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Ligand's Technologies Support and Enable Potential Coronavirus Treatments

Partner Gilead Sciences' Captisol®-enabled remdesivir (GS-5734) highlighted in the *New England Journal of Medicine* for treating the first case of the 2019 novel coronavirus in the United States

OmniAb® antibody discovery platform may be used by partners for the discovery of fully-human therapeutic antibodies

LTP Platform™ technology shown to increase targeting and efficiency of certain direct-acting antiviral agents

SAN DIEGO--(BUSINESS WIRE)-- Ligand Pharmaceuticals Incorporated (NASDAQ: LGND) announces that its proprietary technologies are being utilized by partners to support and enable potential treatments for the 2019 novel coronavirus, 2019-nCoV, that originated in Wuhan, China. Technologies that have shown potential or general applicability in the antiviral or therapeutic antibody areas include Ligand's Captisol, OmniAb and LTP (Liver-Targeted Prodrug) platforms.

Ligand partner Gilead Sciences' Captisol-enabled remdesivir (GS-5734) was highlighted in the *New England Journal of Medicine* last week for treating the first case of 2019 novel coronavirus in the United States[1]. Gilead Sciences stated that while there are no antiviral data for remdesivir that show activity against 2019-nCoV at this time, there are available data in other coronaviruses. Remdesivir is not yet licensed or approved anywhere globally and has not been demonstrated to be safe or effective for any use.

Plans are being developed by current and/or prospective partners to use Ligand's OmniAb antibody discovery platform as well as Ligand's patented antigen technology for the discovery of antibodies to coronavirus, with inbound interest specific to OmniChicken™. Antibodies have been shown to potentially treat a variety of viral-mediated diseases, including those caused by coronaviruses.

Published literature shows that Ligand's Liver-Targeting Prodrug (LTP) technology offers a potential new generation of nucleotide antiviral agents.[2] An example of this is development progress by Nucorion Pharmaceuticals' NCO-1010. Nucorion is a venture-funded biotechnology company focused on developing anticancer and antiviral agents targeting diseases of the liver, initially directed to China. Ligand entered into a multi-program LTP technology licensing agreement with Nucorion in 2016. Nucorion closed a Series B financing in 2019 led by Guangdong Ji-Bao Pharmaceutical Company of Guangzhou, China.

"Ligand's technologies have a history of being successfully utilized by partners working to develop ground-breaking and important medicines, and we are proud that our technology is

now being used to potentially address the 2019-nCoV coronavirus," said John Higgins, Chief Executive Officer of Ligand. "In particular, our partners at Gilead have publicly stated they are working closely with global health authorities to respond to the novel coronavirus outbreak through the appropriate experimental use of investigational compounds, including Captisol-enabled remdesivir. In addition, both the OmniAb and LTP platforms provide partners with paths to developing new drugs that may address this global health concern."

About Captisol®

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 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.

About OmniAb®

OmniAb is a three-species transgenic-animal platform consisting of five different technologies used for producing mono- and bispecific human therapeutic antibodies. OmniRat animals comprise the industry's first human monoclonal antibody technology based on rats. Because they have a complete immune system with a diverse antibody repertoire, OmniRat animals generate antibodies with human idiotypes as effectively as wild-type animals make rat antibodies. OmniMouse is a transgenic mouse that complements OmniRat and expands epitope coverage. OmniFlic is an engineered rat with a fixed light chain for development of bispecific, fully human antibodies. OmniChicken animals comprise the industry's first human monoclonal antibody technology based on chickens. The OmniClic chicken is specifically developed to facilitate the generation of bispecific antibodies and retains the ability to generate diverse, high-quality affinity matured antibodies. All five types of the OmniAb therapeutic human antibody platform – OmniRat, OmniFlic, OmniMouse, OmniChicken and OmniClic – use patented technology, have broad freedom to operate, produce highly diversified, fully human antibody repertoires optimized in vivo for immunogenicity, manufacturability and therapeutic efficacy, and deliver fully human antibodies with high affinity, specificity, expression, solubility and stability – Naturally Optimized Human Antibodies®.

