Anti-spike Protein SARS-COV-2 Nanobodies

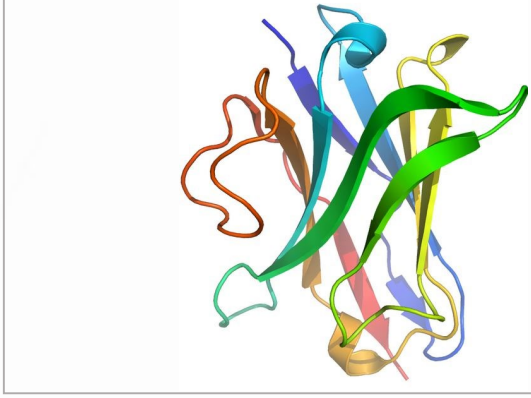
VTIP 22-024: “Llama-derived nanobodies directed to SARS-CoV-2 spike protein”

THE CHALLENGE

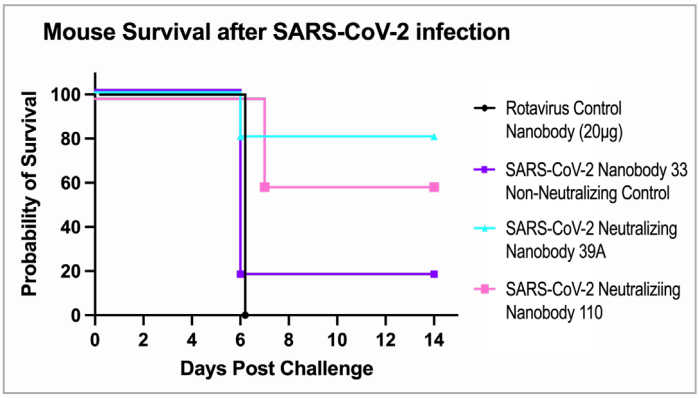
With over 275 million confirmed cases and over 5 million deaths, the emergence of the SARS-CoV-2 virus is the third major coronavirus outbreak in the past 20 years. Despite the approval of multiple vaccines, the development of therapeutic and prophylactic molecules remains essential in blunting the effects of the disease. The SARS-CoV-2 spike protein has proved to be a potential therapeutic target for monoclonal antibodies. However, monoclonal antibodies can be expensive to develop and difficult to deploy as they require infusions.

OUR SOLUTION

An international collaboration of researchers at Virginia Tech, INTA, and CONICET, Argentina has developed llama-derived nanobodies capable of targeting the SARS-CoV-2 spike protein. These nanobodies hold the advantage that they are considerably cheaper to produce than therapeutic antibodies. Additionally, the lower molecular weight of nanobodies facilitates aerosolization. In vitro and vivo testing of these nanobodies has shown significant neutralizing activity, including protection against COVID19 in mice.



A representative ribbon diagram of a llama-derived nanobody.



Survival curve of mice treated intranasally with nanobodies and subsequently challenged with SARS-Cov-2.

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