PRESS RELEASE

Emergex Confirms Synthesis of a CD8+ T cell Adaptive Vaccine for Smallpox and Monkeypox

- *Vaccine construct comprised predominantly of peptides from early "eclipse phase" antigens targeting infections before viral replication is complete*
- *Peptide sequences of the vaccine construct are derived from variola (smallpox) virus and monkeypox virus antigens of the same viral family (Poxviridae)*
- *Construct has been synthesised to preclinical grade at Emergex's in-house manufacturing site. Demonstrates Emergex's ability to respond rapidly to emerging disease threats by creating experimental vaccine constructs using its highly adaptable, precise plug-and-play technology*

Abingdon, Oxon, UK, 18 October 2022 – Emergex Vaccines Holding Limited ('Emergex'), a clinical-stage biotechnology company addressing major global infectious diseases through the development of fully synthetic CD8+ T cell Adaptive Vaccines, announces today that it has formulated and confirmed the synthesis and assembly of a CD8+ T cell Adaptive Vaccine for smallpox and monkeypox, comprised predominantly of early "eclipse phase" antigens.

The monkeypox virus is part of the same family of double-stranded DNA viruses (Poxviridae) as variola virus, the virus that causes smallpox; they share many highly conserved proteins that make ideal T cell vaccine targets. Emergex's current formulation of the vaccine contains 20 viral peptides binding a range of human leukocyte antigens (HLA) that can present to CD8+ T cells to recognize and destroy viral-infected cells. The fact that the vaccine construct's pathogen peptides come from the "eclipse phase" of viral replication plays a key role in infection kinetics. The "eclipse phase" is defined as the period between the entry of the virus' genetic material into the host cell, causing infection, and the appearance of new mature virus in a host cell. Emergex's vaccine construct primes T cells to target an infected cell, with an ideal outcome being an "abortive infection".[1,2] This is one mechanism of sterilizing immunity;[3,4] however, vaccine-induced immunity can protect against future infection in the absence of sterilising immunity.[5]

The vaccine construct has been synthesised to preclinical grade at Emergex's in-house GMP manufacturing facility near Oxford with preclinical testing being performed in the laboratories at Emergex USA.

Phillip Williams, Chief Scientific Officer at Emergex commented: "We're very proud to have synthesized this smallpox and monkeypox vaccine so quickly using intelligence and resources to target highly conserved sequences shared by both viruses. This accomplishment demonstrates our ability to respond rapidly to emerging disease threats by creating experimental vaccines using our highly adaptable plug-and-play technology."

Professor Thomas Rademacher, Co-Founder and CEO at Emergex added: "The recent global monkeypox outbreak and global shortages of smallpox vaccines highlight the urgent need for societies worldwide to be well prepared in advance of any future disease outbreaks. Our vaccine, which targets

highly conserved antigens, is designed to be cross-reactive and convey protection from both smallpox and monkeypox viruses and may also confer protection against other members of the Pox family."

Smallpox is an acute contagious disease caused by the variola virus, thought to have originated up to 3,000 years ago.[6] It was a devastating disease that caused millions of deaths before the World Health Organization declared that it had been eradicated in 1980,[7] widely considered an international public health triumph demonstrating the power of vaccines. Amongst survivors, the disease often left permanent and debilitating complications, such as severe scarring or blindness. With a fatality rate of >30% in unvaccinated people, there are concerns that smallpox could pose a future biosecurity threat.