About the LTP Technology Platform

Ligand's LTP is a novel prodrug technology platform designed to selectively deliver a range of active pharmaceutical agents to the liver. It works by chemically modifying a biologically active molecule into an inactive prodrug that will be administered and later activated in the liver by certain enzymes mainly expressed in the liver. The technology can be used to improve activity and/or safety of an existing drug, or to develop new agents to treat liver diseases or diseases caused by homeostasis imbalance of circulating biomolecules controlled by the liver such as lipids and glucose; LTP is especially applicable to metabolic and cardiovascular diseases. Ligand's LTP technology has expanded chemical class

applicability and also removes certain by-products as compared to other targeting technologies.

About Ligand Pharmaceuticals

Ligand is a biopharmaceutical company focused on developing or acquiring technologies that help pharmaceutical companies discover and develop medicines. 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 than 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. Ligand's OmniAb technology platform is a patent-protected transgenic animal platform used in the discovery of fully human mono- and bispecific therapeutic antibodies. The Captisol® platform technology is a patent-protected, chemically modified cyclodextrin with a structure designed to optimize the solubility and stability of drugs. The Vernalis Design Platform (VDP) integrates protein structure determination and engineering, fragment screening and molecular modeling, with medicinal chemistry, to help enable success in novel drug discovery programs against highly-challenging targets. Ab Initio™ technology and services for the design and preparation of customized antigens enable the successful discovery of therapeutic antibodies against difficult-to-access cellular targets. Ligand has established multiple alliances, licenses and other business relationships with the world's leading pharmaceutical companies including Amgen, Merck, Pfizer, Sanofi, Janssen, Takeda, Gilead Sciences, Baxter International and Eli Lilly. For more information, please visit www.ligand.com.

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Forward-Looking Statements

This news release contains forward-looking statements by Ligand that involve risks and uncertainties and reflect Ligand's judgment as of the date of this release. These include statements regarding the potential that Gilead Sciences' product candidate remdesivir or any other product or product candidate developed using Ligand's technologies will be used successfully to treat 2019-nCoV; the potential that indications of interest from current or potential future partners using our OmniAb platform or LTP platform will result in the initiation of development programs by our current or potential future partners; and Gilead's intent to work closely with global health authorities to respond to the 2019-nCoV outbreak. Actual events or results may differ from our expectations due to the risks and uncertainties inherent in Ligand's business, including, without limitation:, there can be no assurances that Gilead Sciences' product candidate remdesivir will be effective or well tolerated for the treatment of patients with 2019-nCoV since there are no antiviral data for remdesivir that show activity against 2019-nCoV at this time; the risk that Nucorion and Ligand's other current or future partners will initiate development programs to treat 2019-nCoV or any other viral disease; Ligand may not receive any royalties or milestones from the use of remdesivir to potentially treat 2019-nCoV, as remdesivir has not been licensed or approved anywhere globally and

has not been demonstrated to be safe or effective for any use; and other important risk factors affecting Ligand can be found in Ligand's prior press releases available at www.ligand.com as well as in Ligand's public periodic filings with the Securities and Exchange Commission, available at www.sec.gov. The failure to meet expectations with respect to any of the foregoing matters may reduce Ligand's stock price. Ligand disclaims any intent or obligation to update these forward-looking statements beyond the date of this press release, except as required by law. This caution is made under the safe harbor provisions of the Private Securities Litigation Reform Act of 1995.

References

[1] Holshue, et al., *The New England Journal of Medicine*, January 31, 2020: First Case of 2019 Novel Coronavirus in the United States.
[2] Zhi L, Vajda E. LTP prodrug technology offers new generation nucleotide antiviral agents. J Hepatol. 2018 68(Suppl 1):S762–S763 (Abstract).

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