents or security breaches, if such an event were to occur and cause interruptions in our or our critical third parties' operations, it could lead to the loss of trade secrets or other intellectual property, as well as the public exposure of personal information of our employees and others, and could result in a material disruption of our clinical and commercialization activities and business operations, in addition to possibly requiring substantial expenditures to remedy. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and our business, reputation, and financial condition could be harmed. Any losses, costs or liabilities may not be covered by, or may exceed the coverage limits of, any or all applicable insurance policies.

The occurrence of a catastrophic disaster could damage our facilities beyond insurance limits or we could lose key data which could cause us to curtail or cease operations.

We are vulnerable to damage and/or loss of vital data from natural disasters, such as earthquakes, tornadoes, power loss, fire, floods and similar events, as well as from accidental loss or destruction. If any disaster were to occur, our ability to operate our business could be seriously impaired. We have property, liability, and business interruption insurance which may not be adequate to cover our losses resulting from disasters or other similar significant business interruptions, and we do not plan to purchase additional insurance to cover such losses due to the cost of obtaining such coverage. Any significant losses that are not recoverable under our insurance policies could seriously impair our business, financial condition and prospects.

Conversion of our outstanding convertible notes may result in losses, result in the dilution of existing stockholders, create downward pressure on the price of our common stock, and restrict our ability to take advantage of future opportunities.

In May 2018, we issued $750.0 million principal amount of the 2023 Notes. The sale of the 2023 Notes may affect our earnings per share figures, as accounting procedures require that we include in our calculation of earnings per share the number of shares of our common stock into which the 2023 Notes are convertible. The convertible notes may be converted into cash and shares of our common stock, if any (subject to our right or obligation to pay cash in lieu of all or a portion of such shares). If shares of our common stock are issued to the holders of the convertible notes upon conversion, there will be dilution to our shareholders equity and the market price of our shares may decrease due to the additional selling pressure in the market. Any downward pressure on the price of our common stock caused by the sale or potential sale of shares issuable upon conversion of the convertible notes could also encourage short sales by third parties, creating additional selling pressure on our stock. Upon the occurrence of certain circumstances, holders of the convertible notes may require us to purchase all or a portion of their notes for cash, which may require the use of a substantial amount of cash. If such cash is not available, we may be required to sell other assets or enter into alternate financing arrangements at terms that may or may not be desirable. The existence of the convertible notes and the obligations that we incurred by issuing them may restrict our ability to take advantage of certain future opportunities, such as engaging in future debt or equity financing activities.

As of December 31, 2021, we had $343.3 million aggregate principal amount of 2023 Notes. The notes are convertible into cash, and if applicable, shares of our common stock under certain circumstances, including trading price conditions related to our common stock. Upon conversion, we are required to record a gain or loss for the difference between the fair value of the notes to be extinguished and their corresponding net carrying value. The fair value of the notes to be extinguished depends on our current incremental borrowing rate. If our incremental borrowing rate at the time of conversion is lower than the implied interest rate of the notes, we will record a loss in our consolidated statement of income during the period in which the notes are converted.

Impairment charges pertaining to goodwill, identifiable intangible assets or other long-lived assets from our mergers and acquisitions could have an adverse impact on our results of operations and the market value of our common stock.

The total purchase price pertaining to our acquisitions in recent years have been allocated to net tangible assets, identifiable intangible assets, in-process research and development and goodwill. To the extent the value of goodwill or identifiable intangible assets or other long-lived assets become impaired, we will be required to incur material charges relating to the impairment. Any impairment charges could have a material adverse impact on our results of operations and the market value of our common stock.

Our investments are subject to market and credit risks that could diminish their value and these risks could be greater during periods of extreme volatility or disruption in the financial and credit markets, which could adversely impact our business, financial condition, results of operations, liquidity and cash flows.

Our investments are subject to risks of credit defaults and changes in market values. Periods of macroeconomic weakness or recession, heightened volatility or disruption in the financial and credit markets could increase these risks, potentially resulting in other than temporary impairment of assets in our investment portfolio. Any event reducing the estimated fair value of these securities, other than on a temporary basis, could have a material and adverse effect on our business, results of operations, financial condition, liquidity and cash flows. If our investment manager, fails to react appropriately to difficult market, economic and geopolitical conditions, our investment portfolio could incur material losses.

We have a risk management framework in place to identify, assess and prioritize risks, including the market and credit risks to which our investments are subject. As part of that framework, we test our investment portfolio based on various market scenarios. Under certain stressed market scenarios, unrealized losses on our investment portfolio could lead to material reductions in its carrying value.

A decline in fair value below the amortized cost of a security requires management to assess whether an impairment has occurred. The decision on whether to record an impairment is determined in part by our assessment of the financial condition and prospects of a particular issuer, projections of future cash flows and recoverability of the particular security as well as management’s assertion of whether it is more likely than not that we will sell the particular security before recovery.

Our charter documents and concentration of ownership may hinder or prevent change of control transactions.

Provisions contained in our certificate of incorporation and bylaws may discourage transactions involving an actual or potential change in our ownership. In addition, our Board of Directors may issue shares of common or preferred stock without any further action by the stockholders. Our directors and certain of our institutional investors collectively beneficially own a significant portion of our outstanding common stock. Such provisions and issuances may have the effect of delaying or preventing a change in our ownership. If changes in our ownership are discouraged, delayed or prevented, it would be more difficult for our current Board of Directors to be removed and replaced, even if you or our other stockholders believe that such actions are in the best interests of us and our stockholders.

Our amended and restated bylaws provide that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the General Corporation Law of Delaware or our amended and restated certificate of incorporation or amended and restated bylaws, or (iv) any action asserting a claim governed by the internal affairs doctrine. To the extent that any such claims may be based upon federal law claims, Section 27 of the Exchange Act creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. Furthermore, Section 22 of the Securities Act provides for concurrent jurisdiction for federal and state courts over all suits brought to enforce any duty or liability created by the Securities Act or the rules and regulations thereunder, and as such, the exclusive jurisdiction clauses set forth above would not apply to such suits. The choice of forum provisions in our amended and restated bylaws may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. By agreeing to these provisions, however, stockholders will not be deemed to have waived our compliance with the federal securities laws and the rules and regulations thereunder. Furthermore, the enforceability of similar choice of forum provisions in other companies' certificates of incorporation and bylaws has been challenged in legal proceedings, and it is possible that a court could find these types of provisions to be inapplicable or unenforceable. If a court were to find the choice of forum provisions in our amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

Our stock price has been volatile and could experience a sudden decline in value.

The market prices for securities of biotechnology and pharmaceutical companies have historically been highly volatile, and the market has recently experienced significant price and volume fluctuations that are unrelated to the operating performance of particular companies. Continued volatility in the overall capital markets could reduce the market price of our common stock in spite of our operating performance. Further, high stock price volatility could result in higher share-based compensation expense.

Our common stock has experienced significant price and volume fluctuations and may continue to experience volatility in the future. Many factors may have a significant impact on the market price of our common stock, including, but not limited to, the following factors: results of or delays in our preclinical studies and clinical trials; the success of our collaboration agreements; publicity regarding actual or potential medical results relating to products under development by us or others; announcements of technological innovations or new commercial products by us or others; developments in patent or other proprietary rights by us or others; market perception of our plan to spin out the OmniAb business; comments or opinions by securities analysts or major stockholders or changed securities analysts' reports or recommendations; future sales or shorting of our common stock by existing stockholders; regulatory developments or changes in regulatory guidance; litigation or threats of litigation; economic and other external factors or other disaster or crises; the departure of any of our officers, directors or key employees; period-to-period fluctuations in financial results; and price and volume fluctuations in the overall stock market.

Our results of operations and liquidity needs could be materially negatively affected by market fluctuations and economic downturn.

Our results of operations could be materially negatively affected by economic conditions generally, both in the United States and elsewhere around the world. Concerns over inflation, energy costs, geopolitical issues, public health emergencies, the availability and cost of credit, and the U.S. financial markets have in the past contributed to, and may continue in the future to contribute to, increased volatility and diminished expectations for the economy and the markets. For example, the outbreak of a novel strain of coronavirus has affected the People's Republic of China and elsewhere and has affected worldwide equity markets. Domestic and international equity markets periodically experience heightened volatility and turmoil. These events may have an adverse effect on us. In the event of a market downturn, our results of operations could be adversely affected by those factors in many ways, including making it more difficult for us to raise funds if necessary, and our stock price may further decline. We cannot provide assurance that our investments are not subject to adverse changes in market value. If our investments experience adverse changes in market value, we may have less capital to fund our operations.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The following table summarizes our principal facilities leased as of December 31, 2021, including the location and size of each facility, and their designated use. We also lease facilities in other locations. In 2022, we are expanding our office and research and development facilities in Emeryville and will lease approximately 35,000 square feet of space under leases expiring in 2032. We believe our facilities are adequate for our current and near-term needs, and we will be able to locate additional facilities, as needed.

Location	Approximate Square Feet	Operation	Lease Expiration Date
San Diego, CA	54,000	Office and laboratory	March 2024
Emeryville, CA	22,000	Corporate headquarter office and laboratory	March 2032
Durham, NC	30,000	Office and laboratory	February 2029
Las Vegas, NV	2,100	Office	September 2022

Item 3. Legal Proceedings

See "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (10), Commitments and Contingencies—Legal Proceedings.*"

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters, and Issuer Purchases of Equity Securities

Our common stock is traded on the Nasdaq Global Market under the symbol “LGND.” As of February 23, 2022, there were approximately 398 holders of record of the common stock.

Except for 2007, during which we declared a cash dividend on our common stock of $2.50 per share, we have not paid any dividends on our common stock in the past and currently do not expect to pay cash dividends or make any other distributions on common stock in the future. We expect to retain our future earnings, if any, for use in the operation and expansion of our business, to pay down debt and potentially for share repurchases. Any future determination to pay dividends on common stock will be at the discretion of our board of directors and will depend upon our financial condition, results of operations, capital requirements and such other factors as the board deems relevant.

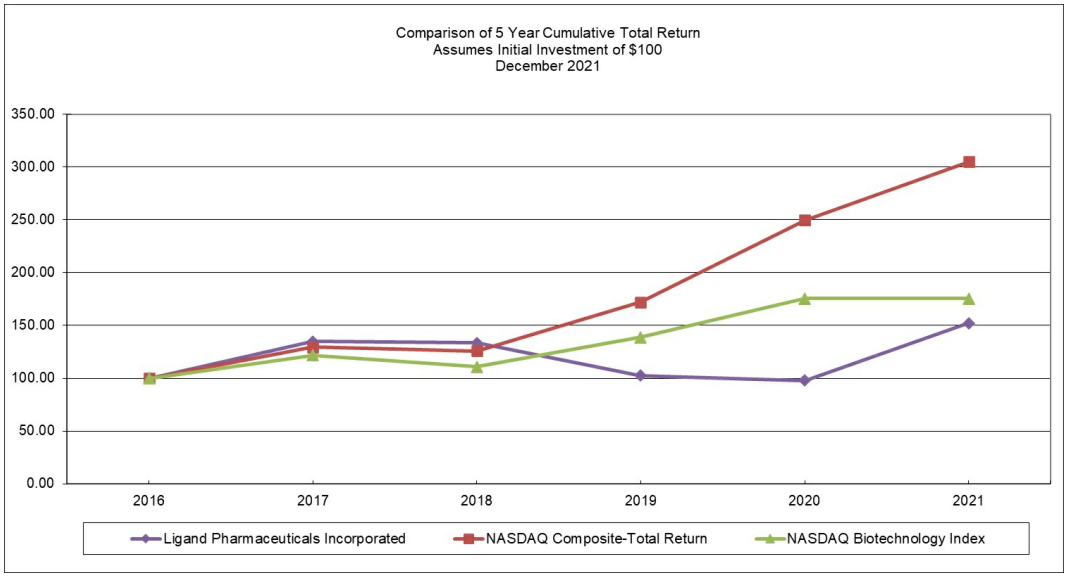
During the fiscal year ended December 31, 2021, we did not repurchase any shares of our common stock under the stock repurchase program approved by our board of directors in September 2019, under which we may acquire up to $500 million of our common stock in open market and negotiated purchases for a period of up to three years. Authorization to repurchase $248.8 million of our common stock remained available as of December 31, 2021.

The information required by Item 201(d) of Regulation S-K is incorporated by reference to the 2022 Annual Meeting Proxy Statement as defined in Item 10 below.

Performance Graph

The graph below shows the five-year cumulative total stockholder return assuming the investment of $100 and is based on the returns of the component companies weighted monthly according to their market capitalizations. The graph compares total stockholder returns of our common stock, of all companies traded on the Nasdaq Stock market, as represented by the Nasdaq Composite® Index, and of the Nasdaq Biotechnology Stock Index, as prepared by The Nasdaq Stock Market Inc.

The stockholder return shown on the graph below is not necessarily indicative of future performance and we will not make or endorse any predictions as to future stockholder returns.



Value of $100 Invested Over Time

	12/31/2016	12/31/2017	12/31/2018	12/31/2019	12/31/2020	12/31/2021
Ligand	$ 100.00	$ 134.76	$ 133.55	$ 102.64	$ 97.87	$ 152.01
NASDAQ Composite-Total Return	$ 100.00	$ 129.64	$ 125.96	$ 172.18	$ 249.51	$ 304.85
NASDAQ Biotechnology Index	$ 100.00	$ 121.66	$ 110.88	$ 138.72	$ 175.38	$ 175.41

Item 6. **[RESERVED]**

Item 7. **Management's Discussion and Analysis of Financial Condition and Results of Operations**

Our Management's Discussion and Analysis of Financial Condition and Results of Operations (MD&A) will help readers understand our results of operations, financial condition, and cash flows. It is provided in addition to the accompanying consolidated financial statements and notes. Comparisons under this heading refer to twelve months ended December 31, 2021 and 2020, respectively, unless otherwise indicated.

Our MD&A is organized as follows:

- *Results of Operations.* Detailed discussion of our revenue and expenses for twelve months ended December 31, 2021 and 2020. A comparison of our results of operations for twelve months ended December 31, 2020 and 2019 can be found under "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations*" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2020, filed with the SEC on February 24, 2021.
- *Liquidity and Capital Resources.* Discussion of key aspects of our consolidated statements of cash flows, changes in our financial position, and our financial commitments.
- *Critical Accounting Policies and Estimates.* Discussion of significant changes we believe are important to understand the assumptions and judgments underlying our consolidated financial statements.
- *Recent Accounting Pronouncements.* For summary of recent accounting pronouncements applicable to our consolidated financial statements, see "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (1), Basis of Presentation and Summary of Significant Accounting Policies*."

Results of Operations

Financial results for the year ended December 31, 2021 in this report differ from those included in our earnings release issued February 17, 2022 in that the earnings did not reflect an adjustment to the income tax benefit of $0.4 million that we identified subsequent to the issuance of our earnings release.

Revenue

(Dollars in thousands)	2021	2020	Change	% Change
Royalties	$ 48,927	$ 33,796	$ 15,131	45 %
Captisol Sales	164,250	109,959	54,291	49 %
Contract Revenue	63,956	42,664	21,292	50 %
Total revenue	$ 277,133	$ 186,419	$ 90,714	49 %

Royalty revenue is a function of our partners' product sales and the applicable royalty rate. Kyprolis royalty rate is under a tiered royalty rate structure with the highest being 3.0%. Evomela has a fixed royalty rate of 20%. Royalty revenue increased in 2021 as compared to 2020 driven primarily by increases in sales of Evomela and Kryprolis plus the additional royalties from the sale of drugs using the Pelican platform - Rylaze, Pneumosil and Teriparatide. Captisol sales increased year over year in 2021 primarily due to shipments to Gilead for manufacturing Veklury (remdesivir). Contract revenue increased year over year in 2021 due to the continued growth in the OmniAb discovery platform as well as milestone revenue from the acquisitions of Icagen in April 2020 and Pfenex in October 2020.

The following table represents royalty revenue by program:

(in millions)	2021 Estimated Partner Product Sales	Effective Royalty Rate	2021 Royalty Revenue	2020 Estimated Partner Product Sales	Effective Royalty Rate	2020 Royalty Revenue
Kyprolis	$ 1,148.9	2.4%	$ 27.5	$ 1,094.6	2.3%	$ 25.2
Evomela	50.5	20.0%	10.1	32.6	20.0%	6.4
Other	288.7	3.9%	11.3	178.5	1.2%	2.2
Total	$ 1,488.1		$ 48.9	$ 1,305.7		$ 33.8

Operating Costs and Expenses

(Dollars in thousands)	2021	2020	Change	% Change
Cost of Captisol	$ 62,176	$ 30,419	$ 31,757	104 %
Amortization of intangibles	47,167	23,442	23,725	101 %
Research and development	69,012	59,392	9,620	16 %
General and administrative	57,483	64,435	(6,952)	(11) %
Other operating income	(37,600)	—	(37,600)	N/A
Total operating costs and expenses	$ 198,238	$ 177,688	$ 20,550	12 %

Total operating costs and expenses for 2021 increased $20.6 million or 12% compared with 2020.

Cost of Captisol increased year over year in 2021 primarily due to higher sales of Captisol during 2021.

Amortization of intangibles increased year over year in 2021 primarily due to the acquisition of Pfenex in October 2020.

At any one time, we are working on multiple programs. As such, we generally do not track our R&D expenses on a specific program basis. Our R&D expenses increased year over year in 2021 due to the acquisitions of Icagen in April 2020 and Pfenex in October 2020, which primarily consisted of salaries and lab costs associated with Icagen ($16.5 million) and Pfenex ($22.7 million).

General and administrative expenses increased year over year in 2020 primarily due to $20.7 million acquisition and integration related expenses associated with the Pfenex acquisition.

Other operating income in 2021 was due to reducing the fair value of the CVR liability associated to the acquisition of Pfenex to zero, as the CVR payment expiration date passed on December 31, 2021 without achieving the triggering event. We did not have any other operating income in 2020.

We do not provide forward-looking estimates of costs and time to complete our ongoing research and development projects as such estimates would involve a high degree of uncertainty. Uncertainties include our inability to predict the outcome of research and clinical studies, regulatory requirements placed upon us by regulatory authorities such as the FDA and EMA, our inability to predict the decisions of our partners, our ability to fund research and development programs, competition from other entities of which we may become aware in future periods, predictions of market potential for products that may be derived from our work, and our ability to recruit and retain personnel or third-party contractors with the necessary knowledge and skills to perform certain research. Refer to "*Item 1A. Risk Factors*" for additional discussion of the uncertainties surrounding our research and development initiatives.

Other income (expense)

(Dollars in thousands)	2021	2020	Change	% Change
Gain (loss) from short-term investments	$ (3,997)	$ (16,933)	$ 12,936	(76) %
Interest income	886	8,078	(7,192)	(89) %
Interest expense	(19,626)	(27,420)	7,794	28 %
Other expense, net	(8,860)	(108)	(8,752)	(8104) %
Total other income (expense), net	$ (31,597)	$ (36,383)	$ 4,786	13 %

The fluctuation in the gain (loss) from short-term investments is primarily driven by the changes in the fair value of our ownership in Viking common stock (an unrealized loss of $9.6 million in 2021 as compared to an unrealized loss of $19.0 million in 2020).

Interest income consists primarily of interest earned on our short-term investments. The year over year decrease in 2021 resulted from the decrease in our short-term investment balances due to the usage of funds for the 2023 Notes repurchases.

Interest expense includes the 0.75% coupon cash interest expense in addition to the non-cash accretion of discount (including the amortization of debt issuance costs) on our 2023 Notes. The year over year decrease in 2021 was primarily due to lower average debt outstanding balance as compared to the prior year. The 2019 Notes were paid off upon the maturity date in August 2019. During 2021, we repurchased $152.0 million in principal of the 2023 Notes for $156.0 million in cash, including accrued interest of $0.3 million. See "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (7), Convertible Senior Notes.*"

Other expense, net, increased year over year in 2021 primarily due to a $7.3 million loss on our debt extinguishments compared to $2.5 million loss on debt extinguishments in 2020. See additional information in "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (1), Basis of Presentation and Summary of Significant Accounting Policies - Commercial License and Other Economic Rights.*"

Income tax benefit (expense)

(Dollars in thousands)	**2021**	**2020**	**Change**	**% Change**
Income before income tax expense (benefit)	$ 47,298	$ (10,538)	$ 57,836	(549) %
Income tax benefit (expense)	9,840	7,553	2,287	30 %
Net income (loss)	$ 57,138	$ (2,985)	$ 60,123	(2,014) %
Effective Tax Rate	(21) %	72 %		

Our effective tax rate for 2021 and 2020 was (21)% and 72%, respectively. Our tax rate is affected by recurring items, such as the U.S. federal and state statutory tax rates and the relative amounts of income we earn in those jurisdictions, which we expect to be fairly consistent in the near term. It is also affected by discrete items that may occur in any given year, but are not consistent from year to year. In 2021, the variance from the U.S. federal statutory rate of 21% was primarily attributable to the mix of earnings in jurisdictions with lower statutory rates than the U.S. federal statutory tax rate, primarily due to excess benefits from shared-based compensation. In 2020, the variance from the U.S. federal statutory rate of 21% was primarily attributable to the mix of earnings in jurisdictions with lower statutory rates than the U.S. federal statutory tax rate, primarily the United Kingdom. The items below also had an impact on the difference between our statutory U.S. rate.

2021

- $11.9 million (25.2%) decrease due to excess tax benefits from share-based compensation which are recorded as a discrete item within the provision for income tax pursuant to ASU 2016-09
- $8.2 million (17.3%) decrease due to the revaluation of contingent value rights
- $3.2 million (6.8%) increase from Section 162(m) limitation
- $2.7 million (5.7%) decrease from research and development tax credits

2020

- $2.4 million (22.9%) increase from Section 162(m) limitation
- $1.7 million (15.7%) decrease from the foreign-derived intangible income deduction
- $1.5 million (13.8%) increase from state income taxes
- $0.9 million (8.3%) increase due to non-deductible transaction costs primarily related to the acquisition of Pfenex
- $0.7 million (6.6%) decrease from research and development tax credits
- $0.3 million (3.4%) decrease due to excess tax benefits from share-based compensation which are recorded as a discrete item within the provision for income tax pursuant to ASU 2016-09

Liquidity and Capital Resources

At December 31, 2021, we had approximately $341.1 million in cash, cash equivalents, and short-term investments. Cash and cash equivalents and short-term investments decreased by $70.1 million from last year, due to factors described in the "Cash Flow Summary" below. Our primary source of liquidity, other than our holdings of cash, cash equivalents, and investments, which decreased during 2021 primarily from extinguishment of debt, has been cash flows from operations. Our ability to generate cash from operations provides us with the financial flexibility we need to meet operating, investing, and financing needs.

Historically, we have liquidated our short-term investments and/or issued debt and equity securities to finance our business needs as a supplement to cash provided by operating activities. Our short-term investments include U.S. government debt securities, investment-grade corporate debt securities, mutual funds and certificates of deposit. We have established guidelines relative to diversification and maturities of our investments in order to provide both safety and liquidity. These guidelines are periodically reviewed and modified to take advantage of trends in yields and interest rates. Additionally, we own certain securities which are classified as short-term investments that we received as a result of a milestone and an upfront license payment as well as 6.7 million shares of common stock in Viking.

In August 2014, we issued the 2019 Notes with aggregate principal amount of $245.0 million. During 2018, $217.7 million in principal of the 2019 Notes were converted into cash. In June 2019, we received notices for conversion of $1.0 million of principal amount of the 2019 Notes, which were settled in cash upon the 2019 Notes' maturity date in August 2019. On August 15, 2019, the 2019 Notes maturity date, we paid the noteholders the remaining $26.3 million principal amount.

In May 2018, we issued the 2023 Notes with an aggregate principal amount of $750.0 million. A portion of the proceeds from such issuance totaling $49.7 million were used to repurchase 260,000 shares of our common stock. During 2020, we repurchased $254.7 million in principal of the 2023 Notes for $222.8 million in cash, including accrued interest of $0.6 million. During 2021, we repurchased $152.0 million in principal of the 2023 Notes for $156.0 million in cash, including accrued interest of $0.3 million. After the repurchases, $343.3 million in principal amount of the 2023 Notes remain outstanding as of December 31, 2021. During February 2022, we repurchased additional $125.5 million in principal of the 2023 Notes for $123.9 million in cash, including accrued interest of $0.3 million.

We may continue to use cash on hand to repurchase additional 2023 Notes through open-market transactions, including through Rule 10b5-1 trading plan to facilitate open-market repurchases, or otherwise, from time to time. The timing and amount of repurchase transactions will be determined by management based on the evaluation of market conditions, trading price of the 2023 Notes, legal requirements and other factors. The 2023 Notes were not convertible as of December 31, 2021. It is our intent and policy to settle conversions through combination settlement, which essentially involves payment in cash equal to the principal portion and delivery of shares of common stock for the excess of the conversion value over the principal portion. See detail in "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (7), Convertible Senior Notes*."

We are obligated to make payments to operating leases, including rental commitments on leases that have not yet commenced. For information on these obligations, see detail in "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (6), Leases*."

We also have commitments under our supply agreement with Hovione for Capitsol purchases. Total purchase obligation as of December 31, 2021 was $40.9 million, of which $24.0 million is expected to be paid within a year and the remain amount is expected to be paid between 1 to 3 years.

In September 2018, our Board of Directors authorized us to repurchase up to $200.0 million of our common stock from time to time over a period of up to three years. On January 23, 2019, our Board of Directors increased the share repurchase authorization by $150.0 million. The available amount under the $350.0 million repurchase plan was fully utilized during the third quarter of 2019.

On September 11, 2019, our Board of Directors approved a stock repurchase program authorizing the repurchase of up to $500.0 million of our common stock from time to time over the next three years. We expect to acquire shares primarily through open-market transactions and have entered into a Rule 10b5-1 trading plan, and may enter into additional Rule 10b5-1 trading plans in the future, to facilitate open-market repurchases. The timing and amount of repurchase transactions will be determined by management based on our evaluation of market conditions, share price, legal requirements and other factors. Our prior $350.0 million stock repurchase program mentioned above was terminated in connection with the approval of the new stock repurchase program. Authorization to repurchase $248.8 million of our common stock remained available as of December 31, 2021. See "*Item 5. Market for Registrant's Common Equity, Related Stockholder Matters, and Issuer Purchase of Equity Securities*."

We believe that existing funds, cash generated from operations and existing sources of and access to financing are adequate to satisfy our needs for working capital; capital expenditure and debt service requirements; continued advancement of research and development efforts; potential stock repurchases; and other business initiatives we plan to strategically pursue, including acquisitions and strategic investments.

As of December 31, 2021, we had $11.1 million in fair value of contingent consideration liabilities associated with the acquisitions to be settled in future periods.

Cash Flow Summary

(in thousands)	2021	2020	2019
Net cash provided by (used in):			
Operating activities	$ 78,798	$ 54,586	$ (29,336)
Investing activities	$ 30,523	$ 231,648	$ 466,918
Financing activities	$ (137,761)	$ (310,545)	$ (485,172)

In 2021, we generated cash from operations, primarily from issuance of common stock under employee stock plans. During the year we generated cash from investing activities due to the proceeds from the sale and maturity of short-term investments. We used cash for financing activities, including the payments related to the extinguishment of certain 2023 Notes.

In 2020, we generated cash from operations, from the sale of Vernalis R&D business and from issuance of common stock under employee stock plans. During the year we used cash for investing activities, including the acquisition of Pfenex, Icagen, xCella and Taurus. We also used cash for financing activities, including the payments related to the extinguishment of certain 2023 Notes and stock repurchases.

In 2019, we generated $827 million from the sale of the Promacta license (including $14.2 million recorded to revenue related to the Promacta royalty for the period between January 1, 2019 and March 6, 2019), used cash for net purchases of short-term investments, used $453.0 million to repurchase our common stock, used $103.8 million to pay federal and state estimated income taxes, paid off the remaining balance of the 2019 Notes in the amount of $27.3 million, paid $12.0 million for the purchase of Novan economic rights and paid $11.8 million for the Ab Initio acquisition (net of cash acquired).

Critical Accounting Policies and Estimates

The preparation of financial statements in conformity with GAAP requires estimates and assumptions that affect the reported amounts of assets and liabilities, revenues and expenses, and related disclosures of contingent liabilities in the consolidated financial statements and accompanying notes. The SEC has defined a company's critical accounting policies as the ones that are most important to the portrayal of the company's financial condition and results of operations, and which require the company to make its most difficult and subjective judgments, often as a result of the need to make estimates of matters that are inherently uncertain. Based on this definition, we have identified the critical accounting policies and judgments addressed below. We also have other key accounting policies, which involve the use of estimates, judgments, and assumptions that are significant to understanding our results. For additional information, see "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (1), Basis of Presentation and Summary of Significant Accounting Policies*." Although we believe that our estimates, assumptions, and judgments are reasonable, they are based upon information presently available. Actual results may differ significantly from these estimates under different assumptions, judgments, or conditions.

Revenue Recognition

We apply the following five-step model in accordance with ASC 606 in order to determine the revenue: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation.

We receive royalty revenue on sales by our partners of products covered by patents that we or our partners own under contractual agreements. We do not have future performance obligations under these license arrangements. We generally satisfy our obligation to grant intellectual property rights on the effective date of the contract. However, we apply the royalty recognition constraint required under the guidance for sales-based royalties which requires a royalty to be recorded no sooner than the underlying sale occurs. Therefore, royalties on sales of products commercialized by our partners are recognized in the quarter the product is sold. Our partners generally report sales information to us on a one quarter lag. Thus, we estimate the expected royalty proceeds based on an analysis of historical experience and interim data provided by our partners including their publicly announced sales. Differences between actual and estimated royalty revenues, which have not been material, are adjusted in the period in which they become known, typically the following quarter.

Our contracts with customers often will include variable consideration in the form of contingent milestone-based payments. We include contingent milestone based payments in the estimated transaction price when it is probable a significant reversal in the amount of cumulative revenue recognized will not occur. These estimates are based on historical experience,

anticipated results and our best judgment at the time. If the contingent milestone based payment is sales-based, we apply the royalty recognition constraint and record revenue when the underlying sale has taken place. Significant judgments must be made in determining the transaction price for our sales of intellectual property. Because of the risk that products in development with our partners will not reach development based milestones or receive regulatory approval, we generally recognize any contingent payments that would be due to us upon the development milestone or regulatory approval. Depending on the terms of the arrangement, we may also defer a portion of the consideration received if we have to satisfy a future obligation, which typically occurs with our contracts for R&D services.

For R&D services we recognize revenue over time and we measure our progress using an input method. The input methods we use are based on the effort we expend or costs we incur toward the satisfaction of our performance obligation. We estimate the amount of effort we expend, including the time it will take us to complete the activities, or the costs we may incur in a given period, relative to the estimated total effort or costs to satisfy the performance obligation. This results in a percentage that we multiply by the transaction price to determine the amount of revenue we recognize each period. This approach requires us to make numerous estimates and use significant judgement. If our estimates or judgements change over the course of the collaboration, they may affect the timing and amount of revenue that we recognize in the current and future periods.

Revenue from Captisol sales is recognized when control of Captisol material or intellectual property license rights is transferred to our customers in an amount that reflects the consideration we expect to receive from our customers in exchange for those products. A performance obligation is considered distinct from other obligations in a contract when it provides a benefit to the customer either on its own or together with other resources that are readily available to the customer and is separately identified in the contract. For Captisol material, we consider our performance obligation is satisfied at a point in time, once we have transferred control of the product, meaning the customer has the ability to use and obtain the benefit of the Captisol material or intellectual property license right. We recognize revenue for satisfied performance obligations only when we determine there are no uncertainties regarding payment terms or transfer of control. Sales tax and other taxes we collect concurrent with revenue-producing activities are excluded from revenue. We have elected to recognize the cost of freight and shipping when control over Captisol material has transferred to the customer as an expense in Cost of Captisol. We expense incremental costs of obtaining a contract when incurred if the expected amortization period of the asset that we would have recognized is one year or less or the amount is immaterial. We did not incur any incremental costs of obtaining a contract during the periods reported.

We occasionally have sub-license obligations related to arrangements for which we receive license fees, milestones and royalties. We evaluate the determination of gross as a principal versus net as an agent reporting based on each individual agreement.

Intangible Assets and Other Long-Lived Assets — Impairment Assessments

We regularly perform reviews to determine if an event occurred that may indicate the carrying values of our intangible and other long-lived assets are impaired. If indicators of impairment exist, we assess the recoverability of the affected long-lived assets by comparing its carrying amounts to its undiscounted cash flows. If the affected assets are not recoverable, we estimate the fair value of the assets and record an impairment loss if the carrying value exceeds the fair value. Factors that may indicate potential impairment include a significant decline in our stock price and market capitalization compared to net book value, significant changes in the ability of an asset to generate positive cash flows and the pattern of utilization of a particular asset.

In order to estimate the fair value of identifiable intangible assets and other long-lived assets, we estimate the present value of future cash flows from those assets. The key assumptions that we use in our discounted cash flow model are the amount and timing of estimated future cash flows to be generated by the asset over an extended period of time and a rate of return that considers the relative risk of achieving the cash flows, the time value of money, and other factors that a willing market participant would consider. Significant judgment is required to estimate the amount and timing of future cash flows and the relative risk of achieving those cash flows.

Assumptions and estimates about future values and remaining useful lives are complex and often subjective. They can be affected by a variety of factors, including external factors such as industry and economic trends, and internal factors such as changes in our business strategy and our internal forecasts. For example, if our future operating results do not meet current forecasts or if we experience a sustained decline in our market capitalization that is determined to be indicative of a reduction in fair value of our reporting unit, we may be required to record future impairment charges for purchased intangible assets. Impairment charges could materially decrease our future net income and result in lower asset values on our balance sheet.

Contingent Liabilities

In connection with our acquisition of Metabasis in January 2010, we issued Metabasis stockholders four tradable CVRs, one CVR from each of four respective series of CVR, for each Metabasis share. The CVRs entitle Metabasis stockholders to

cash payments as proceeds are received by us from the sale or partnering of any of the Metabasis drug development programs. The fair values of the CVRs are remeasured at each reporting date through the term of the related agreement. Changes in the fair values are reported in the statement of operations as income (decreases) or expense (increases). The carrying amount of the liability may fluctuate significantly based upon quoted market prices and actual amounts paid under the agreements may be materially different than the carrying amount of the liability.

On April 1, 2020, we acquired the core assets, including its partnered programs and ion channel technology from Icagen and certain of its affiliates for total cash consideration of $15.1 million, and a contingent earn-out payment of up to $25.0 million based on certain revenue milestones with an estimated fair value upon acquisition of $4.8 million. The fair value of the earn-out liability was determined using a probability weighted income approach incorporating the estimated future cash flows from expected future milestones. These cash flows were then discounted to present value using a discount rate based on the market participants' cost of debt reflective of Icagen. The fair value of the liability is assessed at each reporting date and the change in fair value is recorded in our consolidated statements of operations. The carrying amount of the liability may fluctuate significantly and actual amounts paid may be materially different than the carrying amount of the liability. The fair value of the contingent consideration liability as of December 31, 2021 was $7.4 million.

On October 1, 2020, we acquired Pfenex, which develops next-generation and novel protein therapeutics to improve existing therapies and create new therapies for biological targets linked to critical, unmet diseases using a protein expression technology platform. The purchase price of $465.1 million included $429.6 million cash consideration paid upon acquisition, and a CVR payment of up to $77.8 million of cash payments based on certain specified milestones with an estimated initial fair value of $37.0 million, net of $1.5 million recorded as post-acquisition expenses based on double trigger accelerate feature. The fair value of the CVR liability was determined using a probability adjusted income approach. These cash flows were then discounted to present value using a discount rate based on the market participants' cost of debt reflective of Pfenex. The liability is periodically assessed based on events and circumstances related to the underlying milestone, and any change in fair value is recorded in our consolidated statements of operations. The fair value of the CVR liability as of December 31, 2021 was reduced to zero as the CVR payment expiration date passed on December 31, 2021 without achieving the payment triggering event.

See additional information in "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (5), Fair Value Measurement.*"

Income Taxes

Our provision for income taxes, deferred tax assets and liabilities, and reserves for unrecognized tax benefits reflect our best assessment of estimated future taxes to be paid. Significant judgments and estimates based on interpretations of existing tax laws or regulations in the United States are required in determining our provision for income taxes. Changes in tax laws, statutory tax rates, and estimates of our future taxable income could impact the deferred tax assets and liabilities provided for in the consolidated financial statements and would require an adjustment to the provision for income taxes.

Deferred tax assets are regularly assessed to determine the likelihood they will be recovered from future taxable income. A valuation allowance is established when we believe it is more likely than not the future realization of all or some of a deferred tax asset will not be achieved. In evaluating our ability to recover deferred tax assets within the jurisdiction which they arise, we consider all available positive and negative evidence. Factors reviewed include the cumulative pre-tax book income for the past three years, scheduled reversals of deferred tax liabilities, our history of earnings and reliability of our forecasts, projections of pre-tax book income over the foreseeable future, and the impact of any feasible and prudent tax planning strategies.

We recognize the impact of a tax position in our financial statements only if that position is more likely than not of being sustained upon examination by taxing authorities, based on the technical merits of the position. Tax authorities regularly examine our returns in the jurisdictions in which we do business and we regularly assess the tax risk of our return filing positions. Due to the complexity of some of the uncertainties, the ultimate resolution may result in payments that are materially different from our current estimate of the tax liability. These differences, as well as any interest and penalties, will be reflected in the provision for income taxes in the period in which they are determined.

Share-Based Compensation

We incur share-based compensation expense related to restricted stock, ESPP, and stock options.

Restricted stock unit (RSU) and performance stock unit (PSU) are all considered restricted stock. The fair value of restricted stock is determined by the closing market price of our common stock on the date of grant. We recognize share-based compensation expense based on the fair value on a straight-line basis over the requisite service periods of the awards, taking into consideration of forfeitures as they occur. PSU generally represents a right to receive a certain number of shares of common stock based on the achievement of corporate performance goals and continued employment during the vesting period. At each reporting period, we reassess the probability of the achievement of such corporate performance goals and any expense change resulting from an adjustment in the estimated shares to be released are treated as a cumulative catch-up in the period of adjustment. A limited amount of PSUs contain a market condition dependent upon the Company's relative and absolute total stockholder return over a three-year period, with a range of 0% to 200% of the target amount granted to be issued under the award. Share-based compensation expense for these PSUs is measured using the Monte-Carlo simulation valuation model and is not adjusted for the achievement, or lack thereof, of the market conditions.

We use the Black-Scholes-Merton option-pricing model to estimate the fair value of stock purchases under ESPP and stock options granted. The model assumptions include expected volatility, term, dividends, and the risk-free interest rate. We look to historical and implied volatilities of our stock to determine the expected volatility. The expected term of an award is based on historical forfeiture experience, exercise activity, and on the terms and conditions of the stock awards. The expected dividend yield is determined to be 0% given that except for 2007, during which we declared a cash dividend on our common stock of $2.50 per share, we have not paid any dividends on our common stock in the past and currently do not expect to pay cash dividends or make any other distributions on common stock in the future. The risk-free interest rate is based upon U.S. Treasury securities with remaining terms similar to the expected term of the share-based awards.

We grant options, RSUs and PSUs to employees and non-employee directors. Non-employee directors are accounted for as employees. Options and RSUs granted to certain non-employee directors typically vest one year from the date of grant. Options granted to employees typically vest 1/8 on the six month anniversary of the date of grant, and 1/48 each month thereafter for forty-two months. RSUs and PSUs granted to employees vest over three years. All option awards generally expire ten years from the date of grant.

Share-based compensation expense for awards to employees and non-employee directors is recognized on a straight-line basis over the vesting period until the last tranche vests.

Recent Accounting Pronouncements

For the summary of recent accounting pronouncements applicable to our consolidated financial statements, see "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (1), Basis of Presentation and Summary of Significant Accounting Policies.*"

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to market risk from interest rates and equity prices which could affect our results of operations, financial condition and cash flows. We manage our exposure to these market risks through our regular operating and financing activities.

Investment Portfolio Risk

At December 31, 2021, our investment portfolio included investments in available-for-sale securities of $321.6 million, including the investment in Viking common stock and warrants of $30.9 million. These securities are subject to market risk and may decline in value based on market conditions.

Equity Price Risk

Our 2023 Notes include conversion and settlement provisions that are based on the price of our common stock at conversion or maturity of the notes, as applicable. As of December 31, 2021, the "if-converted value" did not exceed the principal amount of the 2023 Notes. See detail in "*Item 8. Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements—Note (7), Convertible Senior Notes*."

Foreign Currency Risk

Through our licensing and business operations, we are exposed to foreign currency risk. Foreign currency exposures arise from transactions denominated in a currency other than the functional currency and from foreign denominated revenues

and profit translated into U.S. dollars. Our license partners sell our products worldwide in currencies other than the U.S. dollar. Because of this, our revenues from royalty payments are subject to risk from changes in exchange rates.

We purchase Captisol from Hovione, located in Lisbon, Portugal. Payments to Hovione are denominated and paid in U.S. dollars; however, the unit price of Captisol contains an adjustment factor which is based on the sharing of foreign currency risk between the two parties. The effect of an immediate 10% change in foreign exchange rates would not have a material impact on our financial condition, results of operations or cash flows. We do not currently hedge our exposures to foreign currency fluctuations.

Interest Rate Risk

We are exposed to changes in interest rates related primarily to our investment portfolio. Our investment policy and strategy are focused on the preservation of capital and supporting our liquidity requirements. We use a combination of internal and external management to execute our investment strategy. We typically invest in highly rated securities, with the primary objective of minimizing the risk of principal loss. Our investment policy generally requires securities to be investment grade and limits the amount of credit exposure to any one issuer. We have historically maintained a relatively short average maturity for our investment portfolio, and we believe a hypothetical 100 basis point adverse move in interest rates across all maturities would not materially impact the fair market value of the portfolio in either period.

Item 8. **Consolidated Financial Statements and Supplementary Data**

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Ligand Pharmaceuticals Incorporated

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Ligand Pharmaceuticals Incorporated (the Company) as of December 31, 2021 and 2020, and the related consolidated statements of operations, comprehensive income (loss), stockholders' equity and cash flows for each of the three years in the period ended December 31, 2021, and the related notes, (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 28, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Impairment assessment of finite-lived intangibles

Description of the Matter

At December 31, 2021, the Company's finite-lived intangible assets totaled $551.0 million. As discussed in Note 1 to the consolidated financial statements, the Company reviews finite-lived intangible assets for impairment whenever events or changes in circumstances indicate that the finite-lived intangibles are not expected to be recovered through future undiscounted cash flows. The Company did not identify indicators of impairment for its finite-lived intangibles at December 31, 2021.

Auditing management's assessment of impairment is challenging due to the high degree of subjective auditor judgment necessary in evaluating management's identification of indicators of potential impairment and the related assessment of the severity of such indicators in determining whether a triggering event has occurred that requires the Company to evaluate the recoverability of the asset. A high degree of auditor judgment was required to evaluate the significant inputs used in the assessment for potential triggering events which included market conditions, industry and economic trends, changes in regulations, clinical success and historical and forecasted financial results. These possible triggering events could have a significant effect on the Company's impairment assessment and the determination of whether further quantitative analysis of finite-lived intangible impairment was required.

How We Addressed the Matter in Our Audit

We obtained an understanding of management's process to identify indicators of impairment, including the qualitative analysis and related inputs and assumptions used in performing the analyses. We evaluated the design and tested the operating effectiveness of the controls that address the identification of indicators of impairment. For example, we tested controls over management's assessment of indicators of impairment.

To test the Company's evaluation of indicators of impairment for finite-lived intangibles, our audit procedures included, among others, assessing the methodologies and testing the completeness and accuracy of the Company's analysis of events or changes in circumstances. As part of our evaluation, we considered market conditions, industry and economic trends, changes in regulations, clinical success and historical and forecasted financial results, in assessing whether an indicator of impairments exists.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2016.

San Diego, California
February 28, 2022

LIGAND PHARMACEUTICALS INCORPORATED

CONSOLIDATED BALANCE SHEETS

(in thousands, except par value)

	December 31,	
	2021	**2020**
ASSETS		
Current assets:		
Cash and cash equivalents	$ 19,522	$ 47,619
Short-term investments	321,586	363,567
Accounts receivable, net	85,453	56,847
Inventory	27,326	26,487
Income taxes receivable	6,193	2,217
Other current assets	4,671	3,822
Total current assets	464,751	500,559
Deferred income taxes, net	34,482	24,320
Intangible assets, net	551,040	595,330
Goodwill	181,206	189,662
Commercial license and other economic rights	10,110	10,979
Property and equipment, net	20,511	14,434
Operating lease assets	16,542	6,892
Finance lease assets	16,207	15,842
Other assets	2,741	4,267
Total assets	$ 1,297,590	$ 1,362,285
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 8,403	$ 3,784
Accrued liabilities	17,579	18,530
Current contingent liabilities	2,588	39,884
Deferred revenue	10,996	29,435
Current operating lease liabilities	2,053	1,885
Current finance lease liabilities	46	6,593
Total current liabilities	41,665	100,111
2023 convertible senior notes, net	320,717	442,293
Long-term contingent liabilities	8,483	9,249
Deferred income taxes, net	59,095	64,598
Long-term operating lease liabilities	15,494	5,643
Other long-term liabilities	30,977	30,866
Total liabilities	476,431	652,760
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.001 par value; 5,000 shares authorized; zero issued and outstanding at December 31, 2021 and 2020	—	—
Common stock, $0.001 par value; 60,000 shares authorized; 16,767 and 16,080 shares issued and outstanding at December 31, 2021 and 2020, respectively	17	16
Additional paid-in capital	372,969	318,358
Accumulated other comprehensive loss	(917)	(801)
Retained earnings	449,090	391,952
Total stockholders' equity	821,159	709,525
Total liabilities and stockholders' equity	$ 1,297,590	$ 1,362,285

See accompanying notes to these consolidated financial statements.

LIGAND PHARMACEUTICALS INCORPORATED

CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except per share amounts)

	Year Ended December 31,		
	2021	**2020**	**2019**
Revenues:			
Royalties	$ 48,927	$ 33,796	$ 46,976
Captisol	164,250	109,959	31,489
Contract revenue	63,956	42,664	41,817
Total revenues	277,133	186,419	120,282
Operating costs and expenses:			
Cost of Captisol	62,176	30,419	11,347
Amortization of intangibles	47,167	23,442	16,864
Research and development	69,012	59,392	55,908
General and administrative	57,483	64,435	41,884
Other operating income	(37,600)	—	—
Total operating costs and expenses	198,238	177,688	126,003
Gain from sale of Vernalis R&D	—	17,114	—
Gain from sale of Promacta license	—	—	812,797
Income from operations	78,895	25,845	807,076
Other income (expense):			
Gain (loss) from short-term investments	(3,997)	(16,933)	1,049
Interest income	886	8,078	28,430
Interest expense	(19,626)	(27,420)	(35,745)
Other expense, net	(8,860)	(108)	(4,171)
Total other expense, net	(31,597)	(36,383)	(10,437)
Income (loss) before income tax	47,298	(10,538)	796,639
Income tax benefit (expense)	9,840	7,553	(167,337)
Net income (loss)	57,138	(2,985)	629,302
Basic net income (loss) per share	$ 3.44	$ (0.18)	$ 33.13
Shares used in basic per share calculation	16,630	16,185	18,995
Diluted net income (loss) per share	$ 3.31	$ (0.18)	$ 31.85
Shares used in diluted per share calculation	17,246	16,185	19,757

See accompanying notes to these consolidated financial statements.

LIGAND PHARMACEUTICALS INCORPORATED
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(in thousands)

	Year Ended December 31,		
	2021	**2020**	**2019**
Net income (loss)	$ 57,138	$ (2,985)	$ 629,302
Unrealized net gain (loss) on available-for-sale securities, net of tax	(116)	(162)	200
Foreign currency translation adjustment	—	(423)	608
Comprehensive income (loss)	$ 57,022	$ (3,570)	$ 630,110

See accompanying notes to these consolidated financial statements.

LIGAND PHARMACEUTICALS INCORPORATED

CONSOLIDATED STATEMENT OF STOCKHOLDERS' EQUITY

(in thousands)

	Common Stock		Additional paid-in capital	Accumulated other comprehensive income (loss)	Retain earnings (accumulated deficit)	Total stockholders' equity
	Shares	Amount				
Balance at December 31, 2018	20,766	$ 21	$ 791,114	$ (1,024)	$ (229,197)	$ 560,914
Issuance of common stock under employee stock compensation plans, net	180	—	(1,421)	—	—	(1,421)
Share-based compensation	—	—	24,515	—	—	24,515
Repurchase of common stock	(4,122)	(4)	(448,429)	—	—	(448,433)
Unrealized net gain on available-for-sale securities, net of deferred tax	—	—	—	200	—	200
Foreign currency translation adjustment	—	—	—	608	—	608
Other tax adjustments	—	—	1,547	—	—	1,547
Net income	—	—	—	—	629,302	629,302
Balance at December 31, 2019	16,824	17	367,326	(216)	400,105	767,232
Issuance of common stock under employee stock compensation plans, net	190	—	1,535	—	—	1,535
Share-based compensation	—	—	30,727	—	—	30,727
Repurchase of common stock	(934)	(1)	(77,997)	—	—	(77,998)
Unrealized net loss on available-for-sale securities, net of deferred tax	—	—	—	(162)	—	(162)
Foreign currency translation adjustment	—	—	—	(423)	—	(423)
Reacquisition of equity due to 2023 debt extinguishment, net of tax	—	—	(3,236)	—	—	(3,236)
Cumulative-effect adjustment from adoption of ASU 2016-13, net of tax	—	—	—	—	(5,168)	(5,168)
Other tax adjustments	—	—	3	—	—	3
Net loss	—	—	—	—	(2,985)	(2,985)
Balance at December 31, 2020	16,080	16	318,358	(801)	391,952	709,525
Issuance of common stock under employee stock compensation plans, net	687	1	27,744	—	—	27,745
Share-based compensation	—	—	38,783	—	—	38,783
Unrealized net loss on available-for-sale securities, net of deferred tax	—	—	—	(116)	—	(116)
Reacquisition of equity due to 2023 debt extinguishment, net of tax	—	—	(12,407)	—	—	(12,407)
Warrant and bond hedge unwind transactions	—	—	491	—	—	491
Net income	—	—	—	—	57,138	57,138
Balance at December 31, 2021	16,767	$ 17	$ 372,969	$ (917)	$ 449,090	$ 821,159

See accompanying notes to these consolidated financial statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2021	**2020**	**2019**
Operating activities			
Net income (loss)	$ 57,138	$ (2,985)	$ 629,302
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Gain from sale of Promacta license	—	—	(812,797)
Gain from sale of Vernalis R&D	—	(17,114)	—
Change in estimated fair value of contingent liabilities	(36,962)	963	(30)
Depreciation of fixed assets and amortization of intangible assets	51,071	25,691	18,361
Loss (gain) short-term investments	3,997	16,933	(1,049)
Amortization/accretion of premium (discount) on investments, net	111	1,479	(10,274)
Amortization of debt discount and issuance fees	16,692	23,077	29,988
Loss on debt extinguishment	7,303	2,466	—
Amortization of commercial license and other economic rights	(125)	2,275	25,370
Share-based compensation	38,783	30,727	24,515
Deferred income taxes, net	(8,618)	(19,053)	74,829
Other	1,572	191	(3,498)
Changes in operating assets and liabilities, net of acquisitions:			
Accounts receivable, net	(28,616)	(26,061)	25,463
Inventory	(427)	(17,799)	(2,061)
Accounts payable and accrued liabilities	2,810	(1,245)	(6,664)
Income taxes receivable	(3,976)	9,144	(11,219)
Other economic rights	—	—	(12,000)
Deferred revenue	(17,870)	29,236	(1,147)
Other	(4,085)	(3,339)	3,575
Net cash provided by (used in) operating activities	78,798	54,586	(29,336)
Investing activities			
Proceeds from sale of Promacta license	—	—	812,797
Cash paid for acquisition, net of cash and restricted cash acquired	—	(404,884)	(11,840)
Purchases of property and equipment	(8,761)	(4,458)	(2,553)
Purchases of short-term investments	(181,325)	(422,523)	(2,356,545)
Proceeds from commercial license rights	494	1,358	—
Proceeds from sale of short-term investments	154,230	394,539	535,877
Proceeds from maturity of short-term investments	67,105	644,155	1,494,851
Cash paid for equity method investment	—	(500)	(1,000)
Proceeds on sale of Vernalis R&D, net	—	22,061	—
Other, net	(1,220)	1,900	(4,669)
Net cash provided by investing activities	30,523	231,648	466,918
Financing activities			
Repayment of debt	(155,760)	(222,209)	(27,323)
Payments under finance lease obligations	(9,188)	(9,549)	—
Proceeds from bond hedge settlement	18,938	—	12,401
Payments to convert holders for bond conversion	—	—	(12,401)
Net proceeds from stock option exercises and ESPP	33,763	3,017	2,997
Taxes paid related to net share settlement of equity awards	(6,018)	(1,481)	(4,418)
Share repurchases	—	(77,998)	(453,048)
Repurchase of warrants	(18,446)	—	(380)
Payments to CVR Holders	(1,050)	(2,325)	(3,000)
Net cash used in financing activities	(137,761)	(310,545)	(485,172)
Net decrease in cash, cash equivalents, and restricted cash	(28,440)	(24,311)	(47,590)
Effect of exchange rate changes on cash	—	—	83
Cash, cash equivalents and restricted cash at beginning of year	47,962	72,273	119,780
Cash, cash equivalents and restricted cash at end of year	$ 19,522	47,962	72,273

Supplemental disclosure of cash flow information			
Cash paid during the year:			
Interest paid	$ 3,028	$ 4,463	$ 5,827
Taxes paid	$ 3,722	$ 2,130	$ 103,817
Restricted cash in other current assets	$ —	$ 343	$ 730
Supplemental schedule of non-cash investing and financing activities			
Accrued inventory purchases	$ 1,974	$ 1,562	$ 170
Unrealized (loss) gain on available-for-sale investments	$ (221)	$ (212)	$ 256
Purchase of fixed assets recorded in accounts payable	$ 1,567	$ 249	$ 495

See accompanying notes to these consolidated financial statements.

Unless the context requires otherwise, references in this report to "Ligand," "we," "us," the "Company," and "our" refer to Ligand Pharmaceuticals Incorporated and its consolidated subsidiaries.

1. Basis of Presentation and Summary of Significant Accounting Policies

Business

We are a biopharmaceutical company focused on developing or acquiring technologies that help pharmaceutical companies discover and develop medicines. We operate in one business segment: development and licensing of biopharmaceutical assets.

Principles of Consolidation

The accompanying consolidated financial statements include Ligand and its wholly-owned subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation.

Basis of Presentation
Our consolidated financial statements have been prepared in accordance with U.S. GAAP and include the accounts of our parent company and its wholly-owned subsidiaries. All intercompany transactions and balances have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires the use of estimates and assumptions that affect the amounts reported in the consolidated financial statements and the accompanying notes. Actual results may differ from those estimates.

Concentrations of Business Risk

Financial instruments that potentially subject us to significant concentrations of credit risk consist primarily of cash equivalents and investments. We invest excess cash principally in United States government debt securities, investment grade corporate debt securities, mutual funds and certificates of deposit. We maintain some cash and cash equivalents balances with financial institutions that are in excess of the Federal Deposit Insurance Corporation insurance limits. We have established guidelines relative to diversification and maturities that maintain safety and liquidity. These guidelines are periodically reviewed and modified to take advantage of trends in yields and interest rates.

Revenue from significant partners, which is defined as 10% or more of our total revenue, was as follows:

	Year-ended December 31,		
	2021	2020	2019
Partner A	41%	45%	N/A
Partner B	14%	17%	27%
Partner C	<10%	<10%	13%

We obtain Captisol primarily from two sites related to a single supplier, Hovione. If this supplier were not able to supply the requested amounts of Captisol from each site, and if our safety stocks of material were depleted, we would be unable to continue to derive revenues from the sale of Captisol until we obtained material from an alternative source, which could take a considerable length of time.

Cash Equivalents

Cash equivalents consist of highly liquid investments with maturities ofthree months or less from the date of acquisition.

Short-term Investments

Short-term investments primarily consist of investments in debt and equity securities. We classify our short-term investments as “available-for-sale”. Such investments are carried at fair value, with unrealized gains and losses on debt securities included in the statement of comprehensive income (loss), net of tax, and unrealized gains and losses on equity securities included the consolidated statement of operations. We determine the cost of investments based on the specific identification method. We determine the realized gains or losses on the sale of available-for-sale securities using the specific identification method and includes net realized gains and losses as a component of other income or expense within the consolidated statements of operations.

Debt securities consist of certificates of deposit, corporate debt securities, and securities of government-sponsored entities have effective maturities greater than three months and less than twelve months from the date of acquisition. Debt securities securities available-for-sale in an unrealized loss position are assessed for the current expected credit losses methodology. We start by assessing whether we intend to sell the security, or whether it is more likely than not that we will be required to sell the security before recovery of its amortized cost basis. If either of the criteria regarding intent or requirement to sell is met, the security’s amortized cost basis is written down to fair value through earnings. For debt securities available-for-sale that do not meet the aforementioned criteria, we evaluate whether the decline in fair value has resulted from credit losses or other factors. In making this assessment, we consider the extent to which fair value is less than amortized cost, any changes in interest rates, and any changes to the rating of the security by a rating agency, among other factors. If this assessment indicates that a credit loss exists, the present value of cash flows expected to be collected from the security is compared to the amortized cost basis of the security. If the present value of cash flows expected to be collected is less than the amortized cost basis, a credit loss exists and an allowance for credit losses is recorded, limited by the amount that the fair value is less than the amortized cost basis. Any impairment that has not been recorded through an allowance for credit losses is recognized in other comprehensive income or loss, as applicable.

Equity securities are mutual funds, investments in privately held companies (non-marketable equity securities), and companies that have completed initial public offerings (marketable equity securities). Mutual funds are valued at their publicly quoted net asset value (NAV) price on the last day of the period. Our non-marketable equity securities without readily determinable market values are initially measured at cost and adjusted to fair value for observable transactions for identical or similar investments of the same issuer or impairment. Our marketable equity securities are measured at fair value. Equity investments are classified as short-term investments, or non-current other assets, based on the nature of the securities and their availability for use in current operations.

Accounts Receivable

Our accounts receivable arise primarily from sales on credit to customers. We establish an allowance for credit losses to present the net amount of accounts receivable expected to be collected. The allowance is determined by using the loss-rate method, which requires an estimation of loss rates based upon historical loss experience adjusted for factors that are relevant to determining the expected collectability of accounts receivable. Some of these factors include macroeconomic conditions that correlate with historical loss experience, delinquency trends, aging behavior of receivables and credit and liquidity quality indicators for industry groups, customer classes or individual customers.

Inventory

Inventory, which consists of finished goods, is stated at the lower of cost or net realizable value. We determine cost using the first-in, first-out method or the specific identification method. We analyze our inventory levels periodically and write down inventory to net realizable value if it has become obsolete, has a cost basis in excess of its expected net realizable value or is in excess of expected requirements. There were no write downs related to obsolete inventory recorded for the years ended December 31, 2021, 2020 and 2019. As of December 31, 2021 and 2020, inventory consist of Captisol prepayments of $24.6 million and $26.1 million, respectively.

Property and Equipment

Property and equipment are stated at cost, subject to review for impairment, and depreciated over the estimated useful lives of the assets, which generally range from three to ten years, using the straight-line method. Amortization of leasehold improvements is recorded over the shorter of the lease term or estimated useful life of the related asset. Maintenance and repairs are charged to operations as incurred. When assets are sold, or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts and any gain or loss is included in operating income or expense.

Acquisitions

We first determine whether a set of assets acquired constitute a business and should be accounted for as a business combination. If the assets acquired are not a business, we account for the transaction as an asset acquisition. Business combinations are accounted for by using the acquisition method of accounting which requires us to use significant estimates and assumptions, especially with respect to intangible assets. We record the excess consideration over the aggregate fair value of tangible and intangible assets, net of liabilities assumed, as goodwill.

Under the acquisition method of accounting, we recognize separately from goodwill the identifiable assets acquired, the liabilities assumed, including contingent consideration and all contractual contingencies, generally at the acquisition date fair value. Contingent purchase consideration to be settled in cash are remeasured to estimated fair value at each reporting period with the change in fair value recorded in statement of operations. Costs that we incur to complete the business combination such as investment banking, legal and other professional fees are not considered part of consideration and we charge them to general and administrative expense as they are incurred.

Should the initial accounting for a business combination be incomplete by the end of a reporting period that falls within the measurement period, we report provisional amounts in our financial statements. During the measurement period, we adjust the provisional amounts recognized at the acquisition date to reflect new information obtained about facts and circumstances that existed as of the acquisition date that, if known, would have affected the measurement of the amounts recognized as of that date and we record those adjustments to our financial statements in the period of change, if any.

Under the acquisition method of accounting for business combinations, if we identify changes to acquired deferred tax asset valuation allowances or liabilities related to uncertain tax positions during the measurement period and they relate to new information obtained about facts and circumstances that existed as of the acquisition date, those changes are considered a measurement period adjustment and we record the offset to goodwill. We record all other changes to deferred tax asset valuation allowances and liabilities related to uncertain tax positions in current period income tax expense.

Contingent Liabilities

In connection with the acquisition of Pfenex in October 2020, we entered into a CVR agreement pursuant to which former equity holders of Pfenex received one nontransferable contractual right entitling such holder to receive $2.00 per share (or approximately $77.8 million total) in the event that Pfenex's teriparatide injection product received notice from the FDA that such product is therapeutically equivalent with respect to FORTEO® (teriparatide injection) on or before December 31, 2021. The FDA did not provide notice of such event prior to the CVR expiration date and as a result, the Pfenex CVRs expired without payment.

In connection with the acquisition of Icagen in April 2020, Icagen selling shareholders will be entitled to receive up to an additional $25 million of cash payments based on certain revenue achievements.

In connection with the acquisition of CyDex in January 2011, we recorded a contingent liability for amounts potentially due to holders of the CyDex CVRs and former license holders. The liability is periodically assessed based on events and circumstances related to the underlying milestones, royalties and material sales.

In connection with the acquisition of Metabasis in January 2010, we issued Metabasis stockholdersfour tradable CVRs for each Metabasis share. The fair values of the CVRs are remeasured at each reporting date through the term of the related agreement.

Any change in fair value is recorded in our consolidated statement of operations. For additional information, see "*Note (5), Fair Value Measurement and Note (8), Balance Sheet Account Details*."

Goodwill, Intangible Assets and Other Long-Lived Assets

Goodwill, which has an indefinite useful life, represents the excess of cost over fair value of net assets acquired. Goodwill is reviewed for impairment at least annually during the fourth quarter, or more frequently if an event occurs indicating the potential for impairment. During the goodwill impairment review, we assess qualitative factors to determine whether it is more likely than not that the fair value of our reporting unit is less than the carrying amount, including goodwill. We operate in one reporting unit. The qualitative factors include, but are not limited to, macroeconomic conditions, industry and market considerations, and the overall financial performance. If, after assessing the totality of these qualitative factors, we determine that it is not more likely than not that the fair value of our reporting unit is less than the carrying amount, then no additional assessment is deemed necessary. Otherwise, we proceed to perform the quantitative assessment. We will then evaluate goodwill for impairment by comparing the estimated fair value of the reporting unit to its carrying value, including the associated goodwill. To determine the fair value, we generally use a combination of market approach based on Ligand and comparable publicly traded companies in similar lines of businesses and the income approach based on estimated discounted future cash flows. Our cash flow assumptions consider historical and forecasted revenue, operating costs and other relevant factors. We may also elect to bypass the qualitative assessment in a period and elect to proceed to perform the quantitative assessment for the goodwill impairment test. We performed the annual assessment for goodwill impairment during the fourth quarter of 2021, noting no impairment.

Our identifiable intangible assets are typically composed of acquired core technologies, licensed technologies, contractual relationships, customer relationships and trade names. The cost of identifiable intangible assets with finite lives is generally amortized on a straight-line basis over the assets' respective estimated useful lives. We regularly perform reviews to determine if any event has occurred that may indicate that intangible assets with finite useful lives and other long-lived assets are potentially impaired. If indicators of impairment exist, an impairment test is performed to assess the recoverability of the affected assets by determining whether the carrying amount of such assets exceeds the undiscounted expected future cash flows. If the affected assets are not recoverable, we estimate the fair value of the assets and record an impairment loss if the carrying value of the assets exceeds the fair value. Factors that may indicate potential impairment include market conditions, industry and economic trends, changes in regulations, clinical success, historical and forecasted financial results, market capitalization, significant changes in the ability of a particular asset to generate positive cash flows, and the pattern of utilization of a particular asset. We did not identify indicators of impairment for the finite-lived intangibles at December 31, 2021.

Commercial license and other economic rights

As of December 31, 2021 and 2020, commercial license and other economic rights consist of the following (in thousands):

	December 31, 2021			December 31, 2020		
	Gross	Adjustments[1]	Net	Gross	Adjustments[2]	Net
Aziyo and CorMatrix	$ 17,696	$ (9,461)	$ 8,235	$ 17,696	$ (9,588)	$ 8,108
Selexis and Dianomi	10,602	(8,727)	1,875	10,602	(7,731)	2,871
Total	$ 28,298	$ (18,188)	$ 10,110	$ 28,298	$ (17,319)	$ 10,979

(1) Amounts represent accumulated amortization to principal of $ 11.7 million and credit loss adjustments of $ 6.5 million as of December 31, 2021.
(2) Amounts represent accumulated amortization to principal of $ 11.3 million and credit loss adjustments of $ 6.0 million as of December 31, 2020.

Commercial license and other economic rights as of December 31, 2021 represent a portfolio of future milestone and royalty payment rights acquired from Selexis in April 2013 and April 2015, CorMatrix in May 2016, and Dianomi in January 2019. Commercial license rights acquired are accounted for as financial assets, and other economic rights are accounted for as funded research and developments as further discussed below.

In May 2019, we entered into a development funding and royalties agreement with Novan, pursuant to which we would receive certain payments at specified milestones, as well as royalties on any future net sales of SB206, a product candidate being developed to treat molluscum contagiosum, and any other Novan products used for the treatment of molluscum ("Novan Molluscum Products"). We paid Novan an upfront payment of $12.0 million, which Novan is required to use to fund the development of SB206. We are not obligated to provide additional funding to Novan for the development or commercialization

of SB206. Pursuant to the agreement, we would receive up to $20.0 million of milestone payments upon the achievement by Novan of certain regulatory milestones for SB206 or any other Novan Molluscum Product and commercial milestones. In addition to the milestone payments, Novan will pay us tiered royalties from 7.0% to 10.0% based on aggregate annual net sales of SB206 or any other Novan Molluscum Product in North America.

In December 2018, we entered into a development funding and royalties agreement with Palvella. Pursuant to the agreement, we will receive up to $8.0 million of milestone payments upon the achievement by Palvella of certain corporate, financing and regulatory milestones for PTX-022, a product candidate being developed to treat pachyonychia congenita. In addition to the milestone payments, Palvella will pay us tiered royalties from 5.0% to 9.8% based on aggregate annual worldwide net sales of any PTX-022 products, if approved, subject to Palvella's right to reduce the royalty rates by making payments in certain circumstances. We made an upfront payment of $10.0 million, which Palvella is required to use to fund the development of PTX-022. We are not obligated to provide additional funding to Palvella for development or commercialization of PTX-022.

We determined the economic rights related to Novan and Palvella should be characterized as a funded research and development arrangement, thus we account for them in accordance with ASC 730-20, *Research and Development Arrangement,* and reduce our asset as the funds are expended by Novan and Palvella. As of December 31, 2019, Novan had used up the $12.0 million upfront payment provided by us. As such, our other economic rights related to Novan had been fully amortized as of December 31, 2019. As of December 31, 2020, the fund has been fully expended by Palvella and our cost basis for the asset has been reduced to zero, and therefore we will recognize milestones and royalties as revenue when earned. During 2020, we recorded a $3.0 million milestone from Palvella under contract revenue, which has been included in our consolidated statement of operations for the year ended December 31, 2020.

