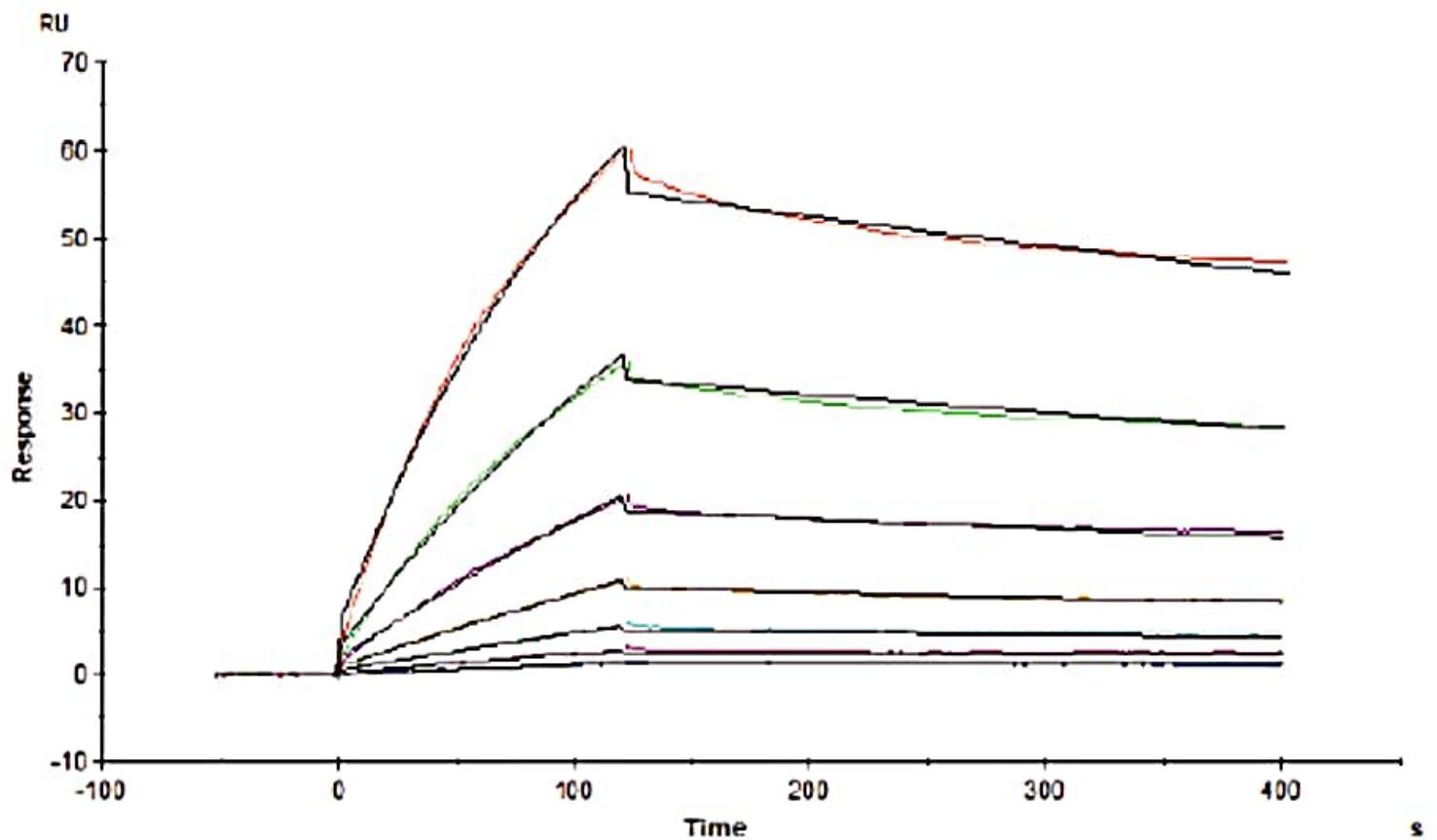


An Overview of Different COVID-19 Vaccines

In more than a year after the virus outbreak, various scientific research units and vaccine companies have worked to successfully develop a variety of COVID-19 vaccines. The vaccines can be classified by different technological platforms into whole virus vaccines, subunit vaccines, viral vector vaccines and gene vaccines (Fig. 1). Currently, 7 vaccines have obtained the WHO's emergency use authorization to be used in massive vaccination on a global scale, and over 300 vaccines are under development in pre-clinical or clinical trial stage.