Monkeypox is a zoonotic disease that is primarily dominant in tropical rainforest areas in Central and Western Africa. It can be transmitted between people through close contact with body fluids, respiratory droplets, and contaminated materials. Over the last ten months, 68,900 laboratory-confirmed cases of monkeypox and 25 deaths have been reported from 106 countries worldwide, the first time monkeypox has spread widely outside Central and West Africa.[8]

References

1. Swadling L, et al. Pre-existing polymerase-specific T cells expand in abortive seronegative SARS-CoV-2. Nature; 601(7891):110-117. https://doi.org/10.1038/s41586-021-04186-8. Epub 2021 Nov 10.
2. Augusto, DG, et al. A common allele of HLA mediates asymptomatic SARS-CoV-2 infection. medRxiv. https://doi.org/10.1101/2021.05.13.21257065. 2022 Oct.
3. Hepburn MJ, et al. Neutralizing antibody response to booster vaccination with the 17d yellow fever vaccine. Vaccine; 24(15):2843-9. https://doi.org/10.1016/j.vaccine.2005.12.055. Epub 2006 Jan 18.
4. Sanchez-Felipe L, et al. A single-dose live-attenuated YF17D-vectored SARS-CoV-2 vaccine candidate. Nature; 590(7845):320-325. https://doi.org/10.1038/s41586-020-3035-9. Epub 2020 Dec 1.
5. Werner JM, et al. The hepatitis B vaccine protects re-exposed health care workers, but does not provide sterilizing immunity. Gastroenterology; 145(5):1026-34. https://doi.org/10.1053/j.gastro.2013.07.044. Epub 2013 Jul 31.
6. Centers for Disease Control and Prevention – History of Smallpox
7. World Health Organisation Health Topics – Smallpox
8. World Health Organisation Multi country Outbreak of Monkeypox External Situation Report Edition 7 5 October 2022

- Ends -

For further information, please contact:

Emergex
Storme Moore-Thornicroft, Executive Director
Phone: +44 (0) 1235 527589
Email: smt@emergexvaccines.com

Consilium Strategic Communications
Chris Gardner / Ashley Tapp
Phone: +44 (0)20 3709 5700
Email: Emergex@consilium-comms.com

About Emergex

Emergex, a clinical-stage, privately-held biotechnology company headquartered in Abingdon, UK, with an operating subsidiary in Doylestown, Pennsylvania, USA, is pioneering the development of 100%

synthetic T cell Adaptive Vaccines that harness the body's natural T cell immune response to destroy pathogen-infected cells in order to provide protection against some of the world's most urgent health threats: [i] viral infectious diseases, amongst which are Universal Coronavirus, Dengue Fever and Universal Influenza A, including pandemic influenza, as well as [ii] intra-cellular bacterial infectious disease.

Emergex has a growing proprietary pipeline of innovative CD8+ T cell Adaptive Vaccine and booster vaccine candidates that have the potential to deliver rapid, broad (mutation-agnostic) and long-lasting immunity to reduce serious illness associated with infectious disease. Emergex has a number of Phase I clinical trials underway, of which the most advanced programmes in development are [i] Dengue Fever (which may also be disease-modifying for other members of the *Flaviviridae* virus family, such as Zika and Yellow Fever) and [ii] Universal Coronavirus. Other programmes in development include vaccine candidates for Universal (pandemic) Influenza, Chikungunya, Hand, Foot, and Mouth Disease, Zika, and a booster vaccine for Yellow Fever. The programmes in the Discovery phase, for which our proprietary ligandome has been developed, include *Francisella tularensis* (intra-cellular bacterium), and a smallpox/monkeypox vaccine candidate.

Emergex's T cell Adaptive Vaccines candidates combine two proprietary technologies, [i] an empirically determined library of pathogen-derived protein fragments expressed on the surface of pathogen-infected cells (forming the MHC Class I expression "ligandome" library) using Immunotope Inc's immunoproteomics technologies to identify naturally processed and presented antigens only on infected cells, and [ii] a passivated gold nanoparticle carrier system designed to deliver the synthetic peptides to the skin-resident immune system (in combination with nociception) via micro-needles in order to elicit a robust, adaptive CD8+ T cell response. With potential stability at ambient temperatures, the vaccine candidates are intended to reduce the burden and the logistics of vaccine administration.

Find out more online at www.emergexvaccines.com.
Visit our LinkedIn page or Twitter account for live updates.