In May 2017, we entered into a royalty agreement with Aziyo pursuant to which we will receive royalties from certain marketed products that Aziyo acquired from CorMatrix. Pursuant to the agreement, we received $10.0 million in 2017 from Aziyo to buydown the royalty rates on the products CorMatrix sold to Aziyo. The agreement closed on May 31, 2017, in connection with the closing of the asset sale from CorMatrix to Aziyo (the "CorMatrix Asset Sale"). Per the agreement, we will receive a 5% royalty on the products Aziyo acquired in the CorMatrix Asset Sale, reduced from the original 20% royalty from CorMatrix pursuant to the previously disclosed interest purchase agreement, dated May 3, 2016 (the "Original Interest Purchase Agreement") between CorMatrix and us. In addition, Aziyo has agreed to pay us up to $10.0 million of additional milestones tied to cumulative net sales of the products Aziyo acquired in the CorMatrix Asset Sale and to extend the term on these royalties by one year. The royalty agreement will terminate on May 31, 2027. In addition, in May 2017, we entered into an amended and restated interest purchase agreement (the "Amended Interest Purchase Agreement") with CorMatrix, which supersedes in its entirety the Original Interest Purchase Agreement. Other than removing the commercial products sold to Aziyo in the CorMatrix Sale, the terms of the Amended Interest Purchase Agreement remain unchanged with respect to the CorMatrix developmental pipeline products, including the royalty rate of 5% on such pipeline products. The Amended Interest Purchase Agreement will terminate 10 years from the date of the first commercial sale of such products.

We account for the Aziyo commercial license right as a financial asset in accordance with ASC 310,*Receivables*, and amortize the commercial license right using the effective interest method whereby we forecast expected cash flows over the term of the arrangement to arrive at an annualized effective interest. The annual effective interest associated with the forecasted cash flows from the royalty agreement with Aziyo as of December 31, 2021 is 21.6%. Revenue is calculated by multiplying the carrying value of the commercial license right by the effective interest. The payments received in 2021 were accordingly allocated between revenue and the amortization of the commercial license rights.

Prior to 2020, we accounted for commercial license rights related to developmental pipeline products such as Selexis and Dianomi on a non-accrual basis. These developmental pipeline products are non-commercialized, non-approved products that require FDA or other regulatory approval, and thus have uncertain cash flows. The developmental pipeline products are on a non-accrual basis as we are not yet able to forecast future cash flows given their pre-commercial stages of development. We will prospectively update the yield model under the effective interest method once the underlying products are commercialized and we can reliably forecast expected cash flows. Income will be calculated by multiplying the carrying value of the commercial license right by the effective interest rate. We regularly perform reviews to determine if any event has occurred that may indicate the carrying value of these commercial license rights are potentially impaired. If the affected commercial license rights are not recoverable, we estimate the fair value of the assets and record an impairment loss if the carrying value of the assets exceeds the fair value. During 2020, given the expected cash flow from the Selexis program, we started to account for the Selexis commercial license right as a financial asset in accordance with ASC 310, and amortize the commercial license right using the effective interest method whereby we forecast expected cash flows over the term of the arrangement to arrive at an annualized effective interest. The annual effective interest associated with the forecasted cash flows from the royalty agreement with Selexis as of December 31, 2021 is 21%. Revenue is calculated by multiplying the carrying value of the commercial license right by the effective interest. The payments received in the year ended December 31, 2021 and 2020 were allocated

accordingly between revenue and the amortization of the commercial license rights. We still accounted for commercial license rights related to Dianomi on a non-accrual basis as of December 31, 2021.

For commercial license rights, we have elected a prospective approach to account for changes in estimated cash flows and selected a method for determining when an impairment would be recognized and how to measure that impairment. In circumstances where our new estimate of expected cash flows is greater than previously expected, we will update our yield prospectively. In circumstances where our new estimate of expected cash flows is less than previously expected and below our original estimated yield we record an impairment. Impairment is recognized by reducing the financial asset to an amount that represents the present value of our most recent estimate of expected cash flows discounted by the original effective interest rate. In circumstances where our new estimate of expected cash flows is less than previously expected, but not below our original estimated yield, we update our yield prospectively.

As a result of adopting ASU 2016-13,*Financial Instruments – Credit Losses: Measurement of Credit losses on Financial Instruments (Topic 326)*, we now recognize an allowance for current expected credit losses on the commercial license rights subject to credit risk. We recorded a $5.5 million pre-tax reserve for credit losses upon adoption of the standard on January 1, 2020. We estimated the credit losses at the individual asset level by considering the performance against the programs, the company operating performance and the macroeconomic forecast. In addition, we have judgmentally applied credit loss risk factors to the future expected payments with consideration given to the timing of the payment. Given the higher inherent credit risk associated with longer term receivables, we applied a lower risk factor to the earlier years and progressively higher risk factors to the later years. During the twelve months ended December 31, 2021 and 2020, we further considered the current and expected future economic and market conditions surrounding novel coronavirus (COVID-19) pandemic, along with other factors, and recorded an additional $0.5 million each year, for credit losses in other expense, net, in our consolidated statements of operations.

Revenue Recognition

Our revenue is generated primarily from royalties on sales of products commercialized by our partners, Captisol material sales, and contract revenue for services, license fees and development, regulatory and sales based milestone payments.

We apply the following five-step model in accordance with ASC 606,*Revenue from Contracts with Customers,* in order to determine the revenue: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation.

Royalties

We receive royalty revenue on sales by our partners of products covered by patents that we or our partners own under contractual agreements. We do not have future performance obligations under these license arrangements. We generally satisfy our obligation to grant intellectual property rights on the effective date of the contract. However, we apply the royalty recognition constraint required under the guidance for sales-based royalties which requires a royalty to be recorded no sooner than the underlying sale occurs. Therefore, royalties on sales of products commercialized by our partners are recognized in the quarter the product is sold. Our partners generally report sales information to us on a one quarter lag. Thus, we estimate the expected royalty proceeds based on an analysis of historical experience and interim data provided by our partners including their publicly announced sales. Differences between actual and estimated royalty revenues, which have not been material, are adjusted in the period in which they become known, typically the following quarter.

Captisol Sales

Revenue from Captisol sales is recognized when control of Captisol material or intellectual property license rights is transferred to our customers in an amount that reflects the consideration we expect to receive from our customers in exchange for those products. A performance obligation is considered distinct from other obligations in a contract when it provides a benefit to the customer either on its own or together with other resources that are readily available to the customer and is separately identified in the contract. For Captisol material, we consider our performance obligation is satisfied at a point in time, once we have transferred control of the product, meaning the customer has the ability to use and obtain the benefit of the Captisol material or intellectual property license right. We recognize revenue for satisfied performance obligations only when we determine there are no uncertainties regarding payment terms or transfer of control. Sales tax and other taxes we collect concurrent with revenue-producing activities are excluded from revenue. We have elected to recognize the cost of freight and shipping when control over Captisol material has transferred to the customer as an expense in Cost of Captisol. We expense incremental costs of obtaining a contract when incurred if the expected amortization period of the asset that we would have recognized is one year or less or the amount is immaterial. We did not incur any incremental costs of obtaining a contract during the periods reported.

Contract Revenue

Our contracts with customers often will include variable consideration in the form of contingent milestone-based payments. We include contingent milestone based payments in the estimated transaction price when it is probable a significant reversal in the amount of cumulative revenue recognized will not occur. These estimates are based on historical experience, anticipated results and our best judgment at the time. If the contingent milestone based payment is sales-based, we apply the royalty recognition constraint and record revenue when the underlying sale has taken place. Significant judgments must be made in determining the transaction price for our sales of intellectual property. Because of the risk that products in development with our partners will not reach development based milestones or receive regulatory approval, we generally recognize any contingent payments that would be due to us upon the development milestone or regulatory approval. Depending on the terms of the arrangement, we may also defer a portion of the consideration received if we have to satisfy a future obligation, which typically occurs with our contracts for R&D services.

For R&D services we recognize revenue over time and we measure our progress using an input method. The input methods we use are based on the effort we expend or costs we incur toward the satisfaction of our performance obligation. We estimate the amount of effort we expend, including the time it will take us to complete the activities, or the costs we may incur in a given period, relative to the estimated total effort or costs to satisfy the performance obligation. This results in a percentage that we multiply by the transaction price to determine the amount of revenue we recognize each period. This approach requires us to make numerous estimates and use significant judgement. If our estimates or judgements change over the course of the collaboration, they may affect the timing and amount of revenue that we recognize in the current and future periods.

We occasionally have sub-license obligations related to arrangements for which we receive license fees, milestones and royalties. We evaluate the determination of gross as a principal versus net as an agent reporting based on each individual agreement.

Deferred Revenue

Depending on the terms of the arrangement, we may also defer a portion of the consideration received if we have to satisfy a future obligation.

The timing of revenue recognition, billings and cash collections results in billed accounts receivable, unbilled receivables (contract assets), and customer advances and deposits (contract liabilities) on the consolidated balance sheet. Except for royalty revenue, we generally receive payment at the point we satisfy our obligation or soon after. Therefore, we do not generally carry a contract asset balance. Any fees billed in advance of being earned are recorded as deferred revenue. During the twelve months ended December 31, 2021, the amount recognized as revenue that was previously deferred at December 31, 2020 was $30.1 million. During the twelve months ended December 31, 2020, the amount recognized as revenue that was previously deferred at December 31, 2019 was $0.9 million.

Disaggregation of Revenue

Royalty revenue for 2021, 2020 and 2019 are reported as below (in thousands):

	Year ended December 31,		
	2021	2020	2019
Kyprolis	$ 27,472	$ 25,164	$ 25,046
Evomela	10,079	6,377	5,171
Other	11,376	2,255	2,566
Promacta	N/A	N/A	14,193
	$ 48,927	$ 33,796	$ 46,976

The following table represents disaggregation of Captisol and Contract Revenue (in thousands):

	Year ended December 31,		
	2021	2020	2019
Captisol	$ 164,250	$ 109,959	$ 31,489
Contract			
Service Revenue	23,712	21,803	16,776
License Fees	5,084	4,378	6,199
Milestone	28,748	11,516	17,173
Other	6,412	4,967	1,669
	$ 63,956	$ 42,664	$ 41,817

Research and Development Expenses

Research and development expense consists of labor, material, equipment, and allocated facilities costs of our scientific staff who are working pursuant to our collaborative agreements and other research and development projects. Also included in research and development expenses are third-party costs incurred for our research programs including in-licensing costs, CRO costs and costs incurred by other research and development service vendors. We expense these costs as they are incurred. When we make payments for research and development services prior to the services being rendered, we record those amounts as prepaid assets on our consolidated balance sheet and we expense them as the services are provided.

Share-Based Compensation

We incur share-based compensation expense related to restricted stock, ESPP, and stock options.

Restricted stock unit (RSU) and performance stock unit (PSU) are all considered restricted stock. The fair value of restricted stock is determined by the closing market price of our common stock on the date of grant. We recognize share-based compensation expense based on the fair value on a straight-line basis over the requisite service periods of the awards, taking into consideration of forfeitures as they occur. PSU generally represents a right to receive a certain number of shares of common stock based on the achievement of corporate performance goals and continued employment during the vesting period. At each reporting period, we reassess the probability of the achievement of such corporate performance goals and any expense change resulting from an adjustment in the estimated shares to be released are treated as a cumulative catch-up in the period of adjustment. A limited amount of PSUs contain a market condition dependent upon the Company's relative and absolute total stockholder return over a three-year period, with a range of 0% to 200% of the target amount granted to be issued under the award. Share-based compensation expense for these PSUs is measured using the Monte-Carlo simulation valuation model and is not adjusted for the achievement, or lack thereof, of the market conditions.

The Black-Scholes-Merton option-pricing model is used to estimate the fair value of stock purchases under our ESPP and stock options granted. The model assumptions include expected volatility, term, dividends, and the risk-free interest rate. We look to historical and implied volatilities of our stock to determine the expected volatility. The expected term of an award is based on historical forfeiture experience, exercise activity, and on the terms and conditions of the stock awards. The expected dividend yield is determined to be 0% given that except for 2007, during which we declared a cash dividend on our common stock of $2.50 per share, we have not paid any dividends on our common stock in the past and currently do not expect to pay cash dividends or make any other distributions on common stock in the future. The risk-free interest rate is based upon U.S. Treasury securities with remaining terms similar to the expected term of the share-based awards.

We grant options, RSUs and PSUs to employees and non-employee directors. Non-employee directors are accounted for as employees. Options and RSUs granted to certain non-employee directors typically vest one year from the date of grant. Options granted to employees typically vest 1/8 on the six month anniversary of the date of grant, and 1/48 each month thereafter for forty-two months. RSUs and PSUs granted to employees vest over three years. All option awards generally expire ten years from the date of grant.

Share-based compensation expense for awards to employees and non-employee directors is recognized on a straight-line basis over the vesting period until the last tranche vests.

Derivatives

In May 2018, we issued $750.0 million aggregate principal amount of 2023 Notes, bearing cash interest at a rate of 0.75% per year, payable semi-annually, as further described in "*Note (7), Convertible Senior Notes*." Concurrently with the issuance of the notes, we entered into a series of convertible note hedge and warrant transactions which in combination are designed to reduce the potential dilution to our stockholders and/or offset the cash payments we are required to make in excess of the principal amount upon conversion of the notes. The conversion option associated with the 2023 Notes temporarily met the criteria for an embedded derivative liability which required bifurcation and separate accounting. In addition, the note hedge and warrants were also temporarily classified as a derivative asset and liability, respectively, on our consolidated balance sheet. As a result of shareholder approval to increase the number of authorized shares of our common stock on June 19, 2018, as discussed in "*Note (7), Convertible Senior Notes*," the derivative asset and liabilities were reclassified to additional paid-in capital.

In connection with our 2019 Notes, which we issued in August 2014 for $245.0 million aggregate principal amount, on May 22, 2018, we amended it making an irrevocable election to settle the entire note in cash. As a result, we reclassified from equity to derivative liability the fair value of the conversion premium as of May 22, 2018. Amounts paid in excess of the principal amount would be offset by an equal receipt of cash under the corresponding convertible bond hedge. As a result, we reclassified from equity to derivative asset the fair value of the bond hedge as of May 22, 2018. Changes in the fair value of these derivatives are reflected in other expense, net, in our consolidated statements of operations.

In connection with the payoff of the 2019 Notes in August 15, 2019, the bond hedge was settled and accordingly, the derivative asset and derivative liability were settled to zero. See detail in "*Note (7), Convertible Senior Notes.*"

Income Taxes

The provision for income taxes is computed using the asset and liability method, under which deferred tax assets and liabilities are recognized for the expected future tax consequences of temporary differences between the financial reporting and tax bases of assets and liabilities, and for the expected future tax benefit to be derived from tax loss and credit carryforwards. Deferred tax assets and liabilities are determined using the enacted tax rates in effect for the years in which those tax assets are expected to be realized. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in the provision for income taxes in the period that includes the enactment date.

Deferred tax assets are regularly assessed to determine the likelihood they will be recovered from future taxable income. A valuation allowance is established when we believe it is more likely than not the future realization of all or some of a deferred tax asset will not be achieved. In evaluating the ability to recover deferred tax assets within the jurisdiction which they arise we consider all available positive and negative evidence. Factors reviewed include the cumulative pre-tax book income for the past three years, scheduled reversals of deferred tax liabilities, history of earnings and reliable forecasting, projections of pre-tax book income over the foreseeable future, and the impact of any feasible and prudent tax planning strategies.

We recognize the impact of a tax position in our financial statements only if that position is more likely than not of being sustained upon examination by taxing authorities, based on the technical merits of the position. Tax authorities regularly examine our returns in the jurisdictions in which we do business and we regularly assess the tax risk of our return filing positions. Due to the complexity of some of the uncertainties, the ultimate resolution may result in payments that are materially different from our current estimate of the tax liability. These differences, as well as any interest and penalties, will be reflected in the provision for income taxes in the period in which they are determined.

Income (Loss) Per Share

Basic income (loss) per share is calculated by dividing net income (loss) by the weighted-average number of common shares outstanding during the period. Diluted income per share is computed based on the sum of the weighted average number of common shares and potentially dilutive common shares outstanding during the period. Diluted loss per share is computed based on the sum of the weighted average number of common shares outstanding during the period.

Potentially dilutive common shares consist of shares issuable under 2023 convertible senior notes, stock options and restricted stock. 2023 convertible senior notes have a dilutive impact when the average market price of the Company's common stock exceeds the applicable conversion price of the respective notes. It is our intent and policy to settle conversions through combination settlement, which essentially involves payment in cash equal to the principal portion and delivery of shares of common stock for the excess of the conversion value over the principal portion. Potentially dilutive common shares from stock options and restricted stock are determined using the average share price for each period under the treasury stock method. In addition, the following amounts are assumed to be used to repurchase shares: proceeds from exercise of stock options and the average amount of unrecognized compensation expense for stock options and restricted stock. In loss periods, basic net loss per

share and diluted net loss per share are identical since the effect of otherwise dilutive potential common shares is anti-dilutive and therefore excluded.

For the twelve months ended December 31, 2020, all of the0.6 million weighted average shares of outstanding equity awards as of December 31, 2020 were anti-dilutive due to the net loss for the period.

The following table presents the calculation of weighted average shares used to calculate basic and diluted income (loss) per share (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Weighted average shares outstanding:	16,630	16,185	18,995
Dilutive potential common shares:			
Restricted stock	96	—	43
Stock options	520	—	719
Shares used to compute diluted income (loss) per share	17,246	16,185	19,757
Potentially dilutive shares excluded from calculation due to anti-dilutive effect	4,793	8,458	8,926

Comprehensive Income (Loss)

Comprehensive income (loss) represents net income (loss) adjusted for the change during the periods presented in unrealized gains and losses on available-for-sale debt securities, foreign currency translation adjustments, and reclassification adjustments for realized gains or losses included in net income (loss). The unrealized gains or losses are reported on the Consolidated Statements of Comprehensive Income (Loss).

Foreign Currency Translation

The British Pound Sterling was the functional currency of our subsidiary, Vernalis, which was sold in fourth quarter of the year ended December 31, 2020. For the years ended December 31, 2020 and 2019 the corresponding financial statements have been translated into U.S. Dollars in accordance with ASC 830-30, *Translation of Financial Statements*. Assets and liabilities are translated at end-of-period rates while revenues and expenses are translated at average rates in effect during the period in which the activity took place. Equity is translated at historical rates and the resulting cumulative translation adjustments are included as a component of accumulated other comprehensive income (loss).

Impact of COVID-19 Pandemic

To date, we have not experienced material disruptions in our business operations or financial impacts as a result of the COVID-19 pandemic. While it is not possible at this time to estimate the impact that COVID-19 could have on our business in the future, the continued spread of COVID-19 and variants of the virus, the rate of vaccinations regionally and globally and the measures taken by the government authorities, and any future epidemic disease outbreaks, could: disrupt the supply chain and the manufacture or shipment of products and supplies for use by us in our discovery activities and by our partners for their discovery and development activities; delay, limit or prevent us or our partners' from continuing research and development activities; impede our negotiations with partners and potential partners; impede testing, monitoring, data collection and analysis and other related activities, by us and our partners; interrupt or delay the operations of the FDA or other regulatory authorities, which may impact review and approval timelines for initiation of clinical trials or marketing; impede the launch or commercialization of any approved products; any of which could delay our partnership programs, increase our operating costs, and have a material adverse effect on our business, financial condition and results of operations. In addition, if COVID-19 infects our genetically modified animals, which form the basis of our platform, or if there is an outbreak among our employees who maintain and care for these animals, we and our partners may be unable to produce antibodies for development.

Some of our partners are working to develop drugs to treat COVID-19. For example, we are supplying Captisol to partners, including Gilead for Veklury (remdesivir), the first FDA-approved treatment for COVID-19 for the treatment of patients with COVID-19 requiring hospitalization and, as a result, we have extended our Captisol supply agreement with Gilead until September 2030 and worked to increase our manufacturing of Captisol to meet this increased demand. In addition, certain of our OmniAb and other license partners have initiated antibody discovery programs for the potential treatment of COVID-19.

The full extent to which the COVID-19 pandemic will directly or indirectly impact our business, the businesses of our partners, our results of operations and our financial condition will depend on future developments that are highly uncertain and cannot be

accurately predicted, including new information that may emerge concerning COVID-19, the actions taken to contain it or treat its impact, including the timing and extent of governments reopening or further restricting activities, and the economic impact on local, regional, national and international markets.

Accounting Standards Not Yet Adopted

In August 2020, the FASB issued ASU 2020-06,*Debt – Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging – Contracts in Entity's Own Equity (Subtopic 815 – 40)*, which simplifies the accounting for certain financial instruments with characteristics of liabilities and equity, including convertible instruments and contracts on an entity's own equity. This guidance is part of the FASB's simplification initiative, which aims to reduce unnecessary complexity in U.S. GAAP. The ASU is effective for public entities for fiscal years beginning after December 15, 2021, and interim periods within those fiscal years. Effective January 1, 2022, we will adopt ASU 2020-06. We are finalizing our analysis of certain assumptions that will be utilized at the transition and expects the effect of adopting ASU 2020-06 will result in an increase to retained earnings, a decrease to additional paid-in capital, and an increase to the convertible senior notes. We expect that interest expense recognized in future periods will be reduced as a result of accounting for the convertible debt instrument as a single liability measured at its amortized cost.

We do not believe that any other recently issued, but not yet effective accounting pronouncements, if adopted, would have a material impact on our consolidated financial statements or disclosures.

2. Sale of Vernalis R&D and Promacta License

Vernalis R&D

On October 11, 2020, we entered into an Agreement for the Sale and Purchase of the Entire Issued Share Capital of Vernalis (R&D) Limited (the "Purchase and Sale Agreement") with HitGen UK Ltd ("Buyer"). Under the terms of the Purchase and Sale Agreement, we transferred certain intellectual property on completed collaboration licenses to Ligand UK Limited, which is a subsidiary of the Company, which we retain rights and interest to and are entitled to receive future milestones and royalties. Under the Purchase and Sale Agreement, we are also entitled to a share of the economic rights on current research collaboration contracts. In addition, Vernalis will continue to support certain existing Ligand partnerships. On December 2, 2020, we completed the sale. Pursuant to the terms of the Purchase and Sale Agreement, at the closing of the transaction, Buyer paid $26.7 million in cash, following adjustment for debt, cash and net working capital. As Vernalis R&D has the input, process and output elements defined in ASC 805, *Business Combinations*, we concluded the sale qualifies as a sale of business. Net assets sold, net of working capital adjustment, was $6.1 million, goodwill allocated to the selling business that was written off was $3.5 million, resulting in a $17.1 million gain from sale of Vernalis R&D recorded to income from operations.

Promacta License

On March 5, 2019, we entered into an Asset Purchase Agreement (the "Asset Purchase Agreement") with RPI Finance Trust ("RPI"), doing business as "Royalty Pharma", who is not an affiliate. Under the Asset Purchase Agreement, we sold, transferred, assigned and conveyed to RPI, and RPI purchased, acquired and accepted from us, all of our rights, title and interest in and to the Purchased Assets, which include among other things the intellectual property and related know-how generated by us in connection with the license agreement (collectively, the "Purchased Assets"), dated December 29, 1994, by and between Novartis (as successor in interest to SmithKline Beecham Corporation) and Ligand, which allowed us to receive a royalty on net sales of Promacta. We concluded the sale does not qualify as a sale of a business, but as a sale of a non-financial asset. At the closing on March 6, 2019, RPI paid us $827.0 million in cash and we do not have any remaining performance obligations related to Novartis or RPI for Promacta. The carrying value of our Promacta asset as of March 6, 2019 was zero. Of the total cash proceeds from the sale, $14.2 million was recorded to revenue related to the Promacta royalty for the period between January 1, 2019 and March 6, 2019, and the remaining $812.8 million was recorded to income from operations in accordance with ASC 610-20,*Other Income - Gains and Losses from the Derecognition of Nonfinancial Assets*.

3. Short-term Investments: Investment in Viking

Our ownership in Viking was approximately 8.6% as of December 31, 2021, and we account for it as an investment in available-for-sale equity securities, which is measured at fair value, with changes in fair value recognized in net income. Viking is considered a related party as we maintain a seat on Viking's board of directors and we do not exert significant influence over Viking.

As of December 31, 2021, we have zero Viking warrants outstanding. As of December 31, 2021 and December 31, 2020, we recorded our common stock in Viking in "short-term investments" at fair value of $30.9 million and $32.8 million, respectively.

At December 31, 2020, we owned warrants to purchase up to 1.5 million shares of Viking's common stock at an exercise price of $1.50 per share, and during the year ended December 31, 2021 we exercised all outstanding Viking warrants. As of December 31, 2021, we have zero Viking warrants outstanding. During the year ended December 31, 2021, we also sold 0.6 million Viking shares. We recorded the warrants in "Short-term investments" in our consolidated balance sheet at fair value of $6.3 million at December 31, 2020. See further discussion in "*Note (5), Fair Value Measurement.*"

4. Acquisitions

As set forth below, we completed five acquisitions from January 1, 2019 through December 31, 2021, of which three (Pfenex, Icagen and Ab Initio) were accounted for as business combinations and two (Taurus and xCella) were accounted for as asset acquisitions. For business combinations, we applied the acquisition method of accounting. Accordingly, we recorded the tangible and intangible assets acquired and liabilities assumed at their estimated fair values as of the applicable date of acquisition. Except for the Pfenex acquisition, for all other acquisitions, we did not incur any material acquisition related costs.

Pfenex Acquisition

On October 1, 2020, we acquired Pfenex, which develops next-generation and novel protein therapeutics to improve existing therapies and create new therapies for biological targets linked to critical, unmet diseases using a protein expression technology platform.

The purchase price of $465.1 million included $429.6 million cash consideration paid upon acquisition, and a contingent CVR payment of up to $77.8 million in cash based on a certain specified milestone with an estimated initial fair value of $37.0 million. The CVR will only be paid in full if the milestone is achieved by December 31, 2021. The amount of the CVR included in purchase price was reduced by $1.5 million which was determined to be post-combination expense. The fair value of the CVR liability was determined using a probability adjusted income approach. These cash flows were then discounted to present value using a discount rate based on market participants' cost of debt reflective of the Company, which was 7.1%. The liability is periodically assessed based on events and circumstances related to the underlying milestone, and any change in fair value is recorded in our consolidated statements of operations. During the year ended December 31, 2021, we wrote off the entire CVR liability of $37.6 million to other operation income, primarily due to not achieving the specific development and regulatory milestone by December 31, 2021 as defined by Pfenex CVR.

In connection with the acquisition, a portion of Pfenex's equity awards that were outstanding and unvested prior to the acquisition became fully vested per the terms of the merger agreement. The acceleration of vesting required us to allocate the fair value of the equity attributable to pre-combination service to the purchase price and the remaining amount was considered our post-combination expense. We paid $17.3 million in cash for equity compensation, which is attributable to pre-combination services and is reflected as a component of the total purchase price paid of $429.6 million. In addition, the fair value of equity compensation attributable to the post-combination service period was $8.7 million. These amounts were associated with the accelerated vesting of stock options previously granted to Pfenex employees and were fully paid in cash, which was recognized as general and administrative expenses during the fourth quarter of 2020.

We recorded $20.7 million of acquisition-related costs for legal, severance and other costs in connection with the acquisition within operating expenses in our consolidated statement of operations for 2020. The following table sets forth an allocation of the purchase price to the identifiable tangible and intangible assets acquired and liabilities assumed, with the excess recorded to goodwill (in thousands):

Cash	$	51,407
Restricted cash		200
Accounts and unbilled receivables		1,359
Property and equipment, net		7,823
Right-of-use asset		3,070
Other assets		1,338
Intangibles acquired		385,000
Goodwill[(1)]		82,303
Accounts payable		(6,814)
Accrued liabilities		(9,606)
Deferred revenue		(3,908)
Lease liabilities		(3,070)
Other liabilities		(1,382)
Deferred tax liabilities, net		(42,622)
Total consideration	$	465,098

(1) Goodwill represents the excess of the purchase price over the preliminary fair value of the underlying assets acquired and liabilities assumed. Goodwill is attributable to the assembled workforce of experienced personnel at Pfenex and expected synergies. None of the goodwill is deductible for tax purposes.

The intangibles acquired and their weighted average useful life are as follows (in thousands, except useful lives):

		Approximate Fair Value	Estimated useful life (in years)
Contractual Relationships:			
Alvogen	$	114,000	12
Merck		117,000	12
Jazz		80,000	17
SII		49,000	10
Arcellx		2,000	17
Acquired Technologies		23,000	10-19
	$	385,000	

The fair values of the contractual relationships were based on the discounted cash flow method that estimated the present value of the potential royalties, milestones and collaboration revenue streams derived from the licensing of the related technologies over the estimated contractual relationship period. The fair values of the acquired technologies were based on the discounted cash flow method that estimated the present value of the potential royalties, milestones, collaboration and product revenue streams derived from the licensing of the related technologies over the estimated useful lives. These projected cash flows were discounted to present value using discount rate, which varies from 12% to 15%. The intangible assets acquired are being amortized on a straight-line basis over the estimated useful life.

Approximately $2.0 million of revenue and $19.3 million of loss before income taxes of Pfenex were included in the consolidated statement of operations for the year ended December 31, 2020. The following summary presents our unaudited pro forma consolidated results of operations for the years ended December 31, 2020 and December 31, 2019 as if the Pfenex acquisition had occurred on January 1, 2019, which gives effect to certain transaction accounting adjustments, including amortization of acquired intangibles and stock based compensation expense for retained Pfenex employees. The transaction accounting adjustments do not include non-recurring adjustments related to Pfenex's executive salary, board of director compensation, and salary of Pfenex employees involved in the reduction of force as part of the acquisition, estimated to be $7.1 million in 2020 and $4.8 million in 2019. The pro forma financial information is not necessarily indicative of the operating results that would have occurred had the acquisition been consummated as if the date indicated, nor is it necessarily indicative of future operating results (in thousands, except per share amounts):

(Unaudited)	Year Ended December 31, 2020	2019
Revenue	$ 189,203	$ 170,608
Net Income (loss)	$ (60,059)	$ 594,941
Net income (loss) per common share:		
Basic	$ (3.71)	$ 31.32
Diluted	$ (3.71)	$ 30.11

Taurus Acquisition

On September 9, 2020, we acquired Taurus, which discovers and develops novel antibodies from immunized cows and cow-derived libraries. These antibodies feature some of the longest CDR3s of any species, with unique genetic and structural diversity that can enable binding to challenging antigens with application in therapeutics, diagnostics and research. The purchase price of $5.1 million included $4.6 million in cash, and a $0.5 million holdback to satisfy indemnification obligations which will be settled by September 2021. We also issued nontransferable CVRs for up to $4.5 million tied to partnered and internal research and development and for up to $25.0 million as a 25% share of post-clinical Taurus product revenues (including milestone payments) received by us. We accounted for this transaction as an asset acquisition as we concluded that substantially all of the fair value of the gross assets acquired was concentrated in the acquired core technology.

The allocation of the consideration was allocated to the acquisition date fair values of acquired assets as follows (in thousands)

Cash	$ 47
Intangibles assets with finite-life - core technologies	5,005
	$ 5,052

The core technology is being amortized on a straight-line basis over the estimated useful life of10 years. We account for the CVRs in accordance with ASC 450,*Contingencies*, when the contingency is resolved and the liability becomes payable. None of the CVRs are recognized as of the acquisition date.

xCella Acquisition

On September 8, 2020, we acquired xCella, an antibody discovery company. xCella's xPloration platform is a proprietary microcapillary platform that can screen single B cells for specificity and bioactivity and will increase Ligand’s antibody discovery throughput and efficiency.

We paid $7.1 million in cash (including a $0.5 million holdback to satisfy indemnification obligations which will be settled by September 2021), and issued earnout rights for up to $5.0 million tied to our use of the xCella technology for partnered research and development and for up to $25.75 million as a 25% share of any future milestone payments we received under a certain existing xCella partner arrangement. We evaluated this acquisition in accordance with ASC 805, *Business Combinations*, to discern whether the assets and operations of xCella met the definition of a business. We accounted for this transaction as an asset acquisition as we concluded that substantially all of the fair value of the gross assets acquired was concentrated in the acquired core technology.

The allocation of the consideration was allocated to the acquisition date fair values of acquired assets and assumed liabilities as follows (in thousands):

Cash and other assets	$ 240
Accrued liabilities	(142)
Deferred tax liabilities, net	(604)
Intangibles assets with finite-life - core technology	7,582
	$ 7,076

The core technology is being amortized on a straight-line basis over the estimated useful life of 15 years. We account for the earnout rights in accordance with ASC 450, *Contingencies*, when the contingency is resolved and the liability becomes payable. None of the earnout rights are recognized as of the acquisition date.

Icagen Acquisition

On April 1, 2020, we acquired the core assets, including its partnered programs and ion channel technology from Icagen and certain of its affiliates.

The purchase price of $19.9 million included $15.1 million cash consideration paid upon acquisition, and a CVR of up to $25.0 million of cash payments based on certain revenue milestones with an estimated fair value of $4.8 million. The fair value of the earn-out liability was determined using a probability weighted income approach incorporating the estimated future cash flows from expected future milestones. These cash flows were then discounted to present value using a discount rate based on the market participants' cost of debt reflective of the Company, which was 5.5%. The liability is periodically assessed based on events and circumstances related to the underlying milestones, and any change in fair value is recorded in our consolidated statements of operations. The carrying amount of the liability may fluctuate significantly and actual amount paid may be materially different than the carrying amount of the liability. As the acquisition is not considered significant, pro forma information has not been provided. The results of Icagen have been included in our results of operations since the date of acquisition.

The allocation of the consideration was allocated to the acquisition date fair values of acquired assets and assumed liabilities as follows (in thousands):

Property and equipment, net	$	1,173
Prepaids and other assets		588
Liabilities assumed		(812)
Deferred revenue		(3,685)
Deferred tax assets, net		861
Acquired intangibles		12,800
Goodwill[(1)]		9,015
	$	19,940

(1) Goodwill represents the excess of the purchase price over the preliminary fair value of the underlying assets acquired and liabilities assumed. Goodwill is attributable to the assembled workforce of experienced personnel at Icagen and expected synergies.

The majority of the goodwill is deductible for tax purposes. Acquired intangibles include $11.1 million of customer relationships and $1.7 million of core technology. The fair values of the customer relationships were based on a discounted cash flow analysis incorporating the estimated future cash flows from these relationships during the contractual term. These cash flows were then discounted to present value using a discount rate of 17%. The fair value of the customer relationships is being amortized on a straight-line basis over the weighted average estimated useful life of 9.6 years. The fair value of the core technology was based on the discounted cash flow method that estimated the present value of the potential royalties, milestones, and collaboration revenue streams derived from the licensing of the related technologies. These projected cash flows were discounted to present value using a discount rate of 17%. The fair value of the core technology is being amortized on a straight-line basis over the estimated useful life of 10 years. The total acquired intangibles are being amortized on a straight-line basis over the estimated useful life of 9.7 years.

Ab Initio Acquisition

On July 23, 2019, we acquired privately-held Ab Initio, an antigen-discovery company located in South San Francisco, California. Ab Initio has a patented antigen technology that is synergistic with the OmniAb® therapeutic antibody discovery platform, providing our current and potential new partners enhanced capabilities for the discovery of therapeutic antibodies against difficult-to-access cellular targets. Ab Initio has a collaboration agreement with Pfizer to discover novel therapeutic antibodies against an undisclosed target in the GPCR superfamily.

The purchase price of $12.0 million included $11.9 million cash consideration paid upon acquisition, net of cash acquired, and $0.15 million cash holdback for potential indemnification claims. As the acquisition is not considered significant, pro forma information has not been provided.

The final purchase consideration was allocated to the acquisition date fair values of acquired assets and assumed liabilities as follows (in thousands):

Cash and other assets	$	28
Accounts payable and accrued liabilities		(83)
Deferred tax liabilities, net		(146)
Intangibles assets with finite-life - core technologies		7,400
Goodwill[(1)]		4,812
	$	12,011

(1) Goodwill represents the excess of the purchase price over the fair value of the underlying assets acquired and liabilities assumed. Goodwill is attributable to the assembled workforce of experienced personnel at Ab Initio and expected synergies.

None of the goodwill is deductible for tax purposes. The fair value of the core technologies was determined based on the discounted cash flow method that estimated the present value of the hypothetical royalty/ milestone streams from the licensing of the antigen-discovery technology and collaboration agreement. These projected cash flows were discounted to present value using a discount rate of 12.0%. The fair value of the core technologies is being amortized on a straight-line basis over the weighted average estimated useful life of approximately 20 years.

5. Fair Value Measurement

We measure certain financial assets and liabilities at fair value on a recurring basis. Fair value is a market-based measurement that should be determined using assumptions that market participants would use in pricing an asset or liability. We establish a three-level hierarchy to prioritize the inputs used in measuring fair value. The levels are described in the below with level 1 having the highest priority and level 3 having the lowest:

Level 1 - Observable inputs such as quoted prices in active markets

Level 2 - Inputs other than the quoted prices in active markets that are observable either directly or indirectly

Level 3 - Unobservable inputs in which there is little or no market data, which require the Company to develop its own assumptions

The following table provides a summary of the assets and liabilities that are measured at fair value on a recurring basis as of December 31, 2021 and 2020 (in thousands):

December 31, 2021	Total	Fair Value Measurements at Reporting Date Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Short-term investments [1]	$ 290,697	$ 9,735	$ 280,553	$ 409
Investment in Viking common stock	30,889	30,889	—	—
Total assets	$ 321,586	$ 40,624	$ 280,553	$ 409
Liabilities:				
Contingent liabilities - Cydex	349	—	—	349
Contingent liabilities - Metabasis [4]	3,358	—	3,358	—
Contingent liabilities - Icagen [5]	7,364	—	—	7,364
Liability for amounts owed to a former licensor	86	86	—	—
Total liabilities	$ 11,157	$ 86	$ 3,358	$ 7,713

December 31, 2020	Total	Fair Value Measurements at Reporting Date Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Short-term investments [1]	$ 324,478	$ 3,438	$ 320,647	$ 393
Investment in Viking common stock	32,763	32,763	—	—
Investment in Viking warrants [2]	6,326	6,326	—	—
Total assets	$ 363,567	$ 42,527	$ 320,647	$ 393
Liabilities:				
Contingent liabilities - Crystal [3]	$ 800	$ —	$ —	$ 800
Contingent liabilities - Cydex	508	—	—	508
Contingent liabilities - Metabasis [4]	3,821	—	3,821	—
Contingent liabilities - Icagen [5]	6,404	—	—	6,404
Contingent liabilities - Pfenex [6]	37,600	—	—	37,600
Liability for amounts owed to a former licensor	60	60	—	—
Total liabilities	$ 49,193	$ 60	$ 3,821	$ 45,312

(1) Excluding our investment in Viking, our short-term investments in marketable debt and equity securities are classified as available-for-sale securities based on management's intentions and are at level 2 of the fair value hierarchy, as these investment securities are valued based upon quoted prices for identical or similar instruments in markets that are not active, and model-based valuation techniques for which all significant assumptions are observable in the market. Short-term investments in mutual funds are valued at their net asset value (NAV) on the last day of the period. We have classified marketable securities with original maturities of greater than one year as short-term investments based upon our ability and intent to use any and all of those marketable securities to satisfy the liquidity needs of our current operations. In addition, we have investment in warrants resulting from Seelos Therapeutics Inc. milestone payments that were settled in shares during the first quarter of 2019 and are at level 3 of the fair value hierarchy, based on Black Scholes value estimated by management on the last day of the period.

(2) Investment in Viking warrants, which we received as a result of Viking's partial repayment of the Viking note receivable and our purchase of Viking common stock and warrants in April 2016, is classified as level 1 as the fair value is determined using quoted market prices in active markets for the same securities. The change of the fair value is recorded in "gain (loss) from short-term investments" in our consolidated statement of operations. See further discussion in "*Note (3), Short-term Investments: Investment in Viking.* "

(3) The fair value of Crystal contingent liabilities was determined using a probability weighted income approach. Most of the contingent payments are based on development or regulatory milestones as defined in the merger agreement with Crystal. The fair value is subjective and is affected by changes in inputs to the valuation model including management's estimates regarding the timing and probability of achievement of certain developmental and regulatory milestones. During the twelve months ended December 31, 2020, we paid $1.8 million contingent liability on development milestones to former Crystal shareholders.

(4) In connection with our acquisition of Metabasis in January 2010, we issued Metabasis stockholders four tradable CVRs, one CVR from each of four respective series of CVR, for each Metabasis share. The CVRs entitle Metabasis stockholders to cash payments as frequently as every six months as cash is received by us from proceeds from the sale or partnering of any of the Metabasis drug development programs, among other triggering events. The liability for the CVRs is determined using quoted prices in a market that is not active for the underlying CVR. The carrying amount of the liability may fluctuate significantly based upon quoted market prices and actual amounts paid under the agreements may be materially differ than the carrying amount of the liability. Several of the Metabasis drug development programs have been outlicensed to Viking, including VK2809. VK2809 is a novel selective TR-β agonist with potential in multiple indications, including hypercholesterolemia, dyslipidemia, NASH, and X-ALD. Under the terms of the agreement with Viking, we may be entitled to up to $375.0 million of development, regulatory and commercial milestones and tiered royalties on potential future sales including a $ 10.0 million payment upon initiation of a Phase 3 clinical trial.

(5) The fair value of Icagen contingent liabilities was determined using a probability weighted income approach. Most of the contingent payments are based on certain revenue milestones as defined in the asset purchase agreement with Icagen. The fair value is subjective and is affected by changes in inputs to the valuation model including management's estimates regarding the timing and probability of achievement of certain developmental and regulatory milestones. Changes in these estimates may materially affect the fair value. During the year-end December 31, 2021, we paid a $1.1 million contingent liability based on revenue milestones to Icagen.

(6) The fair value of the Pfenex contingent liability was determined using a probability adjusted income approach. These cash flows were then discounted to present value using a discount rate based on the market participants' cost of debt reflective of the Company. During the year-end December 31, 2021, we reduced the contingent liability by $37.6 million primarily due to the lower probability of achieving the specific development and regulatory milestone by December 31, 2021 as defined by the Pfenex CVR. See further detail on Pfenex CVR in *Note 4, Acquisitions*.

A reconciliation of the level 3 financial instruments as of December 31, 2021 is as follows (in thousands):

	Liabilities	
	Fair value of level 3 financial instruments as of December 31, 2020	$ 4
	Payments to CVR holders and other contingency payments	(
	Fair value adjustments to contingent liabilities	(3
	Contingent liabilities from xCella asset acquisition	
	Fair value of level 3 financial instruments as of December 31, 2021	$

Assets Measured on a Non-Recurring Basis

We apply fair value techniques on a non-recurring basis associated with valuing potential impairment losses related to our goodwill, indefinite-lived intangible assets, and long-lived assets.

We evaluate goodwill and indefinite-lived intangible assets annually for impairment and whenever circumstances occur indicating that goodwill might be impaired. We determine the fair value of our reporting unit based on a combination of inputs, including the market capitalization of Ligand, as well as Level 3 inputs such as discounted cash flows, which are not observable from the market, directly or indirectly. We determine the fair value of our indefinite-lived intangible assets using the income approach based on Level 3 inputs.

There was no impairment of our goodwill, indefinite-lived assets, or long-lived assets recorded during the twelve months ended December 31, 2021.

Fair Value of Financial Instruments

In August 2014 and May 2018, we issued the 2019 Notes and 2023 Notes, respectively. We use quoted market rates in an inactive market, which are classified as a Level 2 input, to estimate the fair value of our 2019 and 2023 Notes. The carrying value of the notes does not reflect the market rate. See "*Note (7), Convertible Senior Notes*" for additional information related to the fair value.

In addition, our accounts receivable, accounts payable, accrued liabilities, current deferred revenue, current operating lease liabilities, current financing lease liabilities are financial instruments and are recorded at cost in the consolidated balance sheets. The estimated fair value of these financial instruments approximates their carrying value due to their short-term nature.

6. Leases

Finance lease

In May 2020 and January 2021, we entered into an agreement and the first amendment with Hovione, our third-party manufacturer, to increase our manufacturing of Captisol, respectively. The agreements are considered to include an embedded finance lease under ASC 842, *Leases*, as it provides the Company the right to use the underlying equipment to exclusively

manufacture Captisol. As of December 31, 2021, we have fully paid consideration of $69.1 million for prepaid inventory and capacity ramp-up fee. We allocated consideration in the agreements between lease and non-lease components using relative standalone prices. Since the inception of the agreements, we have allocated $50.2 million of the consideration paid to the non-lease component which is accounted for as prepaid inventory and being amortized to cost of Captisol based on the usage. As of December 31, 2021 the Hovione finance lease has no remaining lease liability and the right of use asset balance is $16.1 million. The right of use asset is to be amortized straight-line over the remainingseven year lease term.

Operating lease

We lease certain office facilities and equipment primarily under various operating leases. Our operating leases have remaining contractual terms up toten years, some of which include options to extend the leases for up to ten years. Our lease agreements do not contain any material residual value guarantees, material restrictive covenants, or material termination options. Our operating lease costs are primarily related to facility leases for administration offices and research and development facilities.

Lease assets and lease liabilities are recognized at the commencement of an arrangement where it is determined at inception that a lease exists. Lease assets represent the right to use an underlying asset for the lease term, and lease liabilities represent the obligation to make lease payments arising from the lease. These assets and liabilities are initially recognized based on the present value of lease payments over the lease term calculated using our incremental borrowing rate generally applicable to the location of the lease asset, unless the implicit rate is readily determinable. Lease assets also include any upfront lease payments made and lease incentives. Lease terms include options to extend or terminate the lease when it is reasonably certain that those options will be exercised.

In addition to base rent, certain of our operating leases require variable payments, such as insurance and common area maintenance. These variable lease costs, other than those dependent upon an index or rate, are expensed when the obligation for those payments is incurred. Leases with an initial term of 12 months or less are not recorded on the balance sheet, and the expense for these short-term leases and for operating leases is recognized on a straight-line basis over the lease term.

The depreciable life of lease assets and leasehold improvements is limited by the expected lease term, unless there is a transfer of title or purchase option reasonably certain of exercise.

During the year ended December 31, 2021, we entered into several new lease agreements including our Emeryville headquarter and animal facility expansion and a new Icagen office lease, which resulted in an increase in operating lease right of use assets of $12.7 million and lease liabilities of $13.2 million as of December 31, 2021 for the portion of the lease with a starting accounting lease commencement date during the period.

Operating and Finance Lease Assets and Liabilities (in thousands):

	December 31, 2021	December 31, 2020
Assets		
Operating lease assets	$ 16,542	$ 6,892
Finance lease assets	16,207	15,842
Total lease assets	$ 32,749	$ 22,734
Liabilities		
Current operating lease liabilities	$ 2,053	$ 1,885
Current finance lease liabilities	46	6,593
	2,099	8,478
Long-term operating lease liabilities	15,494	5,643
Long-term finance lease liabilities	58	112
Total lease liabilities	$ 17,651	$ 14,233

Maturity of Operating and Finance Lease Liabilities as of December 31, 2021(in thousands):

Maturity Dates	Operating Leases	Finance Leases
2022	$ 3,653	$ 56
2023	3,414	49
2024	2,716	4
2025	2,614	—
2026	2,670	—
Thereafter	10,832	—
Total lease payments	25,899	109
Less tenant improvement allowance	(4,327)	—
Less imputed interest	(4,025)	(5)
Present value of lease liabilities	$ 17,547	$ 104

As of December 31, 2021, our operating leases have a weighted-average remaining lease term of8.1 years and a weighted-average discount rate of4.1%. As of December 31, 2020, our operating leases have a weighted-average remaining lease term of 4.4 years and a weighted-average discount rate of5.7%. Cash paid for amounts included in the measurement of operating lease liabilities was $2.6 million and $2.4 million for the twelve months ended December 31, 2021 and 2020, respectively. Operating lease expense was $2.6 million (net of sublease income of $0.4 million) and $2.1 million (net of sublease income of $0.3 million) for the twelve months ended December 31, 2021 and 2020, respectively.

As of December 31, 2021, our finance leases have a weighted-average remaining lease term of7.0 years and a weighted-average discount rate of3.0%. As of December 31, 2020, our finance leases have a weighted-average remaining lease term of 7.9 years and a weighted-average discount rate of3.5%. Cash paid for amounts included in the measurement of these finance lease liabilities was $9.3 million and $9.7 million for the twelve months ended December 31, 2021 and 2020, respectively. Finance lease expense was $2.3 million and 0.2 million for the twelve months ended December 31, 2021 and 2020, respectively.

7. Convertible Senior Notes

0.75% Convertible Senior Notes due 2019

In August 2014, we issued $245.0 million aggregate principal amount of 2019 Notes, resulting in net proceeds of $239.3 million. The implied estimated effective rate of the liability component of the 2019 Notes was 5.83%. The 2019 Notes are convertible into common stock at an initial conversion rate of 13.3251 shares per $1,000 principal amount of convertible notes, subject to adjustment upon certain events, which is equivalent to an initial conversion price of approximately $75.05 per share of common stock. The notes bear cash interest at a rate of 0.75% per year, payable semi-annually.

Holders of the 2019 Notes may convert the notes at any time prior to the close of business on the business day immediately preceding May 15, 2019, under any of the following circumstances:

(1) during any fiscal quarter (and only during such fiscal quarter) commencing after December 31, 2014, if, for at least 20 trading days (whether or not consecutive) during the 30 consecutive trading day period ending on the last trading day of the immediately preceding fiscal quarter, the last reported sale price of our common stock on such trading day is greater than 130% of the conversion price on such trading day;

(2) during the five business day period immediately following any 10 consecutive trading day period, in which the trading price per $1,000 principal amount of notes was less than 98% of the product of the last reported sale price of our common stock on such trading day and the conversion rate on each such trading day; or

(3) upon the occurrence of certain specified corporate events as specified in the indenture governing the notes.

On May 22, 2018, we entered into a supplemental indenture whereby we made an irrevocable election to settle the entire 2019 Notes in cash. As such, we would have been required to deliver cash to settle the principal and any premium due upon conversion. As a result of the requirement to deliver cash to settle any premium due upon conversion, on May 22, 2018, we reclassified from equity to liability the conversion option (a derivative) fair value of $341.6 million. In accordance with ASC 815, *Derivatives and Hedging*, the derivative was adjusted to its fair value as of December 31, 2018 to $23.4 million with the resulting $118.7 million increase, net of payments made, reflected in other expense, net, in our consolidated statements of operations for the year ended December 31, 2018.

In March and April 2018, we received notices for conversion of $21.8 million of principal amount of the 2019 Notes which were settled in May and June 2018. We paid the noteholders the conversion value of the notes in cash, up to the principal amount of the 2019 Notes. The excess of the conversion value over the principal amount, totaling $31.6 million, was paid in shares of common stock. In July and August 2018, we received notices for conversion of $195.9 million of principal amount of the 2019 Notes which were settled in October and November 2018. We paid the noteholders the $195.9 million principal amount and the excess of conversion value over the principal amount, totaling $439.6 million, in cash. The equity dilution and cash conversion premium payment upon conversion of the 2019 Notes was offset by the reacquisition of the shares and cash under the convertible bond hedge transactions entered into in connection with the offering of the 2019 Notes. As a result of the conversions, we recorded a $3.2 million loss on extinguishment of debt calculated as the difference between the estimated fair value of the debt and the carrying value of the 2019 Notes as of the settlement dates. To measure the fair value of the converted 2019 Notes as of the settlement dates, the applicable interest rates were estimated using Level 2 observable inputs and applied to the converted notes using the same methodology as in the issuance date valuation.

In June 2019, we received notices for conversion of $1.0 million of principal amount of the 2019 Notes, which were settled in cash upon the 2019 Notes' maturity date in August 2019. As a result, we paid the noteholders (1) the $1.0 million principal amount, and (2) the excess of conversion value over the principal portion in an amount of $0.5 million in cash.

On August 15, 2019, the 2019 Notes maturity date, we paid the noteholders the remaining $26.3 million principal amount and $11.9 million bond premium, which was classified as a derivative liability, in cash. We recorded the decrease in fair value of the derivative liability of $11.0 million in other expense, net, in our consolidated statements of operations for the twelve months ended December 31, 2019.

Convertible Bond Hedge and Warrant Transactions

In August 2014, we entered into convertible bond hedges and sold warrants covering 3,264,643 shares of our common stock to minimize the impact of potential dilution to our common stock and/or offset the cash payments we were required to make in excess of the principal amount upon conversion of the 2019 Notes.

The convertible bond hedges had an exercise price of $75.05 per share and are exercisable when and if the 2019 Notes were converted. If upon conversion of the 2019 Notes, the price of our common stock was above the exercise price of the convertible bond hedges, the counterparties would have delivered shares of common stock and/or cash with an aggregate value approximately equal to the difference between the price of common stock at the conversion date and the exercise price, multiplied by the number of shares of common stock related to the convertible bond hedge transaction being exercised. The convertible bond hedges and warrants described below were separate transactions entered into by us and were not part of the terms of the 2019 Notes. Holders of the 2019 Notes and warrants did not have any rights with respect to the convertible bond hedges.

As a result of the irrevocable cash election, conversion notices received relating to the 2019 Notes after May 22, 2018 must be fully settled in cash and amounts paid in excess of the principal amount would be offset by an equal receipt of cash under the convertible bond hedge. Upon the 2019 Notes payoff on August 15, 2019, the bond hedge was settled, with the remaining $10.2 million fair value decrease reflected in other expense, net, in our consolidated statement of operations for the twelve months ended December 31, 2019.

Concurrently with the convertible bond hedge transactions, we entered into warrant transactions whereby we sold warrants to acquire 3,264,643 shares of common stock with an exercise price of $125.08 per share, subject to certain adjustments. The warrants had expired between November 13, 2019 and April 22, 2020. The warrants have a dilutive effect to the extent the market price per share of common stock exceeds the applicable exercise price of the warrants, as measured under the terms of the warrant transactions.

0.75% Convertible Senior Notes due 2023

In May 2018, we issued $750 million aggregate principal amount of 2023 Notes, bearing cash interest at a rate of 0.75% per year, payable semi-annually. The net proceeds from the offering, after deducting the initial purchasers' discount and offering expenses, were approximately $733.1 million. The 2023 Notes will be convertible into cash, shares of common stock, or a combination of cash and shares of common stock, at our election, based on an initial conversion rate, subject to adjustment, of 4.0244 shares per $1,000 principal amount of the 2023 Notes which represents an initial conversion price of approximately $248.48 per share.

Holders of the 2023 Notes may convert the notes at any time prior to the close of business on the business day immediately preceding November 15, 2022, under any of the following circumstances:

(1) during any fiscal quarter (and only during such fiscal quarter) commencing after September 30, 2018, if, for at least 20 trading days (whether or not consecutive) during the 30 consecutive trading day period ending on the last trading day of the immediately preceding fiscal quarter, the last reported sale price of our common stock on such trading day is greater than 130% of the conversion price on such trading day;

(2) during the five business day period immediately following any 10 consecutive trading day period, in which the trading price per $1,000 principal amount of notes was less than 98% of the product of the last reported sale price of our common stock on such trading day and the conversion rate on each such trading day; or

(3) upon the occurrence of certain specified corporate events as specified in the indenture governing the notes.

The notes will have a dilutive effect to the extent the average market price per share of common stock for a given reporting period exceeds the conversion price of $248.48. As of December 31, 2021, the "if-converted value" did not exceed the principal amount of the 2023 Notes.

In connection with the issuance of the 2023 Notes, we incurred $16.9 million of issuance costs, which primarily consisted of underwriting, legal and other professional fees. The portion of these costs allocated to the liability component totaling $13.7 million is amortized to interest expense using the effective interest method over the five year expected life of the 2023 Notes.

It is our intent and policy to settle conversions through combination settlement, which essentially involves payment in cash equal to the principal portion and delivery of shares of common stock for the excess of the conversion value over the principal portion.

During 2020, we repurchased $254.7 million in principal of the 2023 Notes for $222.8 million in cash, including accrued interest of $0.6 million. We accounted for the repurchase as a debt extinguishment, which resulted (1) a loss of $2.5 million reflected in other expense, net, in our consolidated statement of operations for the year ended December 31, 2020; (2) a $35.0 million reduction in debt discount, and (3) a $3.2 million reduction to additional paid-in-capital, net of tax, related to the reacquisition of the equity component in our condensed consolidated balance sheet as of December 31, 2020.

During 2021, we repurchased $152.0 million in principal of the 2023 Notes for $156.0 million in cash, including accrued interest of $0.3 million. We accounted for the repurchase as a debt extinguishment, which resulted in (1) a loss of $7.3 million reflected in other expense, net, in our condensed consolidated statement of operations for the year ended December 31, 2021, (2) a $13.7 million reduction in debt discount, and (3) a $10.2 million reduction to additional paid in capital, net of tax, related to the reacquisition of the equity component in our condensed consolidated balance sheet as of December 31, 2021. After the repurchases, approximately $343.3 million in principal amount of the 2023 Notes remain outstanding.

During February 2022, we repurchased $125.5 million in principal of the 2023 Notes for $123.9 million in cash, including accrued interest of $0.3 million.

Convertible Bond Hedge and Warrant Transactions

In conjunction with the 2023 Notes, in May 2018, we entered into convertible bond hedges and sold warrants covering 3,018,327 shares of our common stock to minimize the impact of potential dilution to our common stock and/or offset the cash payments we are required to make in excess of the principal amount upon conversion of the 2023 Notes. The convertible bond hedges have an exercise price of $248.48 per share and are exercisable when and if the 2023 Notes are converted. We paid $140.3 million for these convertible bond hedges. If upon conversion of the 2023 Notes, the price of our common stock is above the exercise price of the convertible bond hedges, the counterparties will deliver shares of common stock and/or cash with an aggregate value approximately equal to the difference between the price of common stock at the conversion date and the exercise price, multiplied by the number of shares of common stock related to the convertible bond hedge transaction being exercised. The convertible bond hedges and warrants described below are separate transactions entered into by us and are not part of the terms of the 2023 Notes. Holders of the 2023 Notes and warrants will not have any rights with respect to the convertible bond hedges.

Concurrently with the convertible bond hedge transactions, we entered into warrant transactions whereby we sold warrants covering 3,018,327 shares of common stock with an exercise price of $315.38 per share, subject to certain adjustments. We received $90.0 million for these warrants. The warrants have various expiration dates ranging from August 15, 2023 to

February 6, 2024. The warrants will have a dilutive effect to the extent the market price per share of common stock exceeds the applicable exercise price of the warrants, as measured under the terms of the warrant transactions. The common stock issuable upon exercise of the warrants will be in unregistered shares, and we do not have the obligation and do not intend to file any registration statement with the SEC registering the issuance of the shares under the warrants.

In April 2020, in connection with the repurchases of $234.4 million in principal of the 2023 Notes for $203.8 million in cash, including accrued interest of $0.6 million, during the quarter ended March 31, 2020, we entered into amendments with Barclays Bank PLC, Deutsche Bank AG, London Branch, and Goldman Sachs & Co. LLC to the convertible note hedges transactions we initially entered into in connection with the issuance of the 2023 Notes. The amendments provide that the options under the convertible note hedges corresponding to such repurchased 2023 Notes will remain outstanding notwithstanding such repurchase.

In January 2021, in connection with the repurchases of approximately $20.3 million in principal of the 2023 Notes for approximately $19.1 million in cash, including accrued interest of $0.1 million, during the quarter ended December 31, 2020, we entered into amendments with Barclays Bank PLC, Deutsche Bank AG, London Branch, and Goldman Sachs & Co. LLC to the convertible note hedges transactions we initially entered into in connection with the issuance of the 2023 Notes. The amendments provide that the options under the convertible note hedges corresponding to such repurchased 2023 Notes will remain outstanding notwithstanding such repurchase.

During the year ended December 31, 2021, in connection with the repurchases of $152.0 million in principal of the 2023 Notes for $156.0 million in cash, including accrued interest of $0.3 million, we entered into Warrant Early Unwind Agreements and Bond Hedge Unwind Agreements with Barclays Bank PLC, Deutsche Bank AG, and Goldman Sachs & Co. LLC to unwind a portion of the convertible note hedges transactions we initially entered into in connection with the issuance of the 2023 Notes. We paid $18.4 million as part of the Warrant Early Unwind Agreements reducing the number of shares covered by the warrants from 3,018,327 to 2,559,254. We received $18.9 million as part of the Bond Hedge Early Unwind Agreements reducing the number of options under the convertible bond hedges to 598,021. These unwind transactions resulted in a $0.5 million net increase in additional paid-in-capital in our condensed consolidated balance sheet as of December 31, 2021.

The following table summarizes information about the equity and liability components of the 2023 Notes (in thousands).

	December 31, 2021	December 31, 2020
Principal amount of 2023 Notes outstanding	$ 343,301	$ 495,280
Unamortized discount (including unamortized debt issuance cost)	(22,584)	(52,987)
Total long-term portion of notes payable	$ 320,717	$ 442,293
Carrying value of equity component of 2023 Notes	$ 20,627	$ 48,397
Fair value of convertible senior notes outstanding (Level 2)	$ 341,801	$ 466,053

As of December 31, 2021, there were no events of default or violation of any covenants under our financing obligations.

8. Balance Sheet Account Details

Short-term Investments

Excluding our investments in Viking, the following table summarizes the various investment categories at December 31, 2021 and 2020 (in thousands):

	Cost	Gross unrealized gains	Gross unrealized losses	Estimated fair value
December 31, 2021				
Short-term investments				
Mutual Fund	$ 152,136	$ —	$ (249)	$ 151,887
Bank deposits	63,389	13	(21)	63,381
Commercial paper	36,008	2	(12)	35,998
Corporate bonds	29,308	17	(38)	29,287
Corporate equity securities	5,807	402	(2,027)	4,182
U.S. government securities	5,577	—	(23)	5,554
Warrants	—	408	—	408
	$ 292,225	$ 842	$ (2,370)	$ 290,697
December 31, 2020				
Short-term investments				
Mutual fund	$ 151,512	386	$ —	$ 151,898
Bank deposits	84,120	35	(1)	$ 84,154
Commercial paper	45,459	27	(1)	$ 45,485
Corporate bonds	30,512	99	(1)	$ 30,610
Agency bonds	4,499	2	—	$ 4,501
Corporate equity securities	4,466	360	(1,388)	$ 3,438
Treasury bills	3,999	—	—	$ 3,999
Warrants	—	393	—	$ 393
	$ 324,567	$ 1,302	$ (1,391)	$ 324,478

Gain (loss) from short-term investments on our consolidated statements of operations includes both realized and unrealized gain (loss) from our short-term investments in public equity and warrant securities, and realized gain (loss) from available-for-sale debt securities.

The following table summarizes our available-for-sale debt securities by contractual maturity (in thousands):

	December 31, 2021	
	Amortized Cost	Fair Value
Within one year	$ 111,334	$ 111,315
After one year through five years	24,952	24,909
After five years	—	—
Total	$ 136,286	$ 136,224

The following table summarizes our available-for-sale debt securities in an unrealized loss position (in thousands):

	Less than 12 months		12 months or greater		Total	
	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value
December 31, 2021						
Bank deposits	$ (13)	$ 20,008	$ —	$ —	$ (13)	$ 20,008
Corporate bonds	(15)	27,252	(5)	2,996	(20)	30,248
Commercial paper	(6)	6,689	(32)	10,125	(38)	16,814
U.S. Government Securities	—	—	(23)	5,553	(23)	5,553
Total	$ (34)	$ 53,949	$ (60)	$ 18,674	$ (94)	$ 72,623
December 31, 2020						
Bank deposits	$ (1)	$ 14,013	$ —	$ —	$ (1)	$ 14,013
Corporate bonds	(1)	4,526	—	—	(1)	4,526
Commercial paper	(1)	7,693	—	—	(1)	7,693
Total	$ (3)	$ 26,232	$ —	$ —	$ (3)	$ 26,232

Our investment policy is capital preservation and we only invested in U.S.-dollar denominated investments. We held a total of 55 positions which were in an unrealized loss position as of December 31, 2021. We believe that we will collect the principal and interest due on our debt securities that have an amortized cost in excess of fair value. The unrealized losses are largely due to changes in interest rates and not to unfavorable changes in the credit quality associated with these securities that impacted our assessment on collectability of principal and interest. We do not intend to sell these securities nor do we believe that we will be required to sell these securities before the recovery of the amortized cost basis. Accordingly, no credit losses were recognized for the twelve months ended December 31, 2021.

Property and equipment are stated at cost and consists of the following (in thousands):

	December 31,	
	2021	2020
Lab and office equipment	$ 20,183	$ 14,666
Leasehold improvements	7,983	3,519
Computer equipment and software	1,056	1056
	29,222	19,241
Less accumulated depreciation and amortization	(8,711)	(4,807)
	$ 20,511	$ 14,434

Depreciation of equipment is computed using the straight-line method over the estimated useful lives of the assets which ranges fromthree to ten years. Leasehold improvements are amortized using the straight-line method over their estimated useful lives or their related lease term, whichever is shorter. Depreciation expense of $3.9 million, $1.8 million, and $1.5 million was recognized for the twelve months ended December 31, 2021, 2020, and 2019, respectively, and was included in operating expenses.

Goodwill and identifiable intangible assets consist of the following (in thousands):

	December 31,	
	2021	2020
Indefinite-lived intangible assets		
Goodwill	$ 181,206	$ 189,662
Definite-lived intangible assets		
Complete technology	280,617	277,740
Less: Accumulated amortization	(78,991)	(63,600)
Trade name	2,642	2,642
Less: Accumulated amortization	(1,444)	(1,312)
Customer relationships	40,700	40,700
Less: Accumulated amortization	(18,267)	(15,597)
Contractual relationships	362,000	362,000
Less: Accumulated amortization	(36,217)	(7,243)
Total goodwill and other identifiable intangible assets, net	$ 732,246	$ 784,992

Amortization of finite-lived intangible assets is computed using the straight-line method over the estimated useful life of the asset of up to 20 years. Amortization expense of $47.2 million, $23.4 million, and $16.9 million was recognized for the years ended December 31, 2021, 2020, and 2019, respectively. Estimated amortization expense for the years ending December 31, 2022 through 2026 is $47.0 million per year. For each of the years ended December 31, 2021, 2021, and 2019, there was no material impairment of intangible assets with finite lives.

Accrued liabilities consist of the following (in thousands):

	December 31,	
	2021	2020
Compensation	$ 6,532	$ 8,810
Professional fees	2,046	977
Amounts owed to former licensees	630	421
Royalties owed to third parties	149	693
Return reserve and customer refunds	2,420	687
Acquisition related liabilities	1,000	1,500
Subcontractor	1,759	733
Supplier	848	604
Other	2,195	4,105
	$ 17,579	$ 18,530

Contingent liabilities:

In connection with the acquisition of Crystal in October 2017, we entered into contingent liabilities based on achievement of certain research and business milestones as well as certain revenue goal.

In connection with the acquisition of CyDex in January 2011, we issued a series of CVRs and also assumed certain contingent liabilities. We may be required to make additional payments upon achievement of certain clinical and regulatory milestones to the CyDex shareholders and former license holders.

In connection with the acquisition of Metabasis in January 2010, we entered into four CVR agreements with Metabasis shareholders. The CVRs entitle the holders to cash payments as frequently as every six months as proceeds are received by us upon the sale or licensing of any of the Metabasis drug development programs and upon the achievement of specified milestones.

For CVRs associated with the Pfenex and Icagen acquisitions, see "*Note (4), Acquisitions*" for more information.

The following table summarizes roll-forward of contingent liabilities as of December 2021 and 2020 (in thousands):

	December 31, 2019	Additional Contingent Liabilities	Payments	Fair Value Adjustment	Repurchases	December 31, 2020	Payments	Fair Value Adjustment	Repurchases	December 31, 2021
Cydex	$ 348	$ —	$ —	$ 160	$ —	$ 508	$ (50)	$ (108)	$ —	$ 350
Metabasis	5,935	—	—	(1,867)	(247)	3,821	—	(464)	—	3,357
Crystal	2,659	—	(1,800)	(59)	—	800	—	(800)	—	—
Icagen	—	4,800	(525)	2,129	—	6,404	(1,050)	2,010	—	7,364
Pfenex	—	37,000	—	600	—	37,600	—	(37,600)	—	—
xCella	—	—	—	—	—	—	(720)	720	—	—
Total	**$ 8,942**	**$ 41,800**	**$ (2,325)**	**$ 963**	**$ (247)**	**$ 49,133**	**$ (1,820)**	**$ (36,242)**	**$ —**	**$ 11,071**

9. Stockholders' Equity

Share-based Compensation Expense

The following table summarizes non-cash share-based compensation expense (in thousands):

	December 31,		
	2021	2020	2019
Share-based compensation expense as a component of:			
Research and development expenses	$ 17,436	$ 13,497	$ 9,641
General and administrative expenses	21,347	17,230	14,874
	$ 38,783	$ 30,727	$ 24,515

Stock Plans

In December 2020, our 2002 Stock Incentive Plan was amended to increase the number of shares available for issuance by1.1 million shares. As of December 31, 2021, there were 0.7 million shares available for future option grants or direct issuance under the Amended 2002 Plan.