Human ACE2, Fc Tag (Cat. No. [AC2-H5257](#)) captured on CM5 chip

Anti-human IgG Fc antibodies surface can bind recombinant S



In vivo antibody titer determination in preclinical & clinical trial: **S trimer/RBD/S1 IgG Antibody Titer Detection Kit (indirect ELISA)**

- NAb kits are standardized with WHO

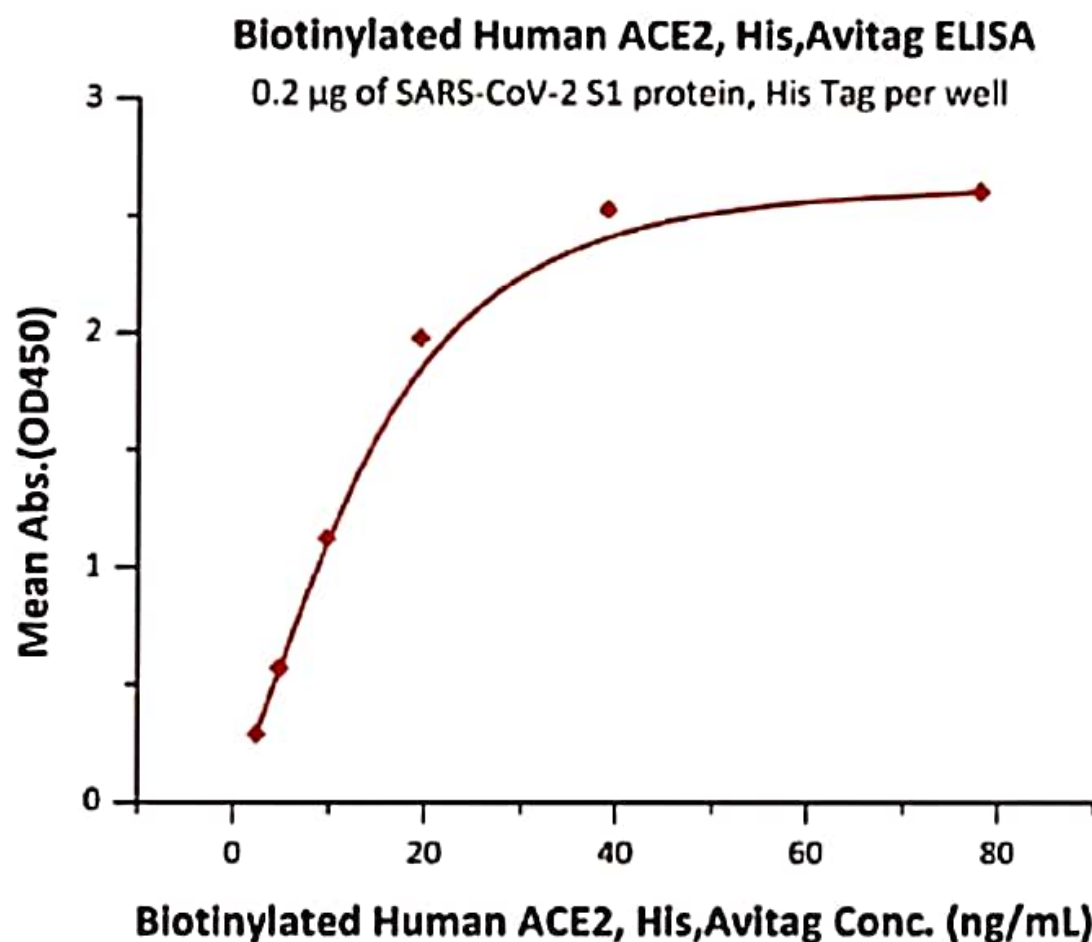
International Standard Serum (G, NIBSC code 20/136) to ensure that data is comparable between studies and laboratories

- Stable reagents with high batch-to-batch consistency to ensure data reliability for measuring changes in antibody titers at different times after vaccination

- Provide different kits suitable for serum antibody detection in different species (rats, monkeys, humans) to meet the needs of preclinical and clinical experiments

- Provide VOCs mutant-specific IgG antibody titer kits for antibody titer evaluation of vaccines against multiple viral variants

Bioactivity Verification



Immobilized SARS-CoV-2 S1 protein, His Tag (Cat. No. [S1N-C52H3](#))

at 2 μ g/mL (100 μ L/well) can bind Biotinylated Human ACE2,

His,Avitag (Cat. No. [AC2-H82E6](#)) with a linear range of 2-20 ng/mL

(QC tested).

