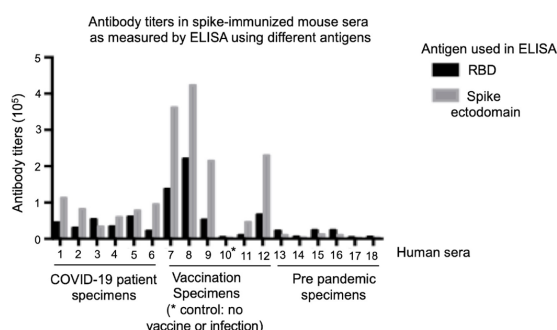




Engineered SARS-CoV-2 spike ectodomain for COVID-19 diagnostic assays

Engineered SARS-CoV-2 spike ectodomain expressed from stably transfected mammalian cell lines to be used as an effective diagnostic antigen against different SARS-CoV-2 variants

Technology No. 2021-233



Comparison of RBD and spike ectodomain as antigens in COVID-19 diagnostic assays

IP Status: Provisional Patent Application Filed

Applications

- Covid-19 diagnostic assays

Key Benefits & Differentiators

- **Effective against different SARS-CoV-2 variants:** by using the spike ectodomain, which is more evolutionarily stable than traditionally used antigens, such as receptor-binding domain (RBD) and N proteins
- **Capable of producing a superior immune response:** the spike ectodomain contains more epitopes than RBDs diagnostics antigen
- **Suitable for scaled-up production:** the proposed system produces the engineered SARS-CoV-2 spike ectodomain with high yield and purity and be easily scaled-up

Technology Overview

Currently, RBDs and the N proteins are the most commonly used antigens in COVID-19 diagnostic assays. However, the recent emergence of many SARS-CoV-2 variants has raised concerns over their ability to accurately predict COVID-19 infections. For instance, the N protein has relatively low specificity, and it cannot be used for people immunized by Moderna or Pfizer vaccines, once their produced immune response is based on spike mRNAs. On the other hand, RBDs are not strongly conserved across all virus mutants, and as a result, it might not be effective against new virus mutants.

To address this problem, researchers at the University of Minnesota have developed an engineered SARS-CoV-2 spike ectodomain with a D614G mutation, which can be used as an effective COVID-19 diagnostic antigen. This novel spike ectodomain is more evolutionarily stable and contains a higher number of epitopes than the traditionally used RBD antigens. Thus, this novel diagnostic antigen is more likely to detect SARS-CoV-2 antibodies in patients infected with different virus mutations. This spike ectodomain is expressed from stably transfected mammalian cell lines and pursues enhanced resistance against denaturation or proteolytic degradation. The engineered recombinant spike ectodomain polypeptides can be quickly obtained with high yield and purity. Furthermore, scaled-up production for commercial uses can be readily achieved.

Phase of Development

TRL: 4-6

The novel engineered spike ectodomain induced high titers of neutralizing antibodies in immunized mice. A head-to-head comparison of the engineered spike ectodomain and RBD antigens showed that higher sensitivity and specificity in detecting SARS-CoV-2-specific antibodies were obtained in ELISA assays using the spike ectodomain as the diagnostic antigen.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

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