Following is a summary of our stock option plan activity and related information:

	Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term in Years	Aggregate Intrinsic Value (In thousands)
Balance at January 1, 2019	1,736,304	$ 66.71	5.47	$ 125,858
Granted	338,617	$ 116.69		
Exercised	(112,011)	$ 23.65		
Forfeited	(6,531)	$ 139.37		
Balance at December 31, 2019	1,956,379	$ 77.54	5.45	72,002
Exercisable at December 31, 2019	1,454,726	$ 61.82	4.42	70,345
Options vested and expected to vest as of December 31, 2019	1,956,379	$ 77.54	5.45	$ 72,002
Granted	806,300	$ 92.93		
Exercised	(156,845)	$ 21.26		
Forfeited	(44,012)	$ 91.30		
Balance at December 31, 2020	2,561,822	$ 85.59	6.09	59,033
Exercisable at December 31, 2020	1,611,830	$ 76.05	4.54	53,286
Options vested and expected to vest as of December 31, 2020	2,561,822	$ 85.59	6.09	$ 59,033
Granted	393,589	$ 159.12		
Exercised	(619,731)	$ 54.28		
Forfeited	(136,082)	$ 110.83		
Balance at December 31, 2021	2,199,598	$ 106.00	6.34	113,302
Exercisable at December 31, 2021	1,391,952	$ 98.16	5.12	80,849
Options vested and expected to vest as of December 31, 2021	2,199,598	$ 106.00	6.34	$ 113,302

The weighted-average grant-date fair value of all stock options granted during 2021, 2020 and 2019 was $80.08, $41.39 and $48.65 per share, respectively. The total intrinsic value of all options exercised during 2021, 2020 and 2019 was approximately $77.3 million, $11.9 million and $10.4 million, respectively.

Cash received from options exercised, net of fees paid, in 2021, 2020 and 2019 was $3.0 million, $2.5 million and $2.6 million, respectively.

Following is a further breakdown of the options outstanding as of December 31, 2021:

Range of exercise prices	Options outstanding	Weighted average remaining life in years	Weighted average exercise price	Options exercisable	Weighted average exercise price
$12.53-$56.26	253,824	1.94	$ 37.55	239,824	$ 38.90
$67.53-$74.42	278,281	4.04	$ 72.10	217,587	$ 73.17
$82.90-$95.35	159,988	5.06	$ 86.11	132,963	$ 86.24
$95.68	266,263	8.12	$ 95.68	109,154	$ 95.68
$98.20-$100.38	294,772	7.33	$ 99.10	160,120	$ 99.79
$101.07-$117.58	159,204	7.45	$ 111.26	99,488	$ 111.18
$117.97	237,292	7.12	$ 117.97	158,958	$ 117.97
$119.08-$159.01	299,585	7.00	$ 149.40	205,098	$ 152.50
$159.81-$171.28	6,881	6.51	$ 166.28	5,828	$ 165.62
$177.50-$195.91	243,508	8.91	$ 178.62	62,932	$ 181.84
	2,199,598	6.34	$ 106.00	1,391,952	$ 98.16

The assumptions used for the specified reporting periods and the resulting estimates of weighted-average grant date fair value per share of options granted:

	Year Ended December 31,		
	2021	2020	2019
Risk-free interest rate	0.4%-1.2%	0.2%-1.4%	1.4%-2.6%
Expected volatility	47%-63%	47%-71%	40%-49%
Expected term	4.7 to 6.3 years	4.7 to 5.1 years	4.6 to 5.9 years

As of December 31, 2021, there was $40.7 million of total unrecognized compensation cost related to non-vested stock options. That cost is expected to be recognized over a weighted average period of 2.4 years.

Restricted Stock Activity

The following is a summary of our restricted stock activity and related information:

	Shares	Weighted-Average Grant Date Fair Value
Outstanding at January 1, 2019	132,273	$ 130.63
Granted	118,498	$ 115.90
Vested	(102,846)	$ 121.55
Forfeited	(666)	$ 134.36
Outstanding at December 31, 2019	147,259	$ 125.11
Granted	111,306	$ 89.73
Vested	(52,363)	$ 121.69
Forfeited	—	$ —
Outstanding at December 31, 2020	206,202	$ 106.88
Granted	167,292	$ 169.63
Vested	(98,501)	$ 125.59
Forfeited	(10,850)	$ 141.85
Outstanding at December 31, 2021	264,143	$ 138.21

As of December 31, 2021, unrecognized compensation cost related to non-vested stock awards amounted to $20.6 million. That cost is expected to be recognized over a weighted average period of 1.6 years.

Employee Stock Purchase Plan

As of December 31, 2021, 44,360 shares of our common stock are available for future issuance under the Amended Employee Stock Purchase Plan, or ESPP. The ESPP permits eligible employees to purchase up to 1,250 shares of Ligand common stock per calendar year at a discount through payroll deductions. The price at which stock is purchased under the ESPP is equal to 85% of the fair market value of the common stock on the first of a six month offering period or purchase date, whichever is lower. There were 8,448, 6,455 and 4,745 shares issued under the ESPP in 2021, 2020 and 2019, respectively.

Share Repurchases

On September 11, 2019, our Board of Directors approved a stock repurchase program authorizing the repurchase of up to $300.0 million of our common stock from time to time over the next three years. We expect to acquire shares primarily through open-market transactions and have entered into a Rule 10b5-1 trading plan, and may enter into additional Rule 10b5-1 trading plans in the future, to facilitate open-market repurchases. The timing and amount of repurchase transactions will be determined by management based on our evaluation of market conditions, share price, legal requirements and other factors. Our prior $350.0 million stock repurchase program was terminated in connection with the approval of the new stock repurchase program. Authorization to repurchase $248.8 million of our common stock remained available as of December 31, 2021.

During the twelve months ended December 31, 2021, we did not repurchase any common stock. During the twelve months ended December 31, 2020 and 2019, we repurchased 934,079 shares for $78.0 million, and 4,122,133 shares for $448.4 million, respectively.

10. Commitment and Contingencies: Legal Proceedings

We record an estimate of a loss when the loss is considered probable and estimable. Where a liability is probable and there is a range of estimated loss and no amount in the range is more likely than any other number in the range, we record the minimum estimated liability related to the claim in accordance with ASC 450, *Contingencies.* As additional information becomes available, we assess the potential liability related to our pending litigation and revises our estimates. Revisions in our estimates of potential liability could materially impact our results of operations.

On April 9, 2019, CyDex, our wholly-owned subsidiary, received a Paragraph IV certification Notice Letter from Alembic Global Holdings SA ("Alembic") stating that Alembic had submitted an ANDA to the FDA, seeking approval to manufacture, offer to sell, and sell a generic version of EVOMELA® prior to the expiration of any of the '077 patent; the '088 patent, the '582 patent, or U.S. Patent No. 10,040,872 ("the '872 patent"), and alleging that these patents, each of which relates to Captisol, are invalid, unenforceable, and/or would not be infringed by Alembic's ANDA product. On May 23, 2019, CyDex filed a complaint against Alembic, Alembic Pharmaceuticals, Ltd., and Alembic Pharmaceuticals, Inc. in the U.S. District Court for the District of Delaware, asserting that the filing of Alembic's ANDA constitutes infringement of each of the '088 patent and the '582 patent. The parties entered into a settlement agreement on June 1, 2021 and the lawsuit has been dismissed.

On September 16, 2019, CyDex received a Paragraph IV certification Notice Letter from Lupin Ltd. ("Lupin") stating that Lupin had submitted an ANDA to the FDA, seeking approval to manufacture, offer to sell, and sell a generic version of EVOMELA® prior to the expiration of any of the '077 patent; the '088 patent, the '582 patent, or the '872 patent, and alleging that these patents, each of which relates to Captisol, are invalid, unenforceable, and/or would not be infringed by Lupin's ANDA product. CyDex filed a complaint on October 29, 2019, alleging patent infringement against Lupin. Lupin filed an answer on December 11, 2019 and counterclaimed for declaratory judgments of invalidity and non-infringement as to all four patents and CyDex filed its answer to Lupin's counterclaims on January 2, 2020. The parties entered into a settlement agreement on April 26, 2021 and the lawsuit has been dismissed.

On October 31, 2019, we received three civil complaints filed in the U.S. District Court for the Northern District of Ohio on behalf of several Indian tribes. The Northern District of Ohio is the Court that the Judicial Panel on Multi-District Litigation ("JPML") has assigned more than one thousand civil cases which have been designated as a Multi-District Litigation ("MDL") and captioned In Re: National Prescription Opiate Litigation. The allegations in these complaints focus on the activities of defendants other than the company and no individualized factual allegations have been advanced against us in any of the three complaints. We reject all claims raised in the complaints and intend to vigorously defend these matters.

On January 12, 2021, Abvivo submitted a JAMS arbitration demand naming the Company as respondent. Abvivo claimed that the Company was in violation of the assignment provision of that certain Commercial Platform License and Services Agreement ("CPLSA"), dated October 9, 2019, by and among OMT and Crystal, on the one hand, and Abvivo, on the other hand because the Company allegedly withheld its consent to a proposed assignment required for Abvivo to negotiate a discovery and development alliance with certain third parties. On January 26, 2021, we submitted a response to the demand, denying all claims and alleging counterclaims against Abvivo and Brian Lundstrom, a Company employee and the sole owner of Abvivo. We alleged that Mr. Lundstrom breached his fiduciary duty of loyalty to the Company and that Abvivo and Mr. Lundstrom fraudulently induced the Company, OMT and Crystal into certain business transactions and contracts. Abvivo and Mr. Lundstrom's response to these counterclaims was due on February 9, 2021, but they did not submit a response. Under JAMS rules, the counterclaims were deemed denied. On February 22, 2021, Abvivo submitted documents to JAMS which indicated that it sought to dismiss its claim without prejudice. On February 25, 2021, we submitted additional counterclaims against Abvivo and Mr. Lundstrom. These counterclaims alleged that Abvivo and Mr. Lundstrom made false promises regarding the CPLSA, Abvivo's breach of and failure to perform under the CPLSA, and Abvivo's infringement of certain Ligand trademarks. On March 11, 2021, Abvivo and Mr. Lundstrom submitted an answer to our amended counterclaims denying all of the claims and asserting various affirmative defenses. On June 21, 2021, the parties executed a confidential settlement agreement that settled all claims in this arbitration. On June 29, 2021, the parties jointly submitted to JAMS a dismissal with prejudice of all claims by all parties in the arbitration.

CyDex and Baxter Healthcare Corp. ("Baxter") are parties to a license agreement relating to Ligand's Captiso.technology and, more specifically, relating to Captisol-enabled Nexterone (amiodarone HCl premixed injection). Baxter contends that it has

overpaid royalties for several years, and seeks both refunds of those overpayment and a reduced royalty going forward. CyDex contends that Baxter has not paid the royalties due to CyDex under the terms of the license agreement. On April 6, 2021, Baxter initiated an arbitration with the American Arbitration Association pursuant to the arbitration provision of the license agreement. On April 21, 2021, CyDex filed an Answering Statement and Counterdemand. On May 5, 2021, Baxter filed an Answering Statement in response to CyDex's Counterdemand. On June 30, 2021, the parties held a Preliminary Hearing before the arbitrator. The parties have completed fact discovery and have exchanged expert witness statements; depositions of the expert witnesses will be completed by the end of March 2022. The arbitration hearing is currently scheduled for May 2022.

From time to time, we may also become subject to other legal proceedings or claims arising in the ordinary course of our business. We currently believe that none of the claims or actions pending against us is likely to have, individually or in the aggregate, a material adverse effect on our business, financial condition or results of operations. Given the unpredictability inherent in litigation, however, we cannot predict the outcome of these matters.

11. Income Taxes

The components of the income tax expense (benefit) for continuing operations are as follows (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Current expense (benefit):			
Federal	$ (1,190)	$ 10,889	$ 89,471
State	(32)	589	3,103
Foreign	—	23	(66)
	(1,222)	11,501	92,508
Deferred expense (benefit):			
Federal	(7,355)	(15,672)	74,627
State	(1,263)	(3,382)	202
	(8,618)	(19,054)	74,829
Total income tax expense (benefit)	$ (9,840)	$ (7,553)	$ 167,337

A reconciliation of income tax expense (benefit) from continuing operations to the amount computed by applying the statutory federal income tax rate to the net income (loss) from continuing operations is summarized as follows (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Tax at federal statutory rate	$ 9,932	$ (2,213)	$ 167,294
State, net of federal benefit	(408)	(1,456)	2,466
Contingent liabilities	(8,161)	(278)	18
Share-based compensation	(11,919)	(362)	(819)
FDII	(637)	(1,652)	(402)
Research and development credits	(2,692)	(699)	(879)
Change in uncertain tax positions	586	(650)	441
Rate change for changes in federal, foreign or state law	(7,963)	(173)	(210)
Provision to return adjustments	(617)	(4,803)	(184)
Foreign tax differential on income/loss of foreign subsidiaries	(114)	(3,839)	57
Change in valuation allowance	11,410	(121,876)	(1,193)
Sale of Vernalis R&D	—	127,372	—
Other	743	3,076	748
	$ (9,840)	$ (7,553)	$ 167,337

We remeasured certain deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future, which is generally 21%. Significant components of our deferred tax assets and liabilities as of December 31, 2021 and 2020 are shown below. We assess the positive and negative evidence to determine if sufficient future taxable income will be generated to

use the existing deferred tax assets. Our evaluation of evidence resulted in management concluding that the majority of our deferred tax assets will be realized. However, we maintain a valuation allowance to offset certain net deferred tax assets as management believes realization of such assets are uncertain as of December 31, 2021, 2020 and 2019. The valuation allowance increased $11.4 million in 2021, decreased $116.5 million in 2020 and increased $136.9 million in 2019.

We offset all deferred tax assets and liabilities by jurisdiction, as well as any related valuation allowance, and present them on our consolidated balance sheet as a non-current deferred income tax asset or liability (as applicable). Deferred tax assets (liabilities) are comprised of the following:

	December 31,	
	2021	2020
	(in thousands)	
Deferred tax assets:		
Net operating loss carryforwards	$ 64,352	$ 64,147
Research credit carryforwards	27,797	19,623
Stock compensation	11,374	11,994
Other	19,668	13,120
	123,191	108,884
Valuation allowance for deferred tax assets	(36,283)	(24,858)
Net deferred tax assets	$ 86,908	$ 84,026
Deferred tax liabilities:		
Identified intangibles	(102,221)	(119,381)
Other	(9,300)	(4,923)
Net deferred tax liabilities	$ (111,521)	$ (124,304)
Deferred income taxes, net	$ (24,613)	$ (40,278)

As of December 31, 2021, we had federal net operating loss carryforwards set to expire through 2037 of $19.6 million and $176.3 million of state net operating loss carryforwards that begin to expire in 2032. We also have $9.8 million of federal research and development credit carryforwards, which expire through 2041. We have $29.7 million of California research and development credit carryforwards that have no expiration date. In addition, we have approximately $101.6 million of non-U.S. net operating loss carryovers and approximately $17.5 million of non-U.S. capital loss carryovers that have no expiration date. At December 31, 2020 we had approximately $110.1 million of non-U.S. net operating loss carryovers and approximately $17.6 million of non-U.S. capital loss carryovers. We have a full valuation allowance against these non-U.S. tax attributes. The year over year decrease in non-U.S. deferred tax assets was attributable to the sale of Vernalis in December 2020. The remaining non-U.S. deferred tax assets as of December 31, 2021 were attributable to the portion of the Vernalis business that we did not sell. We have a full valuation allowance against these non-U.S. tax attributes. See detail in "*Note (2), Sale of Vernalis R&D and Promacta License*."

Pursuant to Section 382 and 383 of the Internal Revenue Code of 1986, as amended, utilization of our net operating losses and credits may be subject to annual limitations in the event of any significant future changes in its ownership structure. These annual limitations may result in the expiration of net operating losses and credits prior to utilization. The deferred tax assets as of December 31, 2021 are net of any previous limitations due to Section 382 and 383.

We account for income taxes by evaluating a probability threshold that a tax position must meet before a financial statement benefit is recognized. The minimum threshold is a tax position that is more likely than not to be sustained upon examination by the applicable taxing authority, including resolution of any related appeals or litigation processes, based on the technical merits of the position. Our remaining liabilities for uncertain tax positions are presented net of the deferred tax asset balances on the accompanying consolidated balance sheet.

A reconciliation of the amount of unrecognized tax benefits at December 31, 2021, 2020 and 2019 is as follows (in thousands):

	December 31,		
	2021	2020	2019
Balance at beginning of year	$ 31,871	$ 28,736	$ 30,289
Additions based on tax positions related to the current year	252	3,911	543
Additions for tax positions of prior years	945	179	—
Reductions for tax positions of prior years	(3,072)	(955)	(2,096)
Balance at end of year	$ 29,996	$ 31,871	$ 28,736

Included in the balance of unrecognized tax benefits at December 31, 2021 is $28.1 million of tax benefits that, if recognized would impact the effective rate. There are no positions for which it is reasonably possible that the uncertain tax benefit will significantly increase or decrease within twelve months.

We recognize interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2021 and December 31, 2020, we recognized an immaterial amount of interest and penalties. We file income tax returns in the United States, various state jurisdictions, United Kingdom, and Canada with varying statutes of limitations. The federal statute of limitation remains open for the 2018 tax year to the present. The state income tax returns generally remain open for the 2017 tax year through the present. Net operating loss and research credit carryforwards arising prior to these years are also open to examination if and when utilized. No tax returns are currently under examination by any tax authorities. We believe our reserve for unrecognized tax benefits and contingent tax issues is adequate with respect to all open years.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

(a) Evaluation of Disclosure Controls and Procedures

We are responsible for maintaining disclosure controls and procedures designed to provide reasonable assurance that information required to be disclosed in reports we file under the Exchange Act is recorded, processed, summarized and reported within the specified time periods and accumulated and communicated to management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure. The design of any system of controls is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected. As of the end of the period covered by this Annual Report on Form 10-K, we have carried out an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, and have concluded our disclosure controls and procedures were effective at a reasonable assurance level as of December 31, 2021.

There have been no changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

(b) Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. Internal control over financial reporting is a process to provide reasonable assurance regarding the reliability of our financial reporting for external purposes in accordance with accounting principles generally accepted in the United States of America. Internal control over financial reporting includes maintaining records that in reasonable detail accurately and fairly reflect our transactions; providing reasonable assurance that transactions are recorded as necessary for preparation of our

financial statements in accordance with generally accepted accounting principles; providing reasonable assurance that receipts and expenditures are made in accordance with our management and directors; and providing reasonable assurance that
unauthorized acquisition, use or disposition of company assets that could have a material effect on our financial statements would be prevented or detected on a timely basis. Because of its inherent limitations, internal control over financial reporting is not intended to provide absolute assurance that a misstatement of our financial statements would be prevented or detected.

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework established by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) as set forth in the 2013 Internal Control-Integrated Framework. Based on our evaluation under the 2013 framework in Internal Control - Integrated Framework, management concluded that our internal controls over financial reporting were effective as of December 31, 2021.

Ernst & Young LLP, an independent registered public accounting firm, has audited the Company's consolidated financial statements included in this Annual Report on Form 10-K and has issued an attestation report, included herein, on the effectiveness of our internal control over financial reporting as of December 31, 2021.

Report of Independent Registered Public Accounting Firm

The Stockholders and Board of Directors of Ligand Pharmaceuticals Incorporated

Opinion on Internal Control Over Financial Reporting

We have audited Ligand Pharmaceuticals Incorporated's internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Ligand Pharmaceuticals Incorporated (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity and cash flows for each of the three years in the period ended December 31, 2021, and the related notes and our report dated February 28, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

San Diego, California
February 28, 2022

Item 9B. Other Information

None

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

None

Part III

Item 10. Directors, Executive Officers and Corporate Governance

Code of Conduct

The Board of Directors has adopted a Code of Conduct and Ethics Policy ("Code of Conduct") that applies to all officers, directors and employees. The Company will promptly disclose (1) the nature of any amendment to the Code of Conduct that applies to our principal executive officer, principal financial officer, principal accounting officer or controller or persons performing similar functions and (2) the nature of any waiver, including an implicit waiver, from a provision of our Code of Conduct that is granted to one of these specified officers, the name of such person who is granted the waiver and the date of the waiver on our website in the future. The Code of Conduct can be accessed via our website (http://www.ligand.com), Corporate Overview page. You may also request a free copy by writing to: Investor Relations, Ligand Pharmaceuticals Incorporated, 5980 Horton Street, Suite 405, Emeryville, CA 94608.

The other information under Item 10 is hereby incorporated by reference to Ligand's Definitive Proxy Statement to be filed with the SEC within 120 days of December 31, 2021.

Item 11. Executive Compensation

Item 11 is hereby incorporated by reference to Ligand's Definitive Proxy Statement to be filed with the SEC within 120 days of December 31, 2021.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

Item 12 is hereby incorporated by reference to Ligand's Definitive Proxy Statement to be filed with the SEC within 120 days of December 31, 2021.

Item 13. Certain Relationships and Related Transactions, and Director Independence

Item 13 is hereby incorporated by reference to Ligand's Definitive Proxy Statement to be filed with the SEC within 120 days of December 31, 2021.

Item 14. Principal Accountant Fees and Services

Item 14 is hereby incorporated by reference to Ligand's Definitive Proxy Statement to be filed with the SEC within 120 days of December 31, 2021.

PART IV

Item 15. Exhibits and Financial Statement Schedule

(a) The following documents are included as part of this Annual Report on Form 10-K.

(1) Financial statements

(2) Schedules not included herein have been omitted because they are not applicable or the required information is in the consolidated financial statements or notes thereto.

(3) The following exhibits are filed as part of this Form 10-K and this list includes the Exhibit Index.

		Incorporated by Reference				
Exhibit Number	**Description of Exhibit**	**Form**	**File Number**	**Date of Filing**	**Exhibit Number**	**Filed Herewith**
2.1	Asset Purchase Agreement, dated March 5, 2019, by and among Ligand Pharmaceuticals Incorporated and RPI Financial Trust	8-K	001-33093	March 5, 2019	2.1	
2.2	Asset Purchase Agreement, dated February 11, 2020, (as amended on April 1, 2020), by and among Ligand Pharmaceuticals Incorporated, Icagen Inc., Icagen Corp., XRPro Sciences, Inc. and Caldera Discovery, Inc.	10-Q	001-33093	May 8, 2020	2.1	
2.3	Agreement and Plan of Merger, dated as of August 10, 2020, by and among Pfenex Inc., Ligand Pharmaceuticals Incorporated and Pelican Acquisition Sub, Inc.	8-K	001-33093	August 11, 2020	2.1	
2.4	Agreement and Plan of Merger, dated September 8, 2020, among Ligand Pharmaceuticals Incorporated, xCella Biosciences, Inc. and Eton Venture Services, Ltd. Co., as stockholders' representative	8-K	001-33093	September 10, 2020	10.1	
2.5	Agreement and Plan of Merger, dated September 9, 2020, among Ligand Pharmaceuticals Incorporated, Taurus Biosciences, LLC and the other signatories listed therein	8-K	001-33093	September 10, 2020	10.2	
2.6*	Agreement for the Sale and Purchase of the Entire Issued Share Capital of Vernalis (R&D) Limited, dated as of October 11, 2020, by and among Ligand Pharmaceuticals Incorporated, Vernalis Limited, HitGen UK Ltd and HitGen Inc.	8-K	001-33093	October 13, 2020	2.1	
3.1	Amended and Restated Certificate of Incorporation of the Company.	S-4	333-58823	July 9, 1998	3.1	
3.2	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of the Company, dated June 14, 2000	10-K	0-20720	March 29, 2001	3.5	
3.3	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of the Company, dated June 30, 2004	10-Q	0-20720	August 5, 2004	3.6	

3.4	Certificate of Amendment of the Amended and Restated Certificate of Incorporation of the Company, dated November 17, 2010	8-K	001-33093	November 19, 2010	3.1
3.5	Certificate of Amendment of the Amended and Restated Certification of Incorporation of the Company, dated June 19, 2018	S-8	333-233130	August 8, 2019	3.6
3.6	Fourth Amended and Restated Bylaws of the Company	8-K	001-33093	October 30, 2020	3.1
4.1	Specimen stock certificate for shares of the common stock of the Company	10-K	001-33093	March 1, 2018	4.1
4.2	Indenture, dated as of May 22, 2018, between the Company and Wilmington Trust, National Association, as trustee, including the form of 0.75% Convertible Senior Notes due 2023	8-K	001-33093	May 22, 2018	4.1
4.3	Description of Registered Securities	10-K	001-33093	February 24, 2021	4.3
10.1#	2002 Stock Incentive Plan (as amended and restated effective December 15, 2020)	10-K	001-33093	February 24, 2021	10.1
10.2#	2002 Employee Stock Purchase Plan (as amended and restated effective June 6, 2019)	DEF	001-33093	April 24, 2019	Appendix B
10.3#	Form of Stock Option Grant Notice and Stock Option Agreement under the Company's 2002 Stock Incentive Plan	10-K	001-33093	February 24, 2014	10.5
10.4#	Form of Stock Issuance Agreement for non-employee directors under the Company's 2002 Stock Incentive Plan	S-1	333-131029	January 13, 2006	10.289
10.5#	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement under the Company's 2002 Stock Incentive Plan	10-K	001-33093	March 1, 2018	10.6
10.6#	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement under the Company's 2002 Stock Incentive Plan - Performance-Based RSU Form	10-K	001-33093	March 1, 2018	10.7
10.7#	Form of Executive Officer Change in Control Severance Agreement	8-K	001-33093	August 22, 2007	10.1
10.8#	Amended and Restated Severance Plan, dated December 20, 2008	8-K	001-33093	December 24, 2008	10.2
10.9#	Amended and Restated Director Compensation and Stock Ownership Policy, effective March 28, 2019	10-K	001-33093	February 27, 2020	10.9
10.10	TR Beta Contingent Value Rights Agreement, dated January 27, 2010, among the Company, Metabasis Therapeutics, Inc., David F. Hale and Mellon Investor Services LLC	8-K	001-33093	January 28, 2010	10.2
10.11	General Contingent Value Rights Agreement, dated January 27, 2010, among the Company, Metabasis Therapeutics, Inc., David F. Hale and Mellon Investor Services LLC	8-K	001-33093	January 28, 2010	10.4
10.12	Amendment of General Contingent Value Rights Agreement, dated January 26, 2011, among the Company, Metabasis Therapeutics, Inc., David F. Hale and Mellon Investor Services LLC	8-K	001-33093	January 31, 2011	10.1
10.13	Amendment of General Contingent Value Rights Agreement dated May 20, 2014 among the Company, Metabasis Therapeutics, Inc., David F. Hale and Computershare Inc.	8-K	001-33093	May 22, 2014	10.1
10.14	Amendment of TR Beta Contingent Value Rights Agreement dated May 20, 2014 among the Company, Metabasis Therapeutics, Inc., David F. Hale and Computershare, Inc.	8-K	001-33093	May 22, 2014	10.2
10.15†	Captisol® Supply Agreement, dated December 20, 2002, among CyDex, Inc., Hovione LLC, Hovione FarmaCiencia S.A., Hovione Pharmascience Limited and Hovione International Limited	10-K	001-33093	March 3, 2011	10.1

10.16†	1st Amendment to Captisol® Supply Agreement, dated July 29, 2005, among CyDex, Inc., Hovione LLC, Hovione FarmaCiencia S.A., Hovione Pharmascience Limited and Hovione International Limited	10-K	001-33093	March 3, 2011	10.101
10.17	2nd Amendment to Captisol® Supply Agreement, dated March 1, 2007, among CyDex, Inc., Hovione LLC, Hovione FarmaCiencia S.A., Hovione Pharmascience Limited, and Hovione International Limited	10-K	001-33093	March 3, 2011	10.102
10.18†	3rd Amendment to Captisol® Supply Agreement, dated January 25, 2008, among CyDex, Inc., Hovione LLC, Hovione FarmaCiencia S.A., Hovione Pharmascience Limited, and Hovione International Limited	10-K	001-33093	March 3, 2011	10.103
10.19†	4th Amendment to Captisol® Supply Agreement, dated September 28, 2009, among CyDex Pharmaceuticals, Inc., Hovione LLC, Hovione FarmaCiencia S.A., Hovione Pharmascience Limited and Hovione International Limited	10-K	001-33093	March 3, 2011	10.104
10.20†	License Agreement, dated September 3, 1993, between CyDex L.C. and The University of Kansas	10-K	001-33093	March 3, 2011	10.105
10.21	First Amendment to License Agreement, dated February 24, 1998, between CyDex, Inc. and The University of Kansas	10-K	001-33093	March 3, 2011	10.106
10.22†	Second Amendment to License Agreement, dated August 4, 2004, between CyDex, Inc. and The University of Kansas	10-K	001-33093	March 3, 2011	10.107
10.23†	Acknowledgement Agreement, dated February 22, 2008, between CyDex, Inc. and The University of Kansas	10-K	001-33093	March 3, 2011	10.111
10.24†	Exclusive License Agreement, dated June 4, 1996, between Pfizer, Inc. and The University of Kansas	10-K	001-33093	March 3, 2011	10.108
10.25†	Addendum to Nonexclusive License Agreement, dated December 11, 2001, between CyDex, Inc. and Pfizer, Inc.	10-K	001-33093	March 3, 2011	10.11
10.26†	License Agreement, by and between CyDex Pharmaceuticals, Inc. and Spectrum Pharmaceuticals, Inc., dated as of March 8, 2013	10-Q	001-33093	May 8, 2013	10.2
10.27†	Supply Agreement, by and between CyDex Pharmaceuticals, Inc. and Spectrum Pharmaceuticals, Inc., dated as of March 8, 2013	10-Q	001-33093	May 8, 2013	10.3
10.28†	Royalty Stream and Milestone Payments Purchase Agreement, dated April 29, 2013, between the Company and Selexis S.A.	10-Q	001-33093	August 1, 2013	10.2
10.29†	Master License Agreement dated May 21, 2014 among the Company, Metabasis Therapeutics, Inc. and Viking Therapeutics, Inc.	10-Q	001-33093	August 5, 2014	10.2
10.30†	First Amendment to Master License Agreement dated September 6, 2014 among the Company, Metabasis Therapeutics, Inc. and Viking Therapeutics, Inc.	10-Q	001-33093	October 31, 2014	10.9
10.31†	Second Amendment to Master License Agreement, dated April 8, 2015, among the Company, Metabasis Therapeutics, Inc. and Viking Therapeutics, Inc.	10-Q	001-33093	August 5, 2015	10.1
10.32	Letter Agreement, dated as of August 12, 2014, between Bank of America, N.A. and the Company regarding the Base Issuer Warrant Transaction	8-K	001-33093	August 18, 2014	10.2
10.33	Letter Agreement, dated as of August 12, 2014, between Deutsche Bank AG, London Branch and the Company regarding the Base Issuer Warrant Transaction	8-K	001-33093	August 18, 2014	10.4
10.34	Letter Agreement, dated as of August 14, 2014, between Bank of America, N.A. and the Company regarding the Additional Issuer Warrant Transaction	8-K	001-33093	August 18, 2014	10.6

10.35	Letter Agreement, dated as of August 14, 2014, between Deutsche Bank AG, London Branch and the Company regarding the Additional Issuer Warrant Transaction	8-K	001-33093	August 18, 2014	10.8	
10.36†	Development Funding and Royalties Agreement, dated December 13, 2018, by and between Ligand Pharmaceuticals Incorporated and Palvella Therapeutics, Inc.	10-K	001-33093	February 28, 2019	10.48	
10.37**	Sublicense Agreement between the Company, Pharmacopeia, Inc. and Retrophin LLC dated as of February 16, 2012, as amended through Amendment No. 5 to Sublicense Agreement, dated March 20, 2018.					X
10.38†	Lease, dated November 3, 2015, between the Company and 3911/3931 SVB, LLC	8-K	001-33093	November 10, 2015	10.1	
10.39	Lease, dated June 8, 2021, between the Company and Emery Station Office II, LLC					X
10.40†	Interest Purchase Agreement, dated May 3, 2016, between the Company and CorMatrix Cardiovascular, Inc.	8-K/A	001-33093	May 9, 2016	10.1	
10.41	Amended and Restated Interest Purchase Agreement, dated May 31, 2017, between the Company and CorMatrix Cardiovascular, Inc.	10-Q	001-033093	August 9, 2017	10.2	
10.42	Letter Agreement, dated as of May 17, 2018, between Barclays Capital Inc. and the Company regarding the Base Convertible Note Hedge Transaction	8-K	001-00393	May 22, 2018	10.1	
10.43	Letter Agreement, dated as of May 17, 2018, between Barclays Capital Inc. and the Company regarding the Base Issuer Warrant Transaction	8-K	001-00393	May 22, 2018	10.2	
10.44	Letter Agreement, dated as of May 17, 2018, between Deutsche Bank AG and the Company regarding the Base Convertible Note Hedge Transaction	8-K	001-00393	May 22, 2018	10.3	
10.45	Letter Agreement, dated as of May 17, 2018, between Deutsche Bank AG and the Company regarding the Base Issuer Warrant Transaction	8-K	001-00393	May 22, 2018	10.4	
10.46	Letter Agreement, dated as of May 17, 2018, between Goldman Sachs & Co. LLC and the Company regarding the Base Convertible Note Hedge Transaction	8-K	001-00393	May 22, 2018	10.5	
10.47	Letter Agreement, dated as of May 17, 2018, between Goldman Sachs & Co. LLC and the Company regarding the Base Issuer Warrant Transaction	8-K	001-00393	May 22, 2018	10.6	
10.48	Letter Agreement, dated as of May 18, 2018, between Barclays Capital Inc. and the Company regarding the Additional Convertible Note Hedge Transaction	8-K	001-00393	May 22, 2018	10.7	
10.49	Letter Agreement, dated as of May 18, 2018, between Barclays Capital Inc. and the Company regarding the Additional Warrant Transaction	8-K	001-00393	May 22, 2018	10.8	
10.50	Letter Agreement, dated as of May 18, 2018, between Deutsche Bank AG and the Company regarding the Additional Convertible Note Hedge Transaction	8-K	001-00393	May 22, 2018	10.9	
10.51	Letter Agreement, dated as of May 18, 2018, between Deutsche Bank AG and the Company regarding the Additional Warrant Transaction	8-K	001-00393	May 22, 2018	10.10	
10.52	Letter Agreement, dated as of May 18, 2018, between Goldman Sachs & Co. LLC and the Company regarding the Additional Convertible Note Hedge Transaction	8-K	001-00393	May 22, 2018	10.11	

10.53	Letter Agreement, dated as of May 18, 2018, between Goldman Sachs & Co. LLC and the Company regarding the Additional Warrant Transaction	8-K	001-00393	May 22, 2018	10.12	
10.54#	Form of Indemnification Agreement between the Company and each of its directors	10-K	001-33093	March 1, 2018	10.60	
10.55#	Form of Indemnification Agreement between the Company and each of its officers	10-K	001-33093	March 1, 2018	10.60	
10.56†	Addendum, dated May 22, 2019, by and among Ligand Pharmaceuticals Incorporated, CyDex Pharmaceuticals, Inc., and Acrotech Biopharma LLC (as successor-in-interest to Spectrum Pharmaceuticals, Inc.), to that certain License Agreement between Ligand Pharmaceuticals Incorporated and Spectrum Pharmaceuticals, Inc., dated March 8, 2013	10-Q	001-33093	August 8, 2019	10.1	
10.57	Call Option Amendment Agreement, dated April 6, 2020, between the Registrant and Barclays Bank PLC	10-Q	001-33093	May 8, 2020	10.1	
10.58	Call Option Amendment Agreement, dated April 6, 2020, between the Registrant and Deutsche Bank AG, London Branch	10-Q	001-33093	May 8, 2020	10.2	
10.59	Call Option Amendment Agreement, dated April 6, 2020, between the Registrant and Goldman Sachs & Co. LLC	10-Q	001-33093	May 8, 2020	10.3	
10.60	Call Option Amendment Agreement, dated January 28, 2021, between the Registrant and Barclays Bank PLC	10-K	001-33093	February 24, 2021	10.67	
10.61	Call Option Amendment Agreement, dated January 28, 2021, between the Registrant and Deutsche Bank AG, London Branch	10-K	001-33093	February 24, 2021	10.68	
10.62	Call Option Amendment Agreement, dated January 28, 2021, between the Registrant and Goldman Sachs & Co. LLC	10-K	001-33093	February 24, 2021	10.69	
10.63	Contingent Value Rights Agreement, dated September 9, 2020, between Ligand Pharmaceuticals Incorporated and Vaughn Smider, as Members' Representative (regarding Taurus Biosciences, LLC acquisition) (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed with the Securities and Exchange Commission on September 10, 2020)	8-K	001-33093	September 10, 2020	10.3	
10.64	Commercial License Agreement, dated September 9, 2020, between Taurus Biosciences, LLC and Minotaur Therapeutics, Inc. (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed with the Securities and Exchange Commission on September 10, 2020)	8-K	001-33093	September 10, 2020	10.4	
10.65	Supply agreement, dated December 22, 2015, by and between Cydex Pharmaceuticals, Inc. and Gilead Sciences, Inc.	10-K	001-33093	February 24, 2021	10.72	
10.66	Amendment to Supply Agreement, dated September 21, 2020, by and between Cydex Pharmaceuticals, Inc. and Gilead Sciences, Inc., which amends that certain Supply Agreement, dated December 2, 2015, by and between Cydex Pharmaceuticals, Inc. and Gilead Sciences, Inc.	10-Q	001-33093	November 6, 2020	10.2	
21.1	Subsidiaries of the Company					X
23.1	Consent of Independent Registered Public Accounting Firm					X
31.1	Certification by Principal Executive Officer, Pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X

31.2	Certification by Principal Financial Officer, Pursuant to Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.	X
32.1	Certifications by Principal Executive Officer and Principal Financial Officer, Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.	X
101	The following financial information from our Annual Report on Form 10-K for the fiscal year ended December 31, 2020, formatted in iXBRL (inline eXtensible Business Reporting Language): (i) Consolidated Balance Sheets, (ii) Consolidated Statements of Operations, (iii) Consolidated Statement of Comprehensive Income, (iv) Consolidated Statements of Stockholders' Equity, (v) Consolidated Statements of Cash Flows, and (vi) the Notes to Consolidated Financial Statements.	X
104	The cover page from the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2021, formatted in Inline XBRL and contained in Exhibit 101.	X

† Confidential treatment has been requested for portions of this exhibit. These portions have been omitted and submitted separately to the Securities and Exchange Commission.

# Indicates management contract or compensatory plan.

* Certain schedules and annexes have been omitted in accordance with Item 601(b)(2) of Regulation S-K. A copy of any omitted schedule and/or annex will be furnished as a supplement to the U.S. Securities and Exchange Commission upon request.

** Pursuant to Item 601(b)(10) of Regulation S-K, certain confidential portions of this exhibit were omitted by means of marking such portions with an asterisk because the identified confidential portions (i) are not material and (ii) would be competitively harmful if publicly disclosed.

Item 16. Form 10-K Summary

None

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

LIGAND PHARMACEUTICALS INCORPORATED

By: /S/ JOHN L. HIGGINS

John L. Higgins,
Chief Executive Officer

Date: February 28, 2022

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ JOHN L. HIGGINS **John L. Higgins**	Chief Executive Officer and Director (Principal Executive Officer)	February 28, 2022
/s/ MATTHEW KORENBERG **Matthew Korenberg**	Executive Vice President, Finance and Chief Financial Officer (Principal Financial and Accounting Officer)	February 28, 2022
/s/ JOHN W. KOZARICH **John W. Kozarich**	Director and Chairman of the Board	February 28, 2022
/s/ JASON M. ARYEH **Jason M. Aryeh**	Director	February 28, 2022
/s/ SARAH BOYCE **Sarah Boyce**	Director	February 28, 2022
/s/ JENNIFER COCHRAN **Jennifer Cochran**	Director	February 28, 2022
/s/ TODD C. DAVIS **Todd C. Davis**	Director	February 28, 2022
/s/ NANCY R. GRAY **Nancy R. Gray**	Director	February 28, 2022
/s/ JOHN L. LAMATTINA **John L. LaMattina**	Director	February 28, 2022
/s/ SUNIL PATEL **Sunil Patel**	Director	February 28, 2022
/s/ STEPHEN L. SABBA **Stephen L. Sabba**	Director	February 28, 2022

Exhibit 10.37

*** CERTAIN MATERIAL (INDICATED BY THREE ASTERISKS IN BRACKETS) HAS BEEN OMITTED FROM THIS DOCUMENT BECAUSE IT IS BOTH (1) NOT MATERIAL AND (2) WOULD BE COMPETITIVELY HARMFUL IF PUBLICLY DISCLOSED.

SUBLICENSE AGREEMENT

THIS SUBLICENSE AGREEMENT (the "Agreement") is made and entered into effective as of February 16, 2012 (the "Effective Date") by and between Ligand Pharmaceuticals Incorporated, a corporation organized under the laws of Delaware and having a place of business at 11085 North Torrey Pines Road, Suite 300, La Jolla, CA, 92037 and its wholly owned subsidiary, Pharmacopeia, Inc. (as successor in interest to Pharmacopeia Drug Discovery Inc.) ("PCOP"), a limited liability company organized under the laws of Delaware and having a place of business at 11085 North Torrey Pines Road, Suite 300, La Jolla, CA, 92037 (collectively, Ligand Pharmaceuticals Incorporated and PCOP shall be known as "Ligand") and Retrophin, LLC, a limited liability company organized under the laws of Delaware and having a place of business at 330 Madison Avenue, 6th Floor, New York, NY, 10017 ("Retrophin"). Ligand and Retrophin are each referred to herein by name or individually as a "Party" or collectively as the "Parties."

RECITALS

WHEREAS, Ligand has in-licensed certain patent rights and know-how rights with respect to the Licensed Compounds (as defined below) and has the right to sublicense the same;

WHEREAS, Retrophin desires to obtain from Ligand sublicenses relating to the Licensed Compounds and Ligand desires to grant such sublicenses to Retrophin, all on the terms and conditions set forth in this Agreement;

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants and agreements set forth below, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

Article 1.

DEFINITIONS

The terms in this Agreement with initial letters capitalized shall have the meaning set forth below or, if not listed below, the meaning designated in places throughout this Agreement.

1.1 "AAA" has the meaning set forth in Section 14.3.1.

1.2 "Act" means the United States Food, Drug and Cosmetic Act, as amended.

1.3 "Active Compound" has the meaning set forth in Appendix 2 hereto.

1.4 "Affiliate" of a Person means any other Person which (directly or indirectly) is controlled by, controls or is under common control with such Person. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to a Person means (i) in the case of a corporate entity, direct or indirect ownership of voting securities entitled

to cast at least **[***]** of the votes in the election of directors or (ii) in the case of a non-corporate entity, direct or indirect ownership of at least **[***]** of the voting securities with the power to direct the management and policies of such entity.

1.5 "Agreement" has the meaning set forth in the initial paragraph herein and includes all Appendices attached hereto, as the same may be amended or supplemented from time to time.

1.6 "Approval" means, with respect to any Licensed Product in any regulatory jurisdiction, approval from the applicable Regulatory Authority sufficient for the manufacture, distribution, use and sale of the Licensed Product in such jurisdiction in accordance with applicable Laws.

1.7 "BMS" means Bristol-Myers Squibb Company, a Delaware corporation headquartered at 345 Park Avenue, New York, New York 10154.

1.8 "BMS Know-How" means **[***]**. BMS Know-How shall not include **[***]**.

1.9 "Business Day" or "business day" means a day other than Saturday, Sunday or any day on which commercial banks located in New York, New York are authorized or obligated by applicable Laws to close.

1.10 **[***]**.

1.11 **[***]**.

1.12 "Combination Product" means **[***]**.

1.13 "Commercialization" or "Commercialize" means activities directed to commercially manufacturing, obtaining pricing and reimbursement approvals, carrying out Phase 4 Trials for, marketing, promoting, distributing, importing or selling a pharmaceutical product.

1.14 "Commercially Reasonable Efforts" means, with respect to Licensed Compounds and Licensed Products, the carrying out of Development or Commercialization activities in a **[***]**. Without limiting the foregoing, Commercially Reasonable Efforts requires that a Party: (i) **[***]** (ii) **[***]** (iii) **[***]** (iv) **[***]** (v) **[***]**.

1.15 "Competitive Compound" means any **[***]** that is **[***]** unless Ligand has**[***]**. Ligand shall not **[***]**.

1.16 "Confidential Information" means all trade secrets, processes, formulae, data, know-how, improvements, inventions, chemical or biological materials, assays, techniques, marketing plans, strategies, customer lists, or other information that has been created, discovered, or developed by a Party, or has otherwise become known to a Party, or to which rights have been assigned to a Party, as well as any other information, agreements and materials that are deemed confidential or proprietary to or by a Party (including all information and materials of a Party's customers and any other Third Party and their consultants), in each case that are disclosed by such Party to the other Party, regardless of whether any of the foregoing are marked "confidential" or "proprietary" or communicated to the other by the disclosing Party in oral, written, graphic, or electronic form.

1.17 "Controlled" or "Controls", when used in reference to intellectual property, means the legal authority or right of a Party hereto (or any of its Affiliates) to grant a

license or sublicense of intellectual property rights to another Party, or to otherwise disclose proprietary or trade secret information to such other Party, without breaching the terms of any agreement with a Third Party, or misappropriating the proprietary or trade secret information of a Third Party.

1.18 "Core Patent Rights" means the patents and patent applications that are listed in Appendix 1 hereto and (a) **[***]** that **[***]** listed in Appendix 1 hereto **[***]** and **[***]** (but in each case, only with respect to **[***]** listed in Appendix 1 hereto), (b) all **[***]** foregoing**[***]**, together with all **[***]** thereof (but in each case, only with respect to **[***]** in Appendix 1 hereto).

1.19 "Cover," "Covered" or "Covering" means, with respect to patent rights, that the making, using, importation, offer for sale or sale of an invention claimed in such patent rights or the conducting of an activity that, in the absence of a license under such patent rights, would infringe at least one Valid Claim of such patent rights whether present in an issued patent or in a patent application if it issued as a patent containing such claim.

1.20 "Development" means non-clinical and clinical drug development activities reasonably related to the development and submission of information to a Regulatory Authority, including toxicology, pharmacology and other discovery and pre-clinical efforts, test method development and stability testing, manufacturing process development, formulation development, delivery system development, quality assurance and quality control development, statistical analysis, clinical studies (including, pre- and post-approval studies and specifically excluding regulatory activities directed to obtaining pricing and reimbursement approvals). When used as a verb, "Develop" means to engage in Development.

1.21 "Development Plan" means, with respect to any Licensed Product, a comprehensive, multi-year plan specifying the anticipated timing and technical details of Development activities for such Licensed Product, including the indications to be targeted, line of therapy, timelines for completing key activities, phasing of development, primary endpoints, criteria for continuing activities, study size, comparator drugs, combination drugs, timelines for data preparation and filing of regulatory submissions, toxicology and pharmacology studies and manufacturing process development and scale up. An outline of the initial Development Plan as of the Effective Date is attached hereto as Appendix 3.

1.22 "Dollar" or "$" means the lawful currency of the United States.

1.23 "Effective Date" has the meaning set forth in the initial paragraph of this Agreement.

1.24 "EMEA" means the European Agency for the Evaluation of Medicinal Products, or any successor agency thereto.

1.25 "Excluded Claim" means a Dispute that concerns (a) the validity or infringement of a patent, trademark or copyright or (b) any antitrust, anti-monopoly or competition law or regulation, whether or not statutory.

1.26 "Executive" means for Ligand, the Chief Executive Officer of Ligand (or such individual's designee) and for Retrophin, the Chief Executive Officer of Retrophin (or such individual's designee). If either position is vacant or either position does not exist, then the person having the most nearly equivalent position (or such individual's designee) shall be deemed to be the Executive of the relevant Party.

1.27 "Exit Transaction" means: (i) **[***]**

1.28 "FDA" means the U.S. Food and Drug Administration, or any successor agency thereto.

1.29 "Field" means the diagnosis, prevention, treatment or control of any human or animal disease, disorder or condition.

1.30 "First Commercial Sale" means, with respect to any Licensed Product, the first sale for use or consumption by the general public of such Licensed Product in any country in the Territory after Approval of such Licensed Product has been granted, or such marketing and sale is otherwise permitted, by the Regulatory Authority of such country.

1.31 "GAAP" means generally accepted accounting principles in the United States.

1.32 "IND" means an Investigational New Drug Application, as defined in the Act, filed with the FDA or its foreign counterparts.

1.33 "Indemnification Claim" has the meaning set forth in Section 12.3.

1.34 "Indemnitee" has the meaning set forth in Section 12.3.

1.35 "Indemnitor" has the meaning set forth in Section 12.3.

1.36 "JNDA" means a New Drug Application filed with the Koseisho required for marketing approval for the applicable Licensed Product in Japan.

1.37 "JNDA Approval" means the approval of a JNDA by the Koseisho for the applicable Licensed Product in Japan.

1.38 "JNDA Filing" means the submission to the Koseisho of a JNDA for the applicable Licensed Product in Japan.

1.39 "Know-How" means **[***]**.

1.40 "Koseisho" means the Japanese Ministry of Health and Welfare, or any successor agency thereto.

1.41 "Laws" means all laws, statutes, rules, regulations, ordinances and other pronouncements having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision, agency or other body, domestic or foreign.

1.42 "License" means any agreement transferring rights with respect to any Licensed Compound or any Licensed Product by Retrophin (or an Affiliate of Retrophin) to any Third Party licensee, including any license, sublicense, co-development, co-promotion, distribution, joint venture, development and commercialization collaboration or similar transaction involving a transfer of rights with respect to a Licensed Compound or Licensed Product. "License" shall also include any further transfer of such rights by a Third Party licensee to any other Third Party. "License" also refers to the corresponding arrangement for the grant by Retrophin of rights back to BMS and Ligand with respect to one or more Licensed Compound(s) and Licensed Product(s) pursuant to Article 3.

1.43 "Licensed Compounds" means:

(a) the **[***]**;

(b) any **[***]**;

(c) any **[***]**; and

(d) any **[***]**.

1.44 "Licensed Product" means any pharmaceutical product containing a Licensed Compound (alone or with other active ingredients), in all forms, presentations, formulations and dosage forms.

1.45 "Listed Compounds" means those compounds identified in Appendix 4.

1.46 "Losses and Claims" has the meaning set forth in Section 12.1.

1.47 "MAA Approval" means approval by the EMEA of a marketing authorization application ("MAA") filed with the EMEA for the applicable Licensed Product under the centralized European procedure. If the centralized EMEA filing procedure is not used, MAA Approval shall be achieved upon the first Approval for the applicable Licensed Product in any two of the following countries: France, Germany, Italy, Spain or the United Kingdom.

1.48 "MAA Filing" means the submission to the EMEA of a MAA for the applicable Licensed Product under the centralized European procedure. If the centralized EMEA filing procedure is not used, MAA Filing shall be achieved upon the first filing of a marketing authorization application for the applicable Licensed Product in any two of the following countries: France, Germany, Italy, Spain or the United Kingdom.

1.49 "Major Market Countries" means the**[***]**. "Major Market Country" **[***]**.

1.50 "NDA" means a New Drug Application filed with the FDA required for marketing approval for the applicable Licensed Product in the U.S.

1.51 "NDA Approval" means the approval of a NDA by the FDA for the applicable Licensed Product in the U.S.

1.52 "NDA Filing" means the submission to the FDA of a NDA for the applicable Licensed Product.

1.53 "Net Sales" means, with respect to any **[***]**:

(a) **[***]**; *provided, however*, that where any such **[***]**;

(b) **[***]**;

(c) **[***]**; and

(d) **[***]**.

Net Sales shall be determined **[***]**. In the case of any Combination Product sold in the Territory, Net Sales for such Combination Product shall be calculated by **[***]**.

Net Sales shall not include any **[***]**.

1.54 "Orphan Licensed Product" means a Licensed Product that receives orphan drug designation from the FDA pursuant to 21 C.F.R. Part 316, or from a Regulatory Authority pursuant to a comparable rule or regulation in a foreign jurisdiction, including the orphan indications set forth in the Development Plan.

1.55 "Other Patent Rights" means (i) **[***]** (a) **[***]** or (b) **[***]** and (ii) **[***]**.

1.56 "Patent Rights" means the Core Patent Rights and the Other Patent Rights.

1.57 "Person" means any individual, firm, corporation, partnership, limited liability company, trust, business trust, joint venture company, governmental authority, association or other entity.

1.58 "Phase 2 Trial" means a human clinical trial of a Licensed Product, the principal purpose of which is a determination of safety and efficacy in the target patient population, as described in 21 C.F.R. 312.21(b), or a similar clinical study prescribed by the Regulatory Authorities in a foreign country. For purposes of this Agreement, "initiation of a Phase 2 Trial" for a Licensed Product means the first dosing of such Licensed Product in a human patient in a Phase 2 Trial.

1.59 "Phase 3 Trial" means a human clinical trial of a Licensed Product on a sufficient number of subjects that is designed to establish that a pharmaceutical product is safe and efficacious for its intended use, and to determine warnings, precautions, and adverse reactions that are associated with such pharmaceutical product in the dosage range to be prescribed, which trial is intended to support Approval of a Licensed Product, as described in 21 C.F.R. 312.21(c), or a similar clinical study prescribed by the Regulatory Authorities in a foreign country. For clarity, any human clinical trial may qualify as a Phase 3 Trial if it supports Approval of a Licensed Product without the need to conduct a Phase 3 Trial. For purposes of this Agreement, "initiation of a Phase 3 Trial" for a Licensed Product means the first dosing of such Licensed Product in a human patient in a Phase 3 Trial.

1.60 "Phase 4 Trial" means a human clinical trial for a Licensed Product commenced after receipt of Approval in the country for which such trial is being conducted and that is conducted within the parameters of the Approval for the Licensed Product. Phase 4 Trials may include epidemiological studies, modeling and pharmacoeconomic studies, investigator sponsored clinical trials of the Licensed Product and post-marketing surveillance studies.

1.61 "Proprietary Compound of BMS or Ligand" means any compound or other agent being developed or sold, (a) as of the March 27, 2006 or at any time thereafter, by BMS or its Affiliates, or their contractors or collaborators, or (b) as of the Effective Date or any time thereafter, by Ligand or its Affiliates, or their contractors or collaborators.

1.62 "Regulatory Authority" means any national or supranational governmental authority, including the FDA, EMEA or Koseisho (i.e., the Japanese Ministry of Health and Welfare, or any successor agency thereto), that has responsibility in countries in the Territory over the Development and/or Commercialization of Licensed Compounds and Licensed Products.

1.63 "Sublicensee" means any Third Party to whom rights are transferred with respect to any Licensed Compound or Licensed Product, including through any license, sublicense, co-development, co-discovery, co-promotion, distribution, joint venture,

Development and Commercialization collaboration or similar transaction between a Party (or an Affiliate of a Party) and a Third Party. "Sublicensee" shall also include any Third Party to whom such rights are transferred through further sublicense by a Sublicensee. "Sublicensee" shall include any Third Party that is a party to a License agreement.

1.64 "Territory" means any country in the world.

1.65 "Third Party" means any Person other than Retrophin, Ligand and their respective Affiliates.

1.66 "Title 11" has the meaning set forth in Section 13.7.

1.67 "United States" or "U.S." means the United States of America and its territories and possessions (including Puerto Rico).

1.68 **[***]**.

1.69 "Valid Claim" means a claim of (i) an issued and unexpired patent or a supplementary protection certificate, which claim has not been held invalid or unenforceable by a court or other government agency of competent jurisdiction from which no appeal can be or has been taken and has not been held or admitted to be invalid or unenforceable through re-examination or disclaimer, opposition procedure, nullity suit or otherwise or (ii) a pending patent application; *provided*, *however*, that if a claim of a pending patent application shall not have issued within **[***]** after the earliest filing date from which such claim takes priority, such claim shall not constitute a Valid Claim for the purposes of this Agreement unless and until a patent issues with such claim.

ARTICLE 2.

LICENSE GRANTS

2.1 Patent Rights and Know-How.

2.1.1 Core Patent Rights and Know-How. Subject to the terms and conditions set forth in this Agreement (including the reservation of rights in Section 2.5), Ligand hereby grants to Retrophin a non-transferable (except in accordance with Section 15.4), exclusive sublicense, with the right to further sublicense in accordance with Section 2.2, under the Core Patent Rights and Know-How solely to the extent reasonably necessary to, make, use (including in activities directed at the research and Development of Licensed Compounds), have made, sell, have sold, offer to sell, export, import and otherwise exploit or Commercialize Licensed Compounds and Licensed Products in the Field in the Territory.

2.1.2 Other Patent Rights. Subject to the terms and conditions set forth in this Agreement (including the reservation of rights in Section 2.5), Ligand hereby grants to Retrophin a non-transferable (except in accordance with Section 15.4), non-exclusive sublicense, with the right to further sublicense in accordance with Section 2.2, under the Other Patent Rights solely to the extent reasonably necessary or useful to make, use (including in activities directed at the research and Development of Licensed Compounds), have made, sell, offer to sell, export and import and otherwise exploit or Commercialize Licensed Compounds and Licensed Products in the Field in the Territory, *provided, however,* that no rights are granted under this Section 2.1.2 (or otherwise under this Agreement) with respect to any Proprietary Compound of BMS or Ligand. For clarification, no rights are granted under this Section 2.1.2 (or otherwise under this

Agreement) to co-formulate or use in combination a Licensed Compound with any Proprietary Compound of BMS or Ligand. The rights granted by Ligand to Retrophin under this Section 2.1.2 include the right to make, have made, use (including in activities directed at the research and Development of Licensed Compounds), export and import intermediates and starting materials reasonably necessary for the manufacture of Licensed Compounds, and to practice methods reasonably necessary for the manufacture of Licensed Compounds, and to practice methods reasonably necessary for manufacturing such intermediates and starting materials, but only for the purposes of manufacturing, using, importing or exporting Licensed Compounds in the Field in the Territory. For clarification, no rights are granted to sell or offer to sell any such intermediates or starting materials, or use such intermediates or starting materials for any purpose other than for the purposes of manufacturing Licensed Compounds.

2.2 Sublicenses.

2.2.1 Retrophin shall have the right to grant sublicenses with respect to the rights licensed to Retrophin under Sections 2.1.1 and 2.1.2 to any Affiliate of Retrophin for so long as such Affiliate remains an Affiliate of Retrophin; *provided, however,* that (i) such Affiliate shall agree in writing to be bound by and subject to the terms and conditions of this Agreement in the same manner and to the same extent as Retrophin and (ii) Retrophin shall remain responsible for the performance of this Agreement and shall cause such Affiliate to comply with the terms and conditions of this Agreement. In addition, Retrophin shall have the right to grant sublicenses with respect to the rights licensed to Retrophin under Sections 2.1.1 and 2.1.2 to Third Parties.

2.2.2 Retrophin shall have the right to enter into a License agreement with a Third Party; *provided, however,* to the extent any such License agreement grants rights with respect to any Licensed Compound:

(i) such License agreement shall be consistent with the terms and conditions of this Agreement, and shall not limit (A) Retrophin's ability to perform its obligations under this Agreement, (B) Ligand's rights under this Agreement, (C) **[***]** or (D) **[***]**.

(ii) in such License agreement, the Sublicensee shall agree in writing to be bound to Retrophin by terms and conditions that are substantially similar to, or less favorable to the Sublicensee than, or otherwise allow Retrophin to fully perform the corresponding terms and conditions of this Agreement;

(iii) such License agreement shall comply with Section 8.10.2 hereof regarding minimum royalty payments;

(iv) promptly after the execution of such License agreement, Retrophin shall provide a copy of such License agreement to Ligand, with financial and other confidential or proprietary commercial terms redacted consistent with the public filing of such license agreement with the Securities and Exchange Commission ("SEC"), or, if not filed with the SEC, then with financial and other confidential or proprietary commercial terms redacted (to the extent that such other commercial terms are not reasonably necessary for Ligand to determine Retrophin's compliance with this Agreement). **[***]**;

(v) Retrophin shall remain responsible for the performance of this Agreement (including its obligations under Sections 5.1.1 and 6.1), the payment of all

payments due, making reports and keeping books and records and shall use commercially reasonable efforts to monitor such Sublicensee's compliance with the terms of such License;

(vi) any sublicense rights granted by Retrophin in a License (to the extent such sublicensed rights are granted to Retrophin in this Agreement) shall terminate on a country-by-country and Licensed Product-by-Licensed Product basis effective upon (i) the termination under Section 13.2 of the license from Ligand to Retrophin with respect to such sublicensed rights or (ii) the termination under Section 13.2 of the license from BMS to Ligand with respect to such sublicensed rights; *provided, however,* that such sublicensed rights shall not terminate if, as of the effective date of such termination by Ligand under Section 13.2 of this Agreement or BMS under Section 13.2 of the Upstream License Agreement, the Sublicensee is not in material breach of its obligations to Retrophin under its License agreement, and within **[***]** days of such termination the Sublicensee agrees in writing to be bound directly to BMS or Ligand, as the case may be, under a license agreement substantially similar to this Agreement **[***]**, as the case may be, with respect to the rights sublicensed hereunder, substituting such Sublicensee for Retrophin or Ligand, as the case may be; and

(vii) such Sublicensees shall have the right to grant further sublicenses with respect to the Development or Commercialization of Licensed Products, provided that such further sublicenses shall be in accordance with and subject to all of the terms and conditions of this Section 2.2.

For purposes of clarification, the preceding provisions of this Section 2.2.2 shall not apply to Licensed Compounds with respect to which Retrophin **[***]** Ligand a License.

2.2.3 In accordance with the foregoing, unless Ligand agrees otherwise in writing, any License shall **[***]**.

2.2.4 It shall be a **[***]**.

2.3 No Trademark License. No right or license, express or implied, is granted to Retrophin to use any trademark, trade name, trade dress or service mark owned or Controlled by BMS, Ligand or any of their respective Affiliates. Retrophin, at its sole cost and expense, shall be responsible for the selection, registration and maintenance of all trademarks which it employs in connection with its activities conducted pursuant to this Agreement, if any, and shall own and control such trademarks.

2.4 No Implied Licenses. No license or other right is or shall be created or granted hereunder by implication, estoppel or otherwise. All such licenses and rights are or shall be granted only as expressly provided in this Agreement.

2.5 Retained Rights.

2.5.1 Retrophin understands and agrees that BMS shall retain the rights specified in Section 2.5 of the Upstream License Agreement.

2.5.2 Subject to the Upstream License Agreement, all rights not expressly granted under Section 2.1 are reserved by Ligand and may be used by Ligand for any purpose. Ligand expressly reserves and retains the right (i) to make, have made and use Licensed Compounds for any internal research purposes (including but not

limited to for purposes of screening in support of Ligand's internal research programs), (ii) to support the filing and prosecution of patent applications, and (iii) to make, have made and use any Licensed Compound solely for use as an intermediate or starting material in the manufacture of any compound which is not a Licensed Compound.

2.5.3 Subject to the exclusive rights granted to Retrophin under this Article 2 and subject to the restrictions on use of Retrophin's Confidential Information under Article 11, **[***]**. For purposes of clarity, nothing in the foregoing shall be construed to reserve to Ligand the right to engage in the discovery, Development and/or Commercialization of Active Compounds Covered by the Core Patent Rights exclusively licensed to Retrophin hereunder.

2.6 Upstream License Agreement. Notwithstanding anything to the contrary in this Agreement, Retrophin understands and agrees (i) that this Agreement is subordinate to the Upstream License Agreement and the sublicense granted to Retrophin under this Agreement is limited in scope to the rights granted to Ligand in the Upstream License Agreement; (ii) this Agreement may be terminated if the Upstream License Agreement is terminated (iii) it will comply with all provisions of the Upstream License Agreement relevant to its activities as a Sublicensee (as defined in the Upstream License Agreement); (iv) BMS' exercise of its rights under the Upstream License Agreement shall not constitute a breach hereunder; (v) it will not take any action that would result in a breach of the Upstream License Agreement; and (vi) it will cooperate with and assist Ligand to meet its obligations under the Upstream License Agreement. Retrophin acknowledges that it has been provided with a copy of the Upstream License Agreement.

ARTICLE 3.

LIGAND RIGHT OF FIRST NEGOTIATION

3.1 BMS Right of First Negotiation. In the event that Retrophin desires to enter into a License arrangement with respect to any Licensed Compound ("Business Opportunity"), BMS shall be granted the Right of First Negotiation set forth in Article 3 of the Upstream License Agreement. Retrophin shall comply with the terms set forth in Sections 3.1.1 and 3.1.3-3.1.6 of the Upstream License Agreement. For the purposes of this Section 3.1, "Pharmacopeia" shall be replaced with "Retrophin" in Sections 3.1.1 and 3,1.3-3.1.6 of the Upstream License Agreement.

3.2 Ligand Right of Second Negotiation.

3.2.1 In the event that Retrophin desires to enter into a Business Opportunity, before entering into negotiations with any Third Party and after following the procedure set forth in Section 3.1 above, with respect to such License, Retrophin shall notify Ligand and provide Ligand with information necessary or useful to Ligand to evaluate the proposed License arrangement ("Evaluation Information"). The Parties shall negotiate in good faith the terms pursuant to which Ligand may obtain such Business Opportunity for a period of **[***]** days following the date of such notice (such period referred to as the "Ligand Negotiation Period").

3.2.2 Unless otherwise agreed between the Parties, **[***]**.

3.2.3 Any License agreement entered into by Retrophin with a Third Party shall be consistent with the terms and conditions of this Agreement and shall fully enable Retrophin to fully perform all of its obligations under the Agreement which will

continue in effect. As set forth in Section 2.2, any Sublicensee shall be bound by the terms and conditions of this Agreement in the same manner as Retrophin.

ARTICLE 4.

TRANSFER OF KNOW-HOW

4.1 Documentation. Prior to the Effective Date, Ligand has provided to Retrophin one (1) electronic or paper copy of all documents, data or other information Controlled by Ligand as of the Effective Date to the extent that such documents, data and information are (i) reasonably necessary or useful for the manufacture, Development or Commercialization of the Listed Compounds (including SAR information) and subject to the Know-How license under Section 2.1 and (ii) are reasonably available to Ligand without undue searching; *provided however,* that subject to the last sentence of this Section 4.1, the foregoing shall in no event require Ligand to provide copies of manufacturing run records or laboratory notebook records; *further provided* that if Retrophin determines it needs additional documents, data or information for the manufacture, Development or Commercialization of the Licensed Compounds (including SAR information), Ligand shall use commercially reasonable efforts (at Retrophin's cost and expense) to determine whether it has such additional information and if Ligand has such information, it shall provide such information to Retrophin at Retrophin's cost and expense. Such documentation shall be deemed to be the Confidential Information of Ligand and shall not be used by Retrophin for any purpose other than Development, manufacture or Commercialization of Licensed Compounds and Licensed Products in accordance with this Agreement. Retrophin acknowledges that it has received from Ligand such documents, data and information prior to the Effective Date through access to the electronic data room established by Ligand for the Listed Compound and that Ligand has allowed Retrophin to print such documents. Ligand shall have no obligation to reformat or otherwise alter or modify any such materials, or to create materials in electronic form, in order to provide them to Retrophin; provided, that such information is readable by Retrophin in its current form. Any and all such materials delivered to Retrophin pursuant to this Section 4.1 are and shall remain, as between the Parties, the sole property of Ligand. Notwithstanding the foregoing, if at any time during the term of this Agreement Retrophin identifies particular documents, data or information (including laboratory notebook records) that are within the Know-How, but were not previously delivered to Retrophin, and that are reasonably necessary or useful for the continued manufacture, Development or Commercialization of a Licensed Compound or Licensed Product (including materials requested in connection with an audit or other inquiry by a Regulatory Authority), or are reasonably necessary or useful to support the filing and/or prosecution of patent rights Covering the Licensed Compounds or Licensed Products, Ligand shall promptly provide such material to Retrophin upon request to the extent that such items are in Ligand's possession and are available without undue searching.

