Cicin-Sain lab
Helmholtz-Centre for Infection Research
Viral Immunology

Characterizing novel omicron-related SARS-CoV-2 spike mutations and their implications for vaccine development

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 highly motivated and skilled students starting between January and March 2022.

Project description

In November 2021, WHO announced the newly emerged omicron variant of SARS-CoV-2 a variant of concern (VOC). This variant is of special interest because it contains 32 spike mutations and this level of spike-evolution goes beyond everything seen so far. Among these spike mutations, several mutations are unique and nothing is currently known about their implications on immune evasion. Within this project, you will generate pseudo-viruses encoding for the SARS-CoV-2 spike protein and its novel mutations. You will then study every novel mutation and its effect on antibody neutralization using pseudo-virus neutralization assays. This will unravel possible implications on immune evasion. In a next step, using bio-informatics tools, you will assess and identify possible synergistic patterns of mutations that are likely to enhance immune-evasive effects and generate and test pseudo-virus constructs harboring these patterns. This work will identify novel mutations and mutational patterns in the SARS-CoV-2 spike protein that are able to confer immune-evasion *in vitro*. These data will have important implications for the design of second-generation vaccine candidates and will help to understand possible implications of newly emerging SARS-CoV-2 variants.

Methods

Molecular cloning, Gibson assembly, cell culture and virological techniques, pseudo-virus neutralization assays, imaging techniques (IncuCyte) and bioinformatics (optional).

Location and duration

Helmholtz Centre for Infection Research, Brunswick, Germany. The project is designed for a duration of 6 – 12 months and open from February 2022.

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. We are looking forward hearing from you!