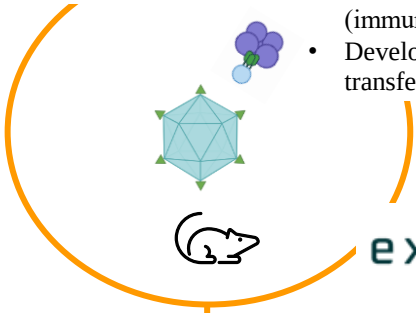
The consortium

AdaptVac, Copenhagen, Denmark

- Provide the VLP technology and expertise
- Develop the mRNA production processes, and transfer to GMP manufacture

University of Copenhagen, Denmark

- Produce the mRNA delivered vaccine for pre-clinical candidate screening
- Assessment of protein and mRNA vaccines (immunization, ELISA, QC analysis…)
- Develop the mRNA production processes, and transfer to GMP manufacture



Schoeder lab in Lepizig, Germany

- Provide expertise on AI platform
- Assist for designs of *de-novo* antigens
- Provide tools for evaluation of the protein quality

Expres2ion Biotech, Hørsholm, Denmark

- Produce the protein, expressed in insect cells, for pre-clinical candidate screening
- Produce the protein vaccine for pre-clinical assessment.
- Develop the antigen production processes, and transfer to GMP manufacture

Friedrich-Loeffler institute , Greifswald Germany

- Perform the critical proof-of-concept animal and human sera based *in vitro* Nipah virus neutralization assays, as well as the animal challenge studies in BSL4.

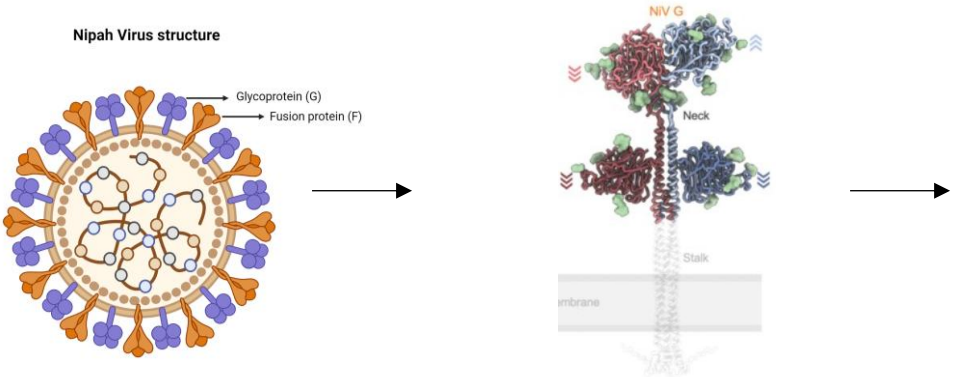
This will guide vaccine development and serve as surrogate marker for efficacy for the vaccine during Phase 1/2a clinical studies.

Radboud University medical center,Nijmegen Netherlands

- Sponsor and perform the Phase 1/2a clinical study.
- Phase I/IIa clinical study execution, data capture, trial, data analysis and safety management

The project

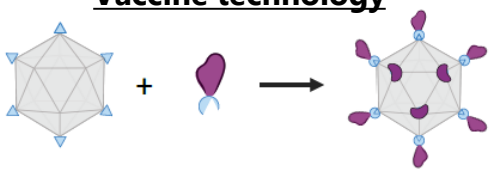
Antigen design



Glycoprotein (G)
Glycoprotein G head
Fusion protein (F)
G/F fusion protein

Different boundaries

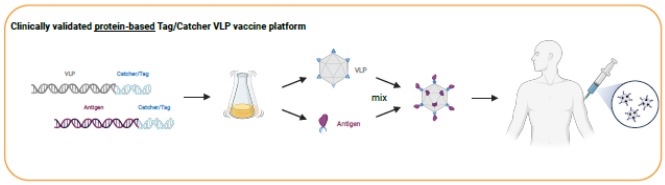
Vaccine technology



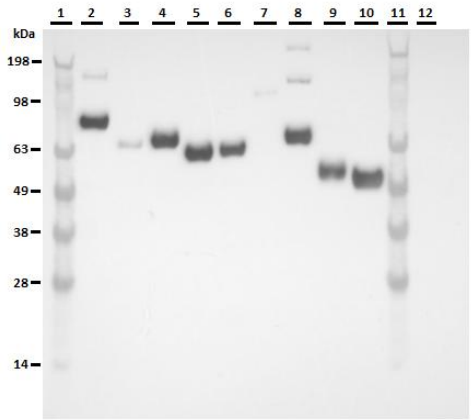
Tag-VLP Catcher-Antigen VLP-Antigen

Antigens are coupled in high density on a Virus Like particle (VLP) through the tag/catcher system.
Using the VLP technology, 2 vaccines are tested head-to-head to select the one that will be taken to Phase I clinical trial.