4.2 Materials. Ligand shall have no obligation to provide Retrophin with samples of any compounds or other materials (other than the information provided under Section 4.1) under this Agreement, *provided* that upon written request by Retrophin, Ligand will authorize in writing the transfer by **[***]** to Retrophin of all existing clinical supplies of Licensed Product and all existing supplies of the active pharmaceutical ingredient of Licensed Product (including other materials that may be provided by or for Ligand to Retrophin pursuant to this Agreement, the "Transferred Materials"). Retrophin shall be responsible for any and all fees charged by **[***]** in connection with the transfer of the Transferred Materials to Retrophin. Any Transferred Materials are provided "AS IS". Retrophin shall be fully responsible for its and its Affiliates', Sublicensees' and

contractors' use, storage, handling and disposition of the Transferred Materials. Under no circumstances shall Ligand be liable or responsible for Retrophin's or its Affiliates', Sublicensees' and contractors' use, storage, handling or disposition of the Transferred Materials, and Retrophin assumes sole responsibility for any claims, liabilities, damages and losses that might arise as a result of Retrophin's and its Affiliates', Sublicensees' and contractors' use, storage, handling or disposition of any Transferred Material. Retrophin shall indemnify, defend and hold harmless Ligand and its Affiliates, and their respective officers, directors, employees, agents, licensors, and their respective successors, heirs and assigns and representatives, from and against any and all damages, liabilities, losses, costs and expenses (including, without limitation, reasonable legal expenses, costs of litigation and reasonable attorney's fees) arising in connection with any claims, suits, proceedings, whether for money damages or equitable relief, of any kind, arising out of or relating, directly or indirectly, to Retrophin's, or any of its Affiliates', Sublicensees' or contractors' use, storage, handling or disposition of any Transferred Material. Transferred Materials may only be provided to Retrophin, its Affiliates, Sublicensees and contractors. The Transferred Materials shall be used by Retrophin solely for purposes of supporting the Development of the Licensed Compounds and Licensed Products.

ARTICLE 5.

DEVELOPMENT

5.1 Development and Development Plan.

5.1.1 Commercially Reasonable Efforts. Retrophin (or its Sublicensees, as applicable) shall use sustained Commercially Reasonable Efforts to Develop at least one Licensed Compound and Licensed Product, including using Commercially Reasonable Efforts to expeditiously carry out the clinical development for the Licensed Compounds and Licensed Products (including expeditiously pursuing regulatory filings and Approvals and marketing authorizations for at least one Licensed Compound and Licensed Product) in accordance with the Development Plan.

5.1.2 Development Plan. The initial Development Plan is attached hereto as Appendix 3 to the Agreement.

5.2 Development Reports. Retrophin will provide Ligand with (a) semi-annual written development reports within **[***]** days following June and December of each **[***]** and (b) quarterly telephonic development reports within **[***]** days following March and September of each **[***]**, in each case presenting a summary of the Development activities accomplished by Retrophin during the applicable period, including as applicable updates to the Development Plan, and significant results, information and data generated with respect to Licensed Compounds and Licensed Products. Upon reasonable request by Ligand, Retrophin shall also meet in-person with Ligand to review Retrophin's Development activities for the Licensed Compounds and Licensed Products. In addition, prior to Retrophin entering into a License agreement with a Third Party, upon reasonable request by Ligand, but no more than once per **[***]**, Retrophin shall present to Ligand, at Retrophin's facilities, summaries of (and, at the request of Ligand, with copies of) clinical protocols, investigator brochures, regulatory submissions and correspondence from regulatory agencies with respect to Licensed Compound and Licensed Product that have been prepared or received by Retrophin as of the date of such request by Ligand.

5.3 Records. Retrophin shall maintain complete and accurate records of all work conducted in furtherance of the Development and Commercialization of the Licensed Compounds and Licensed Products and all material results, data and

developments made in conducting such activities. Such records shall be maintained sufficient detail and in good scientific manner appropriate for patent and regulatory purposes. If Ligand believes in good faith that Retrophin may not be complying with its obligations under this Section 5.3, Ligand shall provide written notice thereof to Retrophin identifying the basis for Ligand's belief, and Retrophin shall allow an independent Third Party that has expertise in reviewing the books and records and financial information, obligations and agreements of pre-clinical and clinical stage bio-technology companies, as to which Retrophin has no reasonable objection, to review such records on behalf of Ligand to verify that Retrophin is complying with this Section 5.3. Such review shall be conducted no more frequently than once per any twelve (12) month period, at Ligand's cost and upon reasonable advance notice at mutually agreed upon times during normal business hours; *provided, however,* if the independent Third Party determines that Retrophin is not in compliance with this Section 5.3 and Retrophin would owe Ligand at least 10% more in royalties or other payments, Retrophin shall reimburse Ligand for all costs and expenses related to the independent Third Party's review.

5.4 Development Responsibilities and Costs. Retrophin shall have sole responsibility for, and shall bear the cost of conducting, all Development with respect to the Licensed Compounds and Licensed Products.

5.5 Regulatory Responsibilities and Costs. Retrophin **[***]**. Retrophin shall be responsible for meeting the requirements of all pre-approval inspections required by any Regulatory Authorities. Except as set forth in Section 13.4, Retrophin or its Affiliate or Sublicensee shall own all INDs, NDAs, Approvals and submissions in connection therewith and all Approvals shall be obtained by and in the name of Retrophin or its Affiliate or Sublicensee.

5.6 Subcontracting. Subject to and without limiting Section 2.2, Retrophin may perform any activities in support of its Development or Commercialization of Licensed Compounds and Licensed Products through subcontracting to a Third Party contractor or contract service organization; *provided, however*: (a) Retrophin shall enter into an appropriate written agreement with any such Third Party subcontractor such that the subcontractor shall be bound by all applicable provisions of this Agreement to the same extent as Retrophin and such that Ligand's rights under this Agreement and BMS' rights under the Upstream License Agreement are not adversely affected; (b) any such Third Party subcontractor to whom Retrophin discloses Confidential Information of Ligand shall enter into an appropriate written agreement obligating such Third Party to be bound by obligations of confidentiality and restrictions on use of such Confidential Information that are no less restrictive than the obligations in this Agreement; (c) Retrophin will obligate such Third Party to agree in writing to assign or license (with the right to grant sublicenses) to Retrophin any inventions (and any patent rights covering such inventions) made by such Third Party in performing such services for Retrophin; and (d) Retrophin shall at all times be responsible for the performance of such subcontractor.

ARTICLE 6.

COMMERCIALIZATION

6.1 Retrophin Obligations. Retrophin (or its Sublicensees, as applicable) shall use sustained Commercially Reasonable Efforts to Commercialize at least **[***]** Licensed Product in the Territory, including the Major Market Countries. Without limiting the foregoing, Retrophin shall:

6.1.1 use Commercially Reasonable Efforts to obtain Approvals in a Major Market Country with respect to at least **[***]** Licensed Product and to effect the First Commercial Sale thereof in such country as soon as reasonably practicable after receipt of such Approvals;

6.1.2 Initiation of a Phase 2 Trial for at least **[***]** Licensed Compound no later than **[***]**;

6.1.3 File for Approval for at least **[***]** Orphan Licensed Product no later than **[***]**; and

6.1.4 File for Approval for at least **[***]** Licensed Product other than the first Orphan Licensed Product no later than **[***]**.

6.2 Continued Availability. Following the First Commercial Sale of a Licensed Product in a Major Market Country in the Territory and until the expiration or termination of this Agreement, Retrophin shall use Commercially Reasonable Efforts to supply and keep such Licensed Product reasonably available to the public in such country.

6.3 Marking. Each Licensed Product Commercialized by Retrophin under this Agreement shall be marked (to the extent not prohibited by applicable Laws): (i) with a notice that such Licensed Product is sold under a license from BMS and Ligand and (ii) with applicable patent and other intellectual property notices relating to the Core Patent Rights in such a manner as may be required by applicable Law.

6.4 Reports. Retrophin shall provide Ligand with semi-annual written reports within **[***]** days following the end of June and December of each **[***]** summarizing significant commercial activities and events with respect to Licensed Products during the just ended six month period.

ARTICLE 7.

MANUFACTURE AND SUPPLY

7.1 Manufacture and Supply. Retrophin shall be solely responsible at its expense for making or having made all of its requirements of the Licensed Compounds and Licensed Products.

ARTICLE 8.

FINANCIAL TERMS

8.1 Consideration. In partial consideration of the rights granted by Ligand to Retrophin pursuant to this Agreement, Retrophin shall make the payments to Ligand as provided for in this Article 8.

8.2 Development Milestone Payments.

8.2.1 Development Milestone Payments. Retrophin shall make milestone payments to Ligand upon achievement of each of the milestone events in the amounts set forth below in Table 1. The first milestone payment shall be payable by Retrophin to Ligand within **[***]** days of execution of the Agreement. Notwithstanding Section 15.4 or any other provision herein, the last milestone payment shall be payable by Retrophin to Ligand upon the Closing of Retrophin's Exit Transaction. Subject to Section 8.2.2, the remainder of the milestone payments set forth below will be payable by Retrophin to Ligand within **[***]** days of the achievement of the specified milestone

event with respect to each Licensed Compound. The milestone payments shall not be refundable or returnable in any event, nor shall they be creditable against royalties or other payments.

Milestone Event	Milestone Payment
Execution of Agreement	$1.15 million
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**
[***]	**$[***]**

Table 1

In the event that a milestone event is achieved that triggers a development milestone payment as set forth above, if the **[***]**. For example, **[***]**.

8.2.2 **[***]**.

8.2.3 **[***]**.

8.3 Royalty Payments.

8.3.1 Retrophin shall pay to Ligand in cash the following royalty payments on the total aggregate annual Net Sales in the Territory of all Licensed Products in a particular **[***]** by Retrophin, its Affiliates, and Sublicensees in the Territory:

Aggregate Annual Worldwide Net Sales of All Licensed Products in a **[***]**	Royalty Rate for Licensed Products in a **[***]**
Up to **[***]** Dollars ($**[***]**)	**[***]** %
More than **[***]** Dollars ($**[***]**)	**[***]** %

By way of example, in a given **[***]**, if the aggregate annual worldwide Net Sales for all Licensed Products is $ **[***]**, the royalty payment under this Section 8.3.1 would be calculated in accordance with the following formula: **[***]** Million Dollars.

8.3.2 Royalty Term. Royalties shall be payable on a **[***]** of (i) **[***]** or (ii) **[***]** or (iii) **[***]**.

8.3.3 **[***]**. **[***]**. Prior to Retrophin or its Sublicensee exercising its **[***]** under this Section 8.3.3, Retrophin shall provide Ligand with **[***]**. The Parties shall discuss the best course of action to resolve such potential **[***]**, provided that such discussions shall not limit or delay Retrophin's or its Sublicensee's right to **[***]**.

Except as set forth above, **[***]**.

8.3.4 Royalty Conditions. The royalties under Section 8.3.1 shall be subject to the following conditions:

a) that only one royalty shall be due with respect to the same unit of Licensed Product;

b) that no royalties shall be due upon the sale or other transfer among Retrophin, its Affiliates, or Sublicensees, but in such cases the royalty shall be due and calculated upon Retrophin's or its Affiliate's or Sublicensee's Net Sales of Licensed Product to the first independent Third Party; and

c) no royalties shall accrue on the disposition of Licensed Product in reasonable quantities by Retrophin, its Affiliates or Sublicensees as part of an expanded access program, as *bona fide* samples, as part of Phase 4 Trials or as donations to non-profit institutions or government agencies for non-commercial purposes; *provided, however,* in each case, that neither Retrophin, its Affiliate or Sublicensees receives any payment for such Licensed Product.

8.4 Manner of Payment. All payments to be made by Retrophin hereunder shall be made in Dollars by wire transfer of immediately available funds to such United States bank account as shall be designated by Ligand. Late payments shall bear interest at the rate provided in Section 8.9.

8.5 Sales Reports and Royalty Payments. After the First Commercial Sale of a Licensed Product and during the term of this Agreement, Retrophin shall furnish to Ligand a written report, within **[***]** days after the end of each **[***]** (or portion thereof, if this Agreement terminates during a **[***]**), showing the amount of royalty due for such **[***]** (or portion thereof). Royalty payments for each **[***]** shall be due at the same time as such written report for the **[***]**. With each **[***]**, Retrophin shall deliver to Ligand a full and accurate accounting to include at least the following information:

[***]

[***]

[***]

[***]

[***]

If no royalty or payment is due for any royalty period hereunder, Retrophin shall so report.

8.6 Sales Record Audit. Retrophin shall keep, and shall cause each of its Affiliates, and Sublicensees, if any, to keep, full and accurate books of accounting in accordance with GAAP as may be reasonably necessary for the purpose of calculating the royalties payable to Ligand. Such books of accounting (including those of Retrophin's

Affiliates, and Sublicensees, if any) shall be kept at their principal place of business and, with all necessary supporting data, shall during all reasonable times for the **[***]** years next following the end of the **[***]** to which each shall pertain, be open for inspection at reasonable times upon written notice by Ligand and at Ligand's sole cost, no more than once per any **[***]** month period, by an independent nationally recognized certified public accounting firm selected by Ligand as to which Retrophin has no reasonable objection, for the purpose of verifying royalty statements for compliance with this Agreement. Such accountant must have agreed in writing to maintain all information learned in confidence, except as necessary to disclose to Ligand such compliance or noncompliance by Retrophin. The results of each inspection, if any, shall be**[***]**. Ligand shall pay for such inspections, except that in the event there is any upward adjustment in aggregate royalties payable for the **[***]** period of such inspection of more than **[***]** of the amount paid, Retrophin shall pay for the reasonable out-of-pocket costs of such inspection. Any underpayments shall be paid by Retrophin within **[***]** of notification of the results of such inspection. Any overpayments shall be fully creditable against amounts payable in subsequent payment periods or, if no such amounts become payable within **[***]** days after notification of such results, shall be refunded.

8.7 Currency Exchange. With respect to Net Sales invoiced in Dollars, the Net Sales and the amounts due to Ligand hereunder shall be expressed in Dollars. With respect to Net Sales invoiced in a currency other than Dollars, the Net Sales shall be expressed in the domestic currency of the entity making the sale, together with the Dollar equivalent, calculated using the arithmetic average of the spot rates on the close of business on the last Business Day of **[***]** in which the Net Sales were made. The "closing mid-point rates" found in the "dollar spot forward against the dollar" table published by The Financial Times, or any other publication as may be agreed to by the Parties in writing, shall be used as the source of spot rates to calculate the average as defined in the preceding sentence. All payments shall be made in Dollars.

8.8 Tax Withholding. In the event that any withholding taxes or similar charges are levied or assessed by any taxing authority in the Territory with respect to payments made by Retrophin to Ligand under this Agreement, Retrophin shall pay such taxes or similar charges to the proper taxing authority. Retrophin may deduct the amount of such taxes or similar charges paid by Retrophin to such taxing authority from the applicable royalties or other payment otherwise payable to Ligand, subject to the following. Retrophin shall promptly provide Ligand with evidence of such tax payment obligation together with an original receipt for such tax payments (or a certified copy, if the original is not available) and other documentation as Ligand reasonably determines is required for the purpose of Ligand's tax returns. Retrophin, its Affiliates and Sublicensees shall cooperate with Ligand to enable the claiming of a reduction or exemption from withholding taxes on payments under any applicable convention on the avoidance of double taxation or similar agreement in force and shall provide to Ligand proper evidence of payments of withholding tax and assist Ligand by obtaining or providing in as far as possible the required documentation for the purpose of Ligand's tax returns. Retrophin's obligation vis-a-vis the tax authorities shall remain unaffected by the provisions of this Section 8.8.

8.9 Interest Due. Without limiting any other rights or remedies available to Ligand, Retrophin shall pay Ligand interest on any payments that are not paid on or before the date **[***]** days after the date such payments are due under this Agreement at a rate of one and **[***]** per month or the maximum applicable legal rate, if less, calculated on the total number of days payment is delinquent.

8.10 **[***]**.

8.10.1 In addition to the above milestone and royalty payments, Retrophin shall pay to Ligand the following **[***]**:

a) **[***]**; and

b) **[***]**.

8.10.2 **[***]**:

[***]	**[***]**
[***]	**[***]**
[***]	**[***]**

8.10.3 Such **[***]**. Such **[***]** to Ligand shall be due within **[***]** days following **[***]**.

8.10.4 For purposes of this Section 8.10, **[***],** but does not include (i) **[***]** or (ii) **[***]**.

ARTICLE 9.

REPRESENTATIONS AND WARRANTIES; DISCLAIMER;
LIMITATION OF LIABILITY

9.1 Mutual Representations and Warranties. Each Party represents and warrants to the other Party that (i) it has all requisite corporate power and authority to enter into this Agreement and to perform its obligations under this Agreement, (ii) execution of this Agreement and the performance by such Party of its obligations hereunder have been duly authorized, (iii) this Agreement is legally binding and enforceable on such Party in accordance with its terms and (iv) the performance of this Agreement by it does not create a material breach or material default under any other agreement to which it is a Party.

9.2 Representations, Warranties and Covenants of Ligand. Ligand represents, warrants and covenants that as of the Effective Date: (i) there is no litigation pending, or to the knowledge of Ligand threatened, which alleges, or any written communication alleging, that Ligand's activities with respect to the Patent Rights or the Licensed Compounds have infringed or misappropriated any of the intellectual property rights of any Third Party, (ii) all fees (including legal fees) required to be paid by Ligand in order to maintain the Patent Rights have been paid to date, (iii) it has not previously granted, assigned, transferred, conveyed, encumbered, mortgaged, pledged, hypothesized or licensed (or granted an option to assign, transfer, convey, encumber, mortgage, pledge, hypothesize or license) its right, title and interest in the Patent Rights or the Know-How, (iv) all of its actions related to its use of the Patent Rights and Know-How and the Development and Commercialization of the Licensed Compounds and Licensed Products complied with all applicable legal requirements and complied in all material respects with all regulatory requirements (except for the actions of Ligand's clinical research organization, Cetero Research, as to which no representations or warranties are made hereunder), (v) to the knowledge of Ligand (A) the Patent Rights and Know-How are subsisting, valid and enforceable and Ligand has not received any notice of a claim alleging that any of the Patent Rights infringes or otherwise violates any intellectual property or proprietary right of any Third Party, (B) the manufacture, Development and

Commercialization of the Listed Compound by Ligand did not interfere with the intellectual property rights of Third Parties, (C) it has not received any notice that any Person is infringing the Patent Rights and (D) it has not received any notice that a patent application within the Patent Rights is the subject of any pending interference, opposition, cancellation, protest or other challenge or adversarial proceeding, (vi) it has complied with the terms and conditions of the Upstream License Agreement in all material respects and has the necessary right, title and power to sublicense the Patent Rights or the Know-How, (vii) it has discontinued its internal drug discovery and development programs for the Listed Compound and that it has no active internal programs for the discovery or development of the Listed Compound and (vii) other than the Core Patent Rights, Ligand does not Control any patent(s) or patent application(s) that are reasonably necessary or useful for the Development or Commercialization of any Listed Compound or that claims the composition of matter of any Listed Compound or a method of manufacture or use of any Listed Compound.

9.3 Representations, Warranties and Covenants of Retrophin.

9.3.1 Retrophin covenants that (i) all of its activities related to its use of the Patent Rights and Know-How, and the Development and Commercialization of the Licensed Compounds and Licensed Products, pursuant to this Agreement shall comply with all applicable legal and regulatory requirements and (ii) it shall not knowingly engage in any activities (A) that use the Patent Rights and/or Know-How in a manner that is outside the scope of the license rights granted to it hereunder or (B) that infringe the intellectual property rights of any Third Party.

9.3.2 Retrophin has not, directly or indirectly, offered, promised, paid, authorized or given, and will not in the future, offer, promise, pay, authorize or give, money or anything of value, directly or indirectly, to any Government Official (as defined below) or Other Covered Party (as defined below) for the purpose of: (i) influencing any act or decision of the Government Official or Other Covered Party; (ii) inducing the Government Official or Other Covered Party to do or omit to do an act in violation of a lawful duty; (iii) securing any improper advantage; or (iv) inducing the Government Official or Other Covered Party to influence the act or decision of a government or government instrumentality, in order to obtain or retain business, or direct business to, any person or entity, in any way related to this Agreement. For purposes of this Agreement: (i) "Government Official" means any official, officer, employee or representative of: (A) any federal, state, provincial, county or municipal government or any department or agency thereof; (B) any public international organization or any department or agency thereof; or (C) any company or other entity owned or controlled by any government; and (ii) "Other Covered Party" means any political party or party official, or any candidate for political office.

9.3.3 Retrophin maintains and shall maintain a system of internal accounting controls sufficient to provide reasonable assurances that (i) transactions are executed in accordance with management's general or specific authorization; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain accountability for assets, including records of payments to any third parties, Government Officials and Other Covered Parties; (iii) access to assets is permitted only in accordance with management's general or specific authorization; and (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences.

9.3.4 Anti-Corruption Compliance.

9.3.4.1 In performing under this Agreement, Retrophin and its Affiliates agree to comply with all applicable anti-corruption laws, including Foreign Corrupt Practices Act of 1977, as amended ("FCPA") and all laws enacted to implement the OECD Convention on Combating Bribery of Foreign Officials in International Business Transactions.

9.3.4.2 Any third party who represents Retrophin or its Affiliates in connection with, or who will be involved in performing, this Agreement or any related activity, shall certify to compliance with all applicable anti-corruption laws and the obligations set forth in this Section 9.3.5 prior to any involvement in this Agreement or any related activity.

9.3.4.3 Retrophin is not aware of any Government Official or Other Covered Party having any financial interest in the subject matter of this Agreement or in any way personally benefiting, directly or indirectly, from this Agreement.

9.3.4.4 No political contributions or charitable donations shall be given, offered, promised or paid at the request of any Government Official or Other Covered Party that is in any way related to this Agreement or any related activity, without Ligand's prior written approval.

9.3.4.5 In the event that Retrophin violates the FCPA or any applicable anti-corruption law or breaches any provision in this Section 9.3, Ligand shall have the right to unilaterally terminate this Agreement.

9.4 Disclaimer. EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING ANY EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ANY PATENT RIGHTS, CONFIDENTIAL INFORMATION OR KNOW-HOW OF SUCH PARTY OR ANY LICENSE GRANTED BY SUCH PARTY HEREUNDER, OR WITH RESPECT TO ANY COMPOUNDS, INCLUDING BUT NOT LIMITED TO THE TRANSFERRED MATERIALS, OR PRODUCTS. FURTHERMORE, EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, NEITHER PARTY MAKES ANY REPRESENTATIONS OR WARRANTIES THAT ANY PATENT, PATENT APPLICATION, OR OTHER PROPRIETARY RIGHTS INCLUDED IN PATENT RIGHTS, CONFIDENTIAL INFORMATION OR KNOW-HOW LICENSED BY SUCH PARTY TO THE OTHER PARTY HEREUNDER ARE VALID OR ENFORCEABLE OR THAT USE OF SUCH PATENT RIGHTS, CONFIDENTIAL INFORMATION OR KNOW-HOW CONTEMPLATED HEREUNDER DOES NOT INFRINGE ANY PATENT RIGHTS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF ANY THIRD PARTY.

9.5 Limitation of Liability. NOTWITHSTANDING ANYTHING IN THIS AGREEMENT OR OTHERWISE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER WITH RESPECT TO ANY SUBJECT MATTER OF THIS AGREEMENT, WHETHER UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER LEGAL OR EQUITABLE THEORY, FOR ANY INCIDENTAL, INDIRECT, SPECIAL, EXEMPLARY, PUNITIVE, MULTIPLE, OR CONSEQUENTIAL

DAMAGES (INCLUDING CONSEQUENTIAL DAMAGES CONSISTING OF LOST PROFITS, LOSS OF USE, DAMAGE TO GOODWILL, OR LOSS OF BUSINESS) AND, IN ANY CASE, LIGAND SHALL NOT BE LIABLE IN AN AMOUNT GREATER THAN THE AMOUNTS PAID BY RETROPHIN TO LIGAND UNDER ARTICLE 8 OF THIS AGREEMENT; *PROVIDED*, *HOWEVER*, THAT THE FOREGOING SHALL NOT APPLY TO ANY BREACH BY RETROPHIN OF THE LICENSES GRANTED TO IT UNDER THIS AGREEMENT THAT IS AN INFRINGEMENT OF PATENT RIGHTS NOT INCLUDED IN THE PATENT RIGHTS LICENSED TO RETROPHIN HEREUNDER, OR ANY BREACH BY EITHER PARTY OF THIS ARTICLE 9 OR ARTICLE 11 HEREOF.

ARTICLE 10.

OWNERSHIP; PATENT MAINTENANCE; INFRINGEMENT; EXTENSIONS

10.1 Ownership of Inventions. Inventorship of inventions conceived or reduced to practice in the course of activities performed under or contemplated by this Agreement shall be determined by application of United States patent Laws pertaining to inventorship. If such inventions are jointly invented by one or more employees, consultants or contractors of each Party, such inventions shall be jointly owned ("Joint Invention"), and if one or more claims included in an issued patent or pending patent application which is filed in a patent office in the Territory claim such Joint Invention, such claims shall be jointly owned ("Joint Patent Rights"). If such an invention is solely invented by an employee, consultant or contractor of a Party, such invention shall be owned by such Party, and any patent filed claiming such solely owned invention shall also be owned by such Party. Subject to Section 5.6 with respect to contractors, each Party shall enter into binding agreements obligating all employees, consultants and contractors performing activities under or contemplated by this Agreement, including activities related to the Patent Rights, Licensed Compounds or Licensed Products, to assign his/her interest in any invention conceived or reduced to practice in the course of such activities to the Party for which such employee, consultant or contractor is providing its services. This Agreement shall be understood to be a joint research agreement in accordance with 35 U.S.C. § 103(c)(3) to develop the Licensed Compounds and Licensed Products. The filing, prosecution, maintenance and enforcement of Joint Patent Rights which are Core Patent Rights shall be handled in accordance with this Article 10.

10.2 Filing, Prosecution and Maintenance of Core Patent Rights. Retrophin shall be responsible, using outside patent counsel selected by Retrophin and acceptable to Ligand, such acceptance not to be unreasonably withheld or delayed, for the preparation, prosecution (including, without limitation, any interferences, reissue proceedings and reexaminations) and maintenance of Core Patent Rights. Promptly following the Effective Date, the Parties shall cooperate to expeditiously transfer such responsibility for the further preparation, prosecution and maintenance of Core Patent Rights to such outside patent counsel. Retrophin shall be responsible for all costs incurred by Retrophin with respect to such preparation, prosecution and maintenance of Core Patent Rights so long as Retrophin remains responsible for such preparation, prosecution and maintenance. Upon request by Ligand, Retrophin (or its patent counsel) shall provide Ligand with an update of the filing, prosecution and maintenance status for each of the Core Patent Rights. Each Party shall reasonably consult with and cooperate with the other Party with respect to the preparation, prosecution and maintenance of the Core Patent Rights reasonably prior to any deadline or action with the U.S. Patent & Trademark Office or any foreign patent office, and Retrophin (or its patent counsel) shall furnish to Ligand copies of all relevant documents reasonably in advance of such consultation. Retrophin (or its patent counsel) shall provide to Ligand

copies of any papers relating to the filing, prosecution or maintenance of the Core Patent Rights promptly upon their being filed or received. Retrophin shall not knowingly take any action during prosecution and maintenance of the Core Patent Rights that would materially adversely affect them (including any reduction in claim scope), without Ligand's prior consent, such consent not to be unreasonably withheld, conditioned or delayed.

10.3 Patent Abandonment.

10.3.1 Generally. In no event will Retrophin knowingly permit any of the Core Patent Rights to be abandoned in any country in the Territory or elect not to file a new patent application claiming priority to a patent application within the Core Patent Rights either before such patent application's issuance or within the time period required for the filing of an international (i.e., Patent Cooperation Treaty), regional (including European Patent Office) or national application, without Ligand first being given an opportunity to assume full responsibility for the continued prosecution and maintenance of such Core Patent Rights, or the filing of such new patent application. Accordingly, Retrophin (or its patent counsel) shall provide Ligand with notice of the allowance and expected issuance date of any patent within the Core Patent Rights, or any of the aforementioned filing deadlines, and Ligand shall provide Retrophin with prompt notice as to whether Ligand desires Retrophin to file such new patent application. In the event that Retrophin decides either (i) not to continue the prosecution or maintenance of a patent application or patent within Core Patent Rights in any country or (ii) not to file such new patent application requested to be filed by Ligand, Retrophin shall provide Ligand with notice of this decision at least **[***]** days prior to any pending lapse or abandonment thereof.

10.3.2 Ligand Option to Assume Responsibility. Ligand shall thereupon have the right, but not the obligation, to assume responsibility for all reasonably documented external costs (subject to Section 10.3.3) thereafter incurred associated with the filing and/or further prosecution and maintenance of such patents and patent applications, on a patent-by-patent and country-by-country basis. The outside patent counsel selected by Retrophin shall proceed with such filing and/or further prosecution and maintenance promptly upon receipt of written notice from Ligand of its election to assume such responsibility, with such filing to occur prior to the issuance of the patent to which the application claims priority or expiration of the applicable filing deadline, as set forth above. In the event that Ligand assumes such responsibility for such filing, prosecution and maintenance costs (subject to Section 10.3.3), upon the reasonable request by Ligand, Retrophin shall transfer the responsibility for such filing, prosecution and maintenance of such patent applications and patents to outside patent counsel selected by Ligand; *provided, however,* Retrophin shall (i) provide sufficient written notice to Ligand of any such election such that the relevant transfer shall not prejudice the filing, prosecution and/or maintenance of patent rights (where possible, such notice shall be provided at least **[***]** days prior to any pending lapse or abandonment thereof); (ii) transfer or cause to be transferred to Ligand or its patent counsel the complete prosecution file for the relevant patents and patent applications, including all correspondence and filings with patent authorities with respect thereto; and (iii) at the reasonable request of Ligand and without demanding any further consideration therefore, do all things necessary, proper or advisable, including without limitation the execution, acknowledgment and recordation of specific assignments, oaths, declarations and other documents on a country-by-country basis, to assist Ligand in obtaining, perfecting, sustaining and/or enforcing such patent(s). Such patent applications and patents shall

otherwise continue to be subject to all of the terms and conditions of the Agreement in the same way as the other Core Patent Rights, as applicable.

10.3.3 Retrophin Responsibility for Patent Costs. Notwithstanding anything to the contrary under this Article 10, unless the Parties otherwise agree in writing, Retrophin shall remain responsible for all costs incurred after the Effective Date with respect to preparation, prosecution and maintenance of the Core Patent Rights covering Licensed Compounds.

10.4 Enforcement of Core Patent Rights Against Infringers.

10.4.1 Enforcement by Retrophin.

a) In the event that Ligand or Retrophin becomes aware of a suspected infringement of any Core Patent Right exclusively licensed to Retrophin under this Agreement, such Party shall notify the other Party promptly, and following such notification, the Parties shall confer. Retrophin shall have the right, but shall not be obligated, to bring an infringement action with respect to such infringement at its own expense, in its own name and entirely under its own direction and control, subject to the following. Ligand shall reasonably assist Retrophin (at Retrophin's expense) in any action or proceeding being prosecuted if so requested, and shall lend its name to and join as a nominal party in such actions or proceedings if reasonably requested by Retrophin or required by applicable Laws. Ligand shall have the right to participate and be represented in any such suit by its own counsel at its own expense. No settlement of any such action or proceeding which restricts the scope, or adversely affects the enforceability, of a Core Patent Right may be entered into by Retrophin without the prior written consent of Ligand, which consent shall not be unreasonably withheld, delayed or conditioned.

b) Ligand shall have the right at its discretion to grant to Retrophin such rights (including assignment of the applicable Core Patent Rights) as may be necessary for Retrophin to exercise its rights under this Section 10.4 (including defending or enforcing any Core Patent Rights) without Ligand's involvement. In the event of such grant of rights (including assignment) with respect to any Core Patent Rights, such Core Patent Rights shall continue to be treated as Core Patent Rights and shall otherwise continue to be subject to all of the terms and conditions of the Agreement in the same way as the other applicable Core Patent Rights. For purposes of clarity, election or non-election by Ligand to grant or assign rights to Retrophin under this Section 10.4.1(b) shall not limit Ligand's obligations under Section 10.4.1(a) to reasonably assist Retrophin in any action or proceeding, or to join in such action or proceeding upon request by Retrophin if such joinder is necessary under applicable Laws for Retrophin to exercise its rights under this Section 10.4.

10.4.2 Enforcement by Ligand. If Retrophin elects not to bring any action for infringement described in Section 10.4.1 and so notifies Ligand, then Ligand may bring such action at its own expense, in its own name and entirely under its own direction and control, subject to the following. Retrophin shall reasonably assist Ligand (at Ligand's expense) in any action or proceeding being prosecuted if so requested, and shall lend its name to such actions or proceedings if requested by Ligand or required by applicable Laws. Retrophin shall have the right to participate and be represented in any such suit by its own counsel at its own expense. No settlement of any such action or proceeding which restricts the scope, or adversely affects the enforceability, of a Core

Patent Right may be entered into by Ligand without the prior written consent of Retrophin, which consent shall not be unreasonably withheld, delayed or conditioned.

10.4.3 Withdrawal. If either Party brings an action or proceeding under this Section 10.4 and subsequently ceases to pursue or withdraws from such action or proceeding, it shall promptly notify the other Party and the other Party may substitute itself for the withdrawing Party under the terms of this Section 10.4.

10.4.4 Damages. In the event that either Party exercises the rights conferred in this Section 10.4 and recovers any damages or other sums in such action, suit or proceeding or in settlement thereof, such damages or other sums recovered shall **[***]**. If such recovery is insufficient **[***]**. If after such **[***]** any funds shall remain from such damages or other sums recovered, such funds shall be **[***]** under this Section 10.4; *provided*, *however*, that if **[***]**.

10.5 Patent Term Extension. Ligand and Retrophin shall each cooperate with one another and shall use commercially reasonable efforts in obtaining patent term extension (including without limitation, any pediatric exclusivity extensions as may be available) or supplemental protection certificates or their equivalents in any country with respect to patent rights covering the Licensed Products. If elections with respect to obtaining such patent term extensions are to be made, Retrophin shall have the right to make the election to seek patent term extension or supplemental protection; *provided*, *however,* such election will be made so as to maximize the period of marketing exclusivity for the Licensed Product. For such purpose, for all Approvals Retrophin shall provide Ligand with written notice of any expected Approval at least **[***]** days prior to the expected date of Approval, as well as notice within **[***]** business days of receiving each Approval confirming the date of such Approval. Notification of the receipt of an Approval shall be in accordance with Section 15.2.

10.6 Data Exclusivity and Orange Book Listings.

10.6.1 With respect to data exclusivity periods (such as those periods listed in the FDA's Orange Book (including without limitation any available pediatric extensions) or periods under national implementations of Article 10.1(a)(iii) of Directive 2001/EC/83, and all international equivalents), Retrophin shall use commercially reasonable efforts consistent with its obligations under applicable Law to seek, maintain and enforce all such data exclusivity periods available for the Licensed Products. With respect to filings in the FDA Orange Book (and foreign equivalents) for issued patents for a Licensed Product, Retrophin shall, consistent with its obligations under applicable Law, list in a timely manner and maintain all applicable Core Patent Rights and other patents Controlled by Retrophin required to be filed by it, or that it is permitted to file, under applicable Law. At least **[***]** days prior to an anticipated deadline for the filing of patent listing information for Core Patent Rights, Retrophin will consult with Ligand regarding the content of such filing. In the event of a dispute between the Parties as to whether a Core Patent Right can be filed and/or the content of such filing, the Parties will take expedited steps to resolve the dispute as promptly as possible, including seeking advice of an independent legal counsel to guide their decision. Ligand shall use commercially reasonable efforts consistent with its obligations under applicable Law to provide reasonable cooperation to Retrophin in filing and maintaining such Orange Book (and foreign equivalent) listings.

10.6.2 Without limiting the foregoing, Ligand shall have the right at its discretion to grant to Retrophin such rights (including assignment of the applicable Core

Patent Rights) as may be necessary for Retrophin to exercise its rights under this Section 10.6 (including seeking, maintaining and enforcing all data exclusivity periods) without Ligand's involvement. In the event of such grant of rights (including assignment) with respect to any Core Patent Rights, such Core Patent Rights shall continue to be treated as Core Patent Rights and shall otherwise continue to be subject to all of the terms and conditions of the Agreement in the same way as the other applicable Core Patent Rights. For purposes of clarity, election by Ligand to grant or assign rights to Retrophin under this Section 10.6.2 shall not limit Ligand's obligation under Section 10.6.1 to provide reasonable cooperation to Retrophin to the extent such cooperation is reasonably necessary for Retrophin in filing and maintaining such Orange Book (and foreign equivalent) listings.

10.7 Notification of Patent Certification. Each Party shall notify and provide the other Party with copies of any allegations of alleged patent invalidity, enforceability or non-infringement of a Core Patent Right pursuant to a Paragraph IV Patent Certification by a Third Party filing an Abbreviated NDA, an application under §505(b)(2) or other similar patent certification by a Third Party, and any foreign equivalent thereof. Such notification and copies shall be provided to the other Party within **[***]** days after such Party receives such certification, and shall be sent to the address set forth in Section 15.2. In addition, upon request by Ligand, Retrophin shall provide reasonable assistance and cooperation (including, without limitation, making available to Ligand documents possessed by Retrophin that are reasonably required by Ligand and making available personnel for interviews and testimony) in any actions reasonably undertaken by Ligand to contest any such patent certification.

ARTICLE 11.

NONDISCLOSURE OF CONFIDENTIAL INFORMATION

11.1 Nondisclosure. Each Party agrees that, for so long as this Agreement is in effect and for a period of **[***]** years thereafter, a Party (the "Receiving Party") receiving or possessing Confidential Information of the other Party (the "Disclosing Party") (or that has received any such Confidential Information from the other Party prior to the Effective Date) shall (i) maintain in confidence such Confidential Information using not less than the efforts such Receiving Party uses to maintain in confidence its own proprietary information of similar kind and value, but in no event shall the Receiving Party use less than a reasonable standard of care, (ii) not disclose such Confidential Information to any Third Party without the prior written consent of the Disclosing Party, except for disclosures expressly permitted below, and (iii) not use such Confidential Information for any purpose except those permitted by this Agreement (it being understood that this clause (iii) shall not create or imply any rights or licenses not expressly granted hereunder).

11.1.1 Confidentiality of Know-How for Disclosure Purposes. During such time as the license to the Know-How granted under Section 2.1 is in effect, solely for disclosure purposes to Third Parties, the Know-How shall be deemed to be Confidential Information of Ligand and Retrophin under Article 11, Ligand and Retrophin shall be deemed to be a Disclosing Party of the Know-How under Article 11, and Ligand and its respective Affiliates shall be deemed not to have known such Know-How prior to disclosure for the purposes of Section 11.1.2(b). Other than for disclosure purposes to Third Parties, the Know-How shall solely be the Confidential Information of Ligand.

11.1.2 Exceptions. The obligations in Section 11.1 shall not apply with respect to any portion of the Confidential Information that the Receiving Party can show by competent proof:

a) is publicly disclosed by the Disclosing Party, either before or after it is disclosed to the Receiving Party hereunder;

b) was known to the Receiving Party or any of its Affiliates, without any obligation to keep it confidential or any restriction on its use, prior to disclosure by the Disclosing Party;

c) is subsequently disclosed to the Receiving Party or any of its Affiliates by a Third Party lawfully in possession thereof and without any obligation to keep it confidential or any restriction on its use;

d) is published by a Third Party or otherwise becomes publicly available or enters the public domain, either before or after it is disclosed to the Receiving Party; or

e) has been independently developed after disclosure by the Disclosing Party by employees or contractors of the Receiving Party or any of its Affiliates without the aid, application or use of Confidential Information of the Disclosing Party.

11.2 Authorized Disclosure. The Receiving Party may disclose Confidential Information belonging to the Disclosing Party to the extent (and only to the extent) such disclosure is reasonably necessary in the following instances:

a) filing or prosecuting patents;

b) regulatory filings;

c) prosecuting or defending litigation;

d) subject to Section 11.4, complying with applicable governmental Laws and regulations (including the rules and regulations of the Securities and Exchange Commission or any national securities exchange) and with judicial process, if in the reasonable opinion of the Receiving Party's counsel, such disclosure is necessary for such compliance; and

e) disclosure (i) in connection with the performance of this Agreement and solely on a "need to know basis" to Affiliates, potential or actual collaborators (including potential Sublicensees) or employees, contractors or agents; or (ii) solely on a "need to know basis" to potential or actual investment bankers, investors, lenders, or acquirers; each of whom in the case of clause (i) or (ii) prior to disclosure must be bound by written obligations of confidentiality and non-use no less restrictive than the obligations set forth in this Article 11; *provided*, *however*, that the Receiving Party shall remain responsible for any failure by any Person who receives Confidential Information pursuant to this Article 11 to treat such Confidential Information as required under this Article 11.

If and whenever any Confidential Information is disclosed in accordance with this Section 11.2, such disclosure shall not cause any such information to cease to be Confidential Information except to the extent that such disclosure results in a public

disclosure of such information (otherwise than by breach of this Agreement). Where reasonably possible and subject to Section 11.4, the Receiving Party shall notify the Disclosing Party of the Receiving Party's intent to make such disclosure pursuant to paragraphs (r) through (v) of this Section 11.2 sufficiently prior to making such disclosure so as to allow the Disclosing Party adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information.

11.3 Terms of this Agreement. The Parties acknowledge that the terms of this Agreement shall be treated as Confidential Information of both Parties.

11.4 Securities Filings. In the event either Party proposes to file with the Securities and Exchange Commission or the securities regulators of any state or other jurisdiction a registration statement or any other disclosure document which describes or refers to this Agreement under the Securities Act of 1933, as amended, the Securities Exchange Act of 1934, as amended, or any other applicable Laws, the Party shall notify the other Party of such intention and shall provide such other Party with a copy of relevant portions of the proposed filing not less than **[***]** business days prior to such filing (and any revisions to such portions of the proposed filing a reasonable time prior to the filing thereof), including any exhibits thereto relating to this Agreement and shall use reasonable efforts to obtain confidential treatment of any information concerning this Agreement that such other Party requests be kept confidential and shall only disclose Confidential Information which it is advised by counsel is legally required to be disclosed. No such notice shall be required under this Section 11.4 if the substance of the description of or reference to this Agreement contained in the proposed filing has been included in any previous filing made by the other Party hereunder or otherwise approved by the other Party.

11.5 Publication.

11.5.1 Publication by Ligand. Ligand may publish or present data and/or results relating to a Licensed Compound or Licensed Product in scientific journals and/or at scientific conferences, subject to the prior review, comment and approval by Retrophin as follows. Ligand shall provide Retrophin with the opportunity to review any proposed abstract, manuscript or presentation which discloses information relating to a Licensed Compound or Licensed Product by delivering a copy thereof to Retrophin no less than **[***]** days before its intended submission for publication or presentation. Retrophin shall have twenty (20) days from its receipt of any such abstract, manuscript or presentation in which to notify Ligand in writing of any specific objections to the disclosure. In the event Retrophin objects to the disclosure in writing within such **[***]** day period, Ligand agrees not to submit the publication or abstract or make the presentation containing the objected-to information until the Parties have agreed to the content of the proposed disclosure and Ligand shall delete from the proposed disclosure any Retrophin Confidential Information or Know-How or the identity of any Licensed Compound or Licensed Product, or any information relating to the Licensed Compound or its improvements that could limit or jeopardize any rights of Retrophin, upon reasonable request by Retrophin. Failure to object to the disclosure in writing within such **[***]** day period shall be deemed approval. Once any such abstract or manuscript is accepted for publication, Ligand will provide Retrophin with a copy of the final version of the manuscript or abstract. For clarification, this Section 11.5.1 shall not limit or restrict Ligand's ability to publish or present publicly information on compounds which are not Licensed Compounds or Licensed Products, provided such publication or presentation does not contain Retrophin Confidential Information or identify any

Licensed Compound or Licensed Product. Retrophin acknowledges BMS' right to publish or otherwise publicly disclose any licensed BMS Know-How at any time.

11.5.2 Publication by Retrophin. Retrophin may publish or present data and/or results relating to a Licensed Compound or Licensed Product in scientific journals and/or at scientific conferences, subject to attribution to Ligand of any data generated by or on behalf of Ligand prior to the Effective Date as well as the prior review and comment by Ligand as follows. Retrophin shall provide Ligand with the opportunity to review any proposed abstract, manuscript or presentation which discloses information relating to a Licensed Compound or Licensed Product by delivering a copy thereof to Ligand no less than **[***]** days before its intended submission for publication or presentation. Ligand shall have **[***]** days from its receipt of any such abstract, manuscript or presentation in which to notify Retrophin in writing of any specific objections to the disclosure, such objections to be limited to matters involving the disclosure of Ligand Confidential Information, or a good faith and documented concern by Ligand that such publication would otherwise result in material commercial harm to Ligand. In the event Ligand objects to the disclosure in writing within such **[***]** day period, Retrophin agrees not to submit the publication or abstract or make the presentation containing the objected-to information until the Parties have agreed to the content of the proposed disclosure, and Retrophin shall delete from the proposed disclosure any Ligand Confidential Information upon the reasonable request by Ligand. The Parties agree to take all reasonable steps to address and resolve a notice of objection by Ligand within **[***]** days of receipt of such notice. Once any such abstract or manuscript is accepted for publication, Retrophin will provide Ligand with a copy of the final version of the manuscript or abstract, a copy of which may be provided to BMS by Ligand.

ARTICLE 12.

INDEMNITY

12.1 Retrophin Indemnity. Retrophin shall indemnify, defend and hold harmless Ligand and its Affiliates, and their respective officers, directors, employees, agents, licensors, and their respective successors, heirs and assigns and representatives, from and against any and all claims, damages, losses, suits, proceedings, liabilities, costs (including reasonable legal expenses, costs of litigation and reasonable attorney's fees) or judgments, whether for money or equitable relief, of any kind, arising out of any claim, action, lawsuit or other proceeding brought by a Third Party ("Losses and Claims") arising out of or relating, directly or indirectly, (i) to the research, Development, Commercialization (including promotion, advertising, offering for sale, sale or other disposition), transfer, importation or exportation, manufacture, labeling, handling or storage, or use of, or exposure to, any Licensed Compound and/or any Licensed Product by or for Retrophin or any of its Affiliates, Sublicensees, agents and/or contractors, (ii) to Retrophin's (or its Affiliates' and/or Sublicensees') use and practice otherwise of the Patent Rights or Know-How, including claims based on (A) product liability, bodily injury, risk of bodily injury, death or property damage, (B) infringement or misappropriation of Third Party patents, copyrights, trademarks or other intellectual property rights or (C) the failure to comply with applicable Laws related to the matters referred to in the foregoing clauses (i) and (ii) with respect to any Licensed Compound and/or any Licensed Product, or (iii) Retrophin's gross negligence, recklessness or willful misconduct or Retrophin's material breach of any representation, warranty or covenant set forth in this Agreement; except in any such case for Losses and Claims to the extent reasonably attributable to Ligand having committed an act or acts of gross negligence, recklessness or willful

misconduct or having materially breached any representation or warranty set forth in this Agreement.

12.2 Ligand Indemnity. Ligand shall indemnify, defend and hold harmless Retrophin and its Affiliates, and their respective officers, directors, employees, agents, licensors, and their respective successors, heirs and assigns and representatives, from and against any and all Losses and Claims arising out of or relating, directly or indirectly to (i) Ligand's gross negligence, recklessness or willful misconduct or (ii) Ligand's material breach of any representation, warranty or covenant set forth in this Agreement; except in any such case for Losses and Claims to the extent reasonably attributable to Retrophin having committed an act or acts of gross negligence, recklessness or willful misconduct or having materially breached any representation or warranty set forth in this Agreement. For the avoidance of doubt, "Ligand's gross negligence, recklessness or willful misconduct" shall not include any acts or omissions on the part of any Third Parties, including Ligand's clinical research organization, Cetero Research.

12.3 Indemnification Procedure. A claim to which indemnification applies under Section 12.1 or Section 12.2 shall be referred to herein as an "Indemnification Claim". If any Person or Persons (collectively, the "Indemnitee") intends to claim indemnification under this Article 12, the Indemnitee shall notify the other Party (the "Indemnitor") in writing promptly upon becoming aware of any claim that may be an Indemnification Claim (it being understood and agreed, however, that the failure by an Indemnitee to give such notice shall not relieve the Indemnitor of its indemnification obligation under this Agreement except and only to the extent that the Indemnitor is actually prejudiced as a result of such failure to give notice). The Indemnitor shall have the right to assume and control the defense of the Indemnification Claim at its own expense with counsel selected by the Indemnitor and reasonably acceptable to the Indemnitee; *provided*, *however*, that an Indemnitee shall have the right to retain its own counsel, with the fees and expenses to be paid by the Indemnitee, if representation of such Indemnitee by the counsel retained by the Indemnitor would be inappropriate due to actual or potential differing interests between such Indemnitee and any other party represented by such counsel in such proceedings. If the Indemnitor does not assume the defense of the Indemnification Claim as aforesaid, the Indemnitee may defend the Indemnification Claim but shall have no obligation to do so. The Indemnitee shall not settle or compromise the Indemnification Claim without the prior written consent of the Indemnitor, and the Indemnitor shall not settle or compromise the Indemnification Claim in any manner which would have an adverse effect on the Indemnitee's interests (including any rights under this Agreement or the scope or enforceability of the Patents Rights or Know-How), without the prior written consent of the Indemnitee, which consent, in each case, shall not be unreasonably withheld or delayed. The Indemnitee shall reasonably cooperate with the Indemnitor at the Indemnitor's expense and shall make available to the Indemnitor all pertinent information under the control of the Indemnitee, which information shall be subject to Article 11.

12.4 Insurance. Retrophin shall, beginning with the initiation of the first clinical trial for a Licensed Product, maintain at all times thereafter during the term of the Agreement, and until the later of (i) **[***]** or (ii) the date **[***]**, comprehensive general liability insurance from a recognized, creditworthy insurance company, on a claims-made basis, with endorsements for contractual liability and product liability, and with coverage limits of not less than **[***]**. The minimum level of insurance set forth herein shall not be construed to create a limit on Retrophin's liability hereunder. Within **[***]** days following written request from Ligand, Retrophin shall furnish to Ligand a certificate of insurance

evidencing such coverage as of the date. Retrophin shall use commercially reasonable efforts to cause such certificate of insurance, as well as any certificates evidencing new coverages of Retrophin, to include a provision whereby **[***]** written notice shall be received by Ligand prior to coverage cancellation by either Retrophin or the insurer and of any new coverage. In the case of a cancellation of such coverage, Retrophin shall promptly provide Ligand with a new certificate of insurance evidencing that Retrophin's coverage meets the requirements in the first sentence of this Section 12.4.

ARTICLE 13.

TERM AND TERMINATION

13.1 Term. This Agreement shall commence as of the Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, shall continue until neither Party has any obligation under this Agreement to make payments to the other Party.

13.2 Termination By Ligand.

13.2.1 Insolvency. Ligand shall have the right to terminate this Agreement with respect to any or all licenses granted to Retrophin pursuant to Article 2 of this Agreement, at Ligand's sole discretion, upon delivery of written notice to Retrophin upon the filing by Retrophin in any court or agency pursuant to any statute or regulation of the United States or any other jurisdiction a petition in bankruptcy or insolvency or for reorganization or similar arrangement for the benefit of creditors or for the appointment of a receiver or trustee of Retrophin or its assets, or if Retrophin is served with an involuntary petition against it in any insolvency proceeding, upon the **[***]** day after such service if such involuntary petition has not previously been stayed or dismissed, or upon the making by Retrophin of an assignment of substantially all of its assets for the benefit of its creditors.

13.2.2 Breach. Subject to Section 13.2.4 below, Ligand shall have the right to terminate this Agreement with respect to any or all licenses granted to Retrophin pursuant to Article 2 of this Agreement, at Ligand's sole discretion, upon delivery of written notice to Retrophin in the event of any material breach by Retrophin of any terms and conditions of this Agreement (other than failure to use Commercially Reasonable Efforts to Develop or Commercialize the Licensed Compounds and a Licensed Product, which breach is covered under Section 13.2.3); *provided, however,* such breach has not been cured within forty-five (45) days after written notice thereof is given by Ligand to Retrophin specifying the nature of the alleged breach; *provided*, *however*, that to the extent such material breach involves the failure to make a payment when due, such breach must be cured within twenty (20) days after written notice thereof is given by Ligand to Retrophin.

13.2.3 Failure to Use Commercially Reasonable Efforts. Subject to Section 13.2.4 below, Ligand shall have the right to terminate this Agreement with respect to any or all licenses granted to Retrophin pursuant to Article 2 of this Agreement on a country-by-country basis (except as otherwise set forth in this Section 13.2.3), at Ligand's sole discretion, in the event that Retrophin (a) fails to use Commercially Reasonable Efforts (by itself or through its Affiliates or Sublicensees) to Develop and Commercialize at least one (1) Licensed Compound and Licensed Product or (b) fails to comply with the specific diligence obligations set forth in Sections 6.1.2 and 6.1.3 of this Agreement; *provided, however,* that Retrophin has not exercised such Commercially Reasonable Efforts or complied with such specific diligence obligations in the applicable

country or countries within sixty (60) days following written notice by Ligand. For clarity, it is understood and acknowledged that Commercially Reasonable Efforts in the Development of a Licensed Compound or Licensed Product in a particular country may include sequential implementation of clinical trials and/or intervals between clinical trials for data interpretation and clinical program planning and any period associated with such program, to the extent such implementation is consistent with the scientific, technical and commercial factors relevant to Development of such Licensed Compound or Licensed Product in such country.

13.2.4 Disputed Breach. If Retrophin disputes in good faith the existence or materiality of a breach specified in a notice provided by Ligand pursuant to Section 13.2.2, or a failure to use Commercially Reasonable Efforts specified in a notice provided by Ligand pursuant to Section 13.2.3, and Retrophin provides notice to Ligand of such dispute within the applicable forty-five (45) day or sixty (60) day period, Ligand shall not have the right to terminate this Agreement unless and until the existence of such material breach or failure by Retrophin has been determined in accordance with Article 14 and Retrophin fails to cure such breach within sixty (60) days following such determination (except to the extent such breach involves the failure to make a payment when due, which breach must be cured within five (5) Business Days following such determination). It is understood and acknowledged that during the pendency of such a dispute, all of the terms and conditions of this Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder. The Parties further agree that any payments that are made by one Party to the other Party pursuant to this Agreement pending resolution of the dispute shall be promptly refunded if an arbitrator or court determines pursuant to Article 14 that such payments are to be refunded by one Party to the other Party.

13.2.5 Termination for **[***]**. Subject to the terms of this Section 13.2.5, Ligand shall have the right to terminate this Agreement (on a country-by-country or worldwide basis, as Ligand may elect), **[***]**, in the event that (a) **[***]** or (b) **[***]**. In the event the Parties are unable to reach agreement regarding whether or not a compound is a **[***]**, and the Parties have not resolved such dispute through good faith discussions, such dispute will be resolved through performance of the relevant scientific determination by an independent Third Party testing provider or other scientific expert who shall be mutually and reasonably selected by both Parties. The findings of such Third Party scientific expert with respect to such dispute shall be binding on the Parties, and the costs of such testing shall be borne by the Party whom the independent determination does not favor.

13.2.6 Termination of Upstream License Agreement. Subject to Section 13.5.1, if the Upstream License Agreement, in whole or in part, is terminated for any reason, the corresponding rights granted to Retrophin shall be terminated effective upon termination of the Upstream License Agreement.

13.3 Termination by Retrophin. Retrophin may terminate this Agreement in the event of material breach by Ligand; *provided, however,* that such breach has not been cured within sixty (60) days after written notice thereof is given by Retrophin to Ligand. Notwithstanding the foregoing, if Ligand disputes in good faith the existence or materiality of such breach and provides notice to Retrophin of such dispute within such sixty (60) day period, Retrophin shall not have the right to terminate this Agreement in accordance with this Section 13.3 unless and until it has been determined in accordance with Article 14 that this Agreement was materially breached by Ligand and Ligand fails to cure such breach

within sixty (60) days following such determination. It is understood and acknowledged that during the pendency of such a dispute, all of the terms and conditions of this Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder. The Parties further agree that any payments that are made by one Party to the other Party pursuant to this Agreement pending resolution of the dispute shall be promptly refunded if an arbitrator or court determines pursuant to Article 14 that such payments are to be refunded by one Party to the other Party.

13.4 Effect of Termination. Upon termination of this Agreement or any right or license pursuant to Section 13.2.1, 13.2.2, 13.2.3 or 13.2.5, the rights and obligations of the Parties shall be as set forth in this Section 13.4.

13.4.1 Upon termination of this Agreement, either in its entirety or with respect to one or more applicable countries (each, a "Terminated Country") pursuant to Section 13.2.1, 13.2.2, 13.2.3 or 13.2.5 hereof (the rights and obligations of the Parties as to the remaining countries of the Territory in which termination under Section 13.2.3 or 13.2.5 has not occurred, being unaffected by such termination), the following shall apply:

a) **[***]**.

b) **[***]**.

c) All amounts due or payable to **[***]** shall remain due and payable.

d) Should Retrophin have **[***]**, Retrophin shall **[***]**.

e) Should Retrophin have **[***]**.

f) Retrophin shall **[***]**.

g) If Retrophin has the **[***]**.

h) Retrophin shall **[***]**.

i) Retrophin shall **[***]**.

j) Retrophin hereby**[***]**.

k) Neither Party shall be relieved of any obligation that accrued prior to the effective date of such termination or expiration.

l) Each Party shall have the right to retain all amounts previously paid to it by the other Party, subject to any applicable determination of an arbitrator or court pursuant to Article 14.

m) It is understood and agreed that Ligand shall be entitled to **[***]** as a remedy to enforce the provisions of this Section 13.4, in addition to any other remedy to which it may be entitled by applicable Law.

13.5 Termination by BMS.

13.5.1 Any rights granted by Ligand pursuant to this Agreement shall terminate on a country-by-country and Licensed Product-by-Licensed Product basis effective upon termination under Section 13.2 of the Upstream License Agreement with respect to such sublicensed rights; *provided, however,* that such sublicensed rights shall not

terminate if, as of the effective date of such termination by BMS under Section 13.2 of the Upstream License Agreement, Retrophin is not in material breach of its obligations to Ligand under this Agreement, and within sixty (60) days of such termination Retrophin agrees in writing to be bound directly to BMS under a license agreement substantially similar to this Agreement with respect to the rights sublicensed hereunder, substituting Retrophin for Ligand.

13.5.2 BMS may terminate the Upstream License Agreement where (a) Retrophin or its Affiliate (alone or in collaboration with a Third Party) undertakes the clinical development of a product that contains a **[***]** prior to the first U.S. NDA Approval being obtained for a Licensed Compound or (b) Retrophin or its Affiliate (alone or in collaboration with a Third Party) markets a product that contains a **[***]** within **[***]** years following the first U.S. NDA Approval for a Licensed Product.

13.6 Scope of Termination. Except as otherwise expressly provided herein, termination of this Agreement shall be as to all countries in the Territory and all Licensed Compounds and Licensed Products.

(i) Survival. The following provisions shall survive termination or expiration of this Agreement, as well as any other provision which by its terms or by the context thereof, is intended to survive such termination: Article 1 (as applicable), Article 5 (with respect to obligations arising prior to expiration or termination of this Agreement), Article 8 (with respect to obligations arising prior to expiration or termination of this Agreement), Section 9.4, Section 9.5, Section 10.1, 10.4.4 (with respect to an action, suit or proceeding commenced prior to termination), Section 10.7, Article 11, Article 12 (with respect to Losses and Claims arising from activities and breaches that take place prior to expiration or termination of this Agreement), this Section 13.6(i), Section 13.7, Article 14 and Article 15. Termination or expiration of this Agreement shall not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity, subject to Article 14, with respect to any breach of this Agreement nor prejudice either Party's right to obtain performance of any obligation. All other obligations shall terminate upon expiration of this Agreement.

13.7 Bankruptcy. The Parties agree that in the event a Party becomes a debtor under Title 11 of the U.S. Code ("Title 11"), this Agreement shall be deemed to be, for purposes of Section 365(n) of Title 11, a license to rights to "intellectual property" as defined therein. Each Party as a licensee hereunder shall have the rights and elections as specified in Title 11. Any agreements supplemental hereto shall be deemed to be "agreements supplementary to" this Agreement for purposes of Section 365(n) of Title 11.

ARTICLE 14.

DISPUTE RESOLUTION; ARBITRATION

14.1 Dispute Resolution. The Parties agree that the procedures set forth in this Section 14.1 shall be the exclusive mechanism for resolving any bona fide disputes, controversies or claims (collectively, "Disputes") between the Parties that arise from time to time pursuant to this Agreement relating to any Party's rights and/or obligations hereunder that cannot be resolved through good faith negotiation between the Parties.

14.2 Executive Mediation. Any Dispute shall first be referred to an Executive from each Party for attempted resolution by good faith negotiations. Any such Dispute shall be submitted to such Executives no later than **[***]** days following such

request by either Party. Such Executives shall attempt in good faith to resolve any such Dispute within **[***]** days after submission of the Dispute. In the event the Executives are unable to resolve the Dispute, the Parties shall otherwise negotiate in good faith and use reasonable efforts to settle.

14.3 Arbitration.

14.3.1 If the Parties are not able to fully settle a Dispute pursuant to Section 14.2 above, and a Party wishes to pursue the matter, each such Dispute that is not an Excluded Claim or subject to expedited arbitration in accordance with Section 14.4 below, shall be finally resolved by binding arbitration in accordance with the Commercial Arbitration Rules and Supplementary Procedures for Large Complex Disputes of the American Arbitration Association ("AAA"), and judgment on the arbitration award may be entered in any court having jurisdiction thereof; provided, however, that the Federal Rules of Evidence shall apply with regard to the admissibility of evidence in such hearing.

14.3.2 The arbitration shall be conducted by a panel of three persons experienced in the pre-clinical and clinical stage pharmaceutical business. Within **[***]** days after initiation of arbitration, each Party shall select one person to act as arbitrator and the two Party-selected arbitrators shall select a third arbitrator within **[***]** days of their appointment. If the arbitrators selected by the Parties are unable or fail to agree upon the third arbitrator, the third arbitrator shall be appointed by the AAA. In any case the arbitrator shall not be an Affiliate, employee, consultant, officer, director or stockholder of either Party, or otherwise have any current or previous relationship with either Party or their respective Affiliates. The Parties shall have the right to be represented by counsel. The place of arbitration shall be New York, NY. All proceedings and communications shall be in English.

14.3.3 Either Party may apply to the arbitrators for interim injunctive relief until the arbitration award is rendered or the controversy is otherwise resolved. Either Party also may, without waiving any remedy under this Agreement, seek from any court having jurisdiction any injunctive or provisional relief necessary to protect the rights or property of that Party pending the arbitration award. The arbitrators shall have no authority to award punitive or any other type of damages not measured by a Party's compensatory damages. Each Party shall bear its own costs and expenses and attorneys' fees and an equal share of the arbitrators' fees and any administrative fees of arbitration.

14.3.4 Except to the extent necessary to confirm an award or as may be required by Law, neither a Party nor an arbitrator may disclose the existence, content, or results of an arbitration without the prior written consent of both Parties. In no event shall an arbitration be initiated after the date when commencement of a legal or equitable proceeding based on the dispute, controversy or claim would be barred by the applicable New York statute of limitations.

14.3.5 The arbitrators shall use their commercially reasonable efforts to rule on each disputed issue within days after completion of the hearing described in Section 14.3. The determination of the arbitrators as to the resolution of any dispute shall be binding and conclusive upon all Parties. All rulings of the arbitrator shall be in writing and shall be delivered to the Parties except to the extent that the Commercial Arbitration Rules of the AAA provide otherwise. Nothing contained herein shall be construed to permit the arbitrator to award punitive, exemplary or any similar damages.

14.3.6 The (i) attorneys' fees of the Parties in any arbitration, (ii) fees of the arbitrator and (iii) costs and expenses of the arbitration shall be borne by the Parties in a proportion determined by the arbitrator.

14.3.7 For all Excluded Claims, the Parties hereby submit to the exclusive jurisdiction of the Supreme Court of the State of New York, New York County and the United States District Court for the Southern District of New York. For clarity, each party may seek injunctive or other equitable relief for Excluded Claims in accordance with this Section 14.3.7. Each Party agrees that service of any process, summons, notice or document by personal delivery, by registered mail, or by a recognized international express delivery service to such Party's respective address set forth in Section 15.2 shall be effective service of process for any action, suit or proceeding in the district court or state court with respect to any matters to which it has submitted to jurisdiction in this Section 14.3.7. Each Party irrevocably and unconditionally waives any objection to the laying of venue of any action, suit or proceeding arising out of this Agreement or the transactions contemplated hereby in the district court or state court, and hereby and thereby further irrevocably and unconditionally waives and agrees not to plead or claim in any such court that any such action, suit or proceeding brought in any such court has been brought in an inconvenient forum. Each Party hereto also hereby waives to the fullest extent permitted by applicable Laws, any right it may have to a trial by jury in respect to any litigation directly or indirectly arising out of, under or in connection with this Agreement. Each Party hereto (i) certifies that no representative, agent or attorney of the other Party has represented, expressly or otherwise, that such other Party would not, in the event of litigation, seek to enforce that foregoing waiver and (ii) acknowledges that it and the other Party hereto have been induced to enter into this Agreement, as applicable, by, among other things, the mutual waivers and certifications in this Section 14.3.7.

14.4 Expedited Arbitration. The Parties agree that it is important to be able to clarify any disputes regarding **[***]** quickly. Accordingly, if: (i) Ligand **[***]**; (ii) **[***]**; or (iii) **[***]**; then the Parties shall resolve such dispute in accordance with this Section 14.4. Arbitration under this Section 14.4 shall be conducted in the same manner and subject to the same terms and conditions as arbitration under Section 14.3, provided that: (i) the Parties shall designate in writing a single arbitrator within fifteen (15) days of written notice of the dispute; (ii) the arbitrator and the Parties shall meet, and each Party shall provide to the arbitrator a written summary of all disputed issues, such Party's position on such disputed issues and such Party's proposed ruling on the merits of each such issue within fifteen (15) days after the designation of the arbitrator; (iii) the arbitrator shall use his or her commercially reasonable efforts to rule on each disputed issue within fifteen (15) days after completion of the hearing described in Section 14.3; (d) the arbitrator shall select one of the requested positions as his decision, and shall not have the authority to render any substantive decision other than to so select the position of either Ligand or Retrophin; and (e) the Parties shall use good faith efforts to complete any expedited arbitration pursuant to this Section 14.4 promptly.

ARTICLE 15.

MISCELLANEOUS

15.1 Severability. If any one or more of the provisions of this Agreement is held to be invalid or unenforceable, the provision shall be considered severed from this Agreement and shall not serve to invalidate any remaining provisions hereof. The Parties shall make a good faith effort to replace any invalid or unenforceable provision with a

valid and enforceable one such that the objectives contemplated by the Parties when entering this Agreement may be realized.

15.2 Notices. Any notice required or permitted to be given by this Agreement shall be in writing and shall be delivered by hand or overnight courier with tracking capabilities or mailed postage prepaid by first class, registered or certified mail addressed as set forth below unless changed by notice so given:

If to Ligand:

Ligand Pharmaceuticals Incorporated
11085 North Torrey Pines Road, Suite 300
La Jolla, CA 92037
Attention: General Counsel

With a copy to (which shall not constitute notice hereunder):

Latham & Watkins LLP
12636 High Bluff Drive, Suite 400
San Diego, CA 92130
Attention: Faye H. Russell, Esq.

If to Retrophin:

Retrophin LLC
330 Madison Avenue, 6th Floor
New York, NY 10017
Attention: Martin Shkreli

With a copy to (which shall not constitute notice hereunder):

Katten Muchin Rosenman LLP
575 Madison Avenue
New York, NY 10022
Attention: Evan L. Greebel, Esq.

Any such notice shall be deemed given on the date received. A Party may add, delete, or change the person or address to whom notices should be sent at any time upon written notice delivered to the Party's notices in accordance with this Section 15.2.

15.3 Force Majeure. Neither Party shall be liable for delay or failure in the performance of any of its obligations hereunder (including, without limitation Sections 6.1.2 and 6.1.3 of this Agreement) if such delay or failure is due to causes beyond its reasonable control, including acts of God, fires, earthquakes, strikes and labor disputes, acts of war, terrorism, civil unrest or intervention of any governmental authority ("Force Majeure"); *provided*, *however*, that the affected Party promptly notifies the other Party and further provided that the affected Party shall use its commercially reasonable efforts to avoid or remove such causes of non-performance and to mitigate the effect of such occurrence and shall continue performance with the utmost dispatch whenever such causes are removed. When such circumstances arise, the Parties shall negotiate in good faith any

modifications of the terms of this Agreement that may be necessary or appropriate in order to arrive at an equitable solution.

15.4 Assignment.

15.4.1 Ligand may, without Retrophin's consent, assign or transfer all of its rights and obligations hereunder, in connection with any transfer of all of the Patent Rights and Know-How, to any Affiliate of Ligand or to any Third Party (including a successor in interest); *provided*, *however*, that such assignee or transferee agrees in writing to be bound by the terms of this Agreement.

