Docket #: S21-152

CORONAVIRUS NEUTRALIZING COMPOSITIONS AND ASSOCIATED METHODS

Technology Reference
CZB-213S
Stanford ref. no. S21-152

Researchers at CZ Biohub SF and Stanford have developed unique fusion proteins that have broad therapeutic benefits for the treatment of infection by existing and future coronaviruses.

Coronaviruses cause human illness ranging from the common cold to more severe diseases. They are large, enveloped, and covered in surface "Spike" glycoproteins that interact with host cell receptors to mediate host cell entry. To date, there are a limited number of active pharmaceutical agents that have any clinical effect in treating coronavirus-infected patients. COVID-19 therapeutics are limited to small molecules alone or in combination with monoclonal antibodies (mAbs), and with the emerging SARS-CoV-2 variants that have been identified, only one clinically available mAb retained activity suitable for use against the Omicron variant. Omicron has a larger mutational profile than previous variants of concern, thereby treatment of Omicron infections and subsequent novel future strains will require the development of broad-spectrum therapeutic agents.

Stage of Development
Research –

in vitro

Stage of Research
The inventors have developed fusion proteins and modified proteins comprising a neutralizing polypeptide and an antibody (e.g., a non-neutralizing antibody) that

binds to an epitope in a conserved region of one or more coronavirus spike proteins. The fusion proteins and modified proteins can specifically bind to and neutralize a broad spectrum of coronaviruses, including SARS-CoV-2 and all known SARS-CoV-2 variants of concern (VOCs).

Applications

- The fusion proteins described herein demonstrate neutralizing activity against all SARS-CoV-2 variants of concern (VOCs) tested, including Omicron and BA.2.
- Bi-functional fusion proteins containing two non-neutralizing antibodies with non-overlapping epitopes demonstrate sub-nano molar neutralization against all VOCs tested.
- Enabling the development of broad-spectrum therapeutic agents against future SARS-CoV-2 strains.

Advantages

- The fusion proteins described herein are highly cross-reactive compounds that compose a new class of broad-spectrum anti-viral agents.

Publications

- Weidenbacher, P., Waltari, E., Kobara, I., Bell, B., Morris, M.K., Cheng, Y.C., Hanson, C., Pak, J., and Kim, P. "Converting non-neutralizing SARS-CoV-2 antibodies into broad-spectrum inhibitors." Nature Chemical Biology, (18) 1270-1276, 2022.

Patents

- Published Application: WO2022271863
- Published Application: 20240270797

Innovators

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