

Design, generation and testing of novel MCMV-based vaccine vectors against COVID-19

Master Thesis

We offer an exciting and highly relevant research project for a master student at one of the leading institutes for infection research. We look for a highly motivated and skilled student starting between July and October 2023.

Project description

Vaccines are the most powerful tool to control the ongoing COVID-19 pandemic. However, waning immune responses and the emergence of novel viral variants escaping recognition by antibodies remain a critical challenge and hinder full control of the pandemic. The need for a vaccine that confers long-lasting and broad immune protection remains unmet.

In our lab, we developed a single-dose MCMV (murine cytomegalovirus) vector vaccine expressing the spike protein of SARS-CoV-2. As CMVs are known to elicit remarkably strong and inflationary T cell responses that remain for a lifetime, CMV-based vaccines are explored as vaccine vectors providing long-term immune protection. We previously showed that our vaccine MCMV^S elicits strong immune responses that do not wane but instead increase over time. Consequently, immunized mice showed full protection against SARS-CoV-2 challenge, even with the Omicron (BA.1) variant and up to five months after immunization.

While we currently develop this project in the direction of a start-up company, we continuously optimize and complement this novel technology. We are looking for a strong candidate to support us in the development of variant-adapted vaccines, the design and construction of bivalent vaccine candidates as well as *in vitro* testing of these vaccine candidates before they will enter pre-clinical testing *in vivo*. We offer a highly competitive and inspiring research environment with the opportunity to contribute directly to translational research and to learn state-of-the-art methods relevant to vaccine development and testing.

Methods

BAC molecular cloning, vector design (SnapGene), cell culture, virology techniques (MCMV, VSV-based pseudo-viruses), ELISA, Western-Blot, pseudo-virus neutralization assays, statistical analysis. Flow Cytometry and ELISpot upon request (not relevant to the project).

Location and duration

Helmholtz Centre for Infection Research, Brunswick, Germany. The project is designed for a duration of 6 – 12 months and open from July 2023.

Contact

Interested? Send an E-mail directly to henning.jacobsen@helmholtz-hzi.de. We would welcome an up-to-date CV and a brief statement of motivation as well one professional reference. We are looking forward hearing from you!