Growing Capability - Virus Protein Production for Vaccine Research

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Introduction

Pandemics have focused global attention on gaining the capability to develop, test, and then locally produce vaccines at pace. The Vaccine Alliance Aotearoa New Zealand (VAANZ) is actively working toward this goal. As part of this endeavor, this project was to develop a protein subunit vaccine candidate against COVID-19.

A protein subunit vaccine uses portions of the virus to create a lasting protective immune response. A key benefit of this approach is that it avoids the challenges of working with active virus.

Method

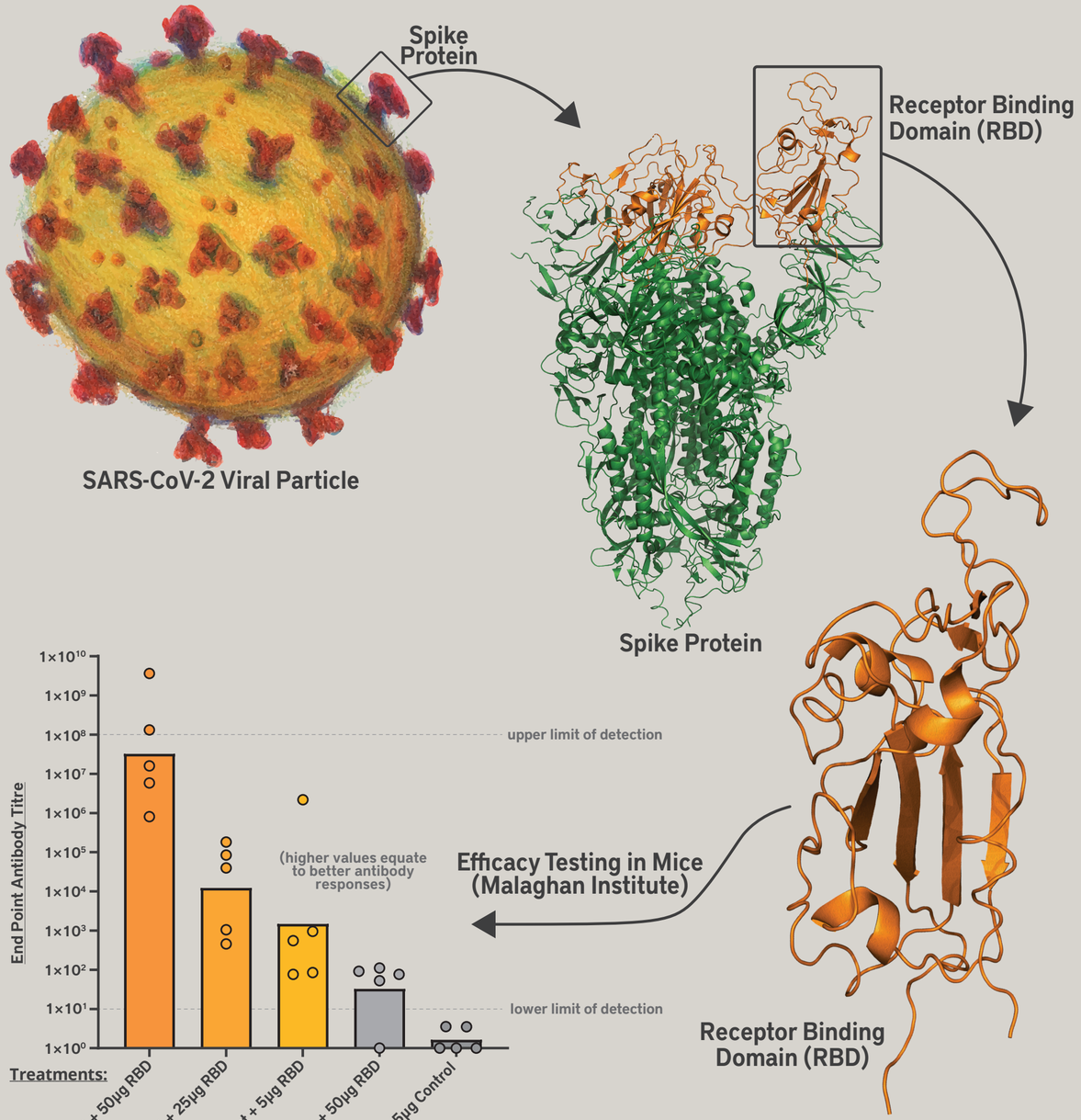
The receptor binding domain (RBD) of the SARS-CoV-2 virus spike protein made an ideal target as the virus uses it to enter host cells. The production of antibodies recognising this site will prevent viral entry and replication.

The encoding sequence of the RBD was introduced into a commercial yeast strain using targeted integration. After testing RBD production was successful, a high yield clone was selected and grown at lab scale. The protein was then harvested and purified.

Results and Conclusion

Production of SARS-CoV-2 RBD in yeast at lab scale was successfully demonstrated. Vaccine testing in mice was undertaken to ascertain the effectiveness of the resultant RBD as a vaccine candidate. The candidate vaccine was shown to stimulate the generation of neutralising antibodies. Further development is now being undertaken to optimise the production process and efficacy.

This research project was a successful incremental step toward providing increased disease response capabilities here in New Zealand.



Results of Vaccine Antibody Testing in Mice

Sources

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