Clover Biopharmaceuticals Announces Positive Phase 1 Data for its Adjuvanted S-Trimer COVID-19 Vaccine Candidates

- *Clover's protein-based COVID-19 vaccine candidates adjuvanted with either GSK's pandemic adjuvant system or Dynavax's CpG 1018 plus alum induced strong neutralizing immune responses in 150 adult and elderly subjects from the Phase 1 clinical study.*
- *Clover's vaccine candidates both demonstrated a favorable safety and tolerability profile, and have also shown long-term stability at 2-8oC, making them suitable for global distribution.*
- *A global phase 2/3 trial evaluating the safety and efficacy of the S-Trimer vaccine candidate in combination with GSK's pandemic adjuvant system is expected to begin in December 2020 funded by the Coalition for Epidemic Preparedness Innovations (CEPI)*
- *A separate pivotal Phase 2/3 clinical trial of the S-Trimer vaccine candidate in combination with Dynavax's advanced CpG 1018 adjuvant plus alum is intended to start in the first half of 2021 to maximize the potential supply of more than 1 billion doses of Clover's COVID-19 vaccines to the world.*

CHENGDU, CHINA, December 4, 2020 – Clover Biopharmaceuticals, a global clinical-stage biotechnology company committed to developing transformative biologics as vaccines and therapeutics for the world's most debilitating diseases, today announced positive clinical data from its Phase 1 trial demonstrating that its protein-based COVID-19 S-Trimer vaccine candidates in combination with adjuvants from either GSK (London Stock Exchange: GSK) or Dynavax (Nasdaq: DVAX) induces strong immune responses, including neutralizing antibodies and cell-mediated immunity, as well as favorable safety and tolerability profiles in 150 adult and elderly participants. The manuscript describing the detailed results can be accessed at **medRxiv**.

The Phase 1 trial was a randomized, observer-blind, placebo-controlled study to assess the safety, reactogenicity and immunogenicity of the adjuvanted COVID-19 S-Trimer vaccine candidates formulated with different antigen levels. No serious adverse events related to the vaccine candidates studied were reported. The majority of adverse events were mild and transient. S-Trimer adjuvanted with GSK's pandemic adjuvant system induced neutralizing antibody titers (seroconversion) in 100% of participants at the selected 9 μg S-Trimer dose in both adult and elderly groups, with geometric mean titers (GMT) greater than 1:1,800. CpG-1018/alum-adjuvanted S-Trimer induced neutralizing antibodies in 100% of adult participants at the selected 30 μg S-Trimer dose with GMT greater than 1:1,000, and seroconversion was observed in 88% (7 out of 8) in elderly. Strong Th1 cell-mediated immune responses were also observed for the vaccine candidates with either adjuvant.

Preliminary results from stability studies have demonstrated that S-Trimer is stable at 2-8o C for at least six months (longer-term stability studies are ongoing) and stable at room temperature and 40o C for at least one month, in line with the adjuvants tested. Thus, the ability of Clover's COVID-19 vaccine candidates to be stored in standard refrigeration temperatures makes them suitable for broad global distribution based on current results.

Based on the positive Phase 1 results reported and the unprecedented need for COVID-19 vaccines, Clover and its partners are confident to enter late-stage clinical development for both adjuvanted vaccines. A global Phase 2/3 efficacy study of the S-Trimer vaccine candidate in combination with GSK's pandemic adjuvant system is expected to begin in December 2020. Clover intends to initiate a separate pivotal clinical trial of the S-Trimer vaccine candidate in combination with Dynavax's advanced CpG 1018 adjuvant plus alum in the first half of 2021.

Joshua Liang, Chief Executive Officer of Clover Biopharmaceuticals, said, "With positive results from our Phase 1 clinical trial demonstrating strong neutralizing immune responses and favorable safety profiles, we look forward to moving our COVID-19 vaccines into the final stages of clinical development. Combined with our ability to potentially produce more than one billion doses of antigen annually and the stability of our vaccines under standard refrigeration conditions, our adjuvanted COVID-19 S-Trimer vaccines are positioned to be well-suited for worldwide distribution. We and our collaborators are steadfast in our commitment to the development of safe, effective and accessible COVID-19 vaccines for the global population."

Thomas Breuer, Chief Medical Officer of GSK Vaccines, commented, "We are delighted by the promising Phase 1 clinical data underscoring the robust and rapid immune response elicited by GSK's pandemic adjuvant system combined with Clover's antigen – in both, adults and older adults and are looking forward to demonstrate the public health value in the upcoming efficacy trial. These results – in addition to results from the combination of our adjuvant with other COVID-19 vaccine technologies – show GSK's commitment to provide scalable solutions to tackle the pandemic around the globe."