Antigen Bioactivity Characterization

ACE2 and other host receptors

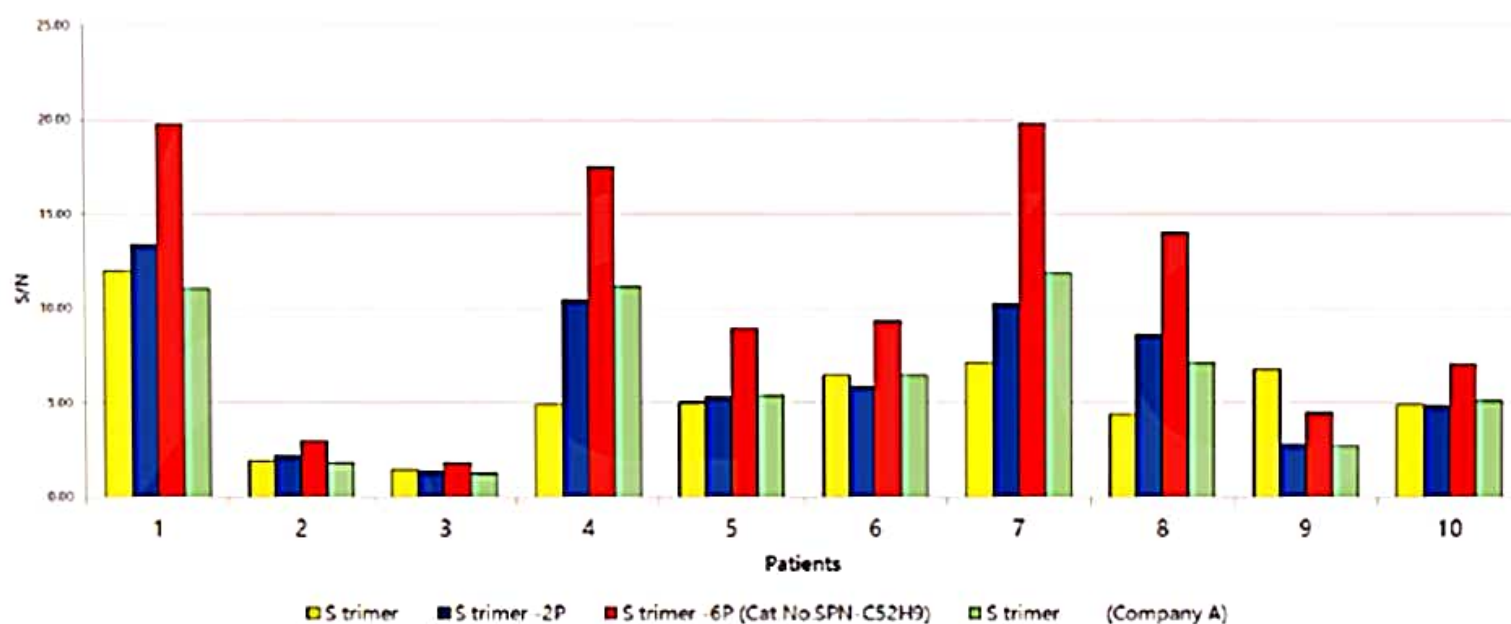
Antigen-ACE2 interaction ✓

High quality dimeric receptor: **ACE2 proteins**

- Available in multiple tags: His, His & Avitag[™], Fc, Fc & Avitag[™] etc.
- Available in multiple species: Human, Mouse, Cynomolgus, Rat, Paguma larvata
- Available in biotinylated or unconjugated forms that suits different experimental needs