15.4.2 Retrophin may assign or transfer all of its rights and obligations hereunder without consent to an Affiliate of Retrophin or to a successor in interest by reason of merger, consolidation or sale of all or substantially all of the assets of Retrophin; *provided however*, that (i) Retrophin's rights and obligations under this Agreement shall be assumed by its successor in interest and shall not be transferred separate from all or substantially all of its other business assets, (ii) such assignment includes all Approvals and all rights and obligations under this Agreement, (iii) such successor in interest or Affiliate shall have agreed prior to such assignment or transfer to be bound by the terms of this Agreement in writing and (iv) where this Agreement is assigned or transferred to an Affiliate, Retrophin remains responsible for the performance of this Agreement.

15.4.3 Subject to the foregoing, this Agreement shall inure to the benefit of and be binding on the Parties' successors and assigns. Any assignment or transfer in violation of the foregoing shall be null and void and wholly invalid, the assignee or transferee in any such assignment or transfer shall acquire no rights whatsoever, and the non-assigning non-transferring Party shall not recognize, nor shall it be required to recognize, such assignment or transfer.

15.5 Further Assurances. Each Party agrees to do and perform all such further acts and things and shall execute and deliver such other agreements, certificates, instruments and documents necessary or that the other Party may deem advisable in order to carry out the intent and accomplish the purposes of this Agreement and to evidence, perfect or otherwise confirm its rights hereunder.

15.6 Waivers and Modifications. The failure of any Party to insist on the performance of any obligation hereunder shall not be deemed to be a waiver of such obligation. Waiver of any breach of any provision hereof shall not be deemed to be a waiver of any other breach of such provision or any other provision on such occasion or any succeeding occasion. No waiver, modification, release or amendment of any obligation under or provision of this Agreement shall be valid or effective unless in writing and signed by all Parties hereto.

15.7 Choice of Law. This Agreement shall be governed by, enforced, and shall be construed in accordance with the laws of the State of New York without regard to its conflicts of law provisions.

15.8 Publicity. The Parties agree to issue a press release regarding the execution of this Agreement, in a form to be mutually agreed upon by the Parties. Subject to the provisions of Sections 11.2, 11.4 and 11.5, each Party agrees not to issue any other press release or public statement disclosing the existence of this Agreement or any other information relating to this Agreement, the other Party, or the transactions contemplated

hereby without the prior written consent of the other Party; *provided*, *however*, that any disclosure which is required by applicable Laws or the rules of a securities exchange, as reasonably advised by the disclosing Party's counsel, may be made subject to the following. The Parties agree that any such required disclosure will not contain confidential business or technical information and, if disclosure of confidential business or technical information is required by applicable Laws, the Parties will use appropriate diligent efforts to minimize such disclosure and obtain confidential treatment for any such information which is disclosed to a governmental agency. Each Party agrees to provide to the other Party a copy of any public announcement regarding this Agreement or the subject matter thereof as soon as reasonably practicable under the circumstances prior to its scheduled release. Except under extraordinary circumstances, or as otherwise required under applicable Laws or the rules of a securities exchange, each Party shall provide the other with an advance copy of any such announcement at least forty eight (48) hours prior to its scheduled release. Each Party shall have the right to expeditiously review and recommend changes to any such announcement and, except as otherwise required by applicable Laws or the rules of a securities exchange, the Party whose announcement has been reviewed shall remove any Confidential Information of the reviewing Party that the reviewing Party reasonably deems to be inappropriate for disclosure. The contents of any announcement or similar publicity which has been reviewed and approved by the reviewing Party can be re-released by either Party without a requirement for re-approval. Nothing in this Section 15.8 shall be construed to prohibit Retrophin or its Affiliates or Sublicensees from making a public announcement or disclosure regarding the stage of development of Licensed Products in Retrophin's (or its Affiliates' or Sublicensees') product pipeline or disclosing clinical trial results regarding such Licensed Products, as may be required by applicable Laws or the rules of a securities exchange, as reasonably advised by Retrophin's (or its Affiliates' or Sublicensees') counsel.

15.9 Relationship of the Parties. Each Party is an independent contractor under this Agreement. Nothing contained herein is intended or is to be construed so as to constitute Ligand and Retrophin as partners, agents or joint venturers. Neither Party shall have any express or implied right or authority to assume or create any obligations on behalf of or in the name of the other Party or to bind the other Party to any contract, agreement or undertaking with any Third Party.

15.10 Headings. Headings and captions are for convenience only and are not be used in the interpretation of this Agreement.

15.11 Entire Agreement. This Agreement (including all Appendices attached hereto, which are incorporated herein by reference) (i) sets forth all of the covenants, promises, agreements, warranties, representations, conditions and understandings between the Parties hereto, (ii) constitutes and contains the complete, final and exclusive understanding and agreement of the Parties with respect to the subject matter herein and (iii) cancels, supersedes and terminates all prior agreements and understanding between the Parties with respect to the subject matter hereof. For the avoidance of doubt, the confidentiality agreement entered into by Ligand and Retrophin effective as of December 11, 2011 (the "Confidentiality Agreement") shall remain in effect with respect to all Confidential Information (as that term is defined in the Confidentiality Agreement) disclosed by the Parties that does not pertain to the subject matter of this Agreement. All Confidential Information (as that term is defined in the Confidentiality Agreement) pertaining to the subject matter of this Agreement disclosed to Ligand by Retrophin under the Confidentiality Agreement shall be considered Confidential Information (as that term is defined in this Agreement) of Retrophin disclosed under this Agreement and shall be

subject to the terms and conditions of this Agreement; and all Confidential Information (as that term is defined in the Confidentiality Agreement) pertaining to the subject matter of this Agreement disclosed to Retrophin by Ligand under the Confidentiality Agreement shall be considered Confidential Information (as that term is defined in this Agreement) of Ligand disclosed under this Agreement and shall be subject to the terms and conditions of this Agreement. There are no covenants, promises, agreements, warranties, representations, conditions or understandings, whether oral or written, between the Parties other than as set forth herein. No subsequent alteration, amendment, change or addition to this Agreement shall be binding upon the Parties hereto unless reduced to writing and signed by the respective authorized officers of the Parties.

15.12 Counterparts. This Agreement may be executed in counter-parts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

15.13 Exports. Retrophin agrees not to export or re-export, directly or indirectly, any information, technical data, the direct product of such data, samples or equipment received or generated under this Agreement in violation of any applicable export control Laws.

15.14 Interpretation.

15.14.1 Each of the Parties acknowledges and agrees that this Agreement has been diligently reviewed by and negotiated by and between them, that in such negotiations each of them has been represented by competent counsel and that the final agreement contained herein, including the language whereby it has been expressed, represents the joint efforts of the Parties hereto and their counsel. Accordingly, in interpreting this Agreement or any provision hereof, no presumption shall apply against any Party hereto as being responsible for the wording or drafting of this Agreement or any such provision, and ambiguities, if any, in this Agreement shall not be construed against any Party, irrespective of which Party may be deemed to have authored the ambiguous provision.

15.14.2 The definitions of the terms herein shall apply equally to the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. The words “include,” “includes” and “including” shall be deemed to be followed by the phrase “without limitation.” The word “will” shall be construed to have the same meaning and effect as the word “shall.” The word “any” shall mean “any and all” unless otherwise clearly indicated by context.

15.14.3 Unless the context requires otherwise, (a) any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein or therein), (b) any reference to any Laws herein shall be construed as referring to such Laws as from time to time enacted, repealed or amended, (c) any reference herein to any person shall be construed to include the person’s successors and assigns, (d) the words “herein”, “hereof” and “hereunder”, and words of similar import, shall be construed to refer to this Agreement in its entirety and not to any particular provision hereof, and (e) all references herein to Articles, Sections

or Appendices, unless otherwise specifically provided, shall be construed to refer to Articles, Sections and Appendices of this Agreement.

* * *

[signature page follows]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective duly authorized officers as of the date first set forth above.

LIGAND PHARMACEUTICALS INCORPORATED ("Ligand")	**RETROPHIN, LLC ("Retrophin")**
By: /s/ Charles Berkman	By: /s/ Martin Shkreli
Name: Charles Berkman	Name: Martin Shkreli
Title: Vice President, General Counsel and Secretary	Title: Chief Executive Officer

Appendix 1

Core Patent Rights

[***]	[***]	[***]	[***]	[***]	[***]	[***]	[***]	[***]
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Appendix 2

Active Compound

"Active Compound" means a compound that **[***]**.

"**[***]**" means **[***]**.

"**[***]**" means the **[***]**.

Appendix 3

Development Plan

(attached hereto)

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***] – EIGHT PAGES REDACTED

Appendix 4

Listed Compounds

[***]

AMENDMENT TO

SUBLICENSE AGREEMENT

THIS AMENDMENT TO SUBLICENSE AGREEMENT (the "**Amendment**") is made and entered into as of December 11, 2012 (**"Amendment Effective Date"**) and amends the Sublicense Agreement effective as of February 16, 2012 (the **"Sublicense Agreement"**) by and between Ligand Pharmaceuticals Incorporated, a corporation organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 and its wholly owned subsidiary, Pharmacopeia, LLC (as successor in interest to Pharmacopeia Drug Discovery Inc.) (**"PCOP"**), a limited liability company organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 (collectively, Ligand Pharmaceuticals Incorporated and PCOP shall be known as **"Ligand"**) and Retrophin, Inc., a corporation organized under the laws of Delaware and having a place of business at 777 Third Avenue, 22nd Floor, New York, NY, 10017 (**"Retrophin"**).

WHEREAS, Ligand and Retrophin have previously entered into the Sublicense Agreement; and

WHEREAS, Ligand and Retrophin desire to amend certain terms of the Sublicense Agreement as set forth herein.

NOW THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the Parties, intending to be legally bound, agree as follows:

1 . **Capitalized Terms**. The capitalized terms used herein and not otherwise defined shall have the same definitions as provided in the Sublicense Agreement.

2. **Amendments**.

(a) **Development Milestone Payments**. Table 1 of Section 8.2.1 of the Agreement is hereby amended in its entirety as follows:

"Table

Milestone Event	Milestone Payment
Execution of Agreement	$1.15 million
The earlier of (a) December 31, 2012 or (b) initiation of the first Phase 2 Trial for a Licensed Product	$1.15 million (the **"Second Milestone"**); provided, that if the Second Milestone is received by Ligand prior to December 31, 2012, Retrophin shall make an additional $150,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.3 million) (the $150,000 additional payment, an **"Additional Payment"**)[1]
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1) If the Second Milestone and any Additional Payment is not received by Ligand on or before December 31, 2012, Ligand shall have the right to terminate the Agreement pursuant to Section 13.2.2 with immediate effect as of December 31, 2012 by providing written notice to Retrophin, notwithstanding (a) the cure period for the failure to make a payment when due set out in said Section 13.2.2 (Breach) or (b) the provisions of Section 13.2.4 (Disputed Breach). In addition, and for clarity, the provisions of Section 13.4 (Effect of Termination) shall be operative, including, without limitation, the provisions of subsections (c), (k) and (m) related to amounts then due and payable. "

(b) **Exit Transaction Milestone**. Section 8.2.2 of the Agreement is amended by replacing [***] with [***].

(c) **Expedited Arbitration**. Section 14.4 of the Agreement is hereby amended in its entirety as follows:

"The Parties agree that it is important to be able to clarify any disputes regarding [***] quickly. Accordingly, if: (i) Ligand [***]; (ii) [***]; (iii) [***]; or (iv)

[***]; then the Parties shall resolve such dispute in accordance with this Section 14.4. Arbitration under this Section 14.4 shall be conducted in the same manner and subject to the same terms and conditions as arbitration under Section 14.3, provided that: (i) the Parties shall designate in writing a single arbitrator within fifteen (15) days of written notice of the dispute; (ii) the arbitrator and the Parties shall meet, and each Party shall provide to the arbitrator a written summary of all disputed issues, such Party's position on such disputed issues and such Party's proposed ruling on the merits of each such issue within fifteen (15) days after the designation of the arbitrator; (iii) the arbitrator shall use his or her commercially reasonable efforts to rule on each disputed issue within fifteen (15) days after completion of the hearing described in Section 14.3; (iv) the arbitrator shall select one of the requested positions as his decision, and shall not have the authority to render any substantive decision other than to so select the position of either Ligand or Retrophin; and (v) the Parties shall use good faith efforts to complete any expedited arbitration pursuant to this Section 14.4 promptly."

3. **No Other Amendments**. Except as provided herein, the Sublicense Agreement shall continue in full force and effect.

4. **Release**.

(a) As used in this Clause, "Related Persons and Entities" in connection with a Party means any and all past, present, and future parents, subsidiaries, affiliates, partners, owners, joint venturers, stockholders, predecessors, successors, officers, members, directors, administrators, employees, agents, representatives, consultants, attorneys, insurers, heirs, executors, assignors or assignees, retirement plans (and/or their trustees) of that Party and any other person, firm, or corporation with whom that Party is now or may hereinafter be affiliated, and any of them.

(b) Retrophin and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party hereby fully and forever, knowingly, voluntarily, and irrevocably release, acquit, discharge, and promises not to sue Ligand and its Related Persons and Entities, from, without limitation, any and all claims, demands, damages, obligations, losses, causes of action, costs, expenses, attorneys' fees, judgments, liabilities, duties, debts, liens, accounts, obligations, contracts/agreements, promises, representations, actions, and causes of action, other proceedings and indemnities of any nature whatsoever arising from or in any way related to: (i) the quality of the medication; or (ii) compliance of the medication with specifications of Governmental Authorities delivered pursuant to the Sublicense Agreement; or (iii) Ligand's conduct during diligence and negotiations leading to the Sublicense Agreement, whether accrued or contingent, secured or unsecured, negligent or intentional, known or unknown, suspected or unsuspected, and whether based on law, equity, contract, tort, statute, or other legal or equitable theory of recovery, whether mature or to mature in the future, which from the beginning of time to the date of this Amendment, Retrophin and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party had, now have, or claims to have against Ligand and its Related Persons and Entities, or any other person or entity described above.

(c) Retrophin acknowledges that it may later discover material facts in addition to, or different from, those which it now knows or believes to be true. Retrophin further acknowledges that there may be future events, circumstances or occurrences materially different from those it knows or believes likely to occur. It is the

intention of Retrophin to fully, finally and forever settle and generally release all claims, disputes and differences described above occurring prior to the date hereof. The releases provided in this Amendment shall remain in full effect notwithstanding the discovery or existence of any such additional or different facts or occurrence of any such future events, circumstances or conditions.

(d) Retrophin and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party hereby expressly waive the benefit of any statute or rule of law that, if applied to this Amendment would otherwise exclude from its binding effect any claims described above not known by it to exist which arose prior to the signing of this Amendment. Retrophin acknowledges that it has read and fully understands the provisions of California Civil Code section 1542, which provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH, IF KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS SETTLEMENT WITH THE DEBTOR.

Retrophin, being aware of said Code Section, hereby expressly waives, on behalf of itself and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party, any rights and benefits that they may have under section 1542 of the California Civil Code to the full extent that they may lawfully waive such rights and benefits, and shall waive any rights and benefits they may have under any other statutes or common law principles of similar effect.

(e) This Amendment and its terms, including, but not limited to, the Release set forth in this Section 4, and the execution of this Amendment, shall not be construed as an admission of liability or fault by either of the Parties.

5 . **Governing Law**. This Amendment shall be governed by, enforced, and shall be construed in accordance with the laws of the State of New York without regard to its conflicts of law provisions.

6 . **Counterparts**. This Amendment may be executed in counter-parts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Amendment to Sublicense Agreement through their duly authorized representatives to be effective as of the Amendment Effective Date.

LIGAND PHARMACEUTICALS INCORPORATED	**RETROPHIN, INC.**
By: /s/ Matthew Foehr	By: /s/ Martin Shkreli
Title: Vice President, Corporate Development	Title: Chief Executive Officer
Date: 12/20/12	Date: 12/19/2012

AMENDMENT NO. 2 TO

SUBLICENSE AGREEMENT

THIS AMENDMENT NO. 2 TO SUBLICENSE AGREEMENT (the "**Amendment**") is made and entered into as of January 7, 2013 (**"Amendment Effective Date"**) and amends the Sublicense Agreement effective as of February 16, 2012, as amended pursuant to that certain Amendment to Sublicense Agreement dated December 11, 2012 (the **"Sublicense Agreement"**) by and between Ligand Pharmaceuticals Incorporated, a corporation organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 and its wholly owned subsidiary, Pharmacopeia, LLC (as successor in interest to Pharmacopeia Drug Discovery Inc.) (**"PCOP"**), a limited liability company organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 (collectively, Ligand Pharmaceuticals Incorporated and PCOP shall be known as **"Ligand"**) and Retrophin, Inc., a corporation organized under the laws of Delaware and having a place of business at 777 Third Avenue, 22nd Floor, New York, NY, 10017 (**"Retrophin"**).

WHEREAS, Ligand and Retrophin have previously entered into the Sublicense Agreement; and

WHEREAS, Ligand and Retrophin desire to amend certain terms of the Sublicense Agreement as set forth herein.

NOW THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the Parties, intending to be legally bound, agree as follows:

1 . **Capitalized Terms**. The capitalized terms used herein and not otherwise defined shall have the same definitions as provided in the Sublicense Agreement.

2. **Amendments**.

Development Milestone Payments. Table 1 of Section 8.2.1 of the Agreement is hereby amended in its entirety as follows:

"Table

Milestone Event	Milestone Payment
Execution of Agreement	$1.15 million
The earlier of (a) March 31, 2013 or (b) initiation of the first Phase 2 Trial for a Licensed Product	$1.3 million (the **"Second Milestone"**); provided, that if the Second Milestone is received by Ligand (a) prior to or on January 31, 2013, Retrophin shall make an additional $50,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.2 million), (b) after January 31, 2013 but prior to or on February 28, 2013, Retrophin shall make an additional $100,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.4 million), and (c) after February 28, 2013 but prior to or on March 31, 2013, Retrophin shall make an additional $150,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.45 million) (the additional payment, an **"Additional Payment"**)[1]
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1) If the Second Milestone and any Additional Payment is not received by Ligand on or before March 31, 2013, Ligand shall have the right to terminate the Agreement pursuant to Section 13.2.2 with immediate effect as of March 31, 2013 by providing written notice to Retrophin, notwithstanding (a) the cure period for the failure to make a payment when due set out in said Section 13.2.2 (Breach) or (b) the provisions of Section 13.2.4 (Disputed Breach). In addition, and for clarity, the provisions of Section 13.4 (Effect of Termination)

shall be operative, including, without limitation, the provisions of subsections (c), (k) and (m) related to amounts then due and payable."

3. **No Other Amendments**. Except as provided herein, the Sublicense Agreement shall continue in full force and effect.

4. **Release**.

(a) As used in this Clause, "Related Persons and Entities" in connection with a Party means any and all past, present, and future parents, subsidiaries, affiliates, partners, owners, joint venturers, stockholders, predecessors, successors, officers, members, directors, administrators, employees, agents, representatives, consultants, attorneys, insurers, heirs, executors, assignors or assignees, retirement plans (and/or their trustees) of that Party and any other person, firm, or corporation with whom that Party is now or may hereinafter be affiliated, and any of them.

(b) Retrophin and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party hereby fully and forever, knowingly, voluntarily, and irrevocably release, acquit, discharge, and promises not to sue Ligand and its Related Persons and Entities, from, without limitation, any and all claims, demands, damages, obligations, losses, causes of action, costs, expenses, attorneys' fees, judgments, liabilities, duties, debts, liens, accounts, obligations, contracts/agreements, promises, representations, actions, and causes of action, other proceedings and indemnities of any nature whatsoever arising from or in any way related to the Sublicense Agreement, as amended pursuant to this Amendment, whether accrued or contingent, secured or unsecured, negligent or intentional, known or unknown, suspected or unsuspected, and whether based on law, equity, contract, tort, statute, or other legal or equitable theory of recovery, whether mature or to mature in the future, which from the beginning of time to the date of this Amendment, Retrophin and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party had, now have, or claims to have against Ligand and its Related Persons and Entities, or any other person or entity described above.

(c) Retrophin acknowledges that it may later discover material facts in addition to, or different from, those which it now knows or believes to be true. Retrophin further acknowledges that there may be future events, circumstances or occurrences materially different from those it knows or believes likely to occur. It is the intention of Retrophin to fully, finally and forever settle and generally release all claims, disputes and differences described above occurring prior to the date hereof. The releases provided in this Amendment shall remain in full effect notwithstanding the discovery or existence of any such additional or different facts or occurrence of any such future events, circumstances or conditions.

(d) Retrophin and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party hereby expressly waive the benefit of any statute or rule of law that, if applied to this Amendment would otherwise exclude from its binding effect any claims described above not known by it to exist which arose prior to the signing of this Amendment. Retrophin acknowledges that it has read and fully understands the provisions of California Civil Code section 1542, which provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS FAVOR

AT THE TIME OF EXECUTING THE RELEASE, WHICH, IF KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS SETTLEMENT WITH THE DEBTOR.

Retrophin, being aware of said Code Section, hereby expressly waives, on behalf of itself and its Affiliates and any and all officers, directors, owners, predecessors, or successors, of that Party, any rights and benefits that they may have under section 1542 of the California Civil Code to the full extent that they may lawfully waive such rights and benefits, and shall waive any rights and benefits they may have under any other statutes or common law principles of similar effect.

(e) This Amendment and its terms, including, but not limited to, the Release set forth in this Section 4, and the execution of this Amendment, shall not be construed as an admission of liability or fault by either of the Parties.

5 . **Governing Law**. This Amendment shall be governed by, enforced, and shall be construed in accordance with the laws of the State of New York without regard to its conflicts of law provisions.

6 . **Counterparts**. This Amendment may be executed in counter-parts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Amendment to Sublicense Agreement through their duly authorized representatives to be effective as of the Amendment Effective Date.

LIGAND PHARMACEUTICALS INCORPORATED	**RETROPHIN, INC.**
By: /s/ Charles Berkman	By: /s/ Martin Shkreli
Name: Charles Berkman	Name: Martin Shkreli
Title: Vice President, General Counsel and Secretary	Title: Chief Executive Officer
Date: January 7, 2013	Date: January 7, 2013

AMENDMENT NO. 3 TO SUBLICENSE AGREEMENT

THIS AMENDMENT NO. 3 TO SUBLICENSE AGREEMENT (the "**Amendment**") is made and entered into as of February 27, 2015 ("**Amendment Effective Date**") and amends the Sublicense Agreement effective as of February 16, 2012, as amended pursuant to that certain Amendment to Sublicense Agreement dated December 11, 2012 and Amendment to Sublicense Agreement dated January 7, 2013 (the "**Sublicense Agreement**") by and between Ligand Pharmaceuticals Incorporated, a corporation organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 and its wholly owned subsidiary, Pharmacopeia, LLC (as successor in interest to Pharmacopeia Drug Discovery Inc.) ("**PCOP**"), a limited liability company organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 (collectively, Ligand Pharmaceuticals Incorporated and PCOP shall be known as "**Ligand**") and Retrophin, Inc., a corporation organized under the laws of Delaware and having a place of business at 777 Third Avenue, 22nd Floor, New York, NY, 10017 ("**Retrophin**").

BACKGROUND

WHEREAS Ligand and Retrophin have previously entered into the Sublicense Agreement; and

WHEREAS, Ligand and Retrophin desire to amend certain terms of the Sublicense Agreement as set forth herein.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the Parties, intending to be legally bound, agree as follows:

1. **Capitalized Terms**. The capitalized terms used herein and not otherwise defined shall have the same definitions as provided in the Sublicense Agreement

2. **Amendments**.

   a) Sections 6.1.2 and 6.1.4 of the Sublicense Agreement are hereby removed.

   b) Section 6.1.3 of the Sublicense Agreement is hereby amended to read as follows:

   "File for Approval for at least one (1) Orphan Licensed Product ("**Approval Submission**") no later than [***] ("**Filing Deadline**"); provided that if Retrophin exercises its Extension Option (as defined below), then the Filing Deadline shall become (a) [***] if the Approval Submission is filed pursuant to the Code of Federal Regulations Title 21, Subpart H ("**Subpart H**") or (b) [***], if the Approval Submission is not eligible to be filed pursuant to Subpart H. In order to exercise the Extension Option, prior to or on [***] ("**Extension Date**"), Retrophin shall either (a) pay to Ligand [***] or (b) issue to Ligand, or ensure that Ligand receives, that number of shares of capital stock of Retrophin equal to [***] as determined by the average of the closing prices for such capital stock over a five (5) trading day period ending three (3) trading days before the Extension Date ("**Extension Option**").

c) **Development Milestone Events**. The third milestone event in Table 1 for $[***] shall be amended and restated as follows:

"[***]"

3. No Other Amendments. Except as provided herein, the Sublicense Agreement shall continue in full force and effect.

4. Governing Law. This Amendment shall be governed by, enforced, and shall be construed in accordance with the laws of the State of New York without regard to its conflicts of law provisions.

5. Counterparts. This Amendment may be executed in counter-parts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

[*Signature Page Follows*]

IN WITNESS WHEREOF, the Parties have executed this Amendment to Sublicense Agreement through their duly authorized representatives to be effective as of the Amendment Effective Date.

LIGAND PHARMACEUTICALS INCORPORATED **RETROPHIN, INC.**

By: /s/ Matthew W. Foehr By: /s/ Steve Aselage

Name: Matthew W. Foehr Name: Steve Aselage
Title: President/COO Title: CEO

AMENDMENT NO. 4 TO SUBLICENSE AGREEMENT

THIS AMENDMENT NO. 4 TO SUBLICENSE AGREEMENT (the "**Amendment**") is made and entered into as of September 17, 2015 ("**Amendment Effective Date**") and amends the Sublicense Agreement effective as of February 16, 2012, as amended pursuant to that certain Amendment to Sublicense Agreement dated December 11, 2012, Amendment No. 2 to Sublicense Agreement dated January 7, 2013, and Amendment No. 3 to Sublicense Agreement dated February 27, 2015 (the "**Sublicense Agreement**") by and between Ligand Pharmaceuticals Incorporated, a corporation organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 and its wholly owned subsidiary, Pharmacopeia, LLC (as successor in interest to Pharmacopeia Drug Discovery Inc.) ("**PCOP**"), a limited liability company organized under the laws of Delaware and having a place of business at 11119 North Torrey Pines Road, Suite 200, La Jolla, CA, 92037 (collectively, Ligand Pharmaceuticals Incorporated and PCOP shall be known as "**Ligand**") and Retrophin, Inc., a corporation organized under the laws of Delaware and having a place of business at 12255 El Camino Real, San Diego, CA 92130 ("**Retrophin**").

BACKGROUND

WHEREAS Ligand and Retrophin have previously entered into the Sublicense Agreement pursuant to which Ligand sublicensed to Retrophin rights under the License Agreement dated March 27, 2006 between PCOP and Bristol-Myers Squib Company (the "Upstream License"); and

WHEREAS, Ligand and Retrophin desire to amend certain terms of the Sublicense Agreement and the Upstream Agreement as set forth herein.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the Parties, intending to be legally bound, agree as follows:

1. **Capitalized Terms**. The capitalized terms used herein and not otherwise defined shall have the same definitions as provided in the Sublicense Agreement

2. **Amendments to Milestone Payments**.

a) **Development Milestone Payments**. Table 1 of Section 8.2.1 of the Agreement is hereby amended in its entirety as follows:

	(a) Milestone Event	(b) Milestone Payment
	(c) Execution of Agreement	(d) $1.15 million
	(e) The earlier of (a) December 31, 2012 or (b) initiation of the first Phase 2 Trial for a Licensed Product	(f) $1.3 million (the **"Second Milestone"**); provided, that if the Second Milestone is received by Ligand (a) prior to or on January 31, 2012, Retrophin shall make an additional $50,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.35 million), (b) after January 31, 2013 but prior to or on February 28, 2013, Retrophin shall make an additional $100,00 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.4 million), and (c) after February 28, 2013 but prior to or on March 31, 2013, Retrophin shall make an additional $150,000 payment of the Second Milestone (for an aggregate payment of $1.45 million) (the additional payment, an "**Additional Payment"**)[1]
[***]	[***]	[***]
[***]	[***]	[***]
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[***]	[***]	[***]

[1] If the Second Milestone and any Additional Payment is not received by Ligand on or before March 31, 2013, Ligand shall have the right to terminate the Agreement pursuant to Section 13.2.2 with immediate effect as of March 31, 2013 by providing written notice to Retrophin, notwithstanding (a) the cure period for

the failure to make a payment when due set out in said Section 13.2.2 (Breach) or (b) the provisions of Section 13.2.4 (Disputed Breach). In addition, and for clarity, the provisions of Section 13.4 (Effect of Termination) shall be operative, including, without limitation, the provisions of subsections (c),(k), and (m) related to amounts then due and payable."

b) Section 8.10 of the Sublicense Agreement is hereby deleted in its entirety.

3. Consideration. Retrophin shall pay Ligand (i) $850,000 in consideration for the amendments set forth in this Amendment, and (ii) $150,000 for the efforts to amend the Upstream License Agreement in accordance with Section 4 of this Amendment, in each case such payment shall be non-refundable and shall be made within 5 days of execution of this Amendment by both parties.

4. Efforts to Amend Upstream License Agreement.

(a) Ligand will use reasonable best efforts to obtain a waiver of Sections 3.1 and 13.2.5 by BMS for the Asia Pacific Region. "Asia Pacific Region" means Japan, China, S. Korea, Taiwan, Thailand and Vietnam.

(b) Ligand will use reasonable best efforts to obtain BMS' agreement to the standby license provided by Section 2.2.2(v) in which event, Section 2.2.2(v) would be amended substantially in the form of the following language:

"…provided, that, that such sublicensed rights shall not terminate if, as of the effective date of termination by BMS under Section 13.2, the Sublicensee is not in material default under its license agreement with Ligand in which case Sublicensee will assume all of Ligand's rights and obligation under this Sublicense Agreement and be bound directly to BMS substituting Sublicensee for Ligand and subject to the payment to Ligand of all royalties and milestones under the sublicense agreement to the extent they exceed payments due to BMS under this Sublicense Agreement and payment to BMS of all royalties and milestones under this Upstream Agreement."

(c) Ligand will use reasonable best efforts to obtain BMS's agreement to the following amendments to the termination provisions of the Upstream Agreement.

i. Section 13.4 (b) of the Upstream Agreement amended to read as set forth below:

"[***]"

ii. Section 13.4(f) amended as set forth below:

"Ligand will [***]."

iii. Section 13.4(i) deleted.

(d) For the avoidance of doubt, any such efforts by Ligand made under this Sublicense Agreement shall not require Ligand to pay BMS any fee or concede and existing rights, but rather shall solely involve the use of logic and reason to seek to persuade BMS.

5. Amendments to Sublicense Agreement.

a) For the avoidance of doubt, none of the following amendments to the Sublicense Agreement are intended to cause a breach of the Upstream Agreement and any amendment that would otherwise cause such a breach shall be null and void ab initio.

b) Section 1 of the Sublicense Agreement is hereby amended to include the following:

"1.70 "Asia Pacific Region" means Japan, China, S. Korea, Taiwan, Thailand and Vietnam."

c) Section 2.2.2 (vi) is hereby revised as set forth below:

"…provided however, that such sublicensed rights shall not terminate if, as of the effective date of termination by Ligand under Article 13, the Sublicensee is not in material default under its license agreement with Retrophin in which case Sublicensee will assume all of Retrophin's rights and obligation under this Sublicense Agreement and be bound directly to Ligand respectively substituting Sublicensee for Retrophin and subject to the payment to Retrophin of all royalties and milestones under the sublicense agreement to the extent they exceed payments due to Ligand under this Sublicense Agreement and payment to Ligand of all royalties and milestones under this Sublicense Agreement to the extent they exceed payments due to BMS under the Upstream Agreement."

d) Section 3.2 of the Sublicense Agreement is hereby amended to include the following:

"3.2.4 The provisions of Sections 3.2.1 and 3.2.2 shall not apply within the Asia Pacific Region."

e) Section 13.1.1 is hereby amended to add at the beginning of the first sentence "Subject to Section 13.7…"

f) Section 13.2.6 is hereby deleted.

g) Section 13.3 is hereby amended to add prior to the first sentence:

"Retrophin may terminate this Agreement for convenience upon [***] ([***]) days prior written notice to Ligand and all of the provisions of Section 13.4 will survive termination of this Agreement pursuant to this Section 13.3."

h) The following amendments will be effective (i) as between Ligand and Retrophin at a time when there is no breach claimed by BMS under the Upstream Agreement, and/or (ii) at any time upon BMS's agreement to amend or waive the applicable sections of the termination provisions in the Upstream Agreement;

a. Section 13.4(b) is hereby amended as set forth below:

"[***]"

b. Section 13.4(f) amended as set forth below:

"Retrophin will [***]."

c. Section 13.4(i) deleted.

6. Further Agreements.

a) Ligand further agrees that it will not, by act or omission, cause the termination of the Upstream Agreement provided however Ligand may terminate the Upstream Agreement for good cause with Retrophin's prior written consent, not to be unreasonably withheld. Upon receipt by Ligand of any notice of default or any event that could likely lead to termination of the Upstream Agreement, Ligand will promptly notify Retrophin and work with Retrophin to effect cure of the default or concession with BMS.

b) To the extent BMS shall not agree to the amendments proposed in Section 4 above, Ligand will, to the extent it does not cause a default under the Upstream Agreement, work with Retrophin in good faith and without further consideration and without refund of payments made hereunder to achieve the objectives contemplated by this Amendment by making further efforts to seek agreement from BMS.

7. No Other Amendments. Except as provided herein, the Sublicense Agreement shall continue in full force and effect.

8. Governing Law. This Amendment shall be governed by, enforced, and shall be construed in accordance with the laws of the State of New York without regard to its conflicts of law provisions.

9. Counterparts. This Amendment may be executed in counter-parts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

[*Signature Page Follows*]

IN WITNESS WHEREOF, the Parties have executed this Amendment to Sublicense Agreement through their duly authorized representatives to be effective as of the Amendment Effective Date.

LIGAND PHARMACEUTICALS INCORPORATED **RETROPHIN, INC.**

By: /s/ Charles Berkman By: /s/ Laura Clague

Name: Charles Berkman Name: Laura Clague

Title: VP, General Counsel & Secretary Title: Chief Financial Officer

AMENDMENT NO. 5 TO SUBLICENSE AGREEMENT

THIS AMENDMENT NO. 5 TO SUBLICENSE AGREEMENT (the "**Amendment**") is made and entered into as of March 20, 2018 ("**Amendment Effective Date**") and amends the Sublicense Agreement effective as of February 16, 2012, as amended pursuant to that certain Amendment to Sublicense Agreement dated December 11, 2012, Amendment No. 2 to Sublicense Agreement dated January 7, 2013, Amendment No. 3 to Sublicense Agreement dated February 27, 2015 and Amendment No. 4 to Sublicense Agreement dated September 17, 2015 (the "**Sublicense Agreement**") by and between Ligand Pharmaceuticals Incorporated, a corporation organized under the laws of Delaware and having a place of business at **3911 SORRENTO VALLEY BOULEVARD, SUITE 110, SAN DIEGO, CA 92121** and its wholly owned subsidiary, Pharmacopeia, LLC (as successor in interest to Pharmacopeia Drug Discovery Inc.) ("**PCOP**"), a limited liability company organized under the laws of Delaware and having a place of business at **3911 SORRENTO VALLEY BOULEVARD, SUITE 110, SAN DIEGO, CA 92121** (collectively, Ligand Pharmaceuticals Incorporated and PCOP shall be known as "**Ligand**") and Retrophin Inc., a corporation organized under the laws of Delaware and having a place of business AT **3721 VALLEY CENTRE DRIVE, SUITE 200, SAN DIEGO, CA 92130** ("**Retrophin**").

BACKGROUND

WHEREAS Ligand and Retrophin have previously entered into the Sublicense Agreement pursuant to which Ligand sublicensed to Retrophin rights under the License Agreement dated March 27, 2006 between PCOP and Bristol-Myers Squib Company (the "Upstream License"); and

WHEREAS, Ligand and Retrophin desire to amend certain terms of the Sublicense Agreement as set forth herein.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the parties, intending to be legally bound, agree as follows:

1. **Capitalized Terms**. The capitalized terms used herein and not otherwise defined shall have the same definitions as provided in the Sublicense Agreement.

2. **Amendments**.

   a) Section 6.1.3 of the Sublicense Agreement is hereby amended to read as follows:

   "6.1.3 File for Approval for at least one (1) Orphan Licensed Product ("**Approval Submission**") no later than [***] ("**Filing Deadline**");

[***].

b) Section 8.2.1 of the Sublicense Agreement is hereby amended to read as follows:

"8.2.1 Development Milestone Payments. Retrophin shall make milestone payments to Ligand upon achievement of each of the milestone events in the amounts set forth below in Table 1. The first milestone payment shall be payable by Retrophin to Ligand within thirty (30) days of execution of the Agreement. Notwithstanding Section 15.4 or any other provision herein, the last milestone payment shall be payable by Retrophin to Ligand upon the Closing of Retrophin's Exit Transaction. Subject to Section 8.2.2, the remainder of the milestone payments set forth below, with the exception of the milestone payment for Initiation of the first Phase 3 Trial for the first Licensed Product, will be payable by Retrophin to Ligand within thirty (30) days of the achievement of the specified milestone event with respect to each Licensed Compound. The milestone for Initiation of the first Phase 3 Trial for the first Licensed Product will be payable by Retrophin to Ligand within ten (10) days of the execution of Amendment No. 5 by both Parties. The milestone payments shall not be refundable or returnable in any event, nor shall they be creditable against royalties or other payments.

Milestone Event	Milestone Payment
Execution of Agreement	$1.15 million
The earlier of (a) December 31, 2012 or (b) initiation of the first Phase 2 Trial for a Licensed Product	$1.3 million (the "**Second Milestone**"); provided, that if the Second Milestone is received by Ligand (a) prior to or on January 31, 2012, Retrophin shall make an additional $50,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.35 million), (b) after January 31, 2013 but prior to or on February 28, 2013, Retrophin shall make an additional $100,000 payment simultaneously with the payment of the Second Milestone (for an aggregate payment of $1.4 million), and (c) after February 28, 2013 but prior to or on March 31, 2013, Retrophin shall make an additional $150,000 payment of the Second Milestone (for an aggregate payment of $1.45 million) (the additional payment, an "**Additional Payment**")[2]
At or prior to Initiation of the first Phase 3 Trial for the first Licensed Product	$4.6 million
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
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[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

Table 1

[2]If the Second Milestone and any Additional Payment is not received by Ligand on or before March 31, 2013, Ligand shall have the right to terminate the Agreement pursuant to Section 13.2.2 with immediate effect as of March 31, 2013 by providing written notice to Retrophin, notwithstanding (a) the cure period for the failure to make a payment when due set out in said Section 13.2.2 (Breach) or (b) the provisions to Section 13.2.4 (Disputed Breach). In addition, and for clarity, the provisions of Section 13.4 (Effect of Termination) shall be operative, including, without limitation, the provisions of subsections (c), (k), and (m) related to amounts then due and payable."

In the event that a milestone event is achieved that triggers a development milestone payment as set forth above, if the preceding milestone events have not occurred such that the previous development milestone payments have not been previously paid, all such previous development milestone payments shall become due and payable upon achievement of such milestone event. For example, if a Phase 3 Trial is initiated that triggers a development milestone payment as set forth above without a Phase 2 Trial supporting such Phase 3 Trial being previously initiated (and consequently the applicable initiation of Phase 2 Trial milestone payment has not been previously paid to Ligand), in addition to the milestone payment for the initiation of the Phase 3 Trial, Retrophin shall also pay to Ligand the applicable milestone payment for the initiation of a Phase 2 Trial."

3. **No Other Amendments**. Except as provided herein, the Sublicense Agreement shall continue in full force and effect.

4. **Governing Law**. This Amendment shall be governed by, enforced, and shall be construed in accordance with the laws of the State of New York without regard to its conflicts of law provisions.

5 . **Counterparts**. This Amendment may be executed in counter-parts with the same effect as if both Parties had signed the same document. All such counterparts shall be deemed an original, shall be construed together and shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have executed this Amendment to Sublicense Agreement through their duly authorized representatives to be effective as of the Amendment Effective Date.

LIGAND PHARMACEUTICALS INCORPORATED	**RETROPHIN, INC.**
By: /s/ Charles S. Berkman	By: /s/ Stephen Aselage
Name: Charles S. Berkman	Name: Stephen Aselage

Title: Sr. VP, General Counsel & Secretary Title: CEO

Exhibit 10.39

OFFICE/LABORATORY LEASE
BETWEEN

EMERY STATION OFFICE II, LLC (LANDLORD)

AND

LIGAND PHARMACEUTICALS INCORPORATED (TENANT)

5980 Horton Street
Emeryville, California

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OFFICE/LABORATORY LEASE

Article 1
BASIC LEASE PROVISIONS

1.1 BASIC LEASE PROVISIONS

In the event of any conflict between these Basic Lease Provisions and any other Lease provision, such other Lease provision shall control.

(1) BUILDING AND ADDRESS:

5980 Horton Street
Emeryville, California 94608

(2) LANDLORD AND ADDRESS:

Emery Station Office II, LLC
1120 Nye Street, Suite 400
San Rafael, California 94901

Notices to Landlord shall be addressed:

Emery Station Office II, LLC
c/o Wareham Property Group
1120 Nye Street, Suite 400
San Rafael, California 94901

With a copy to:

Stewart Ward & Josephson LLP
1601 Response Road, Suite 360
Sacramento, California 95815
Attention: Winnifred C. Ward, Esq.

And to:

Shartsis Friese LLP
One Maritime Plaza, 18th Floor
San Francisco, California 94901
Attention: Senior Real Estate Partner

(3) TENANT AND NOTICE ADDRESS:

(a) Name and Entity:

Ligand Pharmaceuticals Incorporated, a Delaware corporation

(b) Federal Tax Identification Number:

77-0160744

Tenant shall promptly notify Landlord of any change in the foregoing items.

(c) Notices to Tenant shall be addressed:

Prior to the Phase I Rent Commencement Date:

3911 Sorrento Valley Blvd. #110
San Diego, CA 92121
Attention: General Counsel

On and after the Phase I Rent Commencement Date:

At the Premises
Attention: VP of Operations & General Counsel

(4) DATE OF LEASE: as of June 8, 2021

(5) INITIAL TERM: Commencing on the Phase I Commencement Date, and ending on the last day of the one hundred twentieth (120th) full calendar month following the Phase II Commencement Date

(6) PROJECTED COMMENCEMENT DATES:

(a) Phase I Premises: July 1, 2021

(b) Phase II Premises: The date that the Existing Tenant vacates the Phase II Premises and possession thereof is delivered to Tenant, which date is estimated to be April 1, 2022

(7) RENT COMMENCEMENT DATES:

(a) Phase I Premises: Sixty (60) days after the Phase I Commencement Date.

(b) Phase II Premises: Sixty (60) days after the Phase II Commencement Date.

(8) EXPIRATION DATE: The last day of the 120th full calendar month following the Phase II Rent Commencement Date

(9) MONTHLY BASE RENT:

MONTHS OF TERM FOLLOWING PHASE I RENT COMMENCEMENT DATE*	MONTHLY RATE PER RENTABLE SQUARE FOOT OF PREMISES
Months 01 – 12**	$6.00
Months 13 – 24**	$6.21
Month 25 – 36***	$6.43
Month 37 – 48***	$6.66
Month 49 – 60	$6.89
Month 61 – 72	$7.13
Month 73 – 84	$7.38
Month 85 – 96	$7.64
Month 97 – 108	$7.91
Month 108 – 120	$8.19
Month 121 – Month 120 following the Phase II Rent Commencement Date****	$8.48

*Based upon Phase I Rent Commencement Date, although the Term is calculated from the Phase II Rent Commencement Date; see last row of above table.

**The Monthly Base Rent for the Phase II Premises shall commence as of the Phase II Rent Commencement Date, which shall occur during either Months 01 – 12 after the Phase I Rent Commencement Date, or during Months 13 – 24 after the Phase I Rent Commencement Date, and as of such occurrence, Tenant shall pay Monthly Base Rent for the Phase II Premises, in addition to the Monthly Base Rent payable for the Phase I Premises, at the applicable Monthly Base Rent Rate. “Months 01 – 24” will include any partial calendar month: (a) following the Phase I Rent Commencement Date, if the Phase I Rent Commencement Date is other than the first (1st) day of a calendar month, and/or (b) following the Phase II Rent Commencement Date, if the Phase II Rent Commencement Date is other than the first (1st) day of a calendar month,

and in the event such period includes any such partial calendar months, Tenant shall pay the prorated amount of Monthly Base Rent for such partial calendar months pursuant to Article 3 in addition to the Monthly Base Rent for the subsequent full calendar months of the Term.

***The Monthly Base Rent, but not Operating Expenses, for the Phase I Premises and the Phase II Premises shall be abated for Months 26 and 38 of the Term (the "Abated Base Rent"). If a Default, as defined in Section 11.1 of this Lease, shall occur at any time during the Term, then the Abated Base Rent shall upon the written request of Landlord become due and payable in addition to any other remedies that Landlord may possess under this Lease.

****If this period is longer than 12 months, then the Monthly Base Rent Rate shall increase to $8.78 per square foot of Rentable Area of the Premises.

(10) PREMISES:

(a) Phase I Premises: The space located in the Building that is highlighted in yellow on Exhibit A attached hereto.

(b) Phase II Premises: The space located in the Building that is unhighlighted (i.e., in white) on Exhibit A attached hereto.

(11) RENTABLE AREA OF THE PREMISES: 25,429 square feet, comprised of:

(a) Phase I Premises: 8,816 square feet

(b) Phase II Premises: 16,613 square feet

(12) TENANT'S SHARE:

(a) Phase I Premises: 5.55%

(b) Phase II Premises: 10.42%

(13) SECURITY DEPOSIT: $152,574.00

(14) SUITE NUMBER OF PREMISES: 600

(15) TENANT'S USE OF PREMISES: Research and development laboratory use, and related office use

(16) PARKING: Up to fifty-one (51) unreserved parking spaces within the Terraces Garage. Upon providing not less than ten (10) days' prior written notice to Landlord ("Tenant's Parking Adjustment Notice"), and not more often than once per month, Tenant may adjust the number of parking spaces it leases during the Term (but in any event not to exceed 51 spaces). Any such adjustment shall take effect as of the first (1st) day of the calendar month following Tenant's Parking Adjustment Notice.

(17) BROKERS:

Landlord's Broker: N/A

Tenant's Broker: RE:Align Tenant Strategies

(18) TENANT IMPROVEMENT ALLOWANCE: $50.00 per square foot of Rentable Area of the Premises (i.e., $1,271,450.00)

1.2 ENUMERATION OF EXHIBITS AND RIDER(S)

The Exhibits and Rider set forth below and attached to this Lease are incorporated in this Lease by this reference:

EXHIBIT A Outline of Premises
EXHIBIT B Workletter Agreement
EXHIBIT C-1 Laboratory Rules and Regulations
EXHIBIT C-2 Rules and Regulations
EXHIBIT D Crystal Bio Lease Extension Amendment
EXHIBIT E FF&E
RIDER 1 Commencement Date Agreement

1.3 DEFINITIONS

For purposes hereof, in addition to terms defined elsewhere in this Lease, the following terms shall have the following meanings:

AFFILIATE: Any corporation or other business entity that is currently owned or controlled by, owns or controls, or is under common ownership or control with Tenant or Landlord, as the case may be.

BANKRUPTCY CODE: As defined in Section 11.3.

BUILDING: The building located at the address specified in Section 1.1. The Building may include office, medical, laboratory, retail and other uses.

CABLE: As defined in Section 8.2.

CITY: The City of Emeryville, California.

COMMON AREAS: All areas of the Project made available by Landlord from time to time for the general common use or benefit of the tenants of the Building, and their employees and invitees, or the public, as such areas currently exist and as they may be changed from time to time.

DEFAULT: As defined in Section 11.1.

DEFAULT RATE: Two (2) percentage points above the rate then most recently announced by Bank of America N.A. at its San Francisco main office as its base lending reference rate, from time to time announced, but in no event higher than the maximum rate permitted by Law.

EXISTING TENANT: As defined in Section 2.3.

EXPIRATION DATE: The date specified in Section 1.1.

FORCE MAJEURE: Any accident, casualty, act of God, war or civil commotion, strike or labor troubles, or any cause whatsoever beyond the reasonable control of Landlord, including water shortages, energy shortages or governmental preemption in connection with an act of God,

a national emergency, or by reason of Law, or by reason of the conditions of supply and demand which have been or are affected by act of God, war or other emergency.

GREEN BUILDING STANDARDS: One or more of the following: the U.S. EPA's Energy Star® Portfolio Manager, the Green Building Initiative's Green Globes™ building rating system, the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) building rating system, the ASHRAE Building Energy Quotient (BEQ), the Global Real Estate Sustainability Benchmark (GRESB), or other standard for high performance buildings adopted by Landlord with respect to the Building or the Project, as the same may be revised from time to time.

HAZARDOUS MATERIALS: As defined in Section 7.1(f).

HAZARDOUS MATERIALS LAWS: As defined in Section 7.1(f).

INDEMNITEES: Collectively, Landlord, any Mortgagee or ground lessor of the Property, the property manager and the leasing manager for the Property, and their respective partners, members, directors, officers, agents and employees.

LAND: The parcel(s) of real estate on which the Building and Project are located.

LANDLORD WORK: The construction or installation of improvements to the Premises to be furnished by Landlord, if any, as specifically described in the Workletter or exhibits attached hereto.

LAWS OR LAW: All laws, ordinances, rules, regulations, other requirements, orders, rulings or decisions adopted or made by any governmental body, agency, department or judicial authority having jurisdiction over the Property, the Premises or Tenant's activities at the Premises and any covenants, conditions or restrictions of record which affect the Property.

LEASE: This instrument and all exhibits and riders attached hereto, as may be amended from time to time.

LEASEHOLD IMPROVEMENTS: As defined in Section 12.1.

MONTHLY BASE RENT: The monthly base rent specified in Section 1.1.

MORTGAGEE: Any holder of a mortgage, deed of trust or other security instrument encumbering the Property.

NAMED TENANT: As defined in Section 2.2(d).

NATIONAL HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day and other holidays recognized by Landlord and the janitorial and other unions servicing the Building in accordance with their contracts.

OPERATING EXPENSES: All costs, expenses and disbursements which Landlord shall pay or become obligated to pay directly in connection with the ownership, management, operation, maintenance, replacement and repair of the Building and the Property, including, without limitation, property management fees; costs and expenses of any capital expenditure or improvement that is Landlord's responsibility under this Lease, and if Landlord elects to amortize such costs and expenses over a period that Landlord may determine, such costs and expenses shall be together with interest thereon at a rate reasonably determined by Landlord; an equitable allocation of management office expenses (including, without limitation, office rent,

supplies, equipment, salaries, wages, bonuses and other compensation relating to employees of Landlord or its agents engaged in the management, operation, repair, or maintenance of the Building); and, if applicable, the cost of operating a fitness center and/or any conference centers that are available for use by Tenant, as reasonably determined by Landlord. Operating Expenses shall not include: (i) costs of alterations of the premises of tenants of the Project; (ii) costs of goods or services to the extent billed directly to other tenants of the Project, including the cost incurred by Landlord in performing work to or for a tenant of space in the Project (including Tenant) at such tenant's cost and expense; (iii) depreciation charges; (iv) interest and principal payments on loans except for loans for, or imputed interest on, capital expenditures or improvements which Landlord may elect to amortize as specified above); (v) ground rental payments; (vi) real estate brokerage and leasing commissions; (vii) advertising and marketing expenses; (viii) costs to the extent Landlord has been reimbursed for the same by insurance proceeds, condemnation awards, third party warranties or other third parties (other than tenants' reimbursement of Operating Expenses); (ix) expenses incurred in negotiating leases of tenants in the Project or enforcing lease obligations of tenants in the Project; (x) Landlord's general corporate overhead; and (xi) costs directly incurred in connection with a sale, financing, refinancing or transfer of all or any portion of the Project (except as provided for in the definition of Taxes, below). If any Operating Expense, though paid in one year, relates to more than one calendar year, at the option of Landlord such expense may be proportionately allocated among such related calendar years. Operating Expenses for the Property that are not, in Landlord's reasonable discretion, allocable solely to either the office, laboratory or retail portion of the Building shall be equitably allocated by Landlord between/amongst such uses. The above enumeration of services and facilities shall not be deemed to impose an obligation on Landlord to make available or provide such services or facilities except to the extent if any that Landlord has specifically agreed elsewhere in this Lease to make the same available or provide the same.

PHASE I COMMENCEMENT DATE: The date determined pursuant to Article 2, which date is anticipated to be the Projected Phase I Commencement Date specified in Section 1.1.

PHASE II COMMENCEMENT DATE: The date determined pursuant to Article 2, which date is anticipated to be the Projected Phase II Commencement Date specified in Section 1.1.

PHASE I PREMISES: The space defined in Section 1.1.

PHASE II PREMISES: The space defined in Section 1.1.

PHASE I RENT COMMENCEMENT DATE: The date determined pursuant to Section 1.1.

PHASE II RENT COMMENCEMENT DATE: The date determined pursuant to Section 1.1.

PHASE I TENANT WORK: As defined in the Work Letter.

PHASE II TENANT WORK: As defined in the Work Letter.

PREMISES: Collectively, the Phase I Premises and the Phase II Premises, at the Suite Number listed in Section 1.1.

PROJECT or PROPERTY: The Project consists of the office and laboratory/research building with ground floor office and/or retail spaces located at the street address specified in Section 1.1, and associated surface and garage parking as designated by Landlord from time to time, landscaping and improvements, together with the Land, any associated interests in real

property, and the personal property, fixtures, machinery, equipment, systems and apparatus located in or used in conjunction with any of the foregoing. The Project may also be referred to as the Property.

PROJECT'S SUSTAINABILITY PRACTICES: The operations and maintenance practices for the Building, whether incorporated into the Building's Rules and Regulations, construction rules and regulations or separate written sustainability policies of Landlord with respect to the Building or the Project, as the same may be revised from time to time so long as such revisions do not materially and negatively impact Tenant's use of the Premises, addressing, among other things: energy efficiency; energy measurement and reporting; water usage; recycling, composting, and waste management; indoor air quality; and chemical use.

PROJECTED PHASE I COMMENCEMENT DATE: The date specified in Section 1.1.

PROJECTED PHASE II COMMENCEMENT DATE: The date specified in Section 1.1.

REAL PROPERTY: The Property excluding any personal property.

RENT: Collectively, Monthly Base Rent, Rent Adjustments and Rent Adjustment Deposits, and all other charges, payments, late fees or other amounts required to be paid by Tenant under this Lease.

RENT ADJUSTMENT: Any amounts owed by Tenant for payment of Operating Expenses and/or Taxes. The Rent Adjustments shall be determined and paid as provided in Article 4.

RENT ADJUSTMENT DEPOSIT: An amount equal to Landlord's estimate of the Rent Adjustment attributable to each month of the applicable calendar year (or partial calendar year) during the Term, as provided in Article 4.

RENTABLE AREA OF THE PREMISES: The amount of square footage set forth in Section 1.1.

SECURITY DEPOSIT: The funds specified in Section 1.1, if any, deposited by Tenant with Landlord as security for Tenant's performance of its obligations under this Lease.

STANDARD OPERATING HOURS: Monday through Friday from 8:00 A.M. to 6:00 P.M., and Saturday from 9:00 A.M. to 1:00 P.M., excluding National Holidays.

SUBSTANTIALLY COMPLETE or SUBSTANTIAL COMPLETION: The completion of the Landlord Work, the Tenant Work, the Phase I Tenant Work or the Phase II Tenant Work, as the case may be, as evidenced by receipt of a certificate of occupancy or similar certification from local, city and/or state administrative bodies, except for minor insubstantial details of construction, decoration or mechanical adjustments which remain to be done. Substantial Completion shall be deemed to have occurred notwithstanding a requirement to complete "punch-list" or similar minor corrective work. If Landlord shall be delayed in Substantial Completion due to a Tenant Delay, the date of Substantial Completion for purposes of determining the Rent Commencement Date shall be the date when Substantial Completion would have occurred if there had been no Tenant Delay. Tenant acknowledges that the length of any Tenant Delay is to be measured by the duration of the delay in Substantial Completion caused by the event or conduct constituting Tenant Delay, which may exceed the duration of such event or conduct due to the necessity of rescheduling work or other causes.

TAXES: All federal, state and local governmental taxes, assessments, license fees and charges, whether general, special, ordinary or extraordinary, which Landlord shall pay or become obligated to pay directly in connection with the ownership, leasing, management, control, sale, transfer, or operation of the Property or any of its components (including any personal property used in connection therewith) or Landlord's business of owning and operating the Property, which may also include any rental, revenue, general gross receipts or similar taxes levied in lieu of or in addition to general real and/or personal property taxes. For purposes hereof, Taxes for any year shall be Taxes which are assessed for any period of such year, whether or not such Taxes are billed and payable in a subsequent calendar year. There shall be included in Taxes for any year the amount of all fees, costs and expenses (including reasonable attorneys' fees) paid by Landlord during such year in seeking or obtaining any refund or reduction of Taxes. Taxes for any year shall be reduced by the net amount of any tax refund received by Landlord attributable to such year. If a special assessment payable in installments is levied against any part of the Property, Taxes for any year shall include only the installment of such assessment and any interest payable or paid during such year. Taxes shall be determined without reference to any abatement or exemption from or credit against Taxes applicable to all or part of the Property. Taxes shall not include any federal or state inheritance, general income, gift or estate taxes, except that if a change occurs in the method of taxation resulting in whole or in part in the substitution of any such taxes, or any other assessment, for any Taxes as above defined, such substituted taxes or assessments shall be included in the Taxes. Tenant and Landlord acknowledge that Proposition 13 was adopted by the voters of the State of California in the June, 1978 election and that assessments, taxes, fees, levies and charges may be imposed by governmental agencies for such purposes as fire protection, street, sidewalk, road, utility construction and maintenance, refuse removal and for other governmental services which may formerly have been provided without charge to property owners or occupants. It is the intention of the parties that all new and increased assessments, taxes, fees, levies and charges due to any cause whatsoever are to be included within the definition of Taxes for purposes of this Lease.

TENANT ADDITIONS: Collectively, Landlord Work, Tenant Work and Tenant Alterations.

TENANT ALTERATIONS: Any alterations, improvements, additions, installations or construction in or to the Premises or any Building systems serving the Premises (excluding Landlord Work or Tenant Work); and any supplementary air-conditioning systems installed by Landlord or by Tenant at Landlord's request pursuant to Section 6.1(b).

TENANT DELAY: Any event or occurrence that materially delays the completion of the Landlord Work, if any, which is caused by or is described as follows:

(i) special work, changes, alterations, additions, or any Change Orders (defined in the Workletter) requested or made by Tenant in the design or finish in any part of the Premises after approval of the plans and specifications (as described in the Workletter);

(ii) Tenant's delay in submitting plans, supplying information, approving plans, specifications or estimates, giving authorizations or otherwise;

(iii) failure to pay for those portions of Tenant Work that Tenant is obligated to pay for pursuant to the Workletter;

(iv) the performance or completion by Tenant or any person engaged by Tenant of any work in or about the Premises;

(v) failure to perform or comply with any obligation or condition binding upon Tenant pursuant to the Workletter, including the failure to approve and pay for

such Landlord Work or other items if and to the extent the Workletter provides they are to be approved or paid by Tenant; or

(vi) Any other act or omission of Tenant which delays Substantial Completion.

TENANT PARTY OR TENANT PARTIES: As defined in Section 7.1(f)(1)(x).

TENANT WORK: All work installed or furnished to the Premises by Tenant, if any, pursuant to the Workletter.

TENANT'S SHARE: The percentage that represents the ratio of the Rentable Area of the Premises to the Rentable Area of the Building, as set forth in Section 1.1. Tenant's Share shall mean only the percentage that represents the ratio of the Rentable Area of the Phase I Premises to the Rentable Area of the Building as of the Phase I Rent Commencement Date, and shall mean the percentage that represents the ratio of the Rentable Area of the entire Premises to the Rentable Area of the Building as of the Phase II Rent Commencement Date

TERM: The initial term of this Lease commencing on the Commencement Date and expiring on the Expiration Date, and extension of the initial term, if any.

TERMINATION DATE: The Expiration Date or such earlier date as this Lease terminates or Tenant's right to possession of the Premises terminates.

WORKLETTER: The Agreement regarding the manner of completion of Landlord Work and Tenant Work set forth on Exhibit B attached hereto.

Article 2
PREMISES, TERM, FAILURE TO GIVE POSSESSION, AND PARKING

2.1 LEASE OF PREMISES

Landlord hereby leases to Tenant and Tenant hereby leases from Landlord the Premises for the Term and upon the terms, covenants and conditions provided in this Lease. The parties acknowledge and agree that the Rentable Area set forth in this Lease has been conclusively determined and is deemed final for the purposes of this Lease.

2.2 TERM

(a) The "Phase I Commencement Date" shall be (i) the date on which Landlord has substantially completed the Landlord Work (if any) and tendered possession of the Phase I Premises to Tenant; or (ii) any earlier date upon which Tenant, with Landlord's written permission, takes possession of any portion of the Phase I Premises to commence construction of the Tenant Work.

(b) The "Phase II Commencement Date" shall be (i) the date on which Landlord has substantially completed the Landlord Work (if any) and tendered possession of the Phase II Premises to Tenant; or (ii) any earlier date upon which Tenant, with Landlord's written permission, takes possession of any portion of the Phase II Premises to commence construction of the Tenant Work.

(c) Within thirty (30) days following the occurrence of the Rent Commencement Date, Landlord and Tenant shall enter into an agreement (the form of which is attached hereto as Rider 1) confirming the Phase I Commencement Date, the Phase II Commencement Date, the

Phase I Rent Commencement Date, the Phase II Rent Commencement Date and the Expiration Date. If Tenant fails to enter into such agreement, then the Phase I Commencement Date, the Phase II Commencement Date, the Phase I Rent Commencement Date, the Phase I Rent Commencement Date and the Expiration Date shall be the dates designated by Landlord in such agreement.

(d) Option to Extend. Provided that at the time of exercise and at all times prior to the commencement of the subject Extended Term, Tenant shall not be in default under this Lease or otherwise failed to have timely performed all of Tenant's obligations under this Lease, the Term of this Lease shall be subject to two (2) extension options for an additional period of 60 months each (individually, the "Extension Option", and collectively, the "Extension Options"). The first Extension Option shall commence as of the expiration of the Initial Term and expire on the date that is 60 full calendar months thereafter (the "First Extended Term"), and the second Extension Option shall commence as of the expiration of the First Extended Term and expire on the date that is 60 full calendar months thereafter (the "Second Extended Term", and individually with the First Extended Term, an "Extended Term"). The Extension Options shall be exercisable as follows:

(1) The Extension Option shall be upon the same material terms and conditions contained in this Lease, except that (i) the initial Monthly Base Rent for the Premises shall be equal to the Fair Market Rent (as defined in Section 2.2(d)(2) below) for the Premises as of the first month of the subject Extension Option determined in the manner set forth in Section 2.2(d)(3) below and (ii) Tenant shall accept the Premises in an "as is" condition without any obligation of Landlord to repaint, remodel, repair, improve or alter the Premises (subject, however, to the terms of Section 8.1 of this Lease).

(2) Tenant's election to exercise an Extension Option must be given to Landlord in writing no less than eight (8) months prior to (i) the expiration of the initial Term (as to the first Extension Option), or (ii) the expiration of the First Extended Term (as to the second Extension Option) (the "Extension Notice"). Within thirty (30) days of Landlord's receipt of the Extension Notice, Landlord shall send Tenant written notice of Landlord's determination of the Fair Market Rent for the Premises (the "Fair Market Rent Notice"). For purposes of this Section, the term "Fair Market Rent" shall mean the base rental rate, periodic rental rate adjustment and other charges and increases, if any, for space comparable in size, location and quality to the Premises under a primary lease (and not sublease) to new or renewing tenants, for a comparable term with a tenant improvement allowance, if applicable and taking into consideration such amenities as existing improvements, view, floor on which the Premises are situated and the like, situated in buildings in Emeryville, California. Notwithstanding anything to the contrary contained herein, the subject Extension Option shall automatically terminate and be of no further force or effect, whether or not Tenant has timely exercised such Extension Option, if an uncured Default exists at the time of exercise of such Extension Option or at the time of commencement of the subject Extended Term.

(3) If Tenant properly exercises an Extension Option, the Monthly Base Rent during the applicable Extended Term shall be determined in the following manner. The Monthly Base Rent as of the commencement of such Extended Term shall be adjusted to an amount equal to the Fair Market Rent for the Premises as specified in the Fair Market Rent Notice, subject to Tenant's right of arbitration as set forth below. If Tenant believes that the Fair Market Rent specified in the Fair Market Rent Notice exceeds the actual Fair Market Rent for the Premises as of the date of such notice, then Tenant shall so notify Landlord within fifteen (15) days of Tenant's receipt of the Fair Market Rent Notice. If Tenant fails to so notify Landlord within such 15-day period, Landlord's determination of the Fair Market Rent shall be final and binding upon the parties. If the parties are unable to agree upon the Fair Market Rent within ten (10) days after Landlord's receipt of Tenant's objection to the Fair Market Rent Notice, the amount of

Monthly Base Rent as of the commencement of the subject Extended Term shall be determined as follows:

(i) Within 20 days after the 10-day period has expired and the parties have failed to agree on the Fair Market Rent, Tenant, at its sole expense, shall obtain and delivery in writing to Landlord a determination of the Fair Market Rent for the Premises for a term equal to the subject Extended Term from a broker ("Tenant's Broker") licensed in the State of California and engaged in the office and laboratory brokerage business in Emeryville, California or other nearby markets, for at least the immediately preceding five (5) years. If Landlord accepts such determination, the Monthly Base Rent for such Extended Term shall be adjusted to an amount equal to the amount determined by Tenant's Broker.

(ii) If Landlord does not accept such determination, within 10 days after receipt of the determination of Tenant's broker, Landlord shall designate a broker ("Landlord's Broker") licensed in the State of California and engaged in the office and laboratory brokerage business in Emeryville, California or other nearby markets, for at least the immediately preceding five (5) years. Landlord's Broker and Tenant's Broker shall name a third broker, similarly qualified, within five (5) days after appointment of Landlord's Broker. Landlord's Broker and Tenant's Broker shall each determine the Fair Market Rent for the Premises as of the commencement of the subject Extended Term for a term equal to such Extended Term within 10 days after the appointment of the third broker. The Monthly Base Rent payable by Tenant effective as of the commencement of such Extended Term shall be adjusted to an amount equal to the determination of Fair Market Rent made by either Landlord's Broker or Tenant's Broker that the third broker finds to be closer to the Fair Market Rent.

(iii) Landlord shall pay the costs and fees of Landlord's Broker in connection with any determination hereunder, and Tenant shall pay the costs and fees of Tenant's Broker in connection with such determination. The costs and fees of any third broker shall be paid one-half by Landlord and one-half by Tenant.

(4) If the amount of the Fair Market Rent is not known as of the commencement of the subject Extended Term, then Tenant shall continue to pay the Monthly Base Rent for the Premises in effect at the expiration of such Extended Term until the amount of the Fair Market Rent is determined. When such determination is made, Tenant shall pay any deficiency (if any exists) to Landlord upon demand and Landlord shall credit to Tenant any surplus (if any exists).

(5) In connection with the extension of the Term pursuant to Tenant's exercise of an Extension Option, the parties acknowledge and agree that Landlord shall not be responsible for the payment to any real estate broker, salesperson or finder claiming to have represented Tenant of any commission, finder's fee or other compensation in connection with or as a consequence of Tenant's exercise of such Extension Option.

(6) Notwithstanding anything to the contrary contained herein, Tenant's rights under this Section 2.2(d) are personal to the original Tenant executing this Lease ("Named Tenant") and shall not be assigned or assignable, in whole or in part, to any third party. Any assignment or other transfer of such rights by Named Tenant shall be void and of no force or effect. Without limiting the generality of the foregoing, no sublessee of the Premises shall be permitted to exercise the rights granted to Tenant under this Section 2.2(d).

