Computationally Engineered Anti-SARS-CoV-2 Monoclonal Antibodies with High Binding Affinities

Technology Summary

Computational engineering of the anti-SARS-CoV-1 antibody 80R (Hwang et al, 2006) was done to produce monoclonal antibodies that bind specifically to the SARS-CoV-2 spike (S) protein and to SARS-CoV-2 variants, but not to SARS-Cov-1. These new monoclonal antibodies were selected based on their specificity to different variants of SARS-Cov-2, and several monoclonal antibodies with broad specificity were made. These novel monoclonal antibodies have been tested against wild-type, Wuhan S6P, Delta, South African SP6, and Omicron variants. One monoclonal antibody binds strongly to all tested variants and one monoclonal antibody binds to 4 of 5 tested variants.

The plasmids for expressing the various monoclonal antibodies are available for licensing. Theses anti-SARS-CoV-2 monoclonal antibodies may be useful for diagnostic tests, research, quality control, therapeutics, and vaccine development. In addition, the antibodies may be useful for identifying antigens or epitopes specific for a spike protein subtype of a SARS-CoV-2 variant virus responsible for infection, and for validating the conformation of antigenic proteins.

Potential Commercial Applications

- Immunoassays – diagnostic testing or as a research tool
- Vaccine development
- Therapeutic molecule to treat SARS-Cov-2 infection

Competitive Advantages

- Monoclonal antibodies specific to different SARS-CoV-2 variants' spike proteins
- Monoclonal antibodies with broad specificity to multiple SARS-CoV-2 variants' Spike proteins

Development Stage:

Monoclonal antibodies, expression plasmids, and in vitro characterization data

Inventors:

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Publication(s):

New manuscript in preparation; unpublished as of August 2022

Hwang WC, et. al. Structural basis of neutralization by a human anti-severe acute respiratory syndrome spike protein antibody, 80R. J Biol Chem. 2006 Nov 10;281(45):34610-6) (PMID 16954221)

Intellectual Property:

U.S. provisional application 63/351,312 was filed June 10, 2022

Product Area:

Research tools, diagnostic assays, vaccine development, and therapeutic antibodies

FDA Reference:

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Licensing Contact:
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