Preclinical Data Demonstrate That Deciphera Pharmaceuticals' DCC-2618 Exhibits Broader Inhibition Profile Against Primary and Secondary Drug-Resistant Mutations in Gastrointestinal Stromal Tumors (GIST) Compared to Approved and Investigational Agents

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- Pre-Clinical Data Presented at 2018 American Association for Cancer Research (AACR) Annual Meeting Confirms A Broad Spectrum of Potent Inhibition of KIT and PDGFRα Mutations in Gastrointestinal Stromal Tumors (GIST) and Systemic Mastocytosis (SM) -

WALTHAM, Mass.--(BUSINESS WIRE)--Apr. 17, 2018-- Deciphera Pharmaceuticals, Inc. (NASDAQ:DCPH), a clinical-stage biopharmaceutical company focused on addressing key mechanisms of tumor drug resistance, today announced pre-clinical data for DCC-2618 confirming a broad spectrum of potent inhibition across primary and secondary KIT mutations and primary PDGFRα mutations. Compared to the FDA approved and investigational compounds tested in this pre-clinical study, DCC-2618 demonstrated the broadest profile of inhibition of primary and secondary KIT mutations and primary PDGFRα mutations. The data will be presented today at the 2018 American Association for Cancer Research (AACR) Annual Meeting in Chicago, IL in a poster titled “Inhibition of oncogenic and drug-resistant PDGFRA and KIT

alterations by DCC-2618".

Deciphera is currently evaluating DCC-2618 in multiple clinical studies including INVICTUS, a Phase 3 pivotal study in 4th line and 4th line plus GIST patients, and in a Phase 1 study in other KIT and/or PDGFRα-driven diseases, including 2nd line to 4th line plus GIST, SM, glioblastoma multiforme and other cancers. Deciphera expects to initiate a Phase 3 registration study in 2nd line GIST patients in the second half of 2018 and to report top-line data from the ongoing INVICTUS study in 2019.

"In GIST patients receiving FDA approved therapies, secondary drug resistance KIT mutations frequently result in disease progression. Our pre-clinical results confirm that among the kinase inhibitors tested, both approved and investigational, DCC-2618 exhibits the broadest profile of inhibition against these heterogenous, difficult to treat mutations," said Michael D. Taylor, Ph.D., Deciphera's President and Chief Executive Officer. "A significant need exists for therapies with the potential to address both activating mutations and other genetic alterations in KIT and PDGFRα, which have been identified in >85% of patients with GIST and >90% of patients with systemic mastocytosis."

These data describe the breadth of inhibition achieved with DCC-2618 and its active metabolite, DP-5439, across both primary and secondary KIT mutations and primary PDGFRα mutations compared to the *in vitro* profiles of the FDA-approved kinase inhibitors, imatinib, sunitinib, regorafenib, midostaurin and the investigational agent, avapritinib (BLU-285). Highlights from the poster include:

- DCC-2618, a Type II switch control kinase inhibitor of KIT and PDGFRα, broadly inhibits KIT mutants in exons 9, 11, 13, 14 17, and 18 and PDGFRα mutants in exons 12, 14, and 18, forcing even aggressively activated kinase mutants into a Type II inactive conformation.

- Compared to the approved and investigational compounds tested, DCC-2618 and its active metabolite, DP-5439, exhibit the broadest profile of inhibition across primary and secondary drug-resistant KIT mutations, and primary PDGFRα mutations.
- Other Type II inhibitors, such as imatinib, sunitinib and regorafenib, do not

broadly inhibit KIT exon-17 mutations or mutations in PDGRFα while Type I inhibitors, such as avapritinib (BLU-285), have weaker activity against KIT mutations in exons 13 and 14.

- DCC-2618 also exhibited a superior exon 9 KIT mutation profile compared to imatinib, sunitinib, and avapritinib (BLU-285), including complex KIT mutations involving exon 9 coupled with secondary KIT mutations in exons 13, 14, and 17.
- In enzyme assays at relevant cellular levels of adenosine triphosphate (ATP), DCC-2618 broadly inhibited primary and drug-resistant KIT mutants and primary PDGFRα mutants. DCC-2618 also broadly inhibited KIT and PDGFRα mutations in a panel of GIST, mastocytosis, leukemia, lung cancer, and transfected cell assays, as well as in various in vivo xenograft models.
- As previously reported, translational liquid biopsy data from the Phase 1 clinical trial has shown that in heavily pre-treated GIST patients, many of whom had received all three of the FDA approved drugs for GIST, DCC-2618 decreased mutant KIT circulating tumor DNA (ctDNA) across the spectrum of KIT exons 9, 11, 13, 14, 17, and 18.