2.3 FAILURE TO DELIVER POSSESSION

If (a) the Phase I Premises are not delivered to Tenant by the Projected Phase I Commencement Date for any reason, or (b) the Phase II Premises are not delivered to Tenant by

the Projected Phase II Commencement Date for any reason, Landlord shall not be liable for any claims, damages or liabilities by reason thereof, nor affect the validity of this Lease or the obligations of Tenant hereunder. Landlord and Tenant acknowledge and agree that the Phase I Premises are vacant as of the date of this Lease. If the tenant occupying the Phase II Premises (the "Existing Tenant") does not vacate the Phase II Premises prior to the Projected Phase II Commencement Date (*e.g.* April 1, 2022), Landlord shall make commercially reasonable efforts to regain legal possession of the Phase II Premises as soon as possible, including pursuing all available remedies at law or in equity to evict such tenant. Landlord represents and warrants to Tenant that (a) pursuant to the express terms of the Existing Tenant's lease (the "Existing Tenant Lease"), such Existing Tenant Lease is scheduled to expire on June 30, 2022 (the "Existing Tenant Lease Expiration Date"), and (b) the Existing Tenant does not have any rights to remain in or otherwise occupy the Phase II Premises beyond the Existing Tenant Lease Expiration Date. Notwithstanding anything in this Section 2.3 to the contrary, if Landlord fails to deliver the Phase II Premises to Tenant by the Projected Phase II Commencement Date, then Landlord will credit against the first installments of Monthly Base Rent and Rent Adjustments Deposits first becoming due under this Lease an amount equal to one (1) day of Monthly Base Rent and Rent Adjustments Deposits allocable to the Phase II Premises for each day that delivery is delayed beyond the Projected Phase II Commencement Date. The remedy set forth above shall be Tenant's sole remedy in the event of a delay in delivering possession of the Phase II Premises to Tenant. In no event shall Landlord be liable for special or consequential damages as a result of any such delay.

2.4 CONDITION OF PREMISES

Tenant shall be conclusively deemed to have accepted: (a) the Phase I Premises "AS IS" in the condition existing on the Phase I Commencement Date, and (b) the Phase II Premises "AS IS" in the condition existing on the Phase II Commencement Date, both subject to the terms and conditions of this Lease (including without limitation any repair and maintenance obligations of Landlord, and the systems serving the Premises, the Building and the Project being in good order and repair as of the subject Commencement Date). No agreement of Landlord to alter, remodel, decorate, clean or improve the Premises or the Real Property and no representation regarding the condition of the Premises or the Real Property has been made by or on behalf of Landlord to Tenant, except as may be specifically stated in this Lease or in the Workletter. Landlord will deliver the Phase I Premises and the Phase II Premises with all HVAC systems in good operating condition on the Phase I Commencement Date and the Phase II Commencement Date. Should Tenant determine that there is any noncompliance with the foregoing delivery condition and provide Landlord with a written notice thereof, Landlord shall promptly after receipt of written notice from Tenant setting forth with specificity the nature and extent of such noncompliance, rectify the same at Landlord's expense; such noncompliance shall not, however, entitle Tenant to an abatement of rent or to terminate this Lease, or otherwise release Tenant from any of Tenant's obligations under this Lease.

2.5 PARKING

During the Term, Tenant may use up to the number of spaces specified in Section 1.1 for parking at the standard prevailing monthly rates being charged from time to time by Landlord or its parking operator without regard to discounts provided to any other occupants of the Building. Tenant may adjust the number of spaces it uses upon not less than thirty (30) days prior written notice to Landlord. In the event Tenant fails at any time to pay the full amount of such parking charges within 30 days following Landlord's notice to Tenant of such failure to pay, Tenant's parking rights shall be reduced to the extent of Tenant's failure to pay for any such parking. The locations and type of parking (including, without limitation, valet parking, if any) shall be designated by Landlord or Landlord's parking operator from time to time. Tenant acknowledges and agrees that the parking spaces serving the Project may include tandem or valet parking and a

mixture of spaces for compact vehicles as well as full-size passenger automobiles, and that Tenant shall not use parking spaces for vehicles larger than the striped size of the parking spaces. All vehicles utilizing Tenant's parking spaces shall prominently display identification stickers or other markers, and/or have passes or keycards for ingress and egress, as may be required and provided by Landlord or its parking operator from time to time. Tenant shall comply with any and all parking rules and regulations from time to time established by Landlord or Landlord's parking operator, including a requirement that Tenant pay to Landlord or Landlord's parking operator a charge for loss and replacement of passes, keycards, identification stickers or markers, and for any and all loss or other damage caused by persons or vehicles related to use of Tenant's parking spaces. Tenant shall not allow any vehicles using Tenant's parking spaces to be parked, loaded or unloaded except in accordance with this Section, including in the areas and in the manner designated by Landlord or its parking operator for such activities. If any vehicle is using the parking or loading areas contrary to any provision of this Section, Landlord or its parking operator shall have the right, in addition to all other rights and remedies of Landlord under this Lease, to remove or tow away the vehicle without prior notice to Tenant, and the cost thereof shall be paid to Landlord within ten (10) days after notice from Landlord.

2.6 TERMINATION OF EXISTING 4TH FLOOR LEASE TO CRYSTAL BIOSCIENCE.

Tenant's Affiliate, Crystal Bioscience, Inc. ("Crystal Bio"), currently leases space on the 4 th Floor of the Building known as Suite 405 ("Suite 405") pursuant to the terms of that certain Lab Lease dated February 19, 2009 (as amended, the "Crystal Bio Lease"), the term of which lease expires as of August 31, 2021 (the "Original Crystal Bio Lease Expiration Date"). It is the intent of the parties that that the Original Crystal Bio Lease is hereby revised to be the date that is thirty (30) days after Tenant has Substantially Completed the Phase II Tenant Work (the "Revised Crystal Bio Lease Expiration Date"). Crystal Bio shall continue to have use of its parking spaces under the terms and conditions of the Crystal Bio Lease until the Revised Crystal Bio Lease Expiration Date. Tenant shall cause Crystal Bio to: (i) surrender Suite 405 to Landlord in accordance with the terms of the Crystal Bio Lease (including, without limitation, decommissioning and decontaminating Suite 405 using a reputable third-party vendor reasonably acceptable to Landlord) on or before the Revised Crystal Bio Lease Expiration Date, and (ii) enter into amendment to the Crystal Bio Lease extending the Term thereof to the Revised Crystal Bio Lease Expiration Date, in substantially the form attached as Exhibit D hereto.

Article 3
RENT

From and after the Phase I Rent Commencement Date, Tenant shall pay to Landlord at the address specified in Section 1.1, or to such other persons, or at such other places designated by Landlord, without any prior demand therefor in immediately available funds and without any deduction or offset whatsoever, Rent, including Monthly Base Rent and Rent Adjustments in accordance with Article 4, during the Term. Monthly Base Rent shall be paid monthly in advance on or prior to the first day of each month of the Term, except that the first installment of Monthly Base Rent due for the period commencing with the Phase II Rent Commencement Date in the Monthly Base Rent table set forth in Section 1.1 shall be paid by Tenant to Landlord concurrently with Tenant's execution of this Lease. Monthly Base Rent shall be prorated for partial months within the Term. Tenant's covenant to pay Rent shall be independent of every other covenant in this Lease.

Article 4
RENT ADJUSTMENTS AND PAYMENTS

4.1 RENT ADJUSTMENTS

(a) From and after (i) the Phase I Rent Commencement Date, as to the Phase I Premises, and (ii) the Phase II Rent Commencement Date, as to the Phase II Premises, Tenant shall pay to Landlord Rent Adjustments with respect to each calendar year (or partial calendar year in the case of the year in which the subject Rent Commencement Date and the Termination Date occur) as follows:

(1) The Rent Adjustment Deposit representing Tenant's Share of Operating Expenses for the applicable calendar year (or partial calendar year), monthly during the Term with the payment of Monthly Base Rent;

(2) The Rent Adjustment Deposit representing Tenant's Share of Taxes for the applicable calendar year (or partial calendar year), monthly during the Term with the payment of Monthly Base Rent; and

(3) Any Rent Adjustments due in excess of the Rent Adjustment Deposits in accordance with Section 4.2. Rent Adjustments due from Tenant to Landlord for any calendar year (or partial calendar year) shall be Tenant's Share of Operating Expenses for such calendar year (or partial calendar year) and Tenant's Share of Taxes for such calendar year (or partial calendar year).

(b) On or before the beginning of each calendar year or with Landlord's Statement (as defined in Section 4.2 below), Landlord may estimate and notify Tenant in writing of its estimate of the amount of Operating Expenses and Taxes payable by Tenant for such calendar year. Prior to the first determination by Landlord of the amount of Operating Expenses and Taxes for the first calendar year, Landlord may estimate such amounts in the foregoing calculation. Landlord shall have the right from time to time during any calendar year to provide a new or revised estimate of Operating Expenses and/or Taxes and to notify Tenant in writing thereof, of corresponding adjustments in Tenant's Rent Adjustment Deposit payable over the remainder of such year, and of the amount or revised amount due allocable to months preceding such change. The last estimate by Landlord shall remain in effect as the applicable Rent Adjustment Deposit unless and until Landlord notifies Tenant in writing of a change, which notice may be given by Landlord from time to time during any calendar year throughout the Term.

(c) For purposes of determining Rent Adjustments, if the Building or Property is not fully occupied during all or a portion of any calendar year during the Term, Landlord shall make appropriate adjustments to the variable components of Operating Expenses for such calendar year (or partial calendar year), employing sound accounting and management principles consistently applied, to determine the amount of Operating Expenses that would have been paid or incurred by Landlord had the Building or Property been one hundred percent (100%) occupied, and the amount so determined shall be deemed to have been the amount of Operating Expenses for such calendar year (or partial calendar year). In the event that the Property is not fully assessed for all or a portion of any calendar year (or partial calendar year) during the Term, then Taxes shall be adjusted to an amount which would have been payable in such calendar year (or partial calendar year) if the Property had been fully assessed. In the event any other tenant in the Building provides itself with a service of a type which Landlord would supply under this Lease without an additional or separate charge to Tenant, then Operating Expenses shall be deemed to include the cost Landlord would have incurred had Landlord provided such service to such other tenant. In addition, Landlord shall have the right, at its sole discretion, from time to time, to equitably allocate certain Operating Expenses among only certain tenants of the Project as to any expense or cost that relates to a repair, replacement or service that benefits only those tenants, and the Rent Adjustments shall reflect any such allocations.

4.2 STATEMENT OF LANDLORD

As soon as practical after the expiration of each calendar year, Landlord will furnish Tenant with a statement respecting the prior calendar year ("Landlord's Statement") showing the following:

(a) Operating Expenses and Taxes for such calendar year;

(b) The amount of Rent Adjustments due Landlord for the last calendar year, less credit for Rent Adjustment Deposits paid, if any; and

(c) Any change in the Rent Adjustment Deposit due monthly in the current calendar year, including the amount or revised amount due for months preceding any such change pursuant to Landlord's Statement.

Tenant shall pay to Landlord within ten (10) days after receipt of such statement any amounts for Rent Adjustments then due in accordance with Landlord's Statement. Any amounts due from Landlord to Tenant pursuant to this Section shall be credited to the Rent Adjustment Deposit next coming due, or refunded to Tenant if the Term has already expired, provided Tenant is not in default hereunder. No interest or penalties shall accrue on any amounts that Landlord is obligated to credit or refund to Tenant by reason of this Section 4.2. Landlord's failure to deliver Landlord's Statement or to compute the amount of the Rent Adjustments shall not constitute a waiver by Landlord of its right to deliver such items nor constitute a waiver or release of Tenant's obligations to pay such amounts. The Rent Adjustment Deposit shall be credited against Rent Adjustments due for the applicable calendar year (or partial calendar year). During the last complete calendar year or during any partial calendar year in which this Lease terminates, Landlord may include in the Rent Adjustment Deposit its estimate of Rent Adjustments which might not be finally determined until after the termination of this Lease. Tenant's obligation to pay Rent Adjustments survives the expiration or termination of this Lease. Notwithstanding the foregoing, in no event shall the sum of Monthly Base Rent and the Rent Adjustments be less than the Monthly Base Rent payable under this Lease.

4.3 BOOKS AND RECORDS

Landlord shall maintain books and records showing Operating Expenses and Taxes in accordance with sound accounting and management practices, consistently applied. Tenant or its representative (which representative shall be a certified public accountant licensed to do business in the state in which the Property is located and whose primary business is certified public accounting and who shall not be paid on a contingency basis) shall have the right, for a period of sixty (60) days following the date upon which Landlord's Statement is delivered to Tenant, to examine Landlord's books and records with respect to the items in the foregoing statement of Operating Expenses and Taxes during normal business hours, upon written notice, delivered at least five (5) business days in advance. Tenant shall pay for all costs of such examination. If Tenant performs such examination, but does not object in writing to Landlord's Statement within ninety (90) days after Tenant's receipt thereof, specifying the nature of the item in dispute and the reasons therefor, then Landlord's Statement shall be considered final and accepted by Tenant and Tenant shall be deemed to have waived its right to dispute Landlord's Statement. If Tenant does dispute any Landlord's Statement, Tenant shall deliver a copy of any such audit to Landlord at the time of notification of the dispute. If Tenant does not provide such notice of dispute and a copy of such audit to Landlord within such ninety (90) day period, it shall be deemed to have waived such right to dispute Landlord's Statement. Any amount due to Landlord as shown on Landlord's Statement, whether or not disputed by Tenant as provided herein shall be paid by Tenant when due as provided above, without prejudice to any such written exception. In no event shall Tenant be permitted to examine Landlord's records or to dispute any statement of Operating Expenses and Taxes unless Tenant has paid and continues to pay all Rent when due. Upon resolution of any dispute with respect to Operating Expenses and Taxes, Tenant shall

either pay Landlord any shortfall or Landlord shall credit Tenant with respect to any overages paid by Tenant. The records obtained by Tenant shall be treated as confidential and neither Tenant nor any of its representatives or agents shall disclose or discuss the information set forth in the audit to or with any other person or entity (the "Confidentiality Requirement"). Tenant shall indemnify and hold Landlord harmless for any losses or damages arising out of the breach of the Confidentiality Requirement.

4.4 TENANT OR LEASE SPECIFIC TAXES

In addition to Monthly Base Rent, Rent Adjustments, Rent Adjustment Deposits and other charges to be paid by Tenant, Tenant shall pay to Landlord, upon demand, any and all taxes payable by Landlord (other than federal or state inheritance, general income, gift or estate taxes) whether or not now customary or within the contemplation of the parties hereto: (a) upon, allocable to, or measured by the Rent payable hereunder, including any gross receipts tax or excise tax levied by any governmental or taxing body with respect to the receipt of such Rent; or (b) upon or with respect to the possession, leasing, operation, management, maintenance, alteration, repair, use or occupancy by Tenant of the Premises or any portion thereof; or (c) upon the measured value of Tenant's personal property located in the Premises or in any storeroom or any other place in the Premises or the Property, or the areas used in connection with the operation of the Property, it being the intention of Landlord and Tenant that, to the extent possible, such personal property taxes shall be billed to and paid directly by Tenant; (d) resulting from any Landlord Work, Tenant Work, Tenant Alterations, or any other improvements to the Premises, whether title thereto is in Landlord or Tenant; or (e) upon this transaction. Taxes or supplemental taxes paid by Tenant pursuant to this Section 4.4 shall not be included in any computation of Taxes payable pursuant to Sections 4.1 and 4.2, but standard property management fees shall apply to any such payments.

Article 5
SECURITY

(a) Simultaneously with Tenant's execution and delivery of this Lease to Landlord, Tenant shall pay Landlord in immediately available funds the cash amount of the Security Deposit for the full and faithful performance by Tenant of each and every term, provision, covenant, and condition of this Lease. If Tenant fails timely to perform any of the terms, provisions, covenants and conditions of this Lease or any other document executed by Tenant in connection with this Lease, then Landlord may use, apply, or retain the whole or any part of the Security Deposit for the payment of any Rent not paid when due, for the cost of repairing any damage, for the cost of cleaning the Premises, for the payment of any other sum which Landlord may expend or may be required to expend by reason of Tenant's failure to perform, and otherwise for compensation of Landlord for any other loss or damage to Landlord occasioned by Tenant's failure to perform, including, but not limited to, any loss of future Rent and any damage or deficiency in the reletting of the Premises (whether such loss, damages or deficiency accrue before or after summary proceedings or other reentry by Landlord) and the amount of the unpaid past Rent, future Rent loss, and all other losses, costs and damages, that Landlord would be entitled to recover if Landlord were to pursue recovery under Section 11.2(b) or (c) of this Lease or California Civil Code Section 1951.2 or 1951.4 (and any supplements, amendments, replacements and substitutions thereof and therefor from time to time). If Landlord so uses, applies or retains all or part of the Security Deposit, Tenant shall within five (5) business days after demand pay or deliver to Landlord in immediately available funds the sum necessary to replace the amount used, applied or retained. If Tenant has fully and faithfully performed and observed all of Tenant's obligations under the terms, provisions, covenants and conditions of this Lease, the Security Deposit (except any amount retained for application by Landlord as provided herein) shall be returned to Tenant with thirty (30) days after the latest of: (i) the Expiration Date; (ii) the removal of Tenant from the Premises; or (iii) the surrender of the Premises by

Tenant to Landlord in accordance with this Lease, or such longer time as may be permissible under Law; provided, however, in no event shall any such return be construed as an admission by Landlord that Tenant has performed all of its obligations hereunder.

(b) The Security Deposit shall not be deemed an advance rent deposit or an advance payment of any kind, or a measure of Landlord's damages with respect to Tenant's failure to perform, nor shall any action or inaction of Landlord with respect to it or its use or application be a waiver of, or bar or defense to, enforcement of any right or remedy of Landlord. Landlord shall not be required to keep the Security Deposit separate from its general funds and shall not have any fiduciary duties or other duties (except as set forth in this Section) concerning the Security Deposit. Tenant shall not be entitled to any interest on the Security Deposit. In the event of any sale, lease or transfer of Landlord's interest in the Building, Landlord shall have the right to transfer the Security Deposit, or balance thereof, to the transferee and any such transfer shall release Landlord from all liability for the return of the Security Deposit. Tenant thereafter shall look solely to such transferee for the return or payment of the Security Deposit. Tenant shall not assign or encumber or attempt to assign or encumber the Security Deposit or any interest in it and Landlord shall not be bound by any such assignment, encumbrance, attempted assignment or attempted encumbrance, and regardless of one or more assignments of this Lease, Landlord may return the Security Deposit to the original Tenant without liability to any assignee. Tenant hereby waives any and all rights of Tenant under the provisions of Section 1950.7 of the California Civil Code, and any and all rights of Tenant under all provisions of Law, now or hereafter enacted, regarding security deposits.

Article 6
SERVICES

6.1 LANDLORD'S GENERAL SERVICES

(a) Landlord shall furnish the following services the cost of which services shall be included in Operating Expenses or paid directly by Tenant to the utility or service provider:

(1) heat, ventilation and air-conditioning ("HVAC") in the Premises during Standard Operating Hours as necessary in Landlord's reasonable judgment for the comfortable occupancy of the Premises under normal business office and laboratory operations, and outside of Standard Operating Hours, HVAC shall be set to minimum safe setback levels for laboratory operations, operating 24 hours a day, 7 days a week, subject to compliance with all applicable voluntary and mandatory regulations and Laws;

(2) tempered and cold water for normal and customary use in the Premises and in lavatories in common with other tenants from the regular supply of the Building;

(3) customary cleaning and janitorial services in the Common Areas five (5) days per week, excluding National Holidays;

(4) washing of the outside windows in the Premises weather permitting at intervals determined by Landlord; and

(5) automatic passenger elevator service in common with other tenants of the Building. Freight elevator service, if any, will be subject to reasonable scheduling by Landlord.

(b) Landlord shall provide a security program for the Building (but not individually for Tenant or the Premises), the cost of which program shall be an Operating Expense. Landlord shall not be liable in any manner to Tenant or any other Tenant Parties for any acts (including criminal acts) of others, or for any direct, indirect, or consequential damages, or any injury or

damage to, or interference with, Tenant's business, including, but not limited to, loss of profits, loss of rents or other revenues, loss of business opportunity, loss of goodwill or loss of use, or other loss or damage, bodily injury or death, related to any malfunction, circumvention or other failure of any security program, or for the failure of any security program to prevent bodily injury, death, or property damage, or loss, or to apprehend any person suspected of causing such injury, death, damage or loss.

(c) So long as this Lease is in full force and effect and Tenant has paid all Rent then due, Landlord shall furnish to the Premises replacement lamps, bulbs, ballasts and starters used in any normal Building lighting installed in the Premises, except that if the replacement or repair of such items is a result of negligence of Tenant, its employees, agents, servants, licensees, subtenants, contractors or invitees, such cost shall be paid by Tenant within ten (10) days after notice from Landlord and shall not be included as part of Operating Expenses.

(d) If Tenant uses heat generating machines or equipment in the Premises to an extent which adversely affects the temperature otherwise maintained by the air-cooling system or whenever the occupancy or electrical load adversely affects the temperature otherwise maintained by the air-cooling system, Landlord reserves the right to install or to require Tenant to install supplementary air-conditioning units in the Premises. Tenant shall bear all costs and expenses related to the installation, maintenance and operation of such units.

(e) Tenant shall pay Landlord at rates fixed by Landlord for all tenants in the Building, charges for all water furnished to the Premises beyond that described in Section 6.1(a)(2), including the expenses of installation of a water line, meter and fixtures.

(f) On and after the Phase I Commencement Date, Landlord agrees that in the event of an interruption of power to the Building, Tenant may connect Tenant loads (including back-up of all of Tenant's cold storage and incubators) to the emergency generator serving the Building (the "Emergency Generator") on the following conditions: (i) Tenant loads to the Emergency Generator shall in no event exceed Tenant's Share of the kVA capacity of the Emergency Generator Landlord elects to make available for shared use by tenants of the Building; (ii) any use of the Emergency Generator, including the duration of use, shall be subject to the requirements and limitations (if any) imposed by applicable Law; and (iii) in the event of an emergency causing an interruption of power to any portion of the Building, Landlord may, in its reasonable discretion, immediately shed or shut down Tenant loads (an "Emergency Shut Down") to the extent necessary to redirect the power from the Emergency Generator ("Emergency Generator Power") to the Building's emergency/life-safety systems (e.g., elevators, fire-life safety and emergency lighting). To the extent Landlord's load shedding equipment accommodates shedding Tenant loads in stages, then Landlord shall use commercially reasonable good-faith efforts to shed Tenant loads in a priority which Tenant has delivered to Landlord in writing. Notwithstanding anything to the contrary herein, Tenant acknowledges that the Emergency Generator and any transfer switch may be exercised on a periodic basis, such exercise to be conducted by Landlord or the Building Management Staff at Landlord's reasonable discretion. Tenant further acknowledges that annual maintenance procedures require that the Emergency Generator be taken off-line and that an annual full load test be performed on an annual basis, which test shall be conducted by Landlord or the Building Management Staff at Landlord's reasonable discretion; provided, however, Landlord shall give Tenant not less than five (5) business days' prior written notice thereof. Landlord shall not be liable to Tenant, and Tenant shall not be entitled to any abatement of rent or other recourse in the event that Emergency Generator Power is not available for any reason. Landlord's actual out-of-pocket cost of maintenance, repair and testing of the Emergency Generator shall be included in Operating Expenses.

6.2 UTILITIES AND JANITORIAL SERVICES

All utility services used in the production of heating and cooling and air supply and exhaust from the central HVAC systems serving the Building and Premises, including, without limitation, electricity and gas, as well as water and sewer services, shall constitute Operating Expenses. All utility services used by Tenant within the Premises, including, without limitation, electricity and gas, shall be paid for by Tenant either through a separate charge or as part of Operating Expenses. Such charges shall be based upon Tenant's usage, which usage: (a) as to electricity, other than overhead lighting, shall be measured by a separate meter or sub-meter to be installed as part of the Tenant Work, and paid by Tenant within 15 days after billing as additional Rent under this Lease; and (b) as to all other utilities, shall either be reasonably estimated by Landlord and paid by Tenant within 15 days after billing as additional Rent under this Lease or included in Operating Expenses. In addition, Tenant shall provide its own janitorial services to the Premises, using a janitorial service reasonably acceptable to Landlord or shall make arrangements with Landlord for Landlord, through Landlord's vendors, to perform such Premises cleaning services, and shall pay the costs thereof directly to Landlord. Notwithstanding any provision of this Lease to the contrary, Tenant shall not make any alterations or additions to the electric equipment or systems, in each instance, without the prior written approval of Landlord, which approval shall not be unreasonably withheld, conditioned or delayed so long as such alterations or additions (i) do not exceed the capacity of the wiring, feeders and risers and (ii) are in compliance with the City's building code. Tenant's use of electric current shall at no time exceed the capacity of the wiring, feeders and risers providing electric current to the Premises or the Building. The consent of Landlord to the installation of electric equipment shall not relieve Tenant from the obligation to limit usage of electricity to no more than such capacity.

6.3 ADDITIONAL AND AFTER HOUR SERVICES

At Tenant's written request, Landlord shall furnish additional quantities of any of the services or utilities specified in Section 6.1, if Landlord can reasonably do so, on the terms set forth herein. For services or utilities requested by Tenant and furnished by Landlord, Tenant shall pay to Landlord as a charge therefor Landlord's prevailing rates charged from time to time for such services and utilities, as additional Rent under this Lease. Without limiting the generality of the foregoing, for HVAC service outside of Standard Operating Hours, Landlord's prevailing rate as of the date of this Lease includes a one (1) hour minimum per activation. If Tenant shall fail to make any such payment, Landlord may, upon notice to Tenant and in addition to Landlord's other remedies under this Lease, discontinue any or all of such additional services.

6.4 TELEPHONE SERVICES

All telephone and communication connections which Tenant may desire shall be subject to Landlord's prior written approval, in Landlord's reasonable discretion, and the location of all Cables and the work in connection therewith shall be performed by contractors approved by Landlord and shall be subject to the direction of Landlord and in compliance with Landlord's then current Building standards for Cable installation. Landlord reserves the right to designate and control the entity or entities providing Cable installation, removal, repair and maintenance in the Building and to restrict and control access to telephone cabinets or panels. In the event Landlord designates a particular vendor or vendors to provide such Cable installation, removal, repair and maintenance for the Building, Tenant agrees to abide by and participate in such program. Tenant shall be responsible for and shall pay, as additional Rent under this Lease, all costs incurred in connection with the installation of Cables in the Premises, including any hook-up, access and maintenance fees related to the installation of such Cables in the Premises and the commencement of service therein, and the maintenance thereafter of such Cables; and there shall be included in Operating Expenses for the Building all installation, removal, hook-up or maintenance costs incurred by Landlord in connection with Cables serving the Building which are not allocable to any individual users of such service but are allocable to the Building

generally. If Tenant fails to maintain all Cables in the Premises and such failure affects or interferes with the operation or maintenance of any other Cables serving the Building, Landlord or any vendor hired by Landlord may enter into and upon the Premises forthwith and perform such repairs, restorations or alterations as Landlord deems necessary in order to eliminate any such interference (and Landlord may recover from Tenant all of Landlord's costs in connection therewith). If required by Landlord, no later than the Termination Date Tenant shall remove all Cables installed by Tenant for and during Tenant's occupancy and surrender the installation in a condition previously approved by Landlord. Tenant agrees that neither Landlord nor any of its agents or employees shall be liable to Tenant, or any of Tenant's employees, agents, customers or invitees or anyone claiming through, by or under Tenant, for any damages, injuries, losses, expenses, claims or causes of action because of any interruption, diminution, delay or discontinuance at any time for any reason in the furnishing of any telephone or other communication service to the Premises and the Building.

6.5 DELAYS IN FURNISHING SERVICES

Tenant agrees that Landlord shall not be in breach of this Lease nor be liable to Tenant for damages or otherwise, for any failure to furnish, or a delay in furnishing, or a change in the quantity or character of any service when such failure, delay or change is occasioned, in whole or in part, by repairs, improvements or mechanical breakdowns, by the act or default of Tenant or other parties or by an event of Force Majeure. No such failure, delay or change shall be deemed to be an eviction or disturbance of Tenant's use and possession of the Premises, or relieve Tenant from paying Rent or from performing any other obligations of Tenant under this Lease, without any deduction or offset. Failure to any extent to make available, or any slowdown, stoppage, or interruption of, the specified utility services resulting from any cause, including changes in service provider or Landlord's compliance with any voluntary or similar governmental or business guidelines now or hereafter published or any requirements now or hereafter established by any governmental agency, board, or bureau having jurisdiction over the operation of the Property, shall not render Landlord liable in any respect for damages to either persons, property, or business, nor be construed as an eviction of Tenant or work an abatement of Rent, nor relieve Tenant of Tenant's obligations for fulfillment of any covenant or agreement hereof. Should any equipment or machinery furnished by Landlord break down or for any cause cease to function properly, Landlord shall use reasonable diligence to repair same promptly, but Tenant shall have no claim for abatement of Rent or damages on account of any interruption of service occasioned thereby or resulting therefrom. Tenant hereby waives any benefits of any applicable existing or future Law, including the provisions of California Civil Code section 1932(1), permitting the termination of this Lease due to such interruption, failure or inability.

6.6 CHOICE OF SERVICE PROVIDER

Tenant acknowledges that Landlord may, at Landlord's sole option, to the extent permitted by applicable law, elect to change, from time to time, the company or companies which provide services (including electrical service, gas service, water, telephone and technical services) to the Building, the Premises and/or its occupants. Notwithstanding anything to the contrary set forth in this Lease, Tenant acknowledges that Landlord has not and does not make any representations or warranties concerning the identity or identities of the company or companies which provide services to the Building and the Premises or its occupants, and Tenant acknowledges that the choice of service providers and matters concerning the engagement and termination thereof shall be solely that of Landlord. The foregoing provision is not intended to modify, amend, change or otherwise derogate any provision of this Lease concerning the nature or type of service to be provided or any specific information concerning the amount thereof to be provided. Tenant agrees to cooperate with Landlord and each of its service providers in connection with any change in service or provider.

6.7 SIGNAGE

(a) Standard Signage. Initial Building standard signage for Tenant will be installed by Landlord in the directory in the main lobby of the Building. As of the Phase I Rent Commencement Date, Landlord also shall install signage for Tenant in the listing of tenants in the elevator lobby for the floor on which the Premises is located and at Tenant's main entry door to the Premises, all at Tenant's sole cost and expense. As of the Phase II Rent Commencement Date, Tenant shall have exclusive signage rights in the elevator lobby for the floor on which the Premises is located, at Tenant's sole cost and expense. Any change in such initial signage shall be only with Landlord's prior written consent, shall conform to Building standard signage and shall be at Tenant's sole cost and expense.

(b) Exterior Sign. In addition to the signage identified in Section 6.7(a) above, Tenant shall be entitled to one sign panel on any available monument signage for the Building, to the extent Landlord offers such sign panel rights to any other full-floor tenants in the Building (as applicable, "Tenant's Exterior Sign"). Landlord shall have the right to reasonably approve the plans and specifications for the design and installation of Tenant's Exterior Sign, the identity of any contractor or subcontractor to be employed on the work of installing Tenant's Sign, and the time for performance of such work. Any and all maintenance and repair relating to Tenant's Exterior Sign shall be the sole responsibility of Tenant. Tenant shall promptly perform such maintenance and repair obligations in a good and workmanlike manner, such that Tenant's Sign appears and operates at all times in the manner intended at the time it was designed and installed. All costs pertaining to the design, installation, operation, maintenance, repair and removal of Tenant's Exterior Sign or any part thereof shall be paid by Tenant when due. The provisions of this Lease pertaining to mechanic's liens shall apply to Tenant's Exterior Sign. Notwithstanding anything to the contrary contained herein, Tenant's rights under this Section 6.7(b) are personal to Named Tenant and shall not be assigned or assignable, in whole or in part, to any third party. Any assignment or other transfer of such rights by Named Tenant shall be void and of no force or effect. Without limiting the generality of the foregoing, no sublessee of the Premises shall be permitted to exercise the rights granted to Named Tenant under this Section 6.7(b).

Article 7
USE OF PREMISES; LANDLORD'S ACCESS RIGHTS

7.1 USE OF PREMISES

(a) Tenant shall occupy and use the Premises only for the uses specified in Section 1.1 to conduct Tenant's business. Tenant shall not occupy or use the Premises (or permit the use or occupancy of the Premises) for any purpose or in any manner which: (1) is unlawful or in violation of any Law or Hazardous Materials Law; (2) may be dangerous to persons or property or which may increase the cost of, or invalidate, any policy of insurance carried on the Building or covering its operations; (3) is contrary to or prohibited by the terms and conditions of this Lease or the rules of the Building set forth in Article 18; (4) would tend to create or continue a nuisance; or (5) in any manner that will cause the Building or any part thereof not to conform with the Project's Sustainability Practices or the certification of the Building's core and shell issued pursuant to the applicable Green Building Standards.

(b) Landlord shall provide Tenant access to the Premises 24 hours per day, 7 days per week and 365/366 days per year through access card keys, the cost of which shall be paid by Tenant within thirty (30) days of Landlord's demand therefor, and Tenant shall place a deposit for such cards with Landlord to cover lost cards or cards which are not returned at the end of the Term.

(c) Landlord and Tenant acknowledge that the Americans With Disabilities Act of 1990 (42 U.S.C. §12101 et seq.) and regulations and guidelines promulgated thereunder, as all of the same may be amended and supplemented from time to time (collectively referred to herein as the "ADA") establish requirements for business operations, accessibility and barrier removal, and that such requirements may or may not apply to the Premises, the Building and the Project depending on, among other things: (1) whether Tenant's business is deemed a "public accommodation" or "commercial facility", (2) whether such requirements are "readily achievable", and (3) whether a given alteration affects a "primary function area" or triggers "path of travel" requirements. The parties hereby agree that: (a) Landlord shall be responsible for ADA Title III compliance in the Common Areas (including the restrooms), except as provided below, (b) Tenant shall be responsible for ADA Title III compliance in the Premises, including any Leasehold Improvements or other work to be performed in the Premises under or in connection with this Lease, (c) Landlord may perform, or require that Tenant perform, and Tenant shall be responsible for the cost of, ADA Title III "path of travel" requirements triggered by Tenant Additions in the Premises (but Tenant shall not be responsible for the cost of "path of travel" requirements in the Common Areas), and (d) Landlord may perform, or require Tenant to perform, and Tenant shall be responsible for the cost of, ADA Title III compliance in the Common Areas necessitated by the Building being deemed to be a "public accommodation" instead of a "commercial facility" as a result of Tenant's use of the Premises. Tenant shall be solely responsible for requirements under Title I of the ADA relating to Tenant's employees.

(d) Landlord and Tenant agree to cooperate and use commercially reasonable efforts to participate in traffic management programs generally applicable to businesses located in or about the area and Tenant shall encourage and support van, shuttle service, and carpooling by, and staggered and flexible working hours for, its office workers and service employees to the extent reasonably permitted by the requirements of Tenant's business. Neither this Section or any other provision of this Lease is intended to or shall create any rights or benefits in any other person, firm, company, governmental entity or the public.

(e) Tenant agrees to cooperate with Landlord and to comply with any and all guidelines or controls concerning energy management and usage disclosure imposed upon Landlord by federal or state governmental organizations or by any energy conservation association to which Landlord is a party or which is applicable to the Building, including, without limitation, the requirements of California's Nonresidential Building Energy Use Disclosure Program, as more particularly specified in California Public Resources Code Sections 25402.10 et seq. and regulations adopted pursuant thereto. Further, Tenant hereby authorizes (and agrees that Landlord shall have the authority to authorize) any electric or gas utility company providing service to the Building to disclose from time to time so much of the data collected and maintained by it regarding Tenant's energy consumption data as may be necessary to cause the Building to participate in the ENERGY STAR® Portfolio Manager system and similar programs; and Tenant further authorizes Landlord to disclose information concerning energy use by Tenant, either individually or in combination with the energy use of other tenants, as applicable as Landlord determines to be necessary to comply with applicable Laws pertaining to the Building or Landlord's ownership thereof.

(f) Hazardous Materials.

(1) Definitions. The following terms shall have the following meanings for purposes of this Lease:

(i) "Biohazardous Materials" means any and all substances and materials defined or referred to as "medical waste," "biological waste," "biohazardous waste," "biohazardous material" or any other term of similar import under any Hazardous Materials

Laws, including (but not limited to) California Health & Safety Code Sections 25105 et seq., and any regulations promulgated thereunder, as amended from time to time.

(ii) "Chemical Control Area Plan" means that certain plan for the use and storage of Hazardous Materials in the Building created by Landlord and approved by the City.

(iii) "Environmental Condition" means the Release of any Hazardous Materials in, over, on, under, through, from or about the Project (including, but not limited to, the Premises).

(iv) "Environmental Damages" means all claims, suits, judgments, damages, losses, penalties, fines, liabilities, encumbrances, liens, costs and expenses of whatever kind or nature, contingent or otherwise, matured or unmatured, foreseeable or unforeseeable, arising out of or in connection with any Environmental Condition, including, to the extent arising out of an Environmental Condition, without limitation: (A) damages for personal injury, or for injury or damage to the Project or natural resources occurring on or off the Project, including without limitation (1) any claims brought by or on behalf of any person, (2) any loss of, lost use of, damage to or diminution in value of any Project or natural resource, and (3) costs of any investigation, remediation, removal, abatement, containment, closure, restoration or monitoring work required by any federal, state or local governmental agency or political subdivision, or otherwise reasonably necessary to protect the public health or safety, whether on or off the Project; (B) reasonable fees incurred for the services of attorneys, consultants, contractors, experts and laboratories in connection with the preparation of any feasibility studies, investigations or reports or the performance of any work described above; (C) any liability to any third person or governmental agency to indemnify such person or agency for costs expended or liabilities incurred in connection with any items described in clause (A) or (B) above; (D) any fair market or fair market rental value of the Project; and (E) the amount of any penalties, damages or costs a party is required to pay or incur in excess of that which the party otherwise would reasonably have expected to pay or incur absent the existence of the applicable Environmental Condition.

(v) "Handling" or **"**Handles", when used with reference to any substance or material, includes (but is not limited to) any receipt, storage, use, generation, Release, transportation, treatment or disposal of such substance or material.

(vi) "Hazardous Materials" means any and all chemical, explosive, biohazardous, radioactive or otherwise toxic or hazardous materials or hazardous wastes, including without limitation any asbestos-containing materials, PCB's, CFCs, petroleum and derivatives thereof, Radioactive Materials, Biohazardous Materials, Hazardous Wastes, any other substances defined or listed as or meeting the characteristics of a hazardous substance, hazardous material, Hazardous Waste, toxic substance, toxic waste, biohazardous material, biohazardous waste, biological waste, medical waste, radiation, radioactive substance, radioactive waste, or other similar term, as applicable, under any law, statute, ordinance, code, rule, regulation, directive, order, condition or other written requirement enacted, promulgated or issued by any public officer or governmental or quasi-governmental authority, whether now in force or hereafter in force at any time or from time to time to protect the environment or human health, and/or any mixed materials, substances or wastes containing more than one of the foregoing categories of materials, substances or wastes.

(vii) "Hazardous Materials Laws" means, collectively, (A) the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. Sections 9601-9657, (B) the Hazardous Materials Transportation Act of 1975, 49 U.S.C. Sections 1801-1812, (C) the Resource Conservation and Recovery Act of 1976, 42 U.S.C.

Sections 6901-6987 (together with any amendments thereto, any regulations thereunder and any amendments to any such regulations as in effect from time to time, "RCRA"), (D) the California Carpenter-Presley-Tanner Hazardous Substance Account Act, California Health & Safety Code Sections 25300 et seq., (E) the Hazardous Materials Release Response Plans and Inventory Act, California Health & Safety Code Sections 25500 et seq., (F) the California Hazardous Waste Control Law, California Health & Safety Code Sections 25100 et seq. (together with any amendments thereto, any regulations thereunder and any amendments to any such regulations as in effect from time to time, the "CHWCL"), (G) California Health & Safety Code Sections 25015-25027.8, (H) any amendments to or successor statutes to any of the foregoing, as adopted or enacted from time to time, (I) any regulations or amendments thereto promulgated pursuant to any of the foregoing from time to time, (J) any Laws relating to Biohazardous Materials, including (but not limited to) any regulations or requirements with respect to the shipping, use, decontamination and disposal thereof, and (K) any other Law now or at any time hereafter in effect regulating, relating to or imposing liability or standards of conduct concerning any Hazardous Materials, including (but not limited to) any requirements or conditions imposed pursuant to the terms of any orders, permits, licenses, registrations or operating plans issued or approved by any governmental or quasi-governmental authority from time to time either on a Project-wide basis or in connection with any Handling of Hazardous Materials in, on or about the Premises or the Project.

(viii) "Hazardous Wastes" means (A) any waste listed as or meeting the identified characteristics of a "hazardous waste" or terms of similar import under RCRA, (B) any waste meeting the identified characteristics of a "hazardous waste", "extremely hazardous waste" or "restricted hazardous waste" under the CHWCL, and/or (C) any and all other substances and materials defined or referred to as a "hazardous waste" or other term of similar import under any Hazardous Materials Laws.

(ix) "Landlord's Contamination" means any Hazardous Materials which exist in, on, under or in the vicinity of the Project as of the date of this Lease or which migrate onto or beneath the Project after termination of this Lease. Tenant shall not be required to pay any costs with respect to the remediation or abatement of Landlord's Contamination.

(x) "Radioactive Materials" means (A) any and all substances and materials the Handling of which requires an approval, consent, permit or license from the Nuclear Regulatory Commission, (B) any and all substances and materials the Handling of which requires a Radioactive Material License or other similar approval, consent, permit or license from the State of California, and (C) any and all other substances and materials defined or referred to as "radiation," a "radioactive material" or "radioactive waste," or any other term of similar import under any Hazardous Materials Laws, including (but not limited to) Title 26, California Code of Regulations Section 17-30100, and any statutes, regulations or other laws administered, enforced or promulgated by the Nuclear Regulatory Commission.

(xi) "Release" means any accidental or intentional spilling, leaking, pumping, pouring, emitting, discharging, injecting, escaping, leaching, migrating, dumping or disposing into the air, land, surface water, groundwater or the environment (including without limitation the abandonment or discarding of receptacles containing any Hazardous Materials).

(xii) "Tenant's Contamination" means any Hazardous Material Release on or about the Property by Tenant and/or any agents, employees, contractors, vendors, suppliers, licensees, subtenants, and invitees of Tenant (individually, a "Tenant Party" and collectively, "Tenant Parties").

(2) Handling of Hazardous Materials. The parties acknowledge that Tenant wishes and intends to use all or a portion of the Premises as a bio-pharmaceutical research and

development facility in conformance with the conduct by Tenant of its business in accordance with the use specified in Section 1.1, that such use, as conducted or proposed to be conducted by Tenant, would customarily include the Handling of Hazardous Materials, and that Tenant shall therefore be permitted to engage in the Handling in the Premises of necessary and reasonable quantities of Hazardous Materials customarily used in or incidental to the operation of a bio-pharmaceutical research, development preparation and/or dispensing facility in conformance with business operations of Tenant in the manner conducted or proposed to be conducted by Tenant hereunder ("Permitted Hazardous Materials"), provided that the Handling of such Permitted Hazardous Materials by all Tenant Parties shall at all times comply with and be subject to all provisions of this Lease and all Laws, including all Hazardous Materials Laws, and with Landlord's Chemical Control Area Plan for the Building. Without limiting the generality of the foregoing, Tenant shall comply at all times with all Hazardous Materials Laws applicable to any aspect of Tenant's use of the Premises and the Project and of Tenant's operations and activities in, on and about the Premises and the Project, and shall ensure at all times that Tenant's Handling of Hazardous Materials in, on and about the Premises does not violate (x) the terms of any governmental licenses or permits applicable to the Building (including, but not limited to, the Building Discharge Permit as defined below) or Premises or to Tenant's Handling of any Hazardous Materials therein, or (y) any applicable requirements or restrictions relating to the occupancy classification of the Building and the Premises.

(3) Disposition or Emission of Hazardous Materials. Tenant shall not Release or dispose of any Hazardous Materials, except to the extent authorized by permit, at the Premises or on the Project, but instead shall arrange for off-site disposal, under Tenant's own name and EPA waste generator number (or other similar identifying information issued or prescribed by any other governmental authority with respect to Radioactive Materials, Biohazardous Materials or any other Hazardous Materials) and at Tenant's sole expense, in compliance with all applicable Hazardous Materials Laws, with the Laboratory Rules and Regulations (defined below) and with all other applicable Laws and regulatory requirements.

(4) Information Regarding Hazardous Materials. Tenant shall maintain and make available to Landlord the following information and/or documentation upon demand:

(i) An inventory of all Hazardous Materials that Tenant receives, uses, handles, generates, transports, stores, treats or disposes of from time to time, or at the time of preparation of such inventory proposes or expects to use, handle, generate, transport, store, treat or dispose of from time to time, in connection with its operations at the Premises. Such inventory shall include, but shall separately identify, any Hazardous Wastes, Biohazardous Materials and Radioactive Materials covered by the foregoing description. If such inventory includes any Biohazardous Materials, Tenant shall also disclose in writing to Landlord the Biosafety Level designation associated with the use of such materials.

(ii) Copies of all then existing permits, licenses, registrations and other similar documents issued by any governmental or quasi-governmental authority that authorize any Handling of Hazardous Materials in, on or about the Premises or the Project by any Tenant Party.

(iii) All Material Safety Data Sheets ("MSDSs"), if any, required to be completed with respect to operations of Tenant at the Premises from time to time in accordance with Title 26, California Code of Regulations Section 8-5194 or 42 U.S.C. Section 11021, or any amendments thereto, and any Hazardous Materials Inventory Sheets that detail the MSDSs.

(iv) All hazardous waste manifests (as defined in Title 26, California Code of Regulations Section 22-66481), if any, that Tenant is required to complete from time to time in connection with its operations at the Premises.

(v) A copy of any "Hazardous Materials Business Plan" required from time to time with respect to Tenant's operations at the Premises pursuant to California Health & Safety Code Sections 25500 et seq., and any regulations promulgated thereunder, as amended from time to time, or in connection with Tenant's application for a business license from the City. If applicable law does not require Tenant to prepare a Hazardous Materials Business Plan, Tenant shall furnish to Landlord at the times and in the manner set forth above the information that would customarily be contained in a Hazardous Materials Business Plan, including (but not limited to) information regarding Tenant's Hazardous Materials inventories. The parties acknowledge that a Hazardous Materials Business Plan would ordinarily include an emergency response plan, and that regardless of whether applicable Law requires Tenant or other tenants in the Building to prepare Hazardous Materials Business Plans, Landlord in its discretion may elect to prepare a coordinated emergency response plan for the entire Building and/or for multiple Buildings on the Project (if and to the extent applicable).

(vi) Any "Contingency Plans and Emergency Procedures" required of Tenant from time to time, in connection with its operations at the Premises, pursuant to applicable Law, Title 26, California Code of Regulations Sections 22-67140 et seq., and any amendments thereto, and any "Training Programs and Records" required under Title 26, California Code of Regulations Section 22-66493, and any amendments thereto from time to time. Landlord in its discretion may elect to prepare a Contingency Plan and Emergency Procedures for the entire Building and/or for multiple buildings on the Project, in which event, if applicable law does not require Tenant to prepare a Contingency Plan and Emergency Procedures for its operations at the Premises, Tenant shall furnish to Landlord at the times and in the manner set forth above the information that would customarily be contained in a Contingency Plan and Emergency Procedures.

(vii) Copies of any biennial or other periodic reports furnished or required to be furnished to the California Department of Health Services from time to time, under applicable law, pursuant to Title 26, California Code of Regulations Section 22-66493 and any amendments thereto, relating to any Hazardous Materials.

(viii) Copies of any industrial wastewater discharge permits issued to or held by Tenant from time to time in connection with its operations at the Premises (the parties presently anticipate, however, that because of the existence of the Building Discharge Permit in Landlord's name as described above. Tenant will not be required to maintain a separate, individual discharge permit).

(ix) Copies of any other lists, reports, studies, or inventories of Hazardous Materials or of any subcategories of materials included in Hazardous Materials that Tenant is otherwise required to prepare and file from time to time with any governmental or quasi-governmental authority in connection with Tenant's operations at the Premises, including (but not limited to) reports filed by Tenant with the federal Food & Drug Administration or any other regulatory authorities primarily in connection with the presence (or lack thereof) of any "select agents" or other Biohazardous Materials on the Premises, together with proof of filing thereof.

(x) Any other information reasonably requested by Landlord in writing from time to time in connection with (A) Landlord's monitoring (in Landlord's reasonable discretion) and enforcement of Tenant's obligations under this Section and of compliance with applicable Laws in connection with any Handling or Release of Hazardous Materials in the Premises or Building or on or about the Project by any Tenant Party, (B) any inspections or enforcement actions by any governmental authority pursuant to any Hazardous Materials Laws or any other Laws relating to the presence or Handling of Hazardous Materials in the Premises or Building or on or about the Project by any Tenant Party, and/or (C) Landlord's preparation (in

Landlord's discretion) and enforcement of any reasonable rules and procedures relating to the presence or Handling by Tenant or any Tenant Party of Hazardous Materials in the Premises or Building or on or about the Project, including (but not limited to) any contingency plans or emergency response plans as described above. Except as otherwise required by Law, Landlord shall keep confidential any information supplied to Landlord by Tenant pursuant to the foregoing, provided, however, that the foregoing shall not apply to any information filed with any governmental authority or available to the public at large. Landlord may provide such information to its lenders, consultants or investors provided such entities agree to keep such information confidential.

(5) Indemnification; Notice of Release. Tenant shall be responsible for and shall indemnify, defend and hold Landlord harmless from and against all Environmental Damages to the extent arising out of or otherwise relating to, (i) any Handling of Hazardous Materials by any Tenant Party in, on or about the Premises or the Project in violation of this Section, (ii) any breach of Tenant's obligations under this Section or of any Hazardous Materials Laws by any Tenant Party, or (iii) the existence of any Tenant's Contamination in, on or about the Premises or the Project to the extent caused by any Tenant Party, including without limitation any removal, cleanup or restoration work and materials necessary to return the Project or any improvements of whatever nature located on the Project to the condition existing prior to the Handling of Hazardous Materials in, on or about the Premises or the Project by any Tenant Party. In the event of any Tenant's Contamination in, on or about the Premises or any other portion of the Project or any adjacent lands, Tenant shall promptly remedy the problem in accordance with all applicable Hazardous Materials Laws, shall give Landlord oral notice of any such non-standard or non-customary Release promptly after Tenant becomes aware of such Release, followed by written notice to Landlord within five (5) days after Tenant becomes aware of such Release, and shall furnish Landlord with concurrent copies of any and all notices, reports and other written materials filed by any Tenant Party with any governmental authority in connection with such Release. Tenant shall have no obligation to remedy any Hazardous Materials contamination which was not caused or released by a Tenant Party.

(6) Governmental Notices. Tenant shall promptly provide Landlord with copies of all notices received by Tenant relating to any actual or alleged presence or Handling by any Tenant Party of Hazardous Materials in, on or about the Premises or any other portion of the Project, including, without limitation, any notice of violation, notice of responsibility or demand for action from any federal, state or local governmental authority or official in connection with any actual or alleged presence or Handling by any Tenant Party of Hazardous Materials in or about the Premises or any other portion of the Project.

(7) Inspection by Landlord. In addition to, and not in limitation of, Landlord's rights under this Lease, upon reasonable prior request by Landlord, Tenant shall grant Landlord and its consultants, as well as any governmental authorities having jurisdiction over the Premises or over any aspect of Tenant's use thereof, reasonable access to the Premises at reasonable times to inspect Tenant's Handling of Hazardous Materials in, on and about the Premises, and Landlord shall not thereby incur any liability to Tenant or be deemed guilty of any disturbance of Tenant's use or possession of the Premises by reason of such entry; provided, however, that Landlord shall use reasonable efforts to minimize interference with Tenant's use of the Premises caused by such entry. Landlord shall comply with any security precaution reasonably imposed by Tenant during any entry onto the Premises and shall minimize to the extent reasonably possible any interference with Tenant's use of the Premises caused by such entry. Notwithstanding Landlord's rights of inspection and review of documents, materials and physical conditions under this Section with respect to Tenant's Handling of Hazardous Materials, Landlord shall have no duty or obligation to perform any such inspection or review or to monitor in any way any documents, materials, physical conditions or compliance with Laws in connection with Tenant's Handling of Hazardous Materials, and no third Party shall be entitled

to rely on Landlord to conduct any such inspection, review or monitoring by reason of the provisions of this Section.

(8) Monitoring by Landlord. Landlord reserves the right to monitor, in Landlord's reasonable discretion and at Landlord's cost, the reasonable cost of which shall be recoverable as an Operating Expense (except in the case of a breach of any of Tenant's obligations under this Section, in which event such monitoring costs may be charged back entirely to Tenant and shall be reimbursed by Tenant to Landlord within ten (10) days after written demand by Landlord from time to time, accompanied by supporting documentation reasonably evidencing the costs for which such reimbursement is claimed), at such times and from time to time as Landlord in its reasonable discretion may determine, through consultants engaged by Landlord or otherwise as Landlord in its reasonable discretion may determine: (x) all aqueous and atmospheric discharges and emissions from the Premises during the Term by a Tenant Party, (y) Tenant's compliance and the collective compliance of all tenants in the Building with requirements and restrictions relating to the occupancy classification of the Building (including, but not limited to, Hazardous Materials inventory levels of Tenant and all other tenants in the Building), and (z) Tenant's compliance with all other requirements of this Section.

(9) Discovery of Discharge. If Landlord, Tenant or any governmental or quasi-governmental authority discovers any Release from the Premises during the Term by a Tenant Party in violation of this Section that, in Landlord's reasonable determination, jeopardizes the ability of the Building or the Project to meet applicable Laws or otherwise adversely affects the Building's or the Project's compliance with applicable discharge or emission standards, or if Landlord discovers any other breach of Tenant's obligations under this Section, then upon receipt of written notice from Landlord or at such earlier time as Tenant obtains actual knowledge of the applicable discharge, emission or breach, Tenant at its sole expense shall within a reasonable time (x) in the case of a Release in violation of this Lease, cease the applicable discharge or emission and remediate any continuing effects of the discharge or emission until such time, if any, as Tenant demonstrates to Landlord's reasonable satisfaction that the applicable discharge or emission is in compliance with all applicable Laws and any other applicable regulatory commitments and obligations to the satisfaction of the appropriate governmental agency with jurisdiction over the Release, and (y) in the case of any other breach of Tenant's obligations under this Section, take such corrective measures as Landlord may reasonably request in writing in order to cure or eliminate the breach as promptly as practicable and to remediate any continuing effects of the breach.

(10) Post-Occupancy Study. No later than fifteen (15) days following the Termination Date, Tenant at its sole cost and expense, shall obtain and deliver to Landlord an environmental study, performed by an expert reasonably satisfactory to Landlord, evaluating, the presence or absence of any Tenant's Contamination in, on and about the Premises and the Project. Such study shall be based on a reasonable and prudent level of tests and investigations of the Premises and surrounding portions of the Project (if appropriate) which tests shall be conducted no earlier than fifteen (15) days prior to the Termination Date. Liability for any remedial actions required or recommended on the basis of such study shall be allocated in accordance with the applicable provisions of this Lease. To the extent any such remedial actions are the responsibility of Tenant, Tenant at its sole expense shall promptly commence and diligently pursue to completion the required remedial actions.

(11) Emergency Response Plans. If Landlord in its reasonable discretion adopts any emergency response plan and/or any Contingency Plan and Emergency Procedures for the Building (or for multiple buildings on the Project if and to the extent applicable) as contemplated above, Landlord shall provide copies of any such plans and procedures to Tenant and, so long as such plans and procedures are reasonable, Tenant shall comply with all of the

requirements of such plans and procedures to the extent applicable to Tenant and/or the Premises. If Landlord elects to adopt or materially modify any such plans or procedures that apply to the Building during the Term, Landlord shall consult with Tenant and Tenant shall cooperate, in the preparation of such plans, procedures or modifications in efforts to accurately reflect and maintain consistency with Tenant's operations in the Premises, but Landlord alone shall determine, in its good faith reasonable discretion, the appropriate scope of such consultation and nothing in this Section shall be construed to give Tenant any right of approval or disapproval over Landlord's adoption or modification of any such plans or procedures.

(12) Radioactive Materials. Without limiting any other applicable provisions of this Section, if Tenant Handles or proposes to Handle any Radioactive Materials in or about the Premises, Tenant shall provide Landlord with copies of Tenant's licenses or permits for such Radioactive Materials and with copies of all radiation protection programs and procedures required under applicable Laws or otherwise adopted by Tenant from time to time in connection with Tenant's Handling of such Radioactive Materials. In addition, Tenant shall comply with any and all rules and procedures issued by Landlord in its good faith discretion from time to time with respect to the Handling of Radioactive Materials on the Project (such as, by way of example but not limitation, rules implementing a label defacement program for decayed waste destined for common trash and/or rules relating to transportation and storage of Radioactive Materials on the Project), provided that such rules and procedures shall be reasonable and not in conflict with any applicable Laws.

(13) Deemed Holdover Occupancy. Notwithstanding any other provisions of this Lease, Tenant expressly agrees as follows:

(i) If Tenant Handles any Radioactive Materials in or about the Premises or the Project during the Term, then for so long as any license or permit relating to such Radioactive Materials remains open or valid following the Termination Date, and another entity handling Radioactive Materials which is a prospective tenant of Landlord is legally prohibited from occupying a portion of the Premises for a use similar to Tenant's use, then Tenant shall be deemed to be occupying that portion of the Premises on a holdover basis without Landlord's consent (notwithstanding such otherwise applicable termination or expiration of the Term) and shall be required to continue to pay Rent and other charges in accordance with Article 13 solely for that portion of the Premises effected by the radioactive materials license, until such time as all such Radioactive Materials licenses and permits have been fully closed out in accordance with the requirements of this Lease and with all applicable Hazardous Materials Laws and other Laws.

(ii) If Tenant Handles any Hazardous Materials in or about the Premises or the Project during the Term and, on or before the Termination Date, has failed to remove from the Premises or the Project all known Hazardous Materials Handled by a Tenant Party or has failed to complete any remediation or removal of Tenant's Contamination and/or to have fully remediated in compliance with the requirements of this Lease and with all applicable Hazardous Materials Laws and any other applicable Laws, the Tenant's Handling and/or Release (if applicable) of any such Hazardous Materials during the Term, then for so long as such circumstances continue to exist, Tenant shall be deemed to be occupying the Premises on a holdover basis without Landlord's consent (notwithstanding such otherwise applicable termination or expiration of the Term) and shall be required to continue to pay Rent and other charges in accordance with Article 13 until such time as all such circumstances have been fully resolved in accordance with the requirements of this Lease and with all applicable Hazardous Materials Laws and other Laws.

(14) Survival of Obligations. Each party's obligations under this Section shall survive the Termination Date and shall survive any conveyance by Landlord of its interest in the

Premises. The provisions of this Section and any exercise by either party of any of the rights and remedies contained herein shall be without prejudice to any other rights and remedies that such party may have under this Lease or under applicable Law with respect to any Environmental Conditions and/or any Hazardous Materials. Either party's exercise or failure to exercise, at any time or from time to time, any or all of the rights granted in this Section shall not in any way impose any liability on such party or shift from the other party to such party any responsibility or obligation imposed upon the other party under this Lease or under Hazardous Materials Laws, Environmental Conditions and/or compliance with Laws.

(15) Laboratory Rules and Regulations. Tenant agrees for itself and for its subtenants, employees, agents, and invitees to comply with the laboratory rules and regulations ("Laboratory Rules and Regulations") attached to this Lease as Exhibit C-1 and with all reasonable modifications and additions thereto which Landlord may make from time to time.

7.2 LANDLORD ACCESS TO PREMISES; APPROVALS

(a) Tenant shall permit Landlord to erect, use and maintain pipes, ducts, wiring and conduits in and through the Premises, so long as Tenant's use, layout or design of the Premises is not materially affected or altered. Landlord or Landlord's agents shall have the right to enter upon the Premises in the event of an emergency, or to inspect the Premises, to perform any services required hereunder, to conduct safety and other testing in the Premises and to make such repairs, alterations, improvements or additions to the Premises or the Building or other parts of the Property as Landlord may deem necessary or desirable (including all alterations, improvements and additions in connection with a change in service provider or providers). Any entry or work by Landlord may be during Standard Operating Hours and Landlord shall use reasonable efforts to ensure that any entry or work shall not materially interfere with Tenant's occupancy of the Premises.

(b) Advance notice shall not be required for entry in the event of an emergency or urgent situation, as reasonably determined by Landlord, but any other entry or work by Landlord shall be upon at least one (1) business day's prior notice to Tenant, which notice may be delivered orally or by e-mail to Tenant's on-site manager at the Premises. If Tenant shall not be personally present to permit an entry into the Premises when for any reason an entry therein shall be necessary or permissible, Landlord (or Landlord's agents), after attempting to notify Tenant (unless Landlord believes an emergency situation exists), may enter the Premises without rendering Landlord or its agents liable therefor, and without relieving Tenant of any obligations under this Lease.

(c) Landlord may enter the Premises for the purpose of conducting such inspections, tests and studies as Landlord may deem desirable or necessary to confirm Tenant's compliance with all Laws and Hazardous Materials Laws or for other purposes necessary in Landlord's reasonable judgment to ensure the sound condition of the Property and the systems serving the Property. Landlord's rights under this Section 7.2(c) are for Landlord's own protection only, and Landlord has not, and shall not be deemed to have assumed, any responsibility to Tenant or any other party as a result of the exercise or non-exercise of such rights, for compliance with Laws or Hazardous Materials Laws or for the accuracy or sufficiency of any item or the quality or suitability of any item for its intended use.

(d) Landlord may do any of the foregoing, or undertake any of the inspection or work described in the preceding paragraphs without such action constituting an actual or constructive eviction of Tenant, in whole or in part, or giving rise to an abatement of Rent by reason of loss or interruption of business of Tenant, or otherwise.

(e) The review, approval or consent of Landlord with respect to any item required or permitted under this Lease is for Landlord's own protection only, and Landlord has not, and shall not be deemed to have assumed, any responsibility to Tenant or any other party, as a result of the exercise or non-exercise of such rights, for compliance with Laws or Hazardous Materials Laws or for the accuracy or sufficiency of any item or the quality or suitability of any item for its intended use.

7.3 QUIET ENJOYMENT

Landlord covenants, in lieu of any implied covenant of quiet possession or quiet enjoyment, that so long as Tenant is in compliance with the covenants and conditions set forth in this Lease, Tenant shall have the right to quiet enjoyment of the Premises without hindrance or interference from Landlord or those claiming through Landlord, and subject to the covenants and conditions set forth in this Lease and to the rights of any Mortgagee or ground lessor.

7.4 TRANSPORTATION DEMAND MANAGEMENT PROGRAM

(a) Landlord may elect or may be required to develop and implement a Transportation Demand Management ("TDM") program for the Building in order to reduce the traffic-related impacts resulting from development of the Property. One element of any such TDM program will require tenants of the Building to adopt programs and offer incentives to their employees to reduce auto use and support the increase of alternative modes of transit. The following are examples of such programs and incentives:

(1) Alternative commute subsidies and/or parking cash-out, where employees are provided with a subsidy if they use transit or commute by alternative modes;

(2) Opportunities to purchase commuter checks which allow employees to purchase transit tickets at discounted rates from their before-tax income; and

(3) Compressed work weeks and flex time where employees adjust their work schedules to reduce peak hour trips to/from the Building.

(b) In order to support any such TDM program for the Building, Tenant agrees that it shall adopt programs and offer incentives to its employees in order to reduce auto use and support the increase of alternative modes of transit. The specifics of Tenant's programs and incentives shall be tailored to the needs of Tenant's workforce and shall be determined by Tenant in its good faith efforts to meet the goals of the TDM program. Upon request by Landlord from time to time, but not more often than once per calendar year, Tenant shall provide to Landlord a written report summarizing the programs and incentives being offered by Tenant to achieve the goals of the TDM program.

Article 8
MAINTENANCE

8.1 LANDLORD'S MAINTENANCE

Subject to the provisions of Articles 4 and 14, Landlord shall, as an Operating Expense, maintain and make necessary repairs to the foundations, roofs, exterior walls, and the structural elements of the Building, the electrical, plumbing, heating, ventilating, air-conditioning, mechanical, communication, security and the fire and life safety systems of the Building and those corridors, washrooms and lobbies which are Common Areas of the Building, except that: (a) Landlord shall not be responsible for the maintenance or repair of any floor or wall coverings in the Premises or any of such systems which are located within the Premises and are

supplemental or special to the Building's standard systems; and (b) the cost of performing any of said maintenance or repairs whether to the Premises or to the Building caused by the negligence of Tenant, its employees, agents, servants, licensees, subtenants, contractors or invitees, shall be paid by Tenant, subject to the waivers set forth in Section 16.4. Landlord shall not be liable to Tenant for any expense, injury, loss or damage resulting from work done in or upon, or in connection with the use of, any adjacent or nearby building, land, street or alley.

8.2 TENANT'S MAINTENANCE

Tenant shall periodically inspect the Premises to identify any conditions that are dangerous or in need of maintenance, repair or replacement. Tenant shall promptly provide Landlord with notice of any such conditions. Tenant shall, at its sole cost and expense, perform all maintenance, repair and replacement of the Premises that are not Landlord's express responsibility under this Lease, and keep the Premises in good condition and repair, reasonable wear and tear excepted. Tenant's maintenance, repair and replacement obligations include, without limitation, maintenance, repairs and replacements of: (a) floor covering; (b) interior partitions; (c) doors; (d) the interior side of demising walls; (e) electronic, phone and data cabling, wiring and related equipment that is installed by or for the exclusive benefit of Tenant (collectively, "Cable"); (f) supplemental air conditioning units, kitchens, including hot water heaters, plumbing, and similar facilities exclusively serving Tenant; and (g) Tenant Alterations. Landlord shall allocate one hundred percent (100%) of the cost (plus any applicable administration fees) of Landlord's maintenance, repair or replacement of any Tenant Alterations, or repairs or replacements required to areas outside of the Premises due to same, to Tenant as additional Rent under this Lease. Tenant shall reimburse Landlord for the cost of repairing damage to the Building caused by the acts of Tenant, Tenant Parties and their respective contractors and vendors. All maintenance, repairs and replacements, including, but not limited to, janitorial and cleaning services, pest control and waste management and recycling performed by or on behalf of Landlord or Tenant must comply with the Project's Sustainability Practices and Tenant is strongly encouraged to comply with the applicable Green Building Standards. If Tenant fails to make any repairs or replacements of the Premises for more than fifteen (15) days after notice from Landlord (although notice shall not be required in an emergency), Landlord may make the repairs or replacements, and Tenant shall pay, as additional Rent under this Lease, the reasonable cost of the repairs or replacements, together with an administrative charge in an amount equal to 15% of the cost of the repairs or replacements. Tenant hereby waives all right to make repairs or replacements at the expense of Landlord or in lieu thereof to vacate the Premises and its other similar rights as provided in California Civil Code Sections 1932(1), 1941 and 1942 or any other Laws (whether now or hereafter in effect). In addition to the foregoing, Tenant shall be responsible for all costs in connection with maintaining, repairing and replacing all special tenant fixtures and improvements, including garbage disposals, showers, plumbing, water filtration systems and appliances. If Tenant requests that Landlord maintain, repair and/or replace any such fixtures and improvements, Tenant shall reimburse Landlord for the cost of all such maintenance, repair and replacement work, plus an administrative fee equal to fifteen percent (15%) of such cost, as additional Rent under this Lease, and Landlord's liability for such maintenance, repair and replacement work shall be subject to and limited by the provisions of Article 17 below.

8.3 SUDDEN WATER INTRUSION.

Notwithstanding anything in this Lease to the contrary, in the event of sudden water intrusion into the Premises, due to a leaking or bursting pipe or other water source, Landlord will have the right, but not the obligation, to undertake immediate mitigation and repairs measures (the "Water Damage Work") of such nature as would normally be Tenant's responsibility under Section 8.2 above and to notify Tenant promptly after the repairs have been undertaken (including notice by telephone, to the extent reasonably practicable). Landlord shall determine,

in its sole and absolute discretion, the contractors to be used for the Water Damage Work, and Tenant will reimburse Landlord for the reasonable cost of the Water Damage Work, as additional Rent under this Lease, within 30 days following Tenant's receipt of written demand from Landlord therefor.