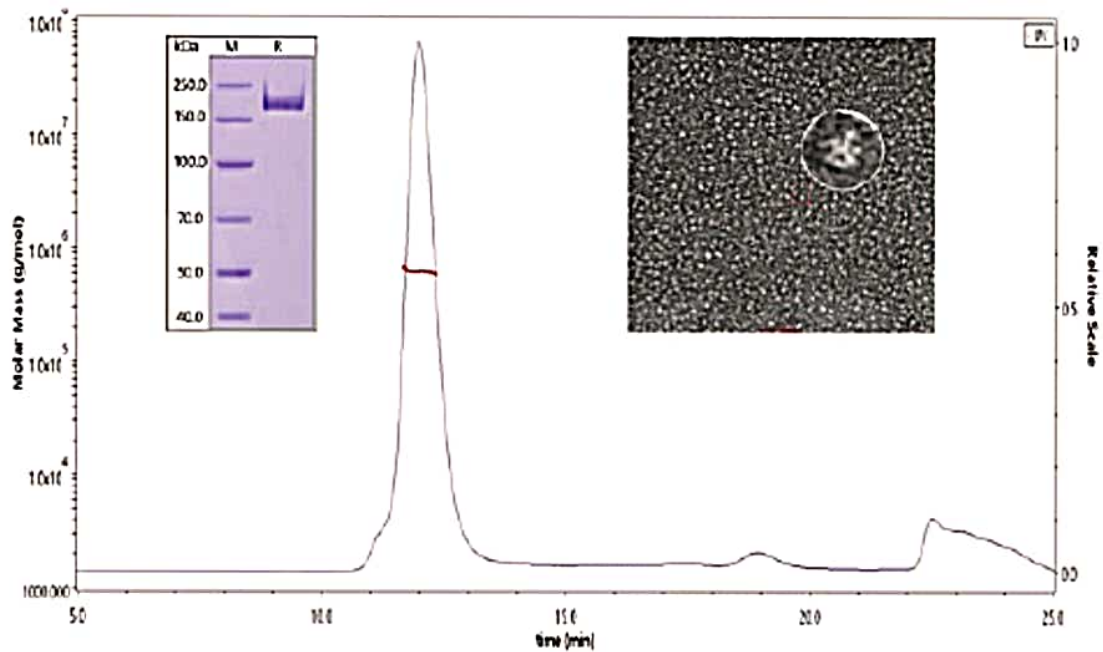


Comparison of Sample Test Data



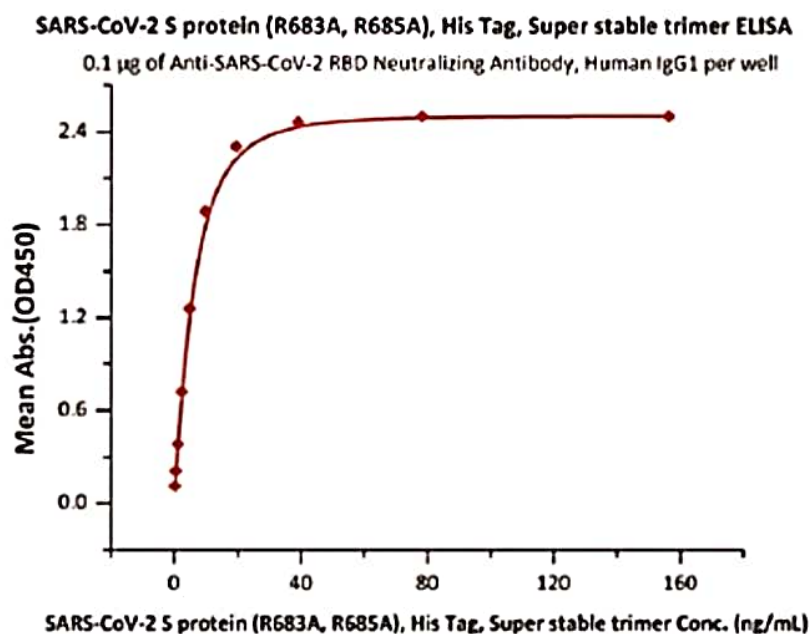
SARS-CoV-2 S protein, His Tag, Super stable trimer (Cat. No. SPN-C52H9) shows highest signal-to-noise ratio as compared to other spike proteins constructs in antibody tests in convalescent serum

Assay data



The purity of SARS-CoV-2 S protein, His Tag, Super stable trimer (Cat. No. [SPN-C52H9](#)) is more than 90% verified by SDS-PAGE under reducing (R) condition. The molecular weight was around 550-660 kDa confirmed by SEC-MALS. The particles are similar in size and appearance to SARS-CoV-2 trimers reported in published literature verified by negative stain electron micrograph.

Bioactivity Verification



Antigen Detection

Super stable SARS-CoV-2 spike trimer

RBD/S trimer ✓

The ideal control for antigen detection: **Super stable SARS-CoV-2 spike trimer**

- Closely resemble the natural conformation:

Introduction of 6P mutations on S2 stabilizes spike protein in the pre-fusion state.

- High trimer purity (>90%) verified by SDS-PAGE, SEC-MALS and Negative Stain Electron Microscopy (NS-EM).
- Provide trimer mutants of all VOCs, VOIs and other dominant strains.
- Suitable as control in antigen detection tests.

Since December 2019, the emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and its associated disease, COVID-19, has caused a devastating pandemic worldwide. The SARS-CoV-2 pandemic presents an extraordinary challenge to the lives and health of the global population, resulting in a total of over 200 million diagnosed cases and 4.9 million death (as of October 2021). It also significantly affected society, economics and the environment around the world and changed everyone's life.

As the virus spreads globally, the continuous emergence of new mutant strains escalated the challenge on humans. To better track and inform the viral variants, the World Health Organization (WHO) characterized several variants as "Variants of Concern (VOCs) " and "Variants of Interest (VOIs) " based on the risk posed to global public health. Today, of hundreds of variants that evolved from the original wild-type virus, Delta (PANGO lineage B.1.617.2/AY) are dominantly circulating and shaping the trend, reported to be responsible for most of the cases worldwide.

Vaccination is the cornerstone to prevent and control the spread of infectious diseases. Despite the importance of mask-wearing and social distancing, immunization by vaccines remains the most cost-effective way to protect our health. For this reason, vaccine development and production are at the center of each nation's public health policy.