About DCC-2618

DCC-2618 is a KIT and PDGFRα kinase switch control inhibitor in clinical development for the treatment of KIT and/or PDGFRα-driven cancers, including gastrointestinal stromal tumors, systemic mastocytosis and glioblastoma multiforme. DCC-2618 was specifically designed to improve the treatment of GIST patients by inhibiting a broad spectrum of mutations in KIT and PDGFRα. DCC-2618 is a KIT and PDGFRα inhibitor that blocks initiating KIT mutations in exons 9, 11, 13, 14, 17, and 18, involved in GIST as well as the primary D816V exon 17 mutation involved in SM. DCC-2618 also inhibits primary PDGFRα mutations in exons 12, 14,and 18, including the exon 18 D842V mutation, involved in a subset of GIST.

About Deciphera Pharmaceuticals

Deciphera Pharmaceuticals is a clinical-stage biopharmaceutical company focused on improving the lives of cancer patients by tackling key mechanisms of drug resistance that limit the rate and/or durability of response to existing cancer therapies. Our small molecule drug candidates are directed against an important family of enzymes called

kinases, known to be directly involved in the growth and spread of many cancers. We use our deep understanding of kinase biology together with a proprietary chemistry library to purposefully design compounds that maintain kinases in a “switched off” or inactivated conformation. These investigational therapies comprise tumor-targeted agents designed to address therapeutic resistance causing mutations and immuno-targeted agents designed to control the activation of immunokinases that suppress critical immune system regulators, such as macrophages. We have used our platform to develop a diverse pipeline of tumor-targeted and immuno-targeted drug candidates designed to improve outcomes for patients with cancer by improving the quality, rate and/or durability of their responses to treatment.

Availability of Other Information About Deciphera Pharmaceuticals

Investors and others should note that Deciphera Pharmaceuticals communicates with its investors and the public using its company website (www.deciphera.com), including but not limited to investor presentations and scientific presentations, Securities and Exchange Commission filings, press releases, public conference calls and webcasts. The information that Deciphera Pharmaceuticals posts on these channels and websites could be deemed to be material information. As a result, Deciphera Pharmaceuticals encourages investors, the media and others interested in Deciphera Pharmaceuticals to review the information that it posts on these channels, including Deciphera Pharmaceuticals’ investor relations website, on a regular basis. This list of channels may be updated from time to time on Deciphera Pharmaceuticals' investor relations website and may include other social media channels than the ones described above. The contents of Deciphera Pharmaceuticals' website or these channels, or any other website that may be accessed from its website or these channels, shall not be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended.

Cautionary Note Regarding Forward-Looking Statements

This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including, without limitation, statements regarding the potential for DCC-2618 to treat GIST SM, glioblastoma multiforme and other diseases; statements regarding the potential

benefits to patients of DCC-2618; statements regarding plans and timelines for the clinical development of DCC-2618; and Deciphera Pharmaceuticals' strategy, business plans and focus. The words "may," "will," "could," "would," "should," "expect," "plan," "anticipate," "intend," "believe," "estimate," "predict," "project," "potential," "continue," "target" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Any forward-looking statements in this press release are based on management's current expectations and beliefs and are subject to a number of risks, uncertainties and important factors that may cause actual events or results to differ materially from those expressed or implied by any forward-looking statements contained in this press release, including, without limitation, statements regarding the potential for DCC-2618 to treat GIST SM, glioblastoma multiforme and other diseases; statements regarding the potential benefits to patients of DCC-2618; statements regarding plans and timelines for the clinical development of DCC-2618; and Deciphera Pharmaceuticals' strategy, business plans and focus. These and other risks and uncertainties are described in greater detail in the section entitled "Risk Factors" in Deciphera Pharmaceuticals' most recent annual report on Form 10-K, and other filings that Deciphera Pharmaceuticals may make with the SEC in the future. Any forward-looking statements contained in this press release represent Deciphera Pharmaceuticals' views only as of the date hereof and should not be relied upon as representing its views as of any subsequent date. Deciphera Pharmaceuticals explicitly disclaims any obligation to update any forward-looking statements.

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