Article 9
ALTERATIONS AND IMPROVEMENTS

9.1 TENANT ALTERATIONS

(a) The following provisions shall apply to the completion of any Tenant Alterations:

(1) Tenant shall not, except as provided herein, without the prior written consent of Landlord, which consent shall not be unreasonably withheld, make or cause to be made any Tenant Alterations in or to the Premises or any Property systems serving the Premises. Prior to making any Tenant Alterations, Tenant shall give Landlord ten (10) days prior written notice (or such earlier notice as would be necessary pursuant to applicable Law) to permit Landlord sufficient time to post appropriate notices of non-responsibility. Tenant shall furnish Landlord with the names and addresses of all contractors and subcontractors and copies of all contracts. All Tenant Alterations shall be completed at such time and in such manner as Landlord may from time to time designate, and only by contractors or mechanics approved by Landlord, which approval shall not be unreasonably withheld; provided, however, that Landlord may, in its sole discretion, specify the engineers and contractors to perform all work relating to the Building's systems (including the mechanical, heating, plumbing, security, ventilating, air-conditioning, electrical, communication and the fire and life safety systems in the Building). The contractors, mechanics and engineers who may be used are further limited to those whose work will not cause or threaten to cause disharmony or interference with Landlord or other tenants in the Building and their respective agents and contractors performing work in or about the Building. Landlord may further condition its consent upon Tenant furnishing to Landlord and Landlord approving prior to the commencement of any work or delivery of materials to the Premises related to the Tenant Alterations such of the following as specified by Landlord: architectural plans and specifications, opinions from Landlord's engineers stating that the Tenant Alterations will not in any way adversely affect the Building's systems, necessary permits and licenses, certificates of insurance, and such other documents in such form reasonably requested by Landlord. Landlord may, in the exercise of reasonable judgment, request that Tenant provide Landlord with appropriate evidence of Tenant's ability to complete and pay for the completion of the Tenant Alterations such as a performance bond or letter of credit. Upon completion of the Tenant Alterations, Tenant shall deliver to Landlord an as-built digitized set of plans and specifications for the Tenant Alterations in both protected document (".pdf") and computer-aided design ("CAD") formats.

(2) Tenant shall pay the cost of all Tenant Alterations and the cost of decorating the Premises and any work to the Property occasioned thereby. Upon completion of Tenant Alterations, Tenant shall furnish Landlord with contractors' affidavits and full and final waivers of lien and receipted bills covering all labor and materials expended and used in connection therewith and such other documentation reasonably requested by Landlord or Mortgagee.

(3) Tenant agrees to complete all Tenant Alterations (i) in accordance with all Laws, Hazardous Materials Laws, all requirements of applicable insurance companies and in accordance with Landlord's standard construction rules and regulations, (ii) in a good and workmanlike manner with the use of good grades of materials, and (iii) in accordance with the requirements of the Project's Sustainability Practices and Tenant is strongly encouraged to comply with the applicable Green Building Standards. Tenant shall notify Landlord immediately

if Tenant receives any notice of violation of any Law in connection with completion of any Tenant Alterations and shall immediately take such steps as are necessary to remedy such violation. In no event shall such supervision or right to supervise by Landlord nor shall any approvals given by Landlord under this Lease constitute any warranty by Landlord to Tenant of the adequacy of the design, workmanship or quality of such work or materials for Tenant's intended use or of compliance with the requirements of Section 9.1(a)(3)(i) and (ii) above or impose any liability upon Landlord in connection with the performance of such work.

(b) For any Tenant Alterations which Tenant requests Landlord to install, the forgoing provisions of this Section 9.1 shall apply; provided, however, in addition to paying the cost of the Tenant Alterations, Tenant also shall pay an administrative fee equal to fifteen percent (15%) of such cost to Landlord, as additional Rent under this Lease, and Landlord's liability for such Tenant Alterations work shall be subject to and limited by the provisions of Article 17 below. All Tenant Additions, whether installed by Landlord or Tenant, shall without compensation or credit to Tenant, become part of the Premises and the property of Landlord at the time of their installation and shall remain in the Premises, unless pursuant to Article 12, Tenant may remove them or is required to remove them at Landlord's request.

(c) Notwithstanding anything in this Section 9.1 to the contrary, Landlord's consent shall not be required for any Tenant Alteration that satisfies all of the following criteria (a "Cosmetic Alteration"): (i) is of a cosmetic nature such as painting, wallpapering, hanging pictures and installing carpeting; (ii) is not visible from the exterior of the Premises or Building; (iii) will not affect the Building's systems; (iv) does not require work to be performed inside the walls or above the ceiling of the Premises; (v) does not require a building permit; and (f) does not exceed (in the aggregate with all other such Cosmetic Alterations) $75,000.00 in any calendar year during the Term. Cosmetic Alterations shall be subject to all the other provisions of this Section 9.1.

9.2 LIENS

Tenant shall not permit any lien or claim for lien of any mechanic, laborer or supplier or any other lien to be filed against the Building, the Land, the Premises, or any other part of the Property arising out of work performed, or alleged to have been performed by, or at the direction of, or on behalf of Tenant. If any such lien or claim for lien is filed, Tenant shall within ten (10) days after receiving notice of such lien or claim (a) have such lien or claim for lien released of record or (b) deliver to Landlord a bond in form, content, amount, and issued by surety, satisfactory to Landlord, indemnifying, protecting, defending and holding harmless the Indemnitees against all costs and liabilities resulting from such lien or claim for lien and the foreclosure or attempted foreclosure thereof. If Tenant fails to take any of the above actions, Landlord, in addition to its rights and remedies under Article 11, without investigating the validity of such lien or claim for lien, may pay or discharge the same and Tenant shall, as payment of additional Rent hereunder, reimburse Landlord upon demand for the amount so paid by Landlord, including Landlord's expenses and attorneys' fees.

Article 10
ASSIGNMENT AND SUBLETTING

10.1 ASSIGNMENT AND SUBLETTING

(a) Without the prior written consent of Landlord, which consent of Landlord shall not be unreasonably withheld, conditioned or delayed, Tenant may not sublease, assign, mortgage, pledge, hypothecate or otherwise transfer or permit the transfer of this Lease or the encumbering of Tenant's interest therein in whole or in part, by operation of Law or otherwise or permit the use or occupancy of the Premises, or any part thereof, by anyone other than Tenant.

Tenant agrees that the provisions governing sublease and assignment set forth in this Article 10 shall be deemed to be reasonable. If Tenant desires to enter into any sublease of the Premises or assignment of this Lease, Tenant shall deliver written notice thereof to Landlord ("Tenant's Notice"), together with the identity of the proposed subtenant or assignee and the proposed principal terms thereof and financial and other information sufficient for Landlord to make an informed judgment with respect to such proposed subtenant or assignee within fifteen (15) days after receiving Tenant's Notice. If Tenant proposes to sublease less than all of the Rentable Area of the Premises, the space proposed to be sublet and the space retained by Tenant must each be a marketable unit as reasonably determined by Landlord and otherwise in compliance with all Laws. Landlord shall notify Tenant in writing of its approval or disapproval of the proposed sublease or assignment or its decision to exercise its rights under Section 10.2 within thirty (30) days after receipt of Tenant's Notice (and all required information). In no event may Tenant publicly offer or advertise all or any portion of the Premises for assignment or sublease at a rental less than that then sought by Landlord for a direct lease (non-sublease) of comparable space in the Project. Tenant shall submit for Landlord's approval (which approval shall not be unreasonably withheld) any advertising which Tenant or its agents intend to use with respect to the space proposed to be sublet.

(b) With respect to Landlord's consent to an assignment or sublease, Landlord may take into consideration any factors that Landlord may deem relevant, and the reasons for which Landlord's denial shall be deemed to be reasonable shall include, without limitation, the following:

(i) the business reputation or creditworthiness of any proposed subtenant or assignee is not acceptable to Landlord; or

(ii) in Landlord's reasonable judgment the proposed assignee or sublessee would diminish the value or reputation of the Project or Landlord, or would increase the expenses associated with operating, maintaining and repairing the Project; or

(iii) any proposed assignee's or sublessee's use of the Premises would violate Section 7.1 of this Lease or would violate the provisions of any other leases of tenants in the Project; or

(iv) the portion of the Premises retained by Tenant after a proposed sublease would not constitute a "marketable unit", meaning that such space would be: (A) deprived of ready access to the then-current corridor and elevator lobby without extension or reconfiguration of the corridor or creation of a connecting corridor; or (B) rendered in violation of any building code requirements; or (C) lacking exterior windows; or

(v) the proposed sublessee or assignee is a current occupant of the Project with which Landlord is actively negotiating to lease more space in the Building or a bona fide prospective tenant of Landlord in the Project as demonstrated by a written proposal dated within three (3) months prior to the date of Tenant's request; or

(vi) the proposed sublessee or assignee would materially increase the estimated pedestrian and vehicular traffic to and from the Premises and the Project above that deemed typical by Landlord for office/lab use in the Project; or

(vii) Tenant is in uncured Default under this Lease.

(c) Any sublease or assignment shall be expressly subject to the terms and conditions of this Lease. Any subtenant or assignee shall execute such documents as Landlord may reasonably require to evidence such subtenant or assignee's assumption of the obligations and

liabilities of Tenant under this Lease. Tenant shall deliver to Landlord a copy of all agreements executed by Tenant and the proposed subtenant and assignee with respect to the Premises. Landlord's approval of a sublease, assignment, hypothecation, transfer or third party use or occupancy shall not constitute a waiver of Tenant's obligation to obtain Landlord's consent to further assignments or subleases, hypothecations, transfers or third party use or occupancy.

(d) For purposes of this Article 10, an assignment shall be deemed to include a change in the majority control of Tenant, resulting from any transfer, sale or assignment of shares of stock of Tenant occurring by operation of Law or otherwise if Tenant is a corporation whose shares of stock are not traded publicly. If Tenant is a partnership, any change in the partners of Tenant shall be deemed to be an assignment.

(e) For purposes of this Lease, a "Permitted Transferee" shall mean any Person which: (i) is an Affiliate; or (ii) is the corporation or other entity (the "Successor") resulting from a merger, consolidation or non-bankruptcy reorganization with Tenant; or (iii) is otherwise a deemed assignee due to a change of control under Section 10.1(d) above; or (iv) purchases substantially all the assets of Tenant as a going concern (the "Purchaser"). Notwithstanding anything to the contrary in Sections 10.1(a) and (b), 10.2 and 10.3, provided there is no uncured Default under this Lease, Tenant shall have the right, without the prior written consent of Landlord, to assign this Lease to a Permitted Transferee or to sublease the Premises or any part thereof to a Permitted Transferee provided that: (1) Landlord receives thirty (30) days' prior written notice of an assignment or sublease (including a proposed transaction described in subparts (i), (ii), (iii) or (iv) of this Section 10.1(e)); (2) with respect to an assignment of this Lease or a sublease of more than half the Premises to an entity described in subparts (ii) or (iv) of this Section 10.1(e), the Permitted Transferee's net worth and liquidity are each not less than the greater of (A) Tenant's net worth and liquidity as of the date of this Lease or (B) Tenant's net worth and liquidity immediately prior to such assignment or subletting; (3) with respect to an assignment of this Lease or a sublease of more than half the Premises to an entity described in subparts (i) or (iii) of this Section 10.1(e), Tenant (as the assignor or sublandlord) continues in existence with a net worth and liquidity not less than the greater of (A) Tenant's net worth and liquidity as of the date of this Lease or (B) Tenant's net worth and liquidity immediately prior to such assignment or subletting; (4) the Permitted Transferee expressly assumes (except a Permitted Transferee which is a deemed assignee under subpart (iii) of this Section 10.1(e) or which is a sublessee in the event of a sublease under this Section 10.1(e)) in writing reasonably satisfactory to Landlord all of the obligations of Tenant under this Lease and delivers such assumption to Landlord no later than fifteen (15) days prior to the effective date of the assignment; (5) Landlord receives no later than five (5) days before the effective date a fully executed copy of the applicable assignment or sublease agreement between Tenant and the Permitted Transferee; (6) promptly after Landlord's written request, Tenant and the Permitted Transferee provide such reasonable documents and information which Landlord reasonably requests for the purpose of substantiating whether or not the assignment or sublease is to a Permitted Transferee; and (7) such transfer is not being entered into for the purpose of avoiding the requirement for Landlord's prior consent or the provisions of Sections 10.2 or 10.3. All determinations of net worth and liquidity for purposes of this Subsection shall exclude any value attributable to goodwill or going concern value. Provided that Tenant complies with the terms of this Section 10.1(e), the excess rent provisions of Section 10.3 shall not apply to any assignment or sublease pursuant hereto.

(f) With respect to any sublease hereunder, Tenant hereby irrevocably assigns to Landlord, effective upon any such sublease, all rent and other payments due from subtenant under the sublease, provided however, that Tenant shall have a license to collect such rent and other payments until the occurrence of a Default by Tenant under any of the provisions of this Lease. At any time after such Default, at Landlord's option, Landlord shall have the right to give notice to the subtenant of such assignment. Landlord shall credit Tenant with any rent received

by Landlord under such assignment but the acceptance of any payment on account of rent from the subtenant as the result of any such default shall in no manner whatsoever serve to release Tenant from any liability under the terms, covenants, conditions, provisions or agreement under this Lease. No such payment of rent or any other payment by the subtenant directly to Landlord and/or acceptance of such payment(s) by Landlord, regardless of the circumstances or reasons therefor, shall in any manner whatsoever be deemed an attornment by the subtenant to Landlord in the absence of a specific written agreement signed by Landlord to such an effect.

10.2 RECAPTURE

Excluding any assignment or sublease contemplated in Section 10.1(e), Landlord shall have the option to exclude from the Premises covered by this Lease ("recapture") the space proposed to be sublet or subject to the assignment, effective as of the proposed commencement date of such sublease or assignment. If Landlord elects to recapture, Tenant shall surrender possession of the space proposed to be subleased or subject to the assignment to Landlord on the effective date of recapture of such space from the Premises, such date being the Termination Date for such space. Effective as of the date of recapture of any portion of the Premises pursuant to this section, the Monthly Base Rent, Rentable Area of the Premises and Tenant's Share shall be adjusted accordingly.

10.3 EXCESS RENT

Tenant shall pay Landlord on the first day of each month during the term of the sublease or assignment, as additional Rent under this Lease, fifty percent (50%) of the amount by which the sum of all rent and other consideration (direct or indirect) due from the subtenant or assignee for such month exceeds: (i) that portion of the Monthly Base Rent and Rent Adjustments due under this Lease for said month which is allocable to the space sublet or assigned; and (ii) the following costs and expenses for the subletting or assignment of such space: (1) brokerage commissions and attorneys' fees and expenses, (2) the actual costs paid in making any improvements or substitutions in the Premises required by any sublease or assignment; and (3) moving costs and other amounts actually paid with respect of such subtenant's or assignee's other leases or occupancy arrangements, but only to the extent same are typical, reasonable and appropriate under the prevailing market conditions. All such costs and expenses shall be amortized over the term of the sublease or assignment pursuant to sound accounting principles.

10.4 TENANT LIABILITY

In the event of any sublease or assignment, whether or not with Landlord's consent, Tenant shall not be released or discharged from any liability, whether past, present or future, under this Lease, including any liability arising from the exercise of any renewal or expansion option, to the extent such exercise is expressly permitted by Landlord. Tenant's liability shall remain primary, and in the event of default by any subtenant, assignee or successor of Tenant in performance or observance of any of the covenants or conditions of this Lease, Landlord may proceed directly against Tenant without the necessity of exhausting remedies against said subtenant, assignee or successor. After any assignment, Landlord may consent to subsequent assignments or subletting of this Lease, or amendments or modifications of this Lease with assignees of Tenant, without notifying Tenant, or any successor of Tenant, and without obtaining its or their consent thereto, and such action shall not relieve Tenant or any successor of Tenant of liability under this Lease. If Landlord grants consent to such sublease or assignment, Tenant shall pay all reasonable attorneys' fees and expenses incurred by Landlord with respect to such assignment or sublease. In addition, if Tenant has any options to extend the Term or to add other space to the Premises, such options shall not be available to any subtenant or assignee, directly or indirectly without Landlord's express written consent, which may be withheld in Landlord's sole discretion.

10.5 ASSUMPTION AND ATTORNMENT

If Tenant shall assign this Lease as permitted herein, the assignee shall expressly assume all of the obligations of Tenant hereunder in a written instrument satisfactory to Landlord and furnished to Landlord not later than fifteen (15) days prior to the effective date of the assignment. Each sublease by Tenant hereunder shall be subject and subordinate to this Lease and to the matters to which this Lease is or shall be subordinate, and each subtenant by entering into a sublease is deemed to have agreed that in the event of termination, re-entry or dispossession by Landlord under this Lease, Landlord may, at its option, either terminate the sublease or take over all of the right, title and interest of Tenant, as sublandlord, under such sublease, and such subtenant shall, at Landlord's option, attorn to Landlord pursuant to the then executory provisions of such sublease, except that Landlord shall not be: (1) liable for any previous act or omission of Tenant under such sublease; (2) subject to any counterclaim, offset or defense that such subtenant might have against Tenant; (3) bound by any previous modification of such sublease or by any rent or additional rent or advance rent which such subtenant might have paid for more than the current month to Tenant, and all such rent shall remain due and owing, notwithstanding such advance payment; (4) bound by any security or advance rental deposit made by such subtenant which is not delivered or paid over to Landlord and with respect to which such subtenant shall look solely to Tenant for refund or reimbursement; or (5) obligated to perform any work in the subleased space or to prepare it for occupancy, and in connection with such attornment, the subtenant shall execute and deliver to Landlord any instruments Landlord may reasonably request to evidence and confirm such attornment. Each subtenant or licensee of Tenant shall be deemed, automatically upon and as a condition of its occupying or using the Premises or any part thereof, to have agreed to be bound by the terms and conditions set forth in this Section 10.5. The provisions of this Section 10.5 shall be self-operative, and no further instrument shall be required to give effect to this provision.

10.6 PROCESSING EXPENSES

Tenant shall pay to Landlord, as Landlord's cost of processing each proposed assignment or subletting (whether or not the same is ultimately approved by Landlord or consummated by Tenant), an amount equal to the sum of (i) Landlord's reasonable attorneys' and other professional fees, plus (ii) the sum of $2,500.00 for the cost of Landlord's administrative, accounting and clerical time (collectively, "Processing Costs"). Notwithstanding anything to the contrary herein, Landlord shall not be required to process any request for Landlord's consent to an assignment or subletting until Tenant has paid to Landlord the amount of Landlord's estimate of the Processing Costs. When the actual amount of the Processing Costs is determined, it shall be reconciled with Landlord's estimate, and any payments or refunds required as a result thereof shall promptly thereafter be made by the parties.

10.7 EFFECT OF IMPERMISSIBLE TRANSFER

Any assignment or sublease effected without Landlord's consent in violation of this Article 10 shall, at Landlord's option, be a noncurable Default under Section 11.1 without the necessity of any notice and grace period. If Landlord elects to treat such unapproved assignment or sublease as a noncurable Default, Landlord may, in addition to all other remedies provided for in Section 11.2 below, increase the Monthly Base Rent to one hundred ten percent (110%) of the Monthly Base Rent then in effect.

Article 11
DEFAULT AND REMEDIES

11.1 DEFAULT

The occurrence or existence of any one or more of the following shall constitute a "Default" by Tenant under this Lease:

(a) Tenant fails to pay any installment or other payment of Rent including Rent Adjustment Deposits or Rent Adjustments within five (5) business days after the date when due;

(b) Tenant vacates or abandons the Premises;

(c) Tenant violates the restrictions on assignments and subleases set forth in Article 10 – Assignment and Subletting;

(d) Tenant fails to maintain any insurance policy required hereunder, and fails to cure such default within five (5) days after written notice thereof to Tenant;

(e) Tenant fails to observe or perform any of the other covenants, conditions or provisions of this Lease and fails to cure such default within fifteen (15) days after written notice thereof to Tenant, unless the default involves an Environmental Condition, which shall be cured forthwith or unless the failure to perform is a Default for which this Lease specifies there is no cure or grace period;

(f) the interest of Tenant in this Lease is levied upon under execution or other legal process;

(g) a petition is filed by or against Tenant to declare Tenant bankrupt or seeking a plan of reorganization or arrangement under any Chapter of the Bankruptcy Code, or any amendment, replacement or substitution therefor, or to delay payment of, reduce or modify Tenant's debts, which in the case of an involuntary action is not discharged within thirty (30) days;

(h) Tenant is declared insolvent by Law or any assignment of Tenant's property is made for the benefit of creditors;

(i) a receiver is appointed for Tenant or Tenant's property, which appointment is not discharged within thirty (30) days;

(j) any action taken by or against Tenant to reorganize or modify Tenant's capital structure in a materially adverse way which in the case of an involuntary action is not discharged within thirty (30) days;

(k) upon the dissolution of Tenant; or

(l) upon the third occurrence during any 12-month period during the Term that Tenant fails to pay Rent when due or has breached a particular covenant of this Lease (whether or not such failure or breach is thereafter cured within any stated cure or grace period or statutory period).

11.2 LANDLORD'S REMEDIES

(a) A Default shall constitute a breach of this Lease for which Landlord shall have the rights and remedies set forth in this Section 11.2 and all other rights and remedies set forth in this Lease or now or hereafter allowed by Law, whether legal or equitable, and all rights and remedies of Landlord shall be cumulative and none shall exclude any other right or remedy now or hereafter allowed by applicable Law.

(b) With respect to a Default, at any time Landlord may terminate Tenant's right to possession by written notice to Tenant stating such election. Any written notice required pursuant to Section 11.1 shall constitute notice of unlawful detainer pursuant to California Code of Civil Procedure Section 1161 if, at Landlord's sole discretion, it states Landlord's election that Tenant's right to possession is terminated after expiration of any period required by Law or any longer period required by Section 11.1. Upon the expiration of the period stated in Landlord's written notice of termination (and unless such notice provides an option to cure within such period and Tenant cures the Default within such period), Tenant's right to possession shall terminate and this Lease shall terminate, and Tenant shall remain liable as hereinafter provided. Upon such termination in writing of Tenant's right to possession, Landlord shall have the right, subject to applicable Law, to re-enter the Premises and dispossess Tenant and the legal representatives of Tenant and all other occupants of the Premises by unlawful detainer or other summary proceedings, or as otherwise permitted by Law, regain possession of the Premises and remove their property (including their trade fixtures, personal property and Required Removables pursuant to Article 12), but Landlord shall not be obligated to effect such removal, and such property may, at Landlord's option, be stored elsewhere, sold or otherwise dealt with as permitted by Law, at the risk of, expense of and for the account of Tenant, and the proceeds of any sale shall be applied pursuant to Law. Landlord shall in no event be responsible for the value, preservation or safekeeping of any such property. Tenant hereby waives all claims for damages that may be caused by Landlord's removing or storing Tenant's personal property pursuant to this Section or Section 12.1, and Tenant hereby indemnifies, and agrees to defend, protect and hold harmless, the Indemnitees from any and all loss, claims, demands, actions, expenses, liability and cost (including attorneys' fees and expenses) arising out of or in any way related to such removal or storage. Upon such written termination of Tenant's right to possession and this Lease, Landlord shall have the right to recover damages for Tenant's Default as provided herein or by Law, including the following damages provided by California Civil Code Section 1951.2:

(1) the worth at the time of award of the unpaid Rent which had been earned at the time of termination;

(2) the worth at the time of award of the amount by which the unpaid Rent which would have been earned after termination until the time of award exceeds the amount of such Rent loss that Tenant proves could reasonably have been avoided;

(3) the worth at the time of award of the amount by which the unpaid Rent for the balance of the term of this Lease after the time of award exceeds the amount of such Rent loss that Tenant proves could be reasonably avoided;

(4) any other amount necessary to compensate Landlord for all the detriment proximately caused by Tenant's failure to perform its obligations under this Lease or which in the ordinary course of things would be likely to result therefrom, including, without limitation, Landlord's unamortized costs of tenant improvements, leasing commissions and legal fees incurred in connection with entering into this Lease; and

(5) any other amounts, in addition to or in lieu of those listed above, that may be permitted by applicable Law.

The word "rent" as used in this Section 11.2 shall have the same meaning as the defined term Rent in this Lease. The "worth at the time of award" of the amount referred to in clauses (1) and (2) above is computed by allowing interest at the Default Rate. The worth at the time of award of the amount referred to in clause (3) above is computed by discounting such amount at the discount rate of the Federal Reserve Bank of San Francisco at the time of award plus one percent (1%). For the purpose of determining unpaid Rent under clause (3) above, the

monthly Rent reserved in this Lease shall be deemed to be the sum of the Monthly Base Rent, monthly storage space rent, if any, the amounts last payable by Tenant as Rent Adjustments for the calendar year in which Landlord terminated this Lease as provided hereinabove, and any additional Rent under this Lease.

(c) Even if Tenant is in Default and/or has abandoned the Premises, this Lease shall continue in effect for so long as Landlord does not terminate Tenant's right to possession by written notice as provided in Section 11.2(b) above, and Landlord may enforce all its rights and remedies under this Lease, including the right to recover Rent as it becomes due under this Lease. In such event, Landlord shall have all of the rights and remedies of a landlord under California Civil Code Section 1951.4 (lessor may continue Lease in effect after lessee's breach and abandonment and recover Rent as it becomes due, if lessee has the right to sublet or assign, subject only to reasonable limitations), or any successor statute. During such time as Tenant is in Default, if Landlord has not terminated this Lease by written notice and if Tenant requests Landlord's consent to an assignment of this Lease or a sublease of the Premises, such consent shall be governed by the terms and conditions of Article 10 above. Tenant acknowledges and agrees that the provisions of Article 10 shall be deemed to constitute reasonable limitations of Tenant's right to assign or sublet. Tenant acknowledges and agrees that in the absence of written notice pursuant to Section 11.2(b) above terminating Tenant's right to possession, no other act of Landlord shall constitute a termination of Tenant's right to possession or an acceptance of Tenant's surrender of the Premises, including acts of maintenance or preservation or efforts to relet the Premises or the appointment of a receiver upon initiative of Landlord to protect Landlord's interest under this Lease or the withholding of consent to a subletting or assignment, or terminating a subletting or assignment, if in accordance with other provisions of this Lease.

(d) In the event that Landlord seeks an injunction with respect to a breach or threatened breach by Tenant of any of the covenants, conditions or provisions of this Lease, Tenant agrees to pay the premium for any bond required in connection with such injunction.

(e) Tenant hereby waives any and all rights to relief from forfeiture, redemption or reinstatement granted by Law (including California Civil Code of Procedure Sections 1174 and 1179) in the event of Tenant being evicted or dispossessed for any cause or in the event of Landlord obtaining possession of the Premises by reason of Tenant's Default or otherwise.

(f) Notwithstanding any other provision of this Lease, a notice to Tenant given under this Article and Article 24 of this Lease or given pursuant to California Code of Civil Procedure Section 1161, and any notice served by mail, shall be deemed served, and the requisite waiting period deemed to begin under said Code of Civil Procedure Section upon mailing (except as may be required under Code of Civil Procedure Section 1161 et seq.), without any additional waiting requirement under Code of Civil Procedure Section 1011 et seq. or by other Law. For purposes of Code of Civil Procedure Section 1162, Tenant's "place of residence", "usual place of business", "the property" and "the place where the property is situated" shall mean and be the Premises, whether or not Tenant has vacated same at the time of service.

(g) The voluntary or other surrender or termination of this Lease, or a mutual termination or cancellation thereof, shall not work a merger and shall terminate all or any existing assignments, subleases, subtenancies or occupancies permitted by Tenant, except if and as otherwise specified in writing by Landlord.

(h) No delay or omission in the exercise of any right or remedy of Landlord upon any default by Tenant, and no exercise by Landlord of its rights pursuant to Section 25.16 to perform any duty which Tenant fails timely to perform, shall impair any right or remedy or be construed as a waiver. No provision of this Lease shall be deemed waived by Landlord unless such waiver is in writing signed by Landlord. The waiver by Landlord of any breach of any provision of this

Lease shall not be deemed a waiver of any subsequent breach of the same or any other provision of this Lease.

11.3 ATTORNEY'S FEES

In the event any party brings any suit or other proceeding with respect to the subject matter or enforcement of this Lease, the prevailing party (as determined by the court, agency or other authority before which such suit or proceeding is commenced) shall, in addition to such other relief as may be awarded, be entitled to recover attorneys' fees, expenses and costs of investigation as actually incurred, including court costs, expert witness fees, costs and expenses of investigation, and all attorneys' fees, costs and expenses in any such suit or proceeding (including in any action or participation in or in connection with any case or proceeding under the Bankruptcy Code, 11 United States Code Sections 101 et seq. (the "Bankruptcy Code"), or any successor statutes, in establishing or enforcing the right to indemnification, in appellate proceedings, or in connection with the enforcement or collection of any judgment obtained in any such suit or proceeding).

11.4 BANKRUPTCY

The following provisions shall apply in the event of the bankruptcy or insolvency of Tenant:

(a) In connection with any proceeding under Chapter 7 of the Bankruptcy Code where the trustee of Tenant elects to assume this Lease for the purposes of assigning it, such election or assignment, may only be made upon compliance with the provisions of (b) and (c) below, which conditions Landlord and Tenant acknowledge to be commercially reasonable. In the event the trustee elects to reject this Lease, then Landlord shall immediately be entitled to possession of the Premises without further obligation to Tenant or the trustee.

(b) Any election to assume this Lease under Chapter 11 or 13 of the Bankruptcy Code by Tenant as debtor-in-possession or by Tenant's trustee (the "Electing Party") must provide for:

The Electing Party to cure or provide to Landlord adequate assurance that it will cure all monetary defaults under this Lease within fifteen (15) days from the date of assumption, and that it will cure all nonmonetary defaults under this Lease within thirty (30) days from the date of assumption. Landlord and Tenant acknowledge such condition to be commercially reasonable.

(c) If the Electing Party has assumed this Lease or elects to assign Tenant's interest under this Lease to any other person, such interest may be assigned only if the intended assignee has provided adequate assurance of future performance (as herein defined), of all of the obligations imposed on Tenant under this Lease.

For the purposes hereof, "adequate assurance of future performance" means that Landlord has ascertained that each of the following conditions has been satisfied:

(i) The assignee has submitted a current financial statement, certified by its chief financial officer, which shows a net worth and working capital in amounts sufficient to assure the future performance by the assignee of Tenant's obligations under this Lease; and

(ii) Landlord has obtained consents or waivers from any third parties that may be required under a lease, mortgage, financing arrangement, or other agreement by which Landlord is bound, to enable Landlord to permit such assignment.

(d) Landlord's acceptance of rent or any other payment from any trustee, receiver, assignee, person, or other entity will not be deemed to have waived, or waive, the requirement of Landlord's consent, Landlord's right to terminate this Lease for any transfer of Tenant's interest under this Lease without such consent, or Landlord's claim for any amount of Rent due from Tenant.

11.5 LANDLORD'S DEFAULT

Landlord shall be in default hereunder in the event Landlord has not commenced and pursued with reasonable diligence the cure of any failure of Landlord to meet its obligations hereunder within thirty (30) days after the receipt by Landlord of written notice from Tenant of the alleged failure to perform. Failure to provide the requisite notice and cure period by Tenant under this paragraph shall be an absolute defense by Landlord against any claims for failure to perform any of its obligations. In no event shall Tenant have the right to terminate or rescind this Lease as a result of Landlord's default as to any covenant or agreement contained in this Lease. Tenant hereby waives such remedies of termination and rescission and hereby agrees that Tenant's remedies for default hereunder and for breach of any promise or inducement shall be limited to a suit for damages and/or injunction. In addition, Tenant hereby covenants that, prior to the exercise of any such remedies, it will give any Mortgagee notice and a reasonable time to cure any default by Landlord (as specified in Section 23.2 below).

Article 12
SURRENDER OF PREMISES

12.1 IN GENERAL

Upon the Termination Date, Tenant shall surrender and vacate the Premises immediately and deliver possession thereof to Landlord in a clean, good and tenantable condition, ordinary wear and tear excepted, and any damage from casualty and condemnation, and damage caused by Landlord, shall be governed by the provisions of this Lease dealing specifically therewith. Tenant shall deliver to Landlord all keys to the Premises. All improvements in and to the Premises, including any Tenant Alterations (collectively, "Leasehold Improvements") shall remain upon the Premises at the end of the Term without compensation to Tenant. Landlord, however, by written notice to Tenant at least 30 days prior to the Termination Date, may require Tenant, at its expense, to remove (a) any Cable, and (b) any Tenant Additions that, in Landlord's reasonable judgment, are of a nature that would require removal and repair costs that are materially in excess of the removal and repair costs associated with standard laboratory and office improvements (collectively referred to as "Required Removables"). Required Removables may include, without limitation, internal stairways, raised floors, personal baths and showers, vaults, rolling file systems and structural alterations and modifications. The designated Required Removables shall be removed by Tenant before the Termination Date. Tenant's removal and disposal of items pursuant to this Section 12.1 must comply with the Project's Sustainability Practices and Tenant is strongly encouraged to comply with the applicable Green Building Standards. Tenant shall repair damage caused by the installation or removal of Required Removables. If Tenant fails to perform its obligations in a timely manner, Landlord may perform such work at Tenant's expense. In the event possession of the Premises is not delivered to Landlord when required hereunder, or if Tenant shall fail to remove those items described above, Landlord may (but shall not be obligated to), at Tenant's expense, remove any of such property and store, sell or otherwise deal with such property, and undertake, at Tenant's expense, such restoration work as Landlord deems necessary or advisable. Notwithstanding anything in this Section 12.1 to the contrary, failure by Tenant to strictly comply with the provisions of this Section 12.1 with respect to any Required Removables that are required to be removed from the Premises by Tenant hereunder shall constitute a failure of Tenant to validly surrender the Premises.

12.2 LANDLORD'S RIGHTS

All property which may be removed from the Premises by Landlord shall be conclusively presumed to have been abandoned by Tenant and Landlord may deal with such property as provided in Section 11.2(b), including the waiver and indemnity obligations provided in that Section. Tenant shall also reimburse Landlord for all costs and expenses incurred by Landlord in removing any Tenant Additions and in restoring the Premises to the condition required by this Lease.

Article 13
HOLDING OVER

In the event that Tenant holds over in possession of the Premises after the Termination Date, for each month or partial month Tenant holds over possession of the Premises, Tenant shall pay Landlord 150% of the monthly Rent payable for the month immediately preceding the holding over (including 100% of any applicable Rent Adjustments or increases to Rent Adjustments which Landlord may reasonably estimate). Tenant shall also pay all damages, including consequential damages, sustained by Landlord by reason of such holding over. The provisions of this Article shall not constitute a waiver by Landlord of any re-entry rights of Landlord, and Tenant's continued occupancy of the Premises shall be as a tenancy in sufferance.

Article 14
DAMAGE BY FIRE OR OTHER CASUALTY

14.1 SUBSTANTIAL UNTENANTABILITY

(a) If any fire or other casualty (whether insured or uninsured) renders all or a substantial portion of the Premises or the Building untenantable, Landlord shall, with reasonable promptness after the occurrence of such damage, estimate the length of time that will be required to substantially complete the repair and restoration and shall, by notice advise Tenant of such estimate ("Landlord's Notice"). If Landlord estimates that the amount of time required to substantially complete such repair and restoration will exceed three hundred sixty-five (365) days from the date such damage occurred, then Landlord, or Tenant if all or a substantial portion of the Premises is rendered untenantable, shall have the right to terminate this Lease as of the date of such damage by delivering written notice to the other at any time within twenty (20) days after delivery of Landlord's Notice, provided that if Landlord so chooses, Landlord's Notice may also constitute such notice of termination.

(b) Unless this Lease is terminated as provided in the preceding subparagraph, Landlord shall proceed with reasonable promptness to repair and restore the Premises to its condition as existed prior to such casualty, subject to reasonable delays for insurance adjustments and Force Majeure delays, and also subject to zoning Laws and building codes then in effect. Landlord shall have no liability to Tenant, and Tenant shall not be entitled to terminate this Lease if such repairs and restoration are not in fact completed within the time period estimated by Landlord so long as Landlord shall proceed with reasonable diligence to complete such repairs and restoration.

(c) Tenant acknowledges that Landlord shall be entitled to the full proceeds of any insurance coverage, whether carried by Landlord or Tenant, for damages to the Premises, except for those proceeds of Tenant's insurance for its own personal property and equipment which would be removable by Tenant at the Termination Date. All such insurance proceeds shall be payable to Landlord whether or not the Premises are to be repaired and restored; provided, however, if this Lease is not terminated and the parties proceed to repair and restore Tenant Additions at Tenant's cost, to the extent Landlord received proceeds of Tenant's insurance

covering Tenant Additions, such proceeds shall be applied to reimburse Tenant for its cost of repairing and restoring Tenant Additions.

(d) Notwithstanding anything to the contrary herein set forth: (i) Landlord shall have no duty pursuant to this Section to repair or restore any portion of any Tenant Additions or to expend for any repair or restoration of the Premises or Building in amounts in excess of insurance proceeds paid to Landlord and available for repair or restoration; and (ii) Tenant shall not have the right to terminate this Lease pursuant to this Section if any damage or destruction was caused by the act or neglect of Tenant, its agent or employees. Whether or not this Lease is terminated pursuant to this Article 14, in no event shall Tenant be entitled to any compensation or damages for loss of the use of the whole or any part of the Premises or for any inconvenience or annoyance occasioned by any such damage, destruction, rebuilding or restoration of the Premises or the Building or access thereto.

(e) Any repair or restoration of the Premises performed by Tenant shall be in accordance with the provisions of Article 9 hereof.

14.2 INSUBSTANTIAL UNTENANTABILITY

If the Premises or the Building is damaged by a casualty but neither is rendered substantially untenantable and Landlord estimates that the time to substantially complete the repair or restoration will not exceed three hundred sixty-five (365) days from the date such damage occurred, then Landlord shall proceed to repair and restore the Building or the Premises other than Tenant Additions, with reasonable promptness, unless such damage is to the Premises and occurs during the last six (6) months of the Term, in which event either Tenant or Landlord shall have the right to terminate this Lease as of the date of such casualty by giving written notice thereof to the other within twenty (20) days after the date of such casualty. Notwithstanding the aforesaid, Landlord's obligation to repair shall be limited in accordance with the provisions of Section 14.1 above.

14.3 RENT ABATEMENT

Except for the negligence or willful act of Tenant or its agents, employees, contractors or invitees, if all or any part of the Premises are rendered untenantable by fire or other casualty and this Lease is not terminated, Monthly Base Rent and Rent Adjustments shall abate for that part of the Premises which is untenantable on a per diem basis from the date of the casualty until Landlord has Substantially Completed the repair and restoration work in the Premises which it is required to perform, provided, that as a result of such casualty, Tenant does not occupy the portion of the Premises which is untenantable during such period.

14.4 WAIVER OF STATUTORY REMEDIES

The provisions of this Lease, including this Article 14, constitute an express agreement between Landlord and Tenant with respect to any and all damage to, or destruction of, the Premises or the Property or any part of either, and any Law, including Sections 1932(2), 1933(4), 1941 and 1942 of the California Civil Code, with respect to any rights or obligations concerning damage or destruction shall have no application to this Lease or to any damage to or destruction of all or any part of the Premises or the Property or any part of either, and are hereby waived.

Article 15
EMINENT DOMAIN

15.1 TAKING OF WHOLE OR SUBSTANTIAL PART

In the event the whole or any substantial part of the Building or of the Premises is taken or condemned by any competent authority for any public use or purpose (including a deed given in lieu of condemnation) and is thereby rendered untenantable, this Lease shall terminate as of the date title vests in such authority, and Monthly Base Rent and Rent Adjustments shall be apportioned as of the Termination Date. Notwithstanding anything to the contrary herein set forth, in the event the taking is temporary (for less than the remaining Term of this Lease), Landlord may elect either (i) to terminate this Lease or (ii) permit Tenant to receive the entire award attributable to the Premises in which case Tenant shall continue to pay Rent and this Lease shall not terminate.

15.2 TAKING OF PART

In the event a part of the Building or the Premises is taken or condemned by any competent authority (or a deed is delivered in lieu of condemnation) and this Lease is not terminated, this Lease shall be amended to reduce or increase, as the case may be, the Monthly Base Rent and Tenant's Share to reflect the Rentable Area of the Premises or Building, as the case may be, remaining after any such taking or condemnation. Landlord, upon receipt and to the extent of the award in condemnation (or proceeds of sale) shall make necessary repairs and restorations to the Premises (exclusive of Tenant Additions) and to the Building to the extent necessary to constitute the portion of the Building not so taken or condemned as a complete architectural and economically efficient unit. Notwithstanding the foregoing, if as a result of any taking, or a governmental order that the grade of any street or alley adjacent to the Building is to be changed and such taking or change of grade makes it necessary or desirable to substantially remodel or restore the Building or prevents the economical operation of the Building, Landlord shall have the right to terminate this Lease upon ninety (90) days prior written notice to Tenant.

15.3 COMPENSATION

Landlord shall be entitled to receive the entire award (or sale proceeds) from any such taking, condemnation or sale without any payment to Tenant, and Tenant hereby assigns to Landlord, Tenant's interest, if any, in such award; provided, however, Tenant shall have the right separately to pursue against the condemning authority a separate award in respect of the loss, if any, to Tenant Additions paid for by Tenant without any credit or allowance from Landlord so long as there is no diminution of Landlord's award as a result.

Article 16
INSURANCE

16.1 TENANT'S INSURANCE

Tenant, at Tenant's expense, agrees to maintain in force, with a company or companies acceptable to Landlord, during the Term: (a) Commercial General Liability Insurance on a primary basis and without any right of contribution from any insurance carried by Landlord covering the Premises on an occurrence basis against all claims for personal injury, bodily injury, death and property damage, including contractual liability covering the indemnification provisions in this Lease, and such insurance shall be for such limits that are reasonably required by Landlord from time to time but not less than a combined single limit (each occurrence and in the aggregate) of Five Million and No/100 Dollars ($5,000,000.00) (which limit may be achieved through use of umbrella coverage); (b) Workers' Compensation and Employers' Liability Insurance to the extent required by and in accordance with the Laws of the State of California; (c) "All Risks" property insurance in an amount adequate to cover the full replacement cost of all Tenant Additions, equipment, installations, fixtures and contents of the Premises in the event of loss from water damage, earthquake sprinkler leakage, and such other risks as Landlord may designate from time to time; (d) in the event a motor vehicle is to be used by Tenant in

connection with its business operation from the Premises, Comprehensive Automobile Liability Insurance coverage with limits of not less than One Million and No/100 Dollars ($1,000,000.00) combined single limit coverage against bodily injury liability and property damage liability arising out of the use by or on behalf of Tenant, its agents and employees in connection with this Lease, of any owned, non-owned or hired motor vehicles; and (e) such other insurance or coverages as Landlord reasonably requires.

16.2 FORM OF POLICIES

Each policy referred to in Section 16.1 shall satisfy the following requirements: (i) the Commercial General Liability policy shall name Landlord and the Indemnitees as additional insureds, (ii) the "All-Risks" property insurance policy shall name Landlord and the Indemnitees as loss payees, (iii) each policy shall be issued by one or more responsible insurance companies licensed to do business in the State of California reasonably satisfactory to Landlord, (iv) where applicable, each policy shall provide for deductible amounts satisfactory to Landlord and not permit co-insurance, and (v) each policy of "All-Risks" property insurance shall provide that the policy shall not be invalidated should the insured waive in writing prior to a loss, any or all rights of recovery against any other party for losses covered by such policies. Tenant shall deliver to Landlord, certificates of insurance (and at Landlord's request, copies of all policies and renewals thereof to be maintained by Tenant hereunder), prior to Tenant's entry into the Premises and prior to the expiration date of each policy. Additionally, Tenant shall provide Landlord written notice of any cancellation or amendment of any such insurance within two (2) business days following Tenant's knowledge of the same. If Tenant fails to carry the insurance required under this Article 16 or fails to provide certificates of renewal as and when required hereunder, Landlord may, but shall not be obligated to acquire such insurance on Tenant's behalf or Tenant's sole cost and expense.

16.3 LANDLORD'S INSURANCE

Landlord agrees to purchase and keep in full force and effect during the Term hereof, including any extensions or renewals thereof, insurance under policies issued by insurers of recognized responsibility, qualified to do business in the State of California on the Building in amounts sufficient to cover 80% of the replacement cost thereof, insuring against fire and such other risks as may be included in standard forms of all risk coverage insurance reasonably available from time to time (which requirement may be achieved through use of a single insurance policy covering multiple buildings owned by Landlord and affiliates of Landlord). Landlord agrees to maintain in force during the Term, Commercial General Liability Insurance covering the Building on an occurrence basis against all claims for personal injury, bodily injury, death, and property damage. Such insurance shall be for a combined single limit (each occurrence and in the aggregate) of not less than Five Million and No/100 Dollars ($5,000,000.00) (which limit may be achieved through use of umbrella coverage). Neither Landlord's obligation to carry such insurance nor the carrying of such insurance shall be deemed to be an indemnity by Landlord with respect to any claim, liability, loss, cost or expense due, in whole or in part, to Tenant's negligent acts or omissions or willful misconduct. Without obligation to do so, Landlord may, in its sole discretion from time to time, carry insurance in amounts greater and/or for coverage additional to the coverage and amounts set forth above.

16.4 WAIVER OF SUBROGATION

(a) Landlord agrees that, if obtainable at no, or minimal, additional cost, and so long as the same is permitted under the laws of the State of California, it will include in its "All Risks" policies appropriate clauses pursuant to which the insurance companies (i) waive all right of subrogation against Tenant with respect to losses payable under such policies and/or (ii) agree

that such policies shall not be invalidated should the insured waive in writing prior to a loss any or all right of recovery against any party for losses covered by such policies.

(b) Tenant agrees to include, if obtainable at no, or minimal, additional cost, and so long as the same is permitted under the laws of the State of California, in its "All Risks" insurance policy or policies on Tenant Additions, whether or not removable, and on Tenant's furniture, furnishings, fixtures and other property removable by Tenant under the provisions of this Lease, appropriate clauses pursuant to which the insurance company or companies (i) waive the right of subrogation against Landlord and/or any tenant of space in the Building with respect to losses payable under such policy or policies and/or (ii) agree that such policy or policies shall not be invalidated should the insured waive in writing prior to a loss any or all right of recovery against any party for losses covered by such policy or policies. If Tenant is unable to obtain in such policy or policies either of the clauses described in the preceding sentence, Tenant shall, if legally possible and without necessitating a change in insurance carriers, have Landlord named in such policy or policies as an additional insured. If Landlord shall be named as an additional insured in accordance with the foregoing, Landlord agrees to endorse promptly to the order of Tenant, without recourse, any check, draft, or order for the payment of money representing the proceeds of any such policy or representing any other payment growing out of or connected with said policies, and Landlord does hereby irrevocably waive any and all rights in and to such proceeds and payments.

(c) Provided that Landlord's right of full recovery under its policy or policies aforesaid is not adversely affected or prejudiced thereby, Landlord hereby waives any and all right of recovery which it might otherwise have against Tenant, its servants, agents and employees, for loss or damage occurring to the Real Property and the fixtures, appurtenances and equipment therein, to the extent the same is covered by Landlord's insurance, notwithstanding that such loss or damage may result from the negligence or fault of Tenant, its servants, agents or employees. Provided that Tenant's right of full recovery under its aforesaid policy or policies is not adversely affected or prejudiced thereby, Tenant hereby waives any and all right of recovery which it might otherwise have against Landlord, its servants, and employees and against every other tenant of the Real Property who shall have executed a similar waiver as set forth in this Section 16.4(c) for loss or damage to Tenant Additions, whether or not removable, and to Tenant's furniture, furnishings, fixtures and other property removable by Tenant under the provisions hereof to the extent the same is coverable by Tenant's insurance required under this Lease, notwithstanding that such loss or damage may result from the negligence or fault of Landlord, its servants, agents or employees, or such other tenant and the servants, agents or employees thereof.

(d) Landlord and Tenant hereby agree to advise the other promptly if the clauses to be included in their respective insurance policies pursuant to subparagraphs (a) and (b) above cannot be obtained on the terms hereinbefore provided. Landlord and Tenant hereby also agree to notify the other promptly of any cancellation or change of the terms of any such policy that would affect such clauses.

16.5 NOTICE OF CASUALTY

Tenant shall give Landlord notice in case of a fire or accident in the Premises promptly after Tenant is aware of such event.

Article 17
WAIVER OF CLAIMS AND INDEMNITY

17.1 WAIVER OF CLAIMS

To the extent permitted by Law, Tenant hereby releases the Indemnitees from, and waives all claims for, damage to person or property sustained by Tenant or any occupant of the Premises or the Property resulting directly or indirectly from any existing or future condition, defect, matter or thing in and about the Premises or the Property or any part of either or any equipment or appurtenance therein, or resulting from any accident in or about the Premises or the Property, or resulting directly or indirectly from any act or neglect of any tenant or occupant of the Property or of any other person, including Landlord's agents and servants, except to the extent caused by the gross negligence or willful and wrongful act of any of the Indemnitees. To the extent permitted by Law, Tenant hereby waives any consequential damages, compensation or claims for inconvenience or loss of business, rents, or profits as a result of such injury or damage, whether or not caused by the gross negligence or willful and wrongful act of any of the Indemnitees. If any such damage, whether to the Premises or the Property or any part of either, or whether to Landlord or to other tenants in the Property, results from any act or neglect of Tenant, its employees, servants, agents, contractors, invitees or customers, Tenant shall be liable therefor and Landlord may, at Landlord's option, repair such damage and Tenant shall, upon demand by Landlord, as payment of additional Rent hereunder, reimburse Landlord within ten (10) days after demand for the total cost of such repairs, in excess of amounts, if any, paid to Landlord under insurance covering such damages. Tenant shall not be liable for any such damage caused by its acts or neglect if Landlord or a tenant has recovered the full amount of the damage from proceeds of insurance policies and the insurance company has waived its right of subrogation against Tenant.

17.2 INDEMNITY

To the extent permitted by Law, Tenant hereby indemnifies, and agrees to protect, defend and hold the Indemnitees harmless, against any and all actions, claims, demands, liability, costs and expenses, including attorneys' fees and expenses for the defense thereof, arising from Tenant's occupancy of the Premises, from the undertaking of any Tenant Additions or repairs to the Premises, from the conduct of Tenant's business on the Premises, or from any breach or default on the part of Tenant in the performance of any covenant or agreement on the part of Tenant to be performed pursuant to the terms of this Lease, or from any willful act or negligence of Tenant, its agents, contractors, servants, employees, customers or invitees, in or about the Premises or the Property or any part of either. In case of any action or proceeding brought against the Indemnitees by reason of any such claim, upon notice from Landlord, Tenant covenants to defend such action or proceeding by counsel chosen by Landlord, in Landlord's sole discretion. Landlord reserves the right to settle, compromise or dispose of any and all actions, claims and demands related to the foregoing indemnity. The foregoing indemnity shall not operate to relieve Indemnitees of liability to the extent such liability is caused by the willful and wrongful act of Indemnitees. Further, the foregoing indemnity is subject to and shall not diminish any waivers in effect in accordance with Section 16.4 by Landlord or its insurers to the extent of amounts, if any, paid to Landlord under its "All Risks" property insurance. This Article 17 shall survive the expiration or earlier termination of this Lease.

17.3 WAIVER OF CONSEQUENTIAL DAMAGES

To the extent permitted by law, Tenant hereby waives and releases the Indemnitees from any consequential damages, compensation or claims for inconvenience or loss of business, rents or profits as a result of any injury or damage, whether or not caused by the willful and wrongful act of any of the Indemnitees.

Article 18
RULES AND REGULATIONS

18.1 RULES

Tenant agrees for itself and for its subtenants, employees, agents, and invitees to comply with the rules and regulations listed on Exhibit C-2 attached hereto and with all reasonable modifications and additions thereto which Landlord may make from time to time.

18.2 ENFORCEMENT

Nothing in this Lease shall be construed to impose upon Landlord any duty or obligation to enforce the rules and regulations as set forth on Exhibit C-2 or as hereafter adopted, or the terms, covenants or conditions of any other lease as against any other tenant, and Landlord shall not be liable to Tenant for violation of the same by any other tenant, its servants, employees, agents, visitors or licensees. Landlord shall use reasonable efforts to enforce the rules and regulations of the Project in a uniform and non-discriminatory manner.

Article 19
LANDLORD'S RESERVED RIGHTS

Landlord shall have the following rights exercisable without notice to Tenant and without liability to Tenant for damage or injury to persons, property or business and without being deemed an eviction or disturbance of Tenant's use or possession of the Premises or giving rise to any claim for offset or abatement of Rent: (1) to change the Building's name or street address upon thirty (30) days' prior written notice to Tenant; (2) to install, affix and maintain all signs on the exterior and/or interior of the Building; (3) to designate and/or approve prior to installation, all types of signs, window shades, blinds, drapes, awnings or other similar items, and all internal lighting that may be visible from the exterior of the Premises; (4) upon reasonable notice to Tenant, to display the Premises to prospective purchasers and lenders at reasonable hours at any time during the Term and to prospective tenants at reasonable hours during the last twelve (12) months of the Term; (5) to grant to any party the exclusive right to conduct any business or render any service in or to the Building, provided such exclusive right shall not operate to prohibit Tenant from using the Premises for the purpose permitted hereunder; (6) to change the arrangement and/or location of entrances or passageways, doors and doorways, corridors, elevators, stairs, washrooms or public portions of the Building, and to close entrances, doors, corridors, elevators or other facilities, provided that such action shall not materially and adversely interfere with Tenant's access to the Premises or the Building; (7) to have access for Landlord and other tenants of the Building to any mail chutes and boxes located in or on the Premises as required by any applicable rules of the United States Post Office; and (8) to close the Building after Standard Operating Hours, except that Tenant and its employees and invitees shall be entitled to admission at all times, under such regulations as Landlord prescribes for security purposes.

Article 20
ESTOPPEL CERTIFICATE

20.1 IN GENERAL

Within ten (10) days after request therefor by Landlord, Mortgagee or any prospective mortgagee or owner, Tenant agrees as directed in such request to execute the proposed form of estoppel certificate (an "Estoppel Certificate") (which may require that such instrument be notarized), binding upon Tenant, certifying (i) that this Lease is unmodified and in full force and effect (or if there have been modifications, a description of such modifications and that this Lease as modified is in full force and effect); (ii) the dates to which Rent has been paid; (iii) that Tenant is in the possession of the Premises if that is the case; (iv) that Landlord is not in default under this Lease, or, if Tenant believes Landlord is in default, the nature thereof in detail; (v) that Tenant has no offsets or defenses to the performance of its obligations under this Lease (or if Tenant believes there are any offsets or defenses, a full and complete explanation thereof); (vi)

that the Premises have been completed in accordance with the terms and provisions hereof or the Workletter, that Tenant has accepted the Premises and the condition thereof and of all improvements thereto and has no claims against Landlord or any other party with respect thereto; (vii) that if an assignment of rents or leases has been served upon Tenant by a Mortgagee, Tenant will acknowledge receipt thereof and agree to be bound by the provisions thereof; (viii) that Tenant will give to the Mortgagee copies of all notices required or permitted to be given by Tenant to Landlord; and (ix) to any other information reasonably requested.

20.2 ENFORCEMENT

In the event that Tenant fails to timely deliver an Estoppel Certificate, then such failure shall be a Default for which there shall be no cure or grace period. In addition to any other remedy available to Landlord, Landlord may impose a charge equal to $500.00 for each day that Tenant fails to deliver an Estoppel Certificate; and (i) Tenant shall be bound to, and deemed to have irrevocably agreed to, the accuracy and truthfulness of the Estoppel Certificate delivered to Tenant, and (ii) Landlord, and any third party receiving such form of Estoppel Certificate, including a Mortgagee or purchaser, may rely upon the accuracy and truthfulness thereof.

Article 21
RELOCATION OF TENANT

[Intentionally omitted.]

Article 22
REAL ESTATE BROKERS

Tenant represents that, except for the broker(s) listed in Section 1.1, Tenant has not dealt with any real estate broker, sales person, or finder in connection with this Lease, and no such person initiated or participated in the negotiation of this Lease, or showed the Premises to Tenant. Tenant hereby agrees to indemnify, protect, defend and hold Landlord and the Indemnitees, harmless from and against any and all liabilities and claims for commissions and fees arising out of a breach of the foregoing representation, as well as from any claim or claims for any commission or fee by any broker or other party claiming to represent Tenant in connection with any future extensions or renewals of the Term. Landlord agrees to pay any commission to which the brokers listed in Section 1.1 are entitled in connection with this Lease pursuant to Landlord's written agreement with such broker.

Article 23
MORTGAGEE PROTECTION

23.1 SUBORDINATION AND ATTORNMENT

This Lease is and shall be expressly subject and subordinate at all times to (i) any ground or underlying lease of the Real Property, now or hereafter existing, and all amendments, extensions, renewals and modifications to any such lease, and (ii) the lien of any mortgage or trust deed now or hereafter encumbering fee title to the Real Property and/or the leasehold estate under any such lease, and all amendments, extensions, renewals, replacements and modifications of such mortgage or trust deed and/or the obligation secured thereby, unless such ground lease or ground lessor, or mortgage, trust deed or Mortgagee, expressly provides or elects that this Lease shall be superior to such lease or mortgage or trust deed. If any such mortgage or trust deed is foreclosed (including any sale of the Real Property pursuant to a power of sale), or if any such lease is terminated, upon request of the Mortgagee or ground lessor, as the case may be, Tenant shall attorn to the purchaser at the foreclosure sale or to the ground lessor under such lease, as the case may be, provided, however, that such purchaser or ground lessor shall not be (i) bound by

any payment of Rent for more than one month in advance except payments in the nature of security for the performance by Tenant of its obligations under this Lease; (ii) subject to any offset, defense or damages arising out of a default of any obligations of any preceding Landlord; or (iii) bound by any amendment or modification of this Lease made without the written consent of the Mortgagee or ground lessor; or (iv) liable for any security deposits not actually received in cash by such purchaser or ground lessor. This subordination shall be self-operative and no further certificate or instrument of subordination need be required by any such Mortgagee or ground lessor. In confirmation of such subordination, however, Tenant shall execute promptly any reasonable certificate or instrument that Landlord, Mortgagee or ground lessor may request. Tenant hereby constitutes Landlord as Tenant's attorney-in-fact to execute such certificate or instrument for and on behalf of Tenant upon Tenant's failure to do so within fifteen (15) days after a request to do so. Upon request by such successor in interest, Tenant shall execute and deliver reasonable instruments confirming the attornment provided for herein. The terms of this paragraph shall survive any termination of this Lease by reason of foreclosure.

23.2 MORTGAGEE PROTECTION

Tenant agrees to give any Mortgagee or ground lessor, by registered or certified mail, a copy of any notice of default served upon Landlord by Tenant, provided that prior to such notice Tenant has received notice (by way of service on Tenant of a copy of an assignment of rents and leases, or otherwise) of the address of such Mortgagee or ground lessor. Tenant further agrees that if Landlord shall have failed to cure such default within the time provided for in this Lease, then the Mortgagee or ground lessor shall have an additional thirty (30) days after receipt of notice thereof within which to cure such default or if such default cannot be cured within that time, then such additional notice time as may be necessary, if, within such thirty (30) days, any Mortgagee or ground lessor has commenced and is diligently pursuing the remedies necessary to cure such default (including commencement of foreclosure proceedings or other proceedings to acquire possession of the Real Property, if necessary to effect such cure). Such period of time shall be extended by any period within which such Mortgagee or ground lessor is prevented from commencing or pursuing such foreclosure proceedings or other proceedings to acquire possession of the Real Property by reason of Landlord's bankruptcy. Until the time allowed as aforesaid for Mortgagee or ground lessor to cure such defaults has expired without cure, Tenant shall have no right to, and shall not, terminate this Lease on account of default. This Lease may not be modified or amended so as to reduce the Rent or shorten the Term, or so as to adversely affect in any other respect to any material extent the rights of Landlord, nor shall this Lease be canceled or surrendered, without the prior written consent, in each instance, of the ground lessor or the Mortgagee.

Article 24
NOTICES

(a) All notices, demands or requests provided for or permitted to be given pursuant to this Lease must be in writing and shall be personally delivered, sent by Federal Express or other reputable overnight courier service, or mailed by first class, registered or certified United States mail, return receipt requested, postage prepaid.

(b) All notices, demands or requests to be sent pursuant to this Lease shall be deemed to have been properly given or served by delivering or sending the same in accordance with this Section, addressed to the parties hereto at their respective addresses listed in Section 1.1.

(c) Notices, demands or requests sent by mail or overnight courier service as described above shall be effective upon deposit in the mail or with such courier service. However, except with respect to a notice given under Code of Civil Procedure Section 1161 et seq., the time period in which a response to any such notice, demand or request must be given

shall commence to run from (i) in the case of delivery by mail, the date of receipt on the return receipt of the notice, demand or request by the addressee thereof, or (ii) in the case of delivery by Federal Express or other overnight courier service, the date of acceptance of delivery by an employee, officer, director or partner of Landlord or Tenant. Rejection or other refusal to accept or the inability to deliver because of changed address of which no notice was given, as indicated by advice from Federal Express or other overnight courier service or by mail return receipt, shall be deemed to be receipt of notice, demand or request sent. Notices may also be served by personal service upon any officer, director or partner of Landlord or Tenant, and shall be effective upon such service.

(d) By giving to the other party at least thirty (30) days written notice thereof, either party shall have the right from time to time during the term of this Lease to change their respective addresses for notices, statements, demands and requests, provided such new address shall be within the United States of America.

Article 25
FURNITURE, FIXTURES AND EQUIPMENT

During the Term, at no charge to Tenant, Tenant shall be permitted to use the existing office and laboratory furniture, fixtures and equipment located in the Phase I or Phase II Premises (as applicable) as of the Phase I or Phase II Commencement Date (as applicable), and as described in more particular detail in Exhibit E attached hereto (the "FF&E"). Tenant shall accept the FF&E in its current "AS-IS" condition and "WITH ALL FAULTS". Landlord specifically disclaims all express or implied warranties regarding the existence or condition of, such FF&E, including without limitation the implied warranties of merchantability and suitability for a particular purpose. For purposes of documenting the current condition of the FF&E, Tenant and Landlord shall, prior to the Phase I Commencement Date, as to the Phase I Premises, and prior to the Phase II Commencement Date, as to the Phase II Premises, conduct a joint walk-through of the Premises in order to inventory items of damage or disrepair in the FF&E. No item of the FF&E shall be removed from the Premises without Landlord's prior written consent; provided, however, not more than once during the Term, Tenant may request in writing that Landlord remove certain portions of the original FF&E, upon which removal the remaining FF&E shall be considered the "FF&E" under this Lease. Landlord and Tenant may enter into a reasonable form of letter agreement or other documentation evidencing such remaining FF&E. In addition, not withstanding anything herein to the contrary, Tenant may elect, via a written notice delivered to Landlord not later than sixty (60) days following the Phase II Commencement Date, to offer to purchase all or a portion of the remaining FF&E (the "Proposed Purchased FF&E"), and if Landlord and Tenant agree upon the price for such Proposed Purchased FF&E, then following any such purchase, any portion of the Proposed Purchased FF&E that is actually purchased by Tenant shall be referred to in this Article 25 as the "Purchased FF&E", and Tenant will have no remaining obligations to Landlord to manage, repair or replace any portion of the Purchased FF&E. Upon such agreement, the parties shall enter into a commercially reasonable bill of sale for such Purchased FF&E, and Landlord shall assign, transfer and convey to Tenant all of Landlord's right, title and interest in and to the Purchased FF&E on an "as is, where is" basis. Landlord represents and warrants that it has the legal right and ownership to the FF&E and has the legal ability to transfer the ownership thereof to Tenant. Tenant shall use the FF&E only for the purposes for which such FF&E is intended and, subject to the terms of this Article 25 with respect to Purchased FF&E, if Tenant does not elect to purchase all of the FF&E pursuant to this Article 25, then Tenant shall be responsible for the proper maintenance, care and repair of the remaining unpurchased FF&E (the "Unpurchased FF&E"), at Tenant's sole cost and expense. On or about the date of expiration of the Term, provided that Tenant did not exercise its right to acquire all of the FF&E, the parties shall once again conduct a walk-through of the Premises to catalog any items of damage, disrepair, misuse or loss among the Unpurchased FF&E (reasonable wear and tear excepted), and Tenant shall be

responsible, at Tenant's sole cost and expense, for curing any such items (including, with respect to loss, replacing any lost item with a substantially similar new item reasonably acceptable to Landlord). If Tenant does not elect to purchase all of the FF&E pursuant to this Article 25, then Tenant shall not modify, reconfigure or relocate any of the Unpurchased FF&E except with the advanced written permission of Landlord, and any work of modifying any of the Unpurchased FF&E (including, without limitation, changing the configuration of, "breaking down" or reassembly of cubicles or other modular furniture, if any) shall be performed at Tenant's sole cost using Landlord's specified vendors or an alternate vendor approved in writing by Landlord (such approval to be granted or withheld on Landlord's good faith discretion, based upon Landlord's assessment of factors which include, without limitation, whether the performance by such vendor will void applicable warranties for such furniture and whether such vendor is sufficiently experienced in the design of such furniture). If Tenant does elect to purchase any of the FF&E, then Tenant shall remove the Purchased FF&E upon the expiration or earlier termination of the Term in accordance with Article 12 above. Notwithstanding anything herein to the contrary, in no event shall Tenant have any duty or obligation to replace any Unpurchased FF&E that does not have a useful life extending beyond the Term.

Article 26
MISCELLANEOUS

26.1 LATE CHARGES

(a) All payments required hereunder (other than the Monthly Base Rent, Rent Adjustments, and Rent Adjustment Deposits, which shall be due as hereinbefore provided) to Landlord shall be paid within ten (10) business days after Landlord's demand therefor. All such amounts (including Monthly Base Rent, Rent Adjustments, and Rent Adjustment Deposits) not paid when due shall bear interest from the date due until the date paid at the Default Rate in effect on the date such payment was due.

(b) In the event Tenant is more than five (5) business days late in paying any installment of Rent due under this Lease, Tenant shall pay Landlord a late charge equal to five percent (5%) of the delinquent installment of Rent. The parties agree that (i) such delinquency will cause Landlord to incur costs and expenses not contemplated herein, the exact amount of which will be difficult to calculate, including the cost and expense that will be incurred by Landlord in processing each delinquent payment of rent by Tenant, (ii) the amount of such late charge represents a reasonable estimate of such costs and expenses and that such late charge shall be paid to Landlord for each delinquent payment in addition to all Rent otherwise due hereunder. The parties further agree that the payment of late charges and the payment of interest provided for in subparagraph (a) above are distinct and separate from one another in that the payment of interest is to compensate Landlord for its inability to use the money improperly withheld by Tenant, while the payment of late charges is to compensate Landlord for its additional administrative expenses in handling and processing delinquent payments.

(c) Payment of interest at the Default Rate and/or of late charges shall not excuse or cure any default by Tenant under this Lease, nor shall the foregoing provisions of this Article or any such payments prevent Landlord from exercising any right or remedy available to Landlord upon Tenant's failure to pay Rent when due, including the right to terminate this Lease.

26.2 NO JURY TRIAL; VENUE; JURISDICTION

To the fullest extent permitted by Laws, each party hereto (which includes any assignee, successor, heir or personal representative of a party) shall not seek a jury trial, hereby waives trial by jury, and hereby further waives any objection to venue in the County in which the Project is located, and agrees and consents to personal jurisdiction of the courts of the State of

California, in any action or proceeding or counterclaim brought by any party hereto against the other on any matter whatsoever arising out of or in any way connected with this Lease, the relationship of Landlord and Tenant, Tenant's use or occupancy of the Premises, or any claim of injury or damage, or the enforcement of any remedy under any statute, emergency or otherwise, whether any of the foregoing is based on this Lease or on tort law. No party will seek to consolidate any such action in which a jury has been waived with any other action in which a jury trial cannot or has not been waived. It is the intention of the parties that these provisions shall be subject to no exceptions. The provisions of this Section shall survive the expiration or earlier termination of this Lease.

26.3 NO DISCRIMINATION

Tenant agrees for Tenant and Tenant's heirs, executors, administrators, successors and assigns and all persons claiming under or through Tenant, and this Lease is made and accepted upon and subject to the following conditions: that there shall be no discrimination against or segregation of any person or group of persons on account of race, color, creed, religion, sex, marital status, national origin or ancestry (whether in the leasing, subleasing, transferring, use, occupancy, tenure or enjoyment of the Premises or otherwise) nor shall Tenant or any person claiming under or through Tenant establish or permit any such practice or practices of discrimination or segregation with reference to the use or occupancy of the Premises by Tenant or any person claiming through or under Tenant.

26.4 FINANCIAL STATEMENTS

Within ten (10) days after written request from Landlord from time to time during the Term, Tenant shall provide Landlord with current financial statements setting forth Tenant's financial condition and net worth for the most recent quarter, including balance sheets and statements of profits and losses. Such statements shall be prepared by an independent accountant and certified by Tenant's president, chief executive officer or chief financial officer. Landlord shall keep such financial information confidential and shall only disclose such information to Landlord's lenders, consultants, purchasers or investors, or other agents (who shall be subject to the same confidentiality obligations) on a need to know basis in connection with the administration of this Lease.