Rob Janssen, Chief Medical Officer of Dynavax, commented, "We are pleased with the strong immune responses and an outstanding safety profile of Clover's S-Trimer vaccine adjuvanted with Dynavax's advanced CpG 1018 adjuvant plus alum. We are encouraged by the high level of neutralizing antibodies in combination with the strong Th1 response which we believe could play an important role in controlling infection. We are proud to be partnered with Clover in our endeavors to develop a safe and effective COVID-19 vaccine that will be readily accessible around the world to combat this ongoing pandemic."

The Phase 1 clinical trial was funded by the Coalition for Epidemic Preparedness Innovations (CEPI). "This is very promising Phase 1 data which warrants further clinical development of Clover's S-Trimer vaccine candidate, " Dr. Richard Hatchett, Chief Executive Officer of CEPI commented, "This vaccine candidate has the potential to be manufactured at scale and stored in a regular refrigerator which makes it suitable for use around the globe, including in low-resource settings. Through our partnership with Clover we hope to make hundreds of millions of doses of this vaccine globally accessible through COVAX, if it is proven to be safe and effective."

About COVID-19 S-Trimer Vaccine Utilizing Clover's proprietary Trimer-Tag© technology, S-Trimer is a trimeric SARS-CoV-2 spike (S)-protein subunit vaccine candidate. Similar to other enveloped RNA viruses such as HIV, RSV and Influenza, SARS-CoV-2 is also an RNA virus that has a trimeric spike (S) protein on its viral envelope. The trimeric S protein of SARS-CoV-2 is responsible for binding to host cell surface receptor ACE2 and subsequent viral entry, making it the primary target antigen for vaccine development. S-Trimer resembles the native trimeric viral spike protein and is produced via a rapid mammalian cell-culture based expression system. S-Trimer is intended to be adjuvanted

adjuvanted.

About Trimer-Tag© Technology Trimer-Tag© is an innovative drug development platform which allows the production of novel, covalently-trimerized fusion proteins. Many major disease targets are trimerization-dependent such as the tumor necrosis factor (TNF) superfamily (involved in extrinsic apoptosis, immune co-stimulation and inflammation) as well as enveloped RNA virus antigens responsible for entry into host cells. Clover is using its Trimer-Tag© technology with global IP position to develop recombinant trimerized fusion proteins that are able to effectively target these previously undruggable pathways.

About Clover Biopharmaceuticals Clover Biopharmaceuticals is a global, clinical-stage, research-based biotechnology company focused on discovering, developing and commercializing transformative biologic therapies, with a focus on oncology and autoimmune diseases, as well as viral vaccines. Having raised more than USD $350 million in total capital since 2016, Clover is utilizing its proprietary Trimer-Tag© technology platform to develop novel biologics targeting trimerization-dependent pathways. Additionally, Clover is leveraging its in-house GMP biomanufacturing capabilities to support large-scale production of its biologic therapies. For more information, please visit our website: www.cloverbiopharma.com.

About GSK GSK is a science-led global healthcare company with a special purpose: to help people do more, feel better, live longer. GSK is the leading manufacturer of vaccines globally. For further information please visit https://www.gsk.com/en-gb/about-us/

About Dynavax Dynavax is a commercial stage biopharmaceutical company developing and commercializing novel vaccines. The Company launched its first commercial product, HEPLISAV-B® [Hepatitis B Vaccine (Recombinant), Adjuvanted], in February 2018, following U.S. FDA approval for prevention of infection caused by all known subtypes of hepatitis B virus in adults age 18 years and older. Dynavax is also advancing CpG 1018 as an advanced vaccine adjuvant through research collaborations and partnerships. For more information, visit www.dynavax.com

About CEPI CEPI is an innovative partnership between public, private, philanthropic, and civil organizations, launched at Davos in 2017, to develop vaccines to stop future epidemics. CEPI has moved with great urgency and in coordination with WHO in response to the emergence of COVID-19. CEPI has initiated nine partnerships to develop vaccines against the novel coronavirus. The programs will leverage rapid response platforms already supported by CEPI as well as new partnerships.

Before the emergence of COVID-19 CEPI's priority diseases included Ebola virus, Lassa virus, Middle East Respiratory Syndrome coronavirus, Nipah virus, Rift Valley Fever and Chikungunya virus. CEPI also invested in platform technologies that can be used for rapid vaccine and immunoprophylactic development against unknown pathogens (Disease X).