Track 1: protein delivery of antigen-:VLP



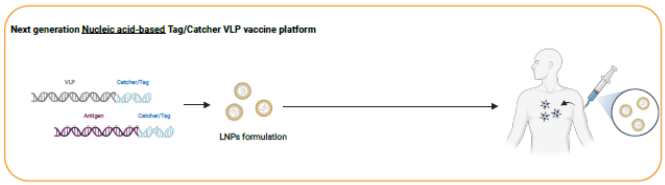
Screening of antigens based on their expression in S2 cells



SDS gel of expression in transient S2 cell lines

Screening of antigens based on their capacity to couple stably to VLP

Track 2: mRNA delivery of antigen:VLP



Screening of antigens based on their expression, secretion and coupling capacity *in vitro* in mammalian cells

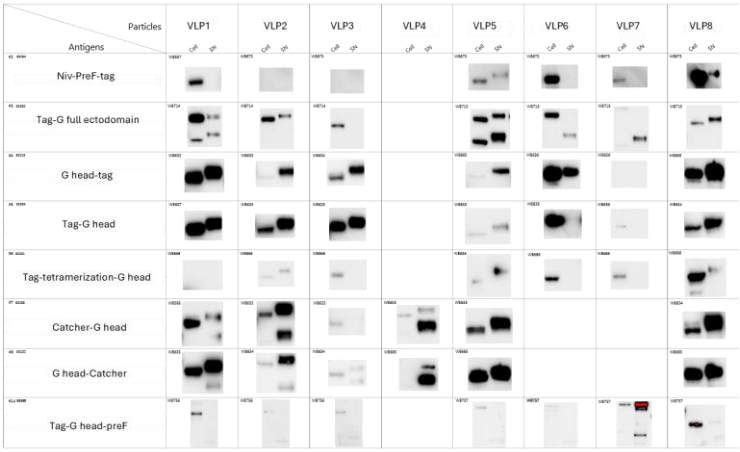
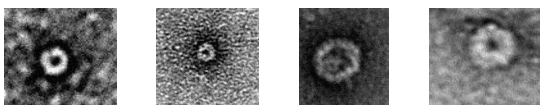


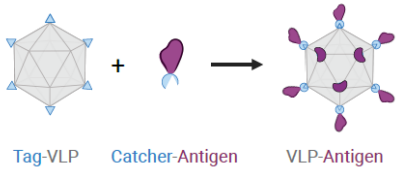
Table of the WB figures corresponding to the expression of the different antigens in HEK cells

Capacity for the antigen:VLP complex to form particle *in vitro*

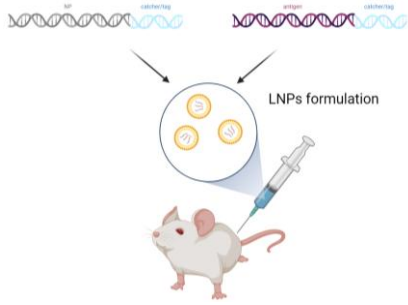


Electron microscope images of particle formation after transfection in HEK cells

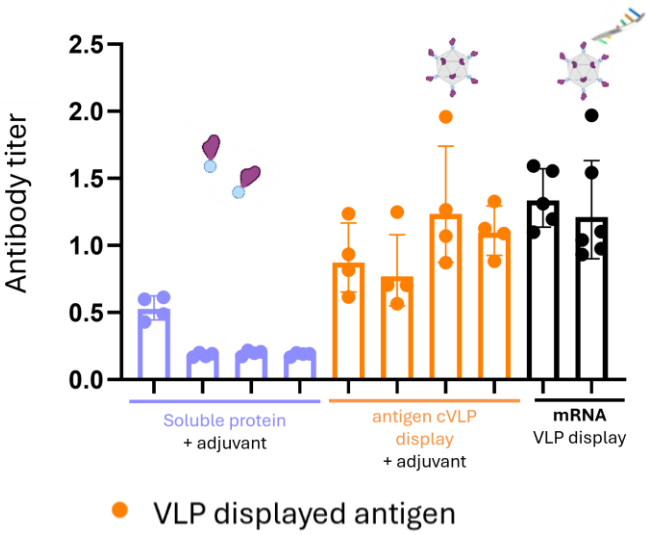
Initial lead candidates were selected based on their capacity to be expressed, secreted and coupled onto the VLP platform through the tag/catcher system, in both production methods

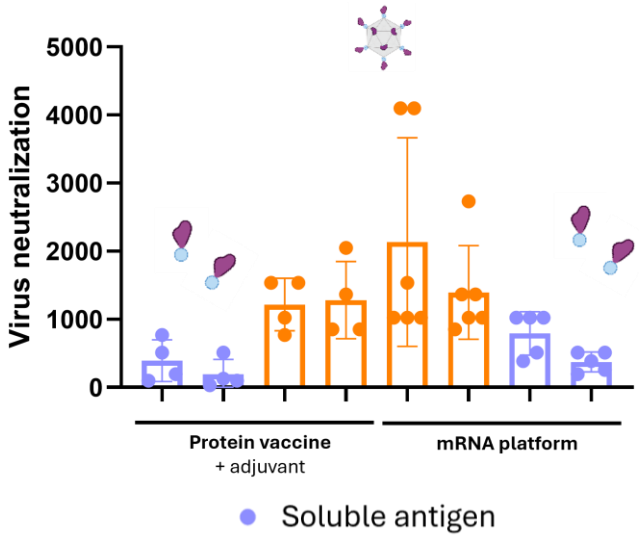


In vivo testing of the lead vaccine candidates



Mice were immunized either with VLP:antigen protein with adjuvant or with 2 mRNA LNPs formulations, one encoding for the VLP-tag/catcher and the other encoding for the antigen-tag/catcher. Mice were immunized twice, 2 weeks apart. Sera were collected 2 weeks after each immunization.





Initial lead candidates presented on the VLP (from the protein or mRNA vaccine) present higher antigen specific antibody titters compared to the soluble antigen. Furthermore, these antibody titters translate in high virus neutralization.