26.5 OPTION

This Lease shall not become effective as a lease or otherwise until executed and delivered by both Landlord and Tenant. The submission of this Lease to Tenant does not constitute a reservation of or option for the Premises, but when executed by Tenant and delivered to Landlord, this Lease shall constitute an irrevocable offer by Tenant in effect for fifteen (15) days to lease the Premises on the terms and conditions herein contained.

26.6 TENANT AUTHORITY

Tenant represents and warrants to Landlord that it has full authority and power to enter into and perform its obligations under this Lease, that the person executing this Lease is fully empowered to do so, and that no consent or authorization is necessary from any third party. Landlord may request that Tenant provide Landlord evidence of Tenant's authority.

26.7 ENTIRE AGREEMENT

This Lease, the Exhibits, and Riders attached hereto contain the entire agreement between Landlord and Tenant concerning the Premises and there are no other agreements, either oral or

written, and no other representations or statements, either oral or written, on which Tenant has relied. This Lease shall not be modified except by a writing executed by Landlord and Tenant.

26.8 MODIFICATION OF LEASE FOR BENEFIT OF MORTGAGEE

If Mortgagee of Landlord requires a modification of this Lease which shall not result in any increased cost or expense to Tenant or in any other substantial and adverse change in the rights and obligations of Tenant hereunder, then Tenant agrees that this Lease may be so modified.

26.9 EXCULPATION

Tenant agrees, on its behalf and on behalf of its successors and assigns, that any liability or obligation under this Lease shall only be enforced against Landlord's equity interest in the Property up to a maximum of Five Million Dollars ($5,000,000.00) and in no event against any other assets of Landlord, or Landlord's members, officers, directors or partners, and that any liability of Landlord with respect to this Lease shall be so limited and Tenant shall not be entitled to any judgment in excess of such amount. Notwithstanding anything to the contrary contained herein, in no event shall Landlord be liable to Tenant for consequential, punitive or special damages with respect to this Lease.

26.10 ACCORD AND SATISFACTION

No payment by Tenant or receipt by Landlord of a lesser amount than any installment or payment of Rent due shall be deemed to be other than on account of the amount due, and no endorsement or statement on any check or any letter accompanying any check or payment of Rent shall be deemed an accord and satisfaction, and Landlord may accept such check or payment without prejudice to Landlord's right to recover the balance of such installment or payment of Rent or pursue any other remedies available to Landlord. No receipt of money by Landlord from Tenant after the termination of this Lease or Tenant's right of possession of the Premises shall reinstate, continue or extend the Term. Receipt or acceptance of payment from anyone other than Tenant, including an assignee of Tenant, is not a waiver of any breach of Article 10, and Landlord may accept such payment on account of the amount due without prejudice to Landlord's right to pursue any remedies available to Landlord.

26.11 LANDLORD'S OBLIGATIONS ON SALE OF BUILDING

In the event of any sale or other transfer of the Building, Landlord shall be entirely freed and relieved of all agreements and obligations of Landlord hereunder accruing or to be performed after the date of such sale or transfer, and any remaining liability of Landlord with respect to this Lease shall be limited to the dollar amount specified in Section 25.9 and Tenant shall not be entitled to any judgment in excess of such amount. Landlord shall have the right to assign this Lease to an entity comprised of the principals of Landlord or any Landlord Affiliate. Upon such assignment and assumption of the obligations of Landlord hereunder, Landlord shall be entirely freed and relieved of all obligations hereunder.

26.12 BINDING EFFECT

Subject to the provisions of Article 10, this Lease shall be binding upon and inure to the benefit of Landlord and Tenant and their respective heirs, legal representatives, successors and permitted assigns.

26.13 CAPTIONS

The Article and Section captions in this Lease are inserted only as a matter of convenience and in no way define, limit, construe, or describe the scope or intent of such Articles and Sections.

26.14 TIME; APPLICABLE LAW; CONSTRUCTION

Time is of the essence of this Lease and each and all of its provisions. This Lease shall be construed in accordance with the Laws of the State of California. If more than one person signs this Lease as Tenant, the obligations hereunder imposed shall be joint and several. If any term, covenant or condition of this Lease or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Lease, or the application of such term, covenant or condition to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby and each item, covenant or condition of this Lease shall be valid and be enforced to the fullest extent permitted by Law. Wherever the term "including" or "includes" is used in this Lease, it shall have the same meaning as if followed by the phrase "but not limited to". The language in all parts of this Lease shall be construed according to its normal and usual meaning and not strictly for or against either Landlord or Tenant.

26.15 ABANDONMENT

In the event Tenant vacates or abandons the Premises but is otherwise in compliance with all the terms, covenants and conditions of this Lease, Landlord shall (i) have the right to enter into the Premises in order to show the space to prospective tenants, (ii) have the right to reduce the services provided to Tenant pursuant to the terms of this Lease to such levels as Landlord reasonably determines to be adequate services for an unoccupied premises, and (iii) during the last six (6) months of the Term, have the right to prepare the Premises for occupancy by another tenant upon the end of the Term. Tenant expressly acknowledges that in the absence of written notice pursuant to Section 11.2(b) or pursuant to California Civil Code Section 1951.3 terminating Tenant's right to possession, none of the foregoing acts of Landlord or any other act of Landlord shall constitute a termination of Tenant's right to possession or an acceptance of Tenant's surrender of the Premises, and this Lease shall continue in effect.

26.16 LANDLORD'S RIGHT TO PERFORM TENANT'S DUTIES

If Tenant fails timely to perform any of its duties under this Lease, Landlord shall have the right (but not the obligation), to perform such duty on behalf and at the expense of Tenant without prior notice to Tenant, and all sums expended or expenses incurred by Landlord in performing such duty shall be deemed to be additional Rent under this Lease and shall be due and payable upon demand by Landlord.

26.17 SECURITY SYSTEM

Landlord, in its sole and absolute discretion, shall install certain card key access and video camera systems respecting certain main entry points of the Building. Subject to the foregoing, Landlord shall not be obligated to provide or maintain any security patrol or security system. Landlord shall not be responsible for the quality of any such patrol or system which may be provided hereunder or for damage or injury to Tenant, its employees, invitees or others due to the failure, action or inaction of such patrol or system.

26.18 NO LIGHT, AIR OR VIEW EASEMENTS

Any diminution or shutting off of light, air or view by any structure which may be erected on lands of or adjacent to the Project shall in no way affect this Lease or impose any liability on Landlord.

26.19 RECORDATION

Neither this Lease, nor any notice nor memorandum regarding the terms hereof, shall be recorded by Tenant. Any such unauthorized recording shall be a Default for which there shall be no cure or grace period. Tenant agrees to execute and acknowledge, at the request of Landlord, a memorandum of this Lease, in recordable form.

26.20 SURVIVAL

The waivers of the right of jury trial, the other waivers of claims or rights, the releases and the obligations of Tenant under this Lease to indemnify, protect, defend and hold harmless Landlord and/or Indemnitees shall survive the expiration or termination of this Lease, and so shall all other obligations or agreements which by their terms survive expiration or termination of this Lease.

26.21 OFAC

(a) Tenant hereby represents, warrants and covenants to Landlord, either that (i) Tenant is regulated by the SEC, FINRA or the Federal Reserve (a "Regulated Entity") or (ii) neither Tenant nor any person or entity that directly or indirectly (A) controls Tenant or (B) has an ownership interest in Tenant of twenty-five percent (25%) or more, appears on the list of Specially Designated Nationals and Blocked Persons ("OFAC List") published by the Office of Foreign Assets Control ("OFAC") of the U.S. Department of the Treasury.

(b) Tenant covenants that during the term of this Lease to provide to Landlord information reasonably requested by Landlord including without limitation, organizational structural charts and organizational documents which Landlord may deem to be necessary ("Tenant OFAC Information") in order for Landlord to confirm Tenant's continuing compliance with the provisions of this Article. Tenant represents and warrants that the Tenant OFAC Information it has provided or to be provided to Landlord or Landlord's Broker in connection with the execution of this Lease is true and complete.

(c) Landlord advises Tenant hereby that the purpose of this Section is to provide to Landlord information and assurances to enable Landlord to comply with the Laws relating to OFAC.

(d) Tenant acknowledges that the breach of any of the representations, warranties and/or covenants by Tenant under this Section 25.21 shall be an immediate Default under this Lease.

26.22 INSPECTION BY A CASP IN ACCORDANCE WITH CIVIL CODE SECTION 1938.

Landlord discloses that to Landlord's knowledge, neither the Building nor the Premises have undergone inspection by a Certified Access Specialist. Furthermore, pursuant to Section 1938 of the California Civil Code, Landlord notifies Tenant of the following: "A Certified Access Specialist (CASp) can inspect the subject premises and determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although California state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of

the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of any such CASp inspection, the payment of the costs and fees for the CASp inspection and the cost of making any repairs necessary to correct violations of construction-related accessibility standards within the Premises." Tenant agrees that (a) Tenant may, at its option and at its sole cost, cause a CASp to inspect the Premises and determine whether the Premises complies with all of the applicable construction-related accessibility standards under California law, (b) the parties shall mutually coordinate and reasonably approve of the timing of any such CASp inspection so that Landlord may, at its option, have a representative present during such inspection, and (c) Tenant shall be solely responsible for the cost of any repairs necessary to correct violations of construction-related accessibility standards within the Premises and Building identified by any such CASp inspection, any and all such alterations and repairs within the Premises to be performed by Tenant shall be subject to Landlord's consent and in accordance with this Lease. Landlord and Tenant hereby agree that if Tenant elects to perform a CASp inspection of the Premises, Tenant will provide written notice to Landlord, and Landlord may elect, in Landlord's sole discretion, to retain a CASp to perform the inspection. If Landlord does not so elect, the time and manner of the CASp inspection is subject to the prior written approval of Landlord. In either event, the payment of the fee for the CASp inspection shall be borne by Tenant.

26.23 COUNTERPARTS

This Lease may be executed in any number of counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument. Telecopied signatures or signatures transmitted by electronic mail in so-called "pdf" format or via DocuSign or similar electronic means, may be used in place of original signatures on this Lease. Landlord and Tenant intend to be bound by the signatures on the telecopied or e-mailed document, are aware that the other party will rely on the telecopied or e-mailed signatures, and hereby waive any defenses to the enforcement of the terms of this Lease based on such telecopied or e-mailed signatures. Promptly following request by either party, the other party shall provide the requesting party with original signatures on this Lease.

26.24 EXHIBITS AND RIDERS

All exhibits, riders and/or addenda referred to in this Lease as an exhibit, rider, or addenda hereto, or attached hereto, are hereby incorporated into and made a part of this Lease.

[Signatures on Following Page]

IN WITNESS WHEREOF, this Lease has been executed as of the date set forth in Section 1.1 hereof.

TENANT:
LIGAND PHARMACEUTICALS INCORPORATED, a Delaware corporation

By: /s/ Matthew W. Foehr

Name: Matthew W. Foehr

Its: President/COO

By: /s/ Charles Berkman

Name: Charles Berkman

Its: SVP, General Counsel & Secretary

LANDLORD:
EMERY STATION OFFICE II, LLC,
a California limited liability company

By: Emery Station Associates II, LLC,
its Managing Member

By: Wareham-NZL, LLC,
its Managing Member

By: /s/ Richard K. Robbins
Richard K. Robbins
Its Manager

EXHIBIT A

OUTLINE OF PREMISES

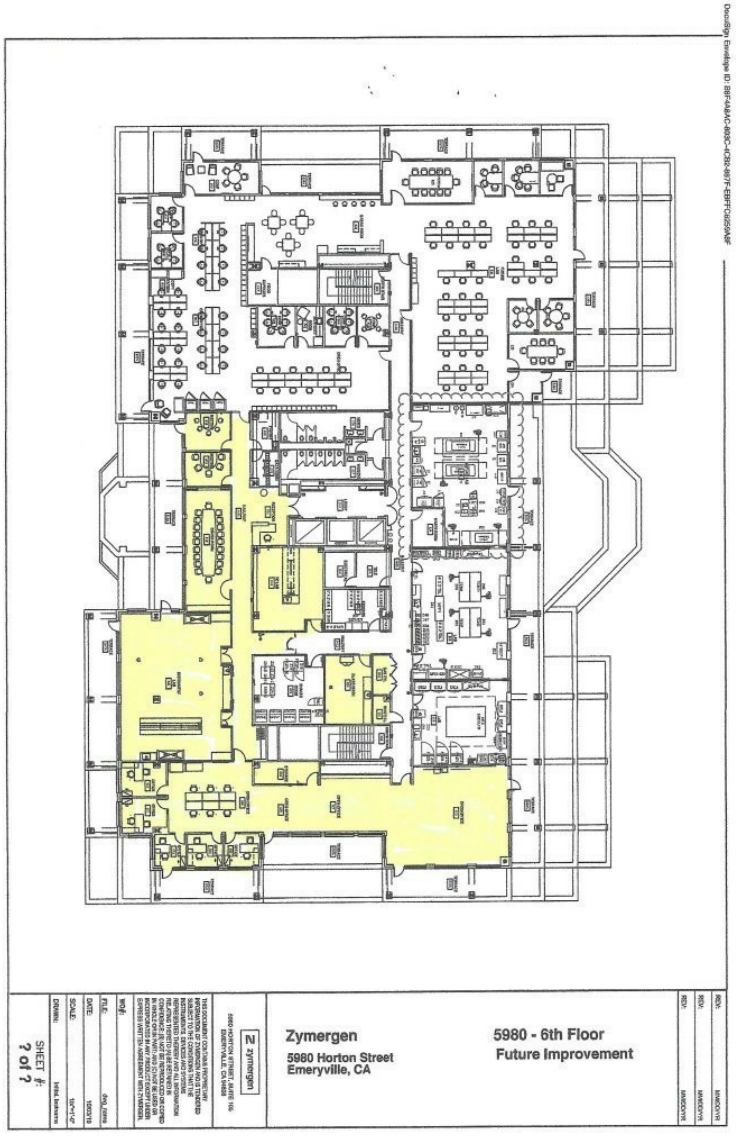

EXHIBIT B

WORKLETTER AGREEMENT
(Tenant Build / Allowance)

THIS WORK AGREEMENT (this "Work Agreement") is attached to and made a part of that certain Lease (the "Lease") between EMERY STATION OFFICE II, LLC ("Landlord"), and LIGAND PHARMACEUTICALS INCORPORATED ("Tenant"). All capitalized terms used but not defined herein shall have the respective meanings given such terms in the Lease. This Work Agreement sets forth the terms and conditions relating to the construction of Tenant Work (defined below) in the Premises.

1. Allowance; Tenant Work.

(a) Allowance. Tenant shall be entitled to the Tenant Improvement Allowance specified in Section 1.1 of the Lease for the costs relating to the design, permitting and construction of Tenant's improvements which are permanently affixed to the Premises (the "Tenant Work"). The portion of the Tenant Work that is in the Phase I Premises is defined as the "Phase I Tenant Work", and the portion of the Tenant Work that is in the Phase II Premises and a portion of the Phase I Premises is defined as the "Phase II Tenant Work". The parties contemplate that the Phase I Tenant Work shall be Substantially Completed prior to the Phase II Tenant Work. Except in connection with the performance of Landlord Work, in no event will Landlord be obligated to make disbursements pursuant to this Work Agreement in a total amount which exceeds the Tenant Improvement Allowance. Landlord will not charge Tenant any fees for Landlord's review, coordination and cooperation related to the Tenant Work.

(b) Disbursement of the Tenant Improvement Allowance.

(i) Tenant Improvement Allowance Items. Except as otherwise set forth in this Work Agreement, the Tenant Improvement Allowance shall be disbursed by Landlord only for the following items and costs (collectively the "Tenant Improvement Allowance Items"):

(A) Payment of the fees of the Architect, Construction Manager and the Building Consultants (as those terms are defined below) and payment of fees and costs reasonably incurred by Landlord for the review of the Construction Drawings (defined below) by Landlord or by Landlord's third party consultants;

(B) The payment of plan check, permit and license fees relating to the Tenant Work;

(C) The cost of construction of the Tenant Work, including, without limitation, after hours charges, testing and inspection costs, freight elevator usage, trash removal costs, and contractors' fees and general conditions;

(D) The cost of any changes to the Building when such changes are required by the Construction Drawings, such cost to include all direct architectural and/or engineering fees and expenses incurred in connection therewith;

(E) The cost of any changes to the Construction Drawings (defined below) or Tenant Work required by applicable building codes (collectively, "Code"); and

(F) The Coordination Fee (defined below).

(ii) Disbursement of Tenant Improvement Allowance. Landlord shall disburse the Tenant Improvement Allowance to reimburse Tenant for Tenant Improvement

Allowance Items and shall authorize the release of funds as follows, and otherwise in accordance with Landlord's standard disbursement process:

(A) *Phase I Tenant Work.*

1. Upon completion of the Phase I Tenant Work, Tenant shall deliver to Landlord an invoice from Tenant which will include: (i) a copy of all pay applications from Contractor (defined below) approved by Tenant and the Architect (hereafter defined), in a commercially reasonable form to be provided or approved in advance by Landlord, including a schedule of values and showing the percentage of completion, by trade, of the Phase I Tenant Work, which details the portion of the work completed and the portion not completed; (ii) invoices from all of Tenant's Agents (defined below) for labor rendered and materials delivered to the Phase I Premises; (iii) executed conditional mechanic's lien releases from all of Tenant's Agents who have lien rights with respect to the subject request for payment (along with unconditional mechanics' lien releases with respect to payments made pursuant to Tenant's prior submission hereunder) in compliance with all applicable laws; (iv) a copy of the check(s) which Tenant issued to pay the requested sums to Tenant's Agents; and (v) all other information reasonably requested by Landlord (collectively, the "Phase I Payment Request Supporting Documentation").

2. Within forty (40) days after Tenant's delivery to Landlord of all Phase I Payment Request Supporting Documentation, Landlord shall deliver to Tenant payment in an amount equal to the lesser of: (x) the amount so requested by Tenant, as set forth above, less a ten percent (10%) retention (the "Final Phase I Retention"), and (y) the balance of any remaining available portion of the Tenant Improvement Allowance allocable to Phase I (not including the Final Phase I Retention), provided that if Landlord, in good faith, disputes any item in a request for payment based on non-compliance of any work with the Approved Working Drawings (defined below) or due to any substandard work and delivers a written objection to such item setting forth with reasonable particularity Landlord's reasons for its dispute within five (5) business days following Tenant's submission of its Phase I Payment Request Supporting Documentation, Landlord may deduct the amount of such disputed item from the payment. Landlord and Tenant shall, in good faith, endeavor to diligently resolve any such dispute. Landlord's payment of such amounts shall not be deemed Landlord's approval or acceptance of the work furnished or materials supplied as set forth in Tenant's payment request.

3. Subject to the provisions of this Work Agreement, following the final completion of construction of the Phase I Tenant Work, Landlord shall deliver to Tenant a check made payable to Tenant, or a check or checks made payable to another party or parties as reasonably requested by Tenant, in the amount of the Final Phase I Retention, provided that (i) Tenant delivers to Landlord properly executed unconditional mechanics' lien releases from all of Tenant's Agents in compliance with all applicable laws, as reasonably determined by Landlord; (ii) Landlord has determined in good faith that no substandard work exists which adversely affects the mechanical, electrical, plumbing, heating, ventilating and air conditioning, life-safety or other systems of the Building, the curtain wall of the Building, the structure or exterior appearance of the Building; (iii) Architect delivers to Landlord a certificate, in a form reasonably acceptable to Landlord, certifying that the construction of the Phase I Tenant Work has been finally completed; (iv) Tenant supplies Landlord with evidence that all governmental approvals required for an occupant to legally occupy the Phase I Premises has been obtained (if required under any building permit issued for the Phase I Tenant Work); and (v) Tenant has fulfilled its Completion Obligations (defined below) relating to the Phase I Premises and has otherwise complied with Landlord's standard "close-out" requirements regarding city approvals, closeout tasks, closeout documentation regarding the general contractor, financial close-out matters, and Tenant's vendors.

(B) *Phase II Tenant Work.*

1. During construction of the Phase II Tenant Work, if Tenant desires payment for any portion of the Phase II Tenant Work that has then been completed, Tenant shall deliver to Landlord an invoice from Tenant which will include: (i) a copy of all pay applications from Contractor approved by Tenant and the Architect, in a commercially reasonable form to be provided or approved in advance by Landlord, including a schedule of values and showing the percentage of completion, by trade, of the Phase II Tenant Work, which details the portion of the work completed and the portion not completed; (ii) invoices from all of Tenant's Agents for labor rendered and materials delivered to the Phase II Premises; (iii) executed conditional mechanic's lien releases from all of Tenant's Agents who have lien rights with respect to the subject request for payment (along with unconditional mechanics' lien releases with respect to payments made pursuant to Tenant's prior submission hereunder) in compliance with all applicable laws; (iv) a copy of the check(s) which Tenant issued to pay the requested sums to Tenant's Agents; and (v) all other information reasonably requested by Landlord (collectively, the "Phase II Payment Request Supporting Documentation").

2. Within forty (40) days after Tenant's delivery to Landlord of all Phase II Payment Request Supporting Documentation, Landlord shall deliver to Tenant payment in an amount equal to the lesser of: (x) the amount so requested by Tenant, as set forth above, less (1) the applicable Phase II Over-Allowance Amount (defined in Section 3(b)(i)(B) below) and (2) a ten percent (10%) retention (the aggregate amount of such retentions to be known as the "Final Phase II Retention"), and (y) the balance of any remaining available portion of the Tenant Improvement Allowance allocable to Phase II (not including the Final Phase II Retention), provided that if Landlord, in good faith, disputes any item in a request for payment based on non-compliance of any work with the Approved Working Drawings or due to any substandard work and delivers a written objection to such item setting forth with reasonable particularity Landlord's reasons for its dispute within five (5) business days following Tenant's submission of its Phase II Payment Request Supporting Documentation, Landlord may deduct the amount of such disputed item from the payment. Landlord and Tenant shall, in good faith, endeavor to diligently resolve any such dispute. Landlord's payment of such amounts shall not be deemed Landlord's approval or acceptance of the work furnished or materials supplied as set forth in Tenant's payment request.

3. Subject to the provisions of this Work Agreement, following the final completion of construction of the Phase II Tenant Work, Landlord shall deliver to Tenant a check made payable to Tenant, or a check or checks made payable to another party or parties as reasonably requested by Tenant, in the amount of the Final Phase II Retention, provided that (i) Tenant delivers to Landlord properly executed unconditional mechanics' lien releases from all of Tenant's Agents in compliance with all applicable laws, as reasonably determined by Landlord; (ii) Landlord has determined in good faith that no substandard work exists which adversely affects the mechanical, electrical, plumbing, heating, ventilating and air conditioning, life-safety or other systems of the Building, the curtain wall of the Building, the structure or exterior appearance of the Building; (iii) Architect delivers to Landlord a certificate, in a form reasonably acceptable to Landlord, certifying that the construction of the Phase II Tenant Work has been finally completed; (iv) Tenant supplies Landlord with evidence that all governmental approvals required for an occupant to legally occupy the Phase II Premises has been obtained; and (v) Tenant has fulfilled its Completion Obligations relating to the Phase II Premises and has otherwise complied with Landlord's standard "close-out" requirements regarding city approvals, closeout tasks, closeout documentation regarding the general contractor, financial close-out matters, and Tenant's vendors.

2. Construction Drawings

(a) Selection of Architect; Construction Drawings.

(i) Tenant shall retain ID Studios as architect, which architect is hereby approved by Landlord (the "Architect"), to prepare the Construction Drawings. Tenant shall

retain engineering consultants approved in writing, in advance by Landlord, such approval not to be unreasonably withheld (the "Building Consultants") to prepare all plans and engineering working drawings and perform all work relating to mechanical, electrical and plumbing ("MEP"), HVAC/Air Balancing, life-safety, structural, sprinkler and riser work. The MEP work will be performed on a design-build basis, using a mutually acceptable subcontractor.

(ii) The plans and drawings to be prepared by Architect and the Building Consultants hereunder (i.e., both the Space Plan and the Working Drawings, as each term is defined below) shall be known collectively as the "Construction Drawings." All MEP drawings will be prepared on a "design-build-assist" basis with a Landlord-approved MEP basis of design ("BOD"), as prepared by an approved MEP engineer consultant. Landlord's review of the Construction Drawings shall be for its sole purpose and shall not obligate Landlord to review the same, for quality, design, Code compliance or other like matters. Accordingly, notwithstanding that any Construction Drawings are reviewed by Landlord or its space planner, architect, engineers and consultants, and notwithstanding any advice or assistance which may be rendered to Tenant by Landlord or Landlord's space planner, architect, engineers, and consultants, Landlord shall have no liability whatsoever in connection therewith and shall not be responsible for any omissions or errors contained in the Construction Drawings.

(b) Space Plan. Tenant shall supply Landlord for Landlord's review and approval Tenant's proposed space plan or space plans for the Premises (collectively, the "Space Plan") before any architectural working drawings or engineering drawings have been commenced. The Space Plan shall include a layout and designation of all laboratory facilities, offices, rooms and other partitioning, their intended use, and equipment to be contained therein. Landlord may request clarification or more specific drawings for special use items not included in the Space Plan. Landlord shall advise Tenant within five (5) business days after Landlord's receipt of the Space Plan (or, if applicable, such additional information requested by Landlord pursuant to the provisions of the immediately preceding sentence) if the same is approved or is unsatisfactory or incomplete in any respect. Upon any disapproval by Landlord, Tenant shall promptly cause the Space Plan to be revised to correct any deficiencies or other matters Landlord may reasonably require.

(c) Working Drawings. After the Space Plan has been approved by Landlord, Tenant shall supply the Architect and the Building Consultants with a complete listing of standard and non-standard equipment and specifications, including, without limitation, B.T.U. calculations, electrical requirements and special electrical receptacle requirements, to enable the Architect and the Building Consultants to complete the Working Drawings and shall cause the Architect and the Engineers to promptly complete the architectural and engineering drawings, and Architect shall compile a fully coordinated set of drawings, including but not limited to architectural, structural, mechanical, electrical, plumbing, fire sprinkler and life safety in a form which is complete to allow subcontractors to bid on the work and to obtain all applicable permits (collectively, the "Working Drawings") and shall submit the same to Landlord for Landlord's review and approval. Landlord shall advise Tenant within five (5) business days after Landlord's receipt of the Working Drawings if Landlord, in good faith, determines that the same are approved or are unsatisfactory or incomplete. If Tenant is so advised, Tenant shall promptly revise the Working Drawings to correct any deficiencies or other matters Landlord may reasonably require. Tenant may elect to submit the Working Drawings to the appropriate city/governmental agency to start the permit process prior to receiving Landlord's approval of the Working Drawings; provided, however, the Working Drawings shall not be deemed approved by Landlord until Tenant has revised the Working Drawings to correct any deficiencies or other matters Landlord may reasonably require.

(d) Landlord's Approval. Tenant acknowledges that it shall be deemed reasonable for Landlord to disapprove the Space Plan and any subsequent Working Drawings unless, at a minimum, the same are prepared on the basis that: (i) the Tenant Work as specified and designed comply with the requirements of the Project's Sustainability Practices (if any), and (ii) the

sprinkler systems shall be designed in compliance with the specifications provided by FM Global. Additionally, Landlord's approval of any matter under this Work Agreement may be withheld if Landlord reasonably determines that the same would violate any provision of the Lease or this Work Agreement or would adversely affect the mechanical, electrical, plumbing, heating, ventilating and air conditioning, life-safety or other systems of the Building, the curtain wall of the Building, the structure or exterior appearance of the Building.

3. Construction of the Tenant Work

(a) Tenant's Selection of Contractors.

(i) The Contractor. Tenant shall retain WCI as general contractor, which general contractor is hereby approved by Landlord, to construct the Tenant Work ("Contractor").

(ii) Tenant's Agents. All subcontractors, laborers, materialmen, and suppliers used by Tenant (such subcontractors, laborers, materialmen, and suppliers, and the Contractor to be known collectively as "Tenant's Agents") must be approved in writing by Landlord, in Landlord's sole discretion, but not unreasonably withheld, provided that Landlord will require Tenant to retain the Building Consultants. All of Tenant's Agents shall be licensed in the State of California and capable of being bonded. Notwithstanding anything herein to the contrary, in connection with Tenant's construction of the Tenant Work, any of Tenant's Agents that are (A) to be reimbursed to Tenant through the Tenant Improvement Allowance, and/or (B) involved in principal construction trades, shall be union-affiliated and in compliance with all then existing master labor agreements.

(iii) Construction Manager. Tenant shall retain a qualified construction manager (the "Construction Manager"). The Construction Manager shall be considered one of Tenant's Agents for all purposes under this Workletter. The Construction Manager shall, at a minimum, attend all meetings with the Contractor (as set forth in Section 3(b)(vi) below).

(b) Construction of Tenant Work by Tenant's Agents.

(i) Construction Contract; Over-Allowance Amounts.

(A) Tenant shall enter into a construction contract and general conditions with Contractor for construction of the Phase I Tenant Work (the "Phase I Contract"). Prior to the commencement of the construction of the Phase I Tenant Work, Tenant shall provide Landlord with a schedule of values consisting of a detailed breakdown, by trade, of the final costs to be incurred or which have been incurred, for all Tenant Improvement Allowance Items in connection with the design and construction of the Phase I Tenant Work, which costs form the basis for the amount of the Phase I Contract (the "Final Phase I Costs"). Tenant shall be solely responsible for the difference between the amount of the Phase I Final Costs and the amount of the Tenant Improvement Allowance allocable to the Phase I Tenant Work.

(B) Tenant shall enter into a construction contract and general conditions with Contractor for construction of the Phase II Tenant Work (the "Phase II Contract"). Prior to the commencement of the construction of the Phase II Tenant Work, Tenant shall provide Landlord with a schedule of values consisting of a detailed breakdown, by trade, of the final costs to be incurred or which have been incurred, for all Tenant Improvement Allowance Items in connection with the design and construction of the Phase II Tenant Work, which costs form the basis for the amount of the Phase II Contract ("Final Phase II Costs"). Prior to the commencement of construction of the Phase II Tenant Work, Landlord and Tenant shall identify the amount (the "Phase II Over-Allowance Amount") equal to the difference between the amount of the Phase II Final Costs and the amount of the Tenant Improvement Allowance allocable to the Phase II Tenant Work (less any portion thereof already disbursed by Landlord, or in the process of being disbursed by Landlord, on or before the commencement of

construction of the Phase II Tenant Work), and Landlord will reimburse Tenant on a periodic basis, as described in Section 1.2(b)(ii) above, for a percentage of each amount requested by the Contractor or otherwise to be disbursed under this Work Agreement, which percentage shall be equal to the Tenant Improvement Allowance allocable to the Phase II Tenant Work divided by the amount of the Final Phase II Costs (after deducting from the Final Phase II Costs any amounts expended in connection with the preparation of the Construction Drawings, and the cost of all other Tenant Improvement Allowance Items incurred prior to the commencement of construction of the Phase II Tenant Work), and Tenant shall be solely responsible for any Phase II Over-Allowance Amount. If, after the Final Phase II Costs have been initially determined, the costs relating to the design and construction of the Phase II Tenant Work shall change, any additional costs for such design and construction in excess of the Final Phase II Costs shall be added to the Phase II Over-Allowance Amount and the Final Phase II Costs, and Landlord's reimbursement percentage, shall be recalculated in accordance with the terms of the immediately preceding sentence.

(C) Notwithstanding anything set forth herein to the contrary, construction of the Tenant Work shall not commence until Tenant has procured and delivered to Landlord a copy of all applicable building permits for the applicable Tenant Work.

(ii) Construction Requirements.

(A) Landlord's General Conditions for Tenant's Agents and Tenant Improvement Work . Construction of the Tenant Work shall comply with the following: (1) the Tenant Work shall be constructed in strict accordance with the Approved Working Drawings and Landlord's then-current published construction guidelines; (2) Tenant's Agents shall submit schedules of all work relating to the Tenant Work to Landlord and Landlord shall, within five (5) business days after receipt thereof, inform Tenant's Agents of any changes which are necessary thereto, and Tenant's Agents shall adhere to such corrected schedule; and (3) Tenant shall abide by all rules made by Landlord's Building Manager with respect to the use of contractor parking, materials delivery, freight, loading dock and service elevators, any required shutdown of utilities (including life-safety systems), storage of materials, coordination of work with the contractors of Landlord, and any other matter in connection with this Work Agreement, including, without limitation, the construction of the Tenant Work, such requirements will not be unreasonable or differ from industry norms. Tenant shall pay an oversight and supervisory fee (the "Coordination Fee") to Landlord in an amount equal to one percent (1%) of the Final Costs.

(B) Indemnity. Tenant's indemnity of Landlord as set forth in the Lease shall also apply with respect to any and all costs, losses, damages, injuries and liabilities related in any way to any act or omission of Tenant or Tenant's Agents, or anyone directly or indirectly employed by any of them, or in connection with Tenant's non-payment of any amount arising out of the Tenant Work and/or Tenant's disapproval of all or any portion of any request for payment. Such indemnity by Tenant, as set forth in the Lease, shall also apply with respect to any and all costs, losses, damages, injuries and liabilities related in any way to Landlord's performance of any ministerial acts reasonably necessary (1) to permit Tenant to complete the Tenant Work, and (2) to enable Tenant to obtain any related building permit or certificate of occupancy.

(C) Requirements of Tenant's Agents . Contractor shall guarantee to Tenant and for the benefit of Landlord that the portion of the Tenant Work for which it is responsible shall be free from any defects in workmanship and materials for a period of not less than one (1) year from the date of completion thereof. Contractor shall be responsible for the replacement or repair, without additional charge, of all work done or furnished in accordance with its contract that shall become defective within one (1) year after the completion of the work performed by such contractor or subcontractor. The correction of such work shall include, without additional charge, all additional expenses and damages incurred in connection with the removal or replacement of all or any part of the Tenant Work, and/or the Building and/or

common areas that are damaged or disturbed thereby. All such warranties or guarantees as to materials or workmanship of or with respect to the Tenant Work shall be contained in the Contract or subcontract and shall be written such that such guarantees or warranties shall inure to the benefit of both Landlord and Tenant, as their respective interests may appear, and can be directly enforced by either. Tenant covenants to give to Landlord any assignment or other assurances as may be necessary to effect such right of direct enforcement.

(iii) Insurance Requirements.

(A) General Coverages. All of Tenant's Agents shall carry employer's liability and worker's compensation insurance covering all of their respective employees, and shall also carry commercial general liability insurance, including personal and bodily injury, property damage and completed operations liability, all with limits, in form and with companies as are required to be carried by Tenant as set forth in the Lease.

(B) Special Coverages. Tenant or Contractor shall carry "Builder's All Risk" insurance in an amount approved by Landlord covering the construction of the Tenant Work, and such other insurance as Landlord may require, it being understood and agreed that the Tenant Work shall be insured by Tenant pursuant to the Lease immediately upon completion thereof. Such insurance shall be in amounts and shall include such extended coverage endorsements as may be reasonably required by Landlord, and shall be in form and with companies as are required to be carried by Tenant as set forth in the Lease.

(C) General Terms. Certificates for all of the foregoing insurance coverage shall be delivered to Landlord before the commencement of construction of the Tenant Work and before the Contractor's equipment is moved onto the site. All such policies of insurance must contain a provision that the company writing said policy will endeavor to give Landlord thirty (30) days' prior written notice of any cancellation of such insurance. In the event that the Tenant Work are damaged by any cause during the course of the construction thereof, Tenant shall immediately repair the same at Tenant's sole cost and expense. Tenant's Agents shall maintain all of the foregoing insurance coverage in force until the Tenant Work are fully completed and accepted by Landlord, except for any Products and Completed Operations Coverage insurance required by Landlord, which is to be maintained for one (1) year following completion of the work and acceptance by Landlord and Tenant. All policies carried hereunder shall insure Landlord, Wareham Property Group as Landlord's manager, and Tenant, as their interests may appear, as well as Tenant's Agents. All insurance, except Workers' Compensation, maintained by Tenant's Agents shall preclude subrogation claims by the insurer against anyone insured thereunder. Such insurance shall provide that it is primary insurance as respects Landlord and Tenant and that any other insurance maintained by Landlord or Tenant is excess and noncontributing with the insurance required hereunder. The requirements for the foregoing insurance shall not derogate from the provisions for indemnification of Landlord by Tenant under the Lease and/or this Work Agreement.

(iv) Governmental Compliance. The Tenant Work shall comply in all respects with the following: (A) the Code and other federal, state, city and/or quasi-governmental laws, codes, ordinances and regulations, as each may apply according to the rulings of the controlling public official, agent or other person or entity; (B) applicable standards of the American Insurance Association (formerly, the National Board of Fire Underwriters) and the National Electrical Code; and (C) building material manufacturer's specifications.

(v) Inspection by Landlord. Prior to the completion of any portion of the Tenant Work, Landlord shall have the right to inspect the same at all times (provided, however, that Landlord will provide Tenant's Agents with Building standards prior to commencement of Tenant Work), provided however, that Landlord's failure to inspect the Tenant Work shall in no event constitute a waiver of any of Landlord's rights hereunder nor shall Landlord's inspection of the Tenant Work constitute Landlord's approval of the same. Should Landlord disapprove

(which disapproval shall not be unreasonable) any portion of the Tenant Work, Landlord shall notify Tenant in writing of such disapproval and shall specify the items disapproved; provided, however, if such Tenant Work is being performed pursuant to Working Drawings approved by Landlord, Landlord will have no right to disapprove, or Landlord will be responsible for any costs or delays related to such disapproval. Any defects or deviations in, and/or disapproval by Landlord of, the Tenant Work shall be rectified by Tenant at no expense to Landlord, provided however, that in the event Landlord determines that a defect or deviation exists or disapproves of any matter in connection with any portion of the Tenant Work and such defect, deviation or matter might adversely affect the mechanical, electrical, plumbing, heating, ventilating and air conditioning or life-safety systems of the Building, the structure or exterior appearance of the Building or any other tenant's use of such other tenant's leased premises, Landlord may take such action as Landlord deems necessary, at Tenant's expense and without incurring any liability on Landlord's part, to correct any such defect, deviation and/or matter, including, without limitation, causing the cessation of performance of the construction of the Tenant Work until such time as the defect, deviation and/or matter is corrected to Landlord's satisfaction.

(vi) Meetings. Tenant shall hold periodic meetings at a reasonable time with the Architect and the Contractor regarding the progress of the preparation of the Construction Drawings and the construction of the Tenant Work, which meetings shall be held at a location designated or reasonably approved by Landlord, and Landlord and/or its agents shall receive prior written notice of, and shall have the right to attend, all such meetings. Upon Landlord's request, certain of Tenant's Agents shall attend such meetings. In addition, minutes shall be taken at all such meetings, and Landlord will be included in the distribution list for such minutes. One such meeting each month shall include the review of Contractor's current request for payment.

(c) Copy of Record Set of Plans. Within thirty (30) days following the completion of construction, (i) Tenant shall cause the Architect and Contractor (A) to update the Approved Working Drawings as necessary to reflect all changes made to the Approved Working Drawings during the course of construction, (B) to certify to the best of their knowledge that the updated drawings are true and correct, which certification shall survive the expiration or termination of the Lease, and (C) to deliver to Landlord such updated drawings, and (ii) Tenant shall deliver to Landlord a copy of all warranties, guaranties, and operating manuals and information relating to the improvements, equipment, and systems in the Premises. Tenant's obligations set forth in this Section are collectively referred to as the "Completion Obligations."

4. Landlord Work

Landlord shall deliver the Premises in a broom clean, decommissioned and decontaminated condition, using a reputable third-party vendor selected by Landlord for the decommissioning and decontamination work, and with all Building systems serving the Premises in good working order. Subject to the foregoing and the terms of Section 2.4 of the Lease, Tenant shall accept the Premises in their then existing, "AS-IS" condition; provided, however, that in connection with the Tenant Work (as opposed to any future Tenant Alterations), Landlord shall be responsible for ensuring that the Building and Common Areas of the 6th floor comply with ADA requirements, which shall be at Landlord's sole cost and expense and not included in Operating Expenses.

5. Miscellaneous

(a) Tenant's Representative. Tenant has designated Sandra Clark of Space Matters as its sole representative with respect to the matters set forth in this Work Agreement, until further notice to Landlord, who shall have full authority and responsibility to act on behalf of Tenant as required in this Work Agreement.

(b) Landlord's Representative. Landlord has designated Geoffrey Sears as its sole representative with respect to the matters set forth in this Work Agreement, who, until further notice to Tenant, shall have full authority and responsibility to act on behalf of Landlord as required in this Work Agreement.

(c) Tenant's Default. Notwithstanding any provision to the contrary contained in the Lease, if a Default by Tenant under the Lease (including, without limitation, this Work Agreement) has occurred at any time on or before the substantial completion of the Tenant Work, then (i) in addition to all other rights and remedies granted to Landlord pursuant to the Lease, Landlord shall have the right to withhold payment of all or any portion of the Tenant Improvement Allowance, and (ii) all other obligations of Landlord under the terms of this Work Agreement shall be forgiven until such time as such default is cured pursuant to the terms of the Lease.

EXHIBIT C-1

LABORATORY RULES AND REGULATIONS

1. Any laboratory equipment (glass and cage washers, sterilizers, centrifuges, etc.) being used during Standard Operating Hours must be properly insulated for noise to prevent interruption of other tenants' business. Landlord reserves the right to request all equipment be insulated prior to occupancy. Should other tenants complain of noise, the laboratory tenant will be responsible for abating any noise issues, at the laboratory tenant's sole cost.

2. Any damages to property due to leaks from laboratory equipment will be the sole responsibility of the laboratory tenant. Should damage occur in other tenant spaces, any and all damages and clean-up will be the responsibility of the laboratory tenant.

3. Animal activities are a recognized and necessary process in the biotech industry. Such activities may only be conducted by laboratory tenants pursuant to all the requirements of their respective lease (including any "Use" clause) and require specific, written approval by Landlord in advance. Any animal activities shall be conducted pursuant to all regulations, standards and best industry practices relating to them.

4. The Project is a mixed-use facility, and laboratory tenants share space with office tenants. To reduce the potential interaction with office tenants and their employees and visitors with any biotech animal operations, any animal testing performed, any deliveries of animals and any equipment, foods, cleaners, etc. associated with animal activities, must be coordinated through the loading dock after hours and with the cooperation of the building management and security personnel. The laboratory tenant should make every effort to handle any deliveries relating to animal activities outside of Standard Operating Hours. The freight elevator must be used at all times, and delivery trucks should not be visible to the other tenants in the campus area. No cartons, containers or cardboard boxes bearing the nature of contents may be stored or left in common area spaces, including any garage/freight areas. Feed bags, animal carriers, and any and all other related containers must be disposed of properly and with discretion.

5. All exterior signage relating to laboratory operations (i.e., visible to common areas, including corridors) must be kept to the minimum required by Laws. All signs must have Landlord's approval prior to installation.

EXHIBIT C-2

RULES AND REGULATIONS

1. No sidewalks, entrance, passages, courts, elevators, vestibules, stairways, corridors or halls shall be obstructed or encumbered by Tenant or used for any purpose other than ingress and egress to and from the Premises and if the Premises are situated on the ground floor of the Project, Tenant shall further, at Tenant's own expense, keep the sidewalks and curb directly in front of the Premises clean and free from rubbish.

2. No awning or other projection shall be attached to the outside walls or windows of the Project without the prior written consent of Landlord. No curtains, blinds, shades, drapes or screens shall be attached to or hung in, or used in connection with any window or door of the Premises, without the prior written consent of Landlord. Such awnings, projections, curtains, blinds, shades, drapes, screens and other fixtures must be of a quality, type, design, color, material and general appearance approved by Landlord, and shall be attached in the manner approved by Landlord. All lighting fixtures hung in offices or spaces along the perimeter of the Premises must be of a quality, type, design, bulb color, size and general appearance approved by Landlord.

3. No sign, advertisement, notice, lettering, decoration or other thing shall be exhibited, inscribed, painted or affixed by Tenant on any part of the outside or inside of the Premises or of the Project, without the prior written consent of Landlord. In the event of the violation of the foregoing by Tenant, Landlord may remove same without any liability, and may charge the expense incurred by such removal to Tenant.

4. The sashes, sash doors, skylights, windows and doors that reflect or admit light or air into the halls, passageways or other public places in the Project shall not be covered or obstructed by Tenant, nor shall any bottles, parcels or other articles be placed on the window sills or in the public portions of the Project.

5. No showcases or other articles shall be put in front of or affixed to any part of the exterior of the Project, nor placed in public portions thereof without the prior written consent of Landlord.

6. The water and wash closets and other plumbing fixtures shall not be used for any purposes other than those for which they were constructed, and no sweepings, rubbish, rags or other substances shall be thrown therein. All damages resulting from any misuse of the fixtures shall be borne by Tenant to the extent that Tenant or Tenant's agents, servants, employees, contractors, visitors or licensees shall have caused the same.

7. Tenant shall not mark, paint, drill into or in any way deface any part of the Premises or the Project. No boring, cutting or stringing of wires shall be permitted, except with the prior written consent of Landlord, and as Landlord may direct.

8. No animal or bird of any kind shall be brought into or kept in or about the Premises or the Project, except dogs that qualify as "service animals" under the ADA.

9. Tenant shall cooperate with Landlord's efforts to implement the Project's Sustainability Practices and the applicable Green Building Standards, including, but not limited to, complying with Landlord's then-current energy saving efforts and participating in any recycling programs and occupant satisfaction and transportation surveys.

10. Prior to leaving the Premises for the day, Tenant shall draw or lower window coverings and extinguish all lights.

11. Tenant shall regularly conduct cleaning and janitorial activities, especially in bathrooms, kitchens and janitorial spaces, to remove mildew and prevent moist conditions and shall comply with the Project's Sustainability Practices and Tenant is strongly encouraged to comply with the applicable Green Building Standards.

12. Tenant shall not make, or permit to be made, any unseemly or disturbing noises or disturb or interfere with occupants of the Project, or neighboring buildings or premises, or those having business with them. Tenant shall not throw anything out of the doors, windows or skylights or down the passageways.

13. Neither Tenant nor any of Tenant's agents, servants, employees, contractors, visitors or licensees shall at any time bring or keep upon the Premises any flammable, combustible or explosive fluid, chemical or substance.

14. No additional locks, bolts or mail slots of any kind shall be placed upon any of the doors or windows by Tenant, nor shall any change be made in existing locks or the mechanism thereof. Tenant must, upon the termination of the tenancy, restore to Landlord all keys of stores, offices and toilet rooms, either furnished to, or otherwise procured by Tenant, and in the event of the loss of any keys so furnished, Tenant shall pay to Landlord the cost thereof.

15. All removals, or the carrying in or out of any safes, freight, furniture, construction material, bulky matter or heavy equipment of any description must take place during the hours which Landlord or its agent may determine from time to time. Landlord reserves the right to prescribe the weight and position of all safes, which must be placed upon two-inch thick plank strips to distribute the weight. The moving of safes, freight, furniture, fixtures, bulky matter or heavy equipment of any kind must be made upon previous notice to the Building Manager and in a manner and at times prescribed by the Building Manager, and the persons employed by Tenant for such work are subject to Landlord's prior approval. Landlord reserves the right to inspect all safes, freight or other bulky articles to be brought into the Project and to exclude from the Project all safes, freight or other bulky articles which exceed the load bearing capacity of the floors of the Building or which violate any of these Rules and Regulations or the Lease of which these Rules and Regulations are a part.

16. Tenant shall not purchase janitorial or maintenance or other like service from any company or persons not approved by Landlord. Landlord shall approve a sufficient number of sources of such services to provide Tenant with a reasonable selection, but only in such instances and to such extent as Landlord in its judgment shall consider consistent with security and proper operation of the Project.

17. Landlord shall have the right to prohibit any advertising or business conducted by Tenant referring to the Project which, in Landlord's opinion, tends to impair the reputation of the Project or its desirability as a first class building for offices and/or commercial services and upon notice from Landlord, Tenant shall refrain from or discontinue such advertising.

18. Landlord reserves the right to exclude from the Project between the hours of 6:00 p.m. and 8:00 a.m. Monday through Friday, after 1:00 p.m. on Saturdays and at all hours Sundays and legal holidays, all persons who do not present a pass to the Project issued by Landlord. Landlord may furnish passes to Tenant so that Tenant may validate and issue same. Tenant shall safeguard said passes and shall be responsible for all acts of persons in or about the Project who possess a pass issued to Tenant.

19. Tenant's vendors and contractors shall, while in the Premises or elsewhere in the Project, be subject to and under the control and direction of the Building Manager (but not as agent or servant of said Building Manager or of Landlord) and, prior to commencing any work, shall be required to maintain and provide copies of such insurance coverage as reasonably approved by Landlord with liability policies naming Landlord and the Indemnitees as additional insureds.

20. If the Premises is or becomes infested with vermin as a result of the use or any misuse or neglect of the Premises by Tenant, its agents, servants, employees, contractors, visitors or licensees, Tenant shall forthwith at Tenant's expense cause the same to be exterminated from time to time to the satisfaction of Landlord and shall employ such licensed exterminators as shall be approved in writing in advance by Landlord.

21. The requirements of Tenant will be attended to only upon application at the office of the Project. Project personnel shall not perform any work or do anything outside of their regular duties unless under special instructions from the office of Landlord.

22. Canvassing, soliciting and peddling in the Project are prohibited and Tenant shall cooperate to prevent the same.

23. No water cooler, air conditioning unit or system or other apparatus shall be installed or used by Tenant without the written consent of Landlord.

24. There shall not be used in any premises, or in the public halls, plaza areas, lobbies, or elsewhere in the Project, either by Tenant, Tenant's contractors or others, in the delivery or receipt of merchandise, any hand trucks or dollies, except those equipped with rubber tires and sideguards.

25. Tenant, Tenant's agents, servants, employees, contractors, licensees, or visitors shall not park any vehicles in any driveways, service entrances, or areas posted "No Parking" and shall comply with any other parking restrictions imposed by Landlord from time to time.

26. Tenant shall install and maintain, at Tenant's sole cost and expense, an adequate visibly marked (at all times properly operational) fire extinguisher next to any duplicating or photocopying machine or similar heat producing equipment, which may or may not contain combustible material, in the Premises.

27. Tenant shall keep its window coverings closed during any period of the day when the sun is shining directly on the windows of the Premises.

28. Tenant shall not use the name of the Project for any purpose other than as the address of the business to be conducted by Tenant in the Premises, nor shall Tenant use any picture of the Project in its advertising, stationery or in any other manner without the prior written permission of Landlord. Landlord expressly reserves the right at any time to change said name without in any manner being liable to Tenant therefor.

29. Tenant shall not prepare any food nor do any cooking, operate or conduct any restaurant, luncheonette or cafeteria for the sale or service of food or beverages to its employees or to others, except that food and beverage preparation by Tenant's employees using microwave ovens or coffee makers shall be permitted provided no odors of cooking or other processes emanate from the Premises. Tenant shall not install or permit the installation or use of any vending machine or permit the delivery of any food or beverage to the Premises except by such persons and in such manner as are approved in advance in writing by Landlord.

30. The Premises shall not be used as an employment agency, a public stenographer or typist, a labor union office, a physician's or dentist's office, a dance or music studio, a school, a beauty salon, or barber shop, the business of photographic reproductions or offset printing, a restaurant or bar, an establishment for the sale of confectionery, soda, beverages, sandwiches, ice cream or baked goods, an establishment for preparing, dispensing or consumption of food or beverages of any kind in any manner whatsoever, or news or cigar stand, or a radio, television or recording studio, theatre or exhibition hall, or manufacturing, or the storage or sale of merchandise, goods, services or property of any kind at wholesale, retail or auction, or for lodging, sleeping or for any immoral purposes.

31. Business machines and mechanical equipment shall be placed and maintained by Tenant at Tenant's expense in settings sufficient in Landlord's judgment to absorb and prevent vibration, noise and annoyance. Tenant shall not install any machine or equipment which causes noise, heat, cold or vibration to be transmitted to the structure of the building in which the Premises are located without Landlord's prior written consent, which consent may be conditioned on such terms as Landlord may require. Tenant shall not place a load upon any floor of the Premises exceeding the floor load per square foot that such floor was designed to carry and which is allowed by Law.

32. Tenant shall not bring any Hazardous Materials onto the Premises except for those that are in general commercial use and are incidental to Tenant's business office operations and only in quantities suitable for immediate use.

33. Tenant shall not store any vehicle within the parking area. Tenant's parking rights are limited to the use of parking spaces for short-term parking, of up to twenty-four (24) hours, of vehicles utilized in the normal and regular daily travel to and from the Project. Tenants who wish to park a vehicle for longer than a 24-hour period shall notify the Building Manager for the Project and consent to such long-term parking may be granted for periods up to two (2) weeks. Any motor vehicles parked without the prior written consent of the Building Manager for the Project for longer than a 24-hour period shall be deemed stored in violation of this rule and regulation and shall be towed away and stored at the owner's expense or disposed of as provided by Law.

34. Smoking is prohibited in the Premises, the Building and all enclosed Common Areas of the Project, including all lobbies, all hallways, all elevators and all lavatories. "Smoking", as used herein, shall be deemed to include the use of e-cigarettes, smokeless cigarettes and other similar products. All rules and regulations set forth in this Exhibit C applicable to smoking also apply to the use of e-cigarettes, smokeless cigarettes and other similar products.

35. Tenant shall not store any items within 18 inches of a sprinkler head.

36. Building ladders including fixed ladders and step ladders are not to be used by Tenant, Tenant's agents, servants, employees, contractors, licensees or visitors.

37. Electrical power strips and portable "space heaters" are not permitted.

38. Tenants are not permitted to open an electrical panel. Tenants are required to contact Landlord to reset a circuit breaker.

39. Tenant shall reimburse Landlord for the cost (plus an administrative charge at Landlord's then prevailing rate) of Landlord providing any special services or work requested by Tenant to the extent such services or work are not specifically set forth as a Landlord obligation in the Lease.

EXHIBIT D

CRYSTAL BIO LEASE EXTENSION AMENDMENT

EIGHTH AMENDMENT
(5980 Horton Street, Emeryville, California)

This Eighth Amendment (this "**Amendment**"), dated as of June __, 2021, is entered into by and between EMERY STATION OFFICE II, LLC, a California limited liability company ("**Landlord**"), and CRYSTAL BIOSCIENCE, INC., a California corporation ("**Tenant**").

Recitals

A. Landlord and Tenant entered into that certain Lease dated February 16, 2009, as amended by that certain First Amendment to Lease dated May 21, 2010, that certain Second Amendment to Lease dated April 13, 2011, that certain Third Amendment to Lease dated June 14, 2011, that certain Fourth Amendment to Lease dated November 20, 2013, that certain Fifth Amendment to Lease dated February 2, 2014, that certain Sixth Amendment to Lease dated September 29, 2014, and that certain Seventh Amendment to Lease dated March 14, 2016 (collectively, the "**Lease**"), whereby Tenant leases certain space known as Suite 405 and consisting of approximately 7,320 rentable square feet (the "**Premises**") within the building located at 5980 Horton Street, Emeryville, California (the "**Building**").

B. Tenant's parent company, Ligand Pharmaceuticals Incorporated, a Delaware corporation (" **Ligand Phama**"), and Landlord have entered into that certain Office/Laboratory Lease dated substantially concurrently herewith for space (the "**Ligand Pharma Space**") on the 6th Floor of the Building (the "**Ligand Pharma Lease**"). Pursuant to the terms of the Ligand Pharma Lease, Ligand Pharma intends to complete certain improvement work within the Ligand Pharma Space designated as the "Phase II Tenant Work" in the Ligand Pharma Lease.

C. The current Term of the Lease expires as of August 31, 2021 (the "**Prior Expiration Date**"), and the parties now desire to extend the Term of the Lease to the date that is thirty (30) days after completion of the Phase II Tenant Work under the Ligand Pharma Lease, on the following terms and conditions.

NOW THEREFORE, in consideration of the foregoing and the mutual covenants contained herein, the parties agree as follows:

Agreement

1. Definitions; Recitals. Unless otherwise specified herein, all capitalized terms used in this Amendment are used as defined in the Lease. The parties acknowledge the truthfulness of the foregoing Recitals, which are hereby incorporated into this Amendment.

2. Inconsistencies. To the extent that there are any inconsistencies between the terms of the Lease and this Amendment, the terms of this Amendment shall control.

3. Extension. The Term of the Lease is hereby extended for a period of approximately ten (10) months and shall expire the date that is thirty (30) days after Substantial Completion of the Phase II Tenant Work under the Ligand Pharma Lease (the "**Extended Expiration Date**"), unless sooner terminated in accordance with the terms of the Lease. The Extended Expiration Date is estimated to be on or about June 30, 2022. Tenant acknowledges and agrees that Tenant and Ligand Pharma shall confirm the actual Extended Expiration Date in a Commencement Date Memorandum to be executed in connection with the Ligand Pharma

Lease. That portion of the Term commencing the day immediately following the Prior Expiration Date (the "**Extension Date**") and ending on the Extended Termination Date shall be referred to herein as the "**Extended Term**".

4. Monthly Base Rent. As of the Extension Date, the schedule of Monthly Base Rent shall remain as set forth in the Lease. All such Monthly Base Rent shall continue to be payable by Tenant in accordance with the terms of the Lease.

5. Premises "As-Is". Tenant is in possession of the Premises and accepts the same "as is" without any agreements, representations, understandings or obligations on the part of Landlord to perform any alterations, repairs or improvements, except as may be expressly provided otherwise in this Amendment.

6. Miscellaneous.

(a) This Amendment sets forth the entire agreement between the parties with respect to the matters set forth herein. There have been no additional oral or written representations or agreements. Under no circumstances shall Tenant be entitled to any Rent abatement, improvement allowance, leasehold improvements, or other work to the Premises, or any similar economic incentives that may have been provided Tenant in connection with entering into the Lease, unless specifically set forth in this Amendment.

(b) Except as herein modified or amended, the provisions, conditions and terms of the Lease shall remain unchanged and in full force and effect.

(c) In the case of any inconsistency between the provisions of the Lease and this Amendment, the provisions of this Amendment shall govern and control.

(d) Submission of this Amendment by Landlord is not an offer to enter into this Amendment but rather is a solicitation for such an offer by Tenant. Landlord shall not be bound by this Amendment until Landlord has executed and delivered the same to Tenant.

(e) The capitalized terms used in this Amendment shall have the same definitions as set forth in the Lease to the extent that such capitalized terms are defined therein and not redefined in this Amendment.

(f) Tenant hereby represents to Landlord that Tenant has dealt with no broker in connection with this Amendment. Tenant agrees to indemnify and hold Landlord, its members, principals, beneficiaries, partners, officers, directors, employees, mortgagee(s) and agents, and the respective principals and members of any such agents (collectively, the "**Landlord Related Parties**") harmless from all claims of any brokers claiming to have represented Tenant in connection with this Amendment. Landlord hereby represents to Tenant that Landlord has dealt with no broker in connection with this Amendment. Landlord agrees to indemnify and hold Tenant, its members, principals, beneficiaries, partners, officers, directors, employees, and agents, and the respective principals and members of any such agents (collectively, the "**Tenant Related Parties**") harmless from all claims of any brokers claiming to have represented Landlord in connection with this Amendment.

(g) This Amendment may be executed in counterparts each of which counterparts when taken together shall constitute one and the same agreement. Any facsimile, PDF or other electronic signature shall constitute a valid and binding method for executing this Amendment. Executed counterparts of this Amendment exchanged by facsimile transmission, PDF email, or other electronic means shall be fully enforceable.

IN WITNESS WHEREOF, the parties have executed this Amendment as of the date set forth above.

TENANT:
CRYSTAL BIOSCIENCE, INC.,
a California corporation

By: _____

Name: _____

Its: _____

By: _____

Name: _____

Its: _____

LANDLORD:
EMERY STATION OFFICE II, LLC,
a California limited liability company

By: Emery Station Associates II, LLC,
its Managing Member

By: Wareham-NZL, LLC,
its Managing Member

By: /s/ Richard K. Robbins
Richard K. Robbins
Its Manager

EXHIBIT E

FF&E

Room	Equipment	Qty
Meeting 614	Panasonic 55" LED LCD TV	1
	Whiteboard	1
Meeting 613	Conference Table	1
	Office Chairs	5
	Samsung 55" LED TV	1
	Whiteboard	1
Lobby	2 chairs	2
	1 small table	1
Boardroom/Conf Room	Conference Table	1
	Office Chairs	16
	Office counter	1
	Sharp TV	1
	Video Conference Equipment	1
Open Office 648	Workstation - desk, chair, under table cabinet	6
Office 650	Sit/stand desk w/return	1
	Lateral file cabinet	1
	Office Chair	2
	Whiteboard	1
Office 651	Sit/Stand desk w/return	1
	Office Chair	2
	Lateral file cabinet	1
	Bookshelf	1
Office 652	Sit/Stand desk w/return	1
	Office Chair	2
	Lateral file cabinet	1
Office 653	Sit/Stand desk w/return	1
	Office Chair	1
	Lateral file cabinet	1
Data/Server Room	Server Racks	2
*Trash Receptacles - Small +Large		45

Room	Equipment	Qty
Office 654	Sit/stand desk w/return	1
	Lateral file cabinet	1
	Office Chair	2
	Whiteboard	1
Open Office 655	Table	1
	Chair	6
	Whiteboard	
Open Office 657	Sofa	1
	Love Seat	2
	Small table	1
	Cabinet	1
	Pillow	2
Open Office 658	Kenmore Refrigerator	1
	Dishwasher	1
	Workstations - sit/stand desk, office chair, under table cabinet	20
Terrace 652A	Outdoor table	2
	White outdoor chair	8
Terrace 655A	Outdoor table	1
	Outdoor chair	4
	White outdoor chairs	3
Glass Wash 664	Autoclave	1
	Glass Washer	1
	Counter w/sink	1
TC Lab	Island counter w/sink & 4 valves/spigots	1
	Table	4
Instrument Lab	Tables	15
	Fume Hood	2
	Counter w/cabinet	3
	Island counter w/8 valves/spigots	1
	Sink	2
	Under table cabinet	4

RIDER 1

COMMENCEMENT DATE AGREEMENT

_____, LLC, a _____ limited liability company ("Landlord"), and _____, a_____ ("Tenant"), have entered into a certain Office/Laboratory Lease dated as of _____, 20__ (the "Lease").

WHEREAS, Landlord and Tenant wish to confirm and memorialize the Commencement Date, the Rent Commencement Date and Expiration Date of the Lease as provided for in Section 2.2 of the Lease;

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants contained herein and in the Lease, Landlord and Tenant agree as follows:

1. Unless otherwise defined herein, all capitalized terms shall have the same meaning ascribed to them in the Lease.

2. The Phase I Commencement Date (as defined in the Lease) of the Lease is _____, 20__.

3. The Phase II Commencement Date (as defined in the Lease) of the Lease is _____, 20__.

4. The Phase I Rent Commencement Date (as defined in the Lease) of the Lease is _____, 20__.

5. The Phase II Rent Commencement Date (as defined in the Lease) of the Lease is _____, 20__.

6. The Expiration Date (as defined in the Lease) of the Lease is _____, 20__.

7. The Extended Expiration Date under the Crystal Bio Lease (as defined in the _____ Amendment to the Crystal Bio Lease) is _____, 20__.

8. Tenant hereby confirms the following:

   (a) That it has accepted possession of the Premises pursuant to the terms of the Lease;

   (b) That the Landlord Work is Substantially Complete; and

   (c) That the Lease is in full force and effect.

9. Except as expressly modified hereby, all terms and provisions of the Lease are hereby ratified and confirmed and shall remain in full force and effect and binding on the parties hereto.

10. The Lease and this Commencement Date Agreement contain all of the terms, covenants, conditions and agreements between Landlord and Tenant relating to the subject matter herein. No prior other agreements or understandings pertaining to such matters are valid or of any force and effect.

TENANT:

_____,
a _____

By: _____
Print Name: _____
Its: _____

By: _____
Print Name: _____
Its: _____

LANDLORD:

_____ LLC,
a _____ limited liability company

By: _____
Richard K. Robbins
Managing Member

[INSERT CORRECT SIGNATURE BLOCK FOR PROPERTY]

Exhibit 21.1

LIGAND PHARMACEUTICALS INCORPORATED
LIST OF SUBSIDIARIES

Name	**Jurisdiction of Incorporation**
Ab Initio Biotherapeutics, Inc.	Delaware
Allergan Ligand Retinoid Therapeutics, Inc.	Delaware
Cita NeuroPharmaceuticals Inc.	Canada
Crystal Bioscience, Inc.	California
CyDex Pharmaceuticals, Inc.	Delaware
Glycomed Incorporated	California
Icagen, LLC	Delaware
Ligand Biopharmaceuticals Incorporated	Delaware
Ligand Holdings UK Limited	England and Wales
Ligand JVR, Inc.	Delaware
Ligand Pharmaceuticals (Canada) Incorporated	Canada
Ligand Pharmaceuticals International, Inc.	Delaware
Ligand Pharmaceuticals UK Limited	United Kingdom
Ligand UK Development Limited	England and Wales
Ligand UK Group Limited	England and Wales
Ligand UK Limited	England and Wales
Ligand UK Research Limited	England and Wales
Metabasis Therapeutics, Inc.	Delaware
Neurogen Corporation	Delaware
OmniAb, Inc.	Delaware
OMT I, Inc.	Delaware
OMT II, Inc.	Delaware
Pfenex Inc.	Delaware
Pharmacopeia, LLC	Delaware
Seragen Incorporated	Delaware
Seragen Technology, Inc.	Delaware
Taurus Biosciences, LLC	Delaware
Vernalis Therapeutics Inc.	Delaware
xCella Biosciences, Inc.	Delaware

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-8 No. 333-252480) pertaining to the 2002 Stock Incentive Plan, as amended and restated of Ligand Pharmaceuticals Incorporated,

(2) Registration Statement (Form S-8 No. 333-233130) pertaining to the 2002 Stock Incentive Plan, as amended and restated of Ligand Pharmaceuticals Incorporated,

(3) Registration Statement (Form S-8 No. 333-212775) pertaining to the 2002 Stock Incentive Plan, as amended and restated of Ligand Pharmaceuticals Incorporated,

(4) Registration Statement (Form S-8 No. 333-182547) pertaining to the 2002 Stock Incentive Plan, as amended and restated of Ligand Pharmaceuticals Incorporated,

(5) Registration Statement (Form S-8 No. 333-160132) pertaining to the 2002 Stock Incentive Plan, as amended and restated, and Employee Stock Purchase Plan, as amended and restated of Ligand Pharmaceuticals Incorporated, and

(6) Registration Statement (Form S-8 No. 333-131029) pertaining to the 2002 Stock Incentive Plan and 2002 Employee Stock Purchase Plan of Ligand Pharmaceuticals Incorporated;

of our reports dated February 28, 2022, with respect to the consolidated financial statements of Ligand Pharmaceuticals Incorporated and the effectiveness of internal control over financial reporting of Ligand Pharmaceuticals Incorporated included in this Annual Report (Form 10-K) of Ligand Pharmaceuticals Incorporated for the year ended December 31, 2021.

/s/ Ernst & Young LLP

San Diego, California
February 28, 2022

Exhibit 31.1

I, John L. Higgins, certify that:

1. I have reviewed this Annual Report on Form 10-K of Ligand Pharmaceuticals Incorporated;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 28, 2022

/s/ John L. Higgins

John L. Higgins
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

I, Matthew Korenberg, certify that:

1. I have reviewed this Annual Report on Form 10-K of Ligand Pharmaceuticals Incorporated;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ Matthew Korenberg

Matthew Korenberg

Executive Vice President, Finance and Chief Financial Officer

(Principal Financial Officer)

Date: February 28, 2022

Exhibit 32.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER

In connection with the Annual Report of Ligand Pharmaceuticals Incorporated (the "Company") on Form 10-K for the year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, John L. Higgins, Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

(1) The Report fully complies with the requirements of Section 13(a) or Section 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 28, 2022

/s/ John L. Higgins

John L. Higgins
Chief Executive Officer
(Principal Executive Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. Section 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing. A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER

In connection with the Annual Report of Ligand Pharmaceuticals Incorporated (the "Company") on Form 10-K for the year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Matthew Korenberg, Executive Vice President, Finance and Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

(1) The Report fully complies with the requirements of Section 13(a) or Section 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 28, 2022

/s/ Matthew Korenberg

Matthew Korenberg
Executive Vice President, Finance and Chief Financial Officer
(Principal Financial Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. Section 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing. A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.