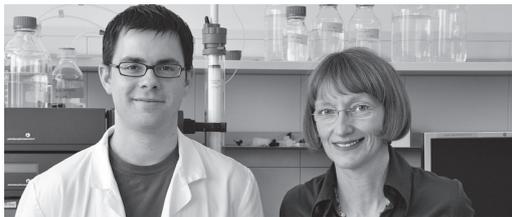


Development of an RSV Virosome Vaccine



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Respiratory syncytial virus (RSV) is a major cause of severe respiratory infections in infants and the elderly. An estimated 50% of all newborns contract RSV within their first year, sometimes with fatal consequences. There is still no vaccine for the treatment of RSV infection. The aim of the project is to develop a virosome vaccine against RSV in cooperation with Pevion Biotech.

Search for a Vaccine

RSV is a virus belonging to the paramyxovirus group, which mainly affects the epithelial cells of the airways. Currently, RSV-infected patients are treated with antiviral drugs or with virus neutralizing antibodies. A vaccine could prevent RSV infection. Pevion is developing such a vaccine, based on a membrane protein (rRSV-F) of the virus, which is recombinantly produced and incorporated into virosomes.



Droplet infection

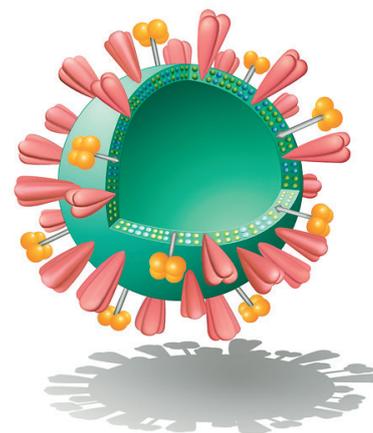
Virosome Technology

Virosomes consist of lipid vesicles in which membrane proteins of the influenza virus are embedded, and serve as carrier systems for the production of vaccines against different antigens. For the preparation of the RSV-F vaccine, rRSV-F is also integrated into the virosome membrane. This leads to increased immunogenicity of the rRSV-F.

Recombinant Protein Expression and Downstream Processing

The rRSV-F protein was recombinantly produced in mammalian cells by transient expression (Prof. Dr. F. Wurm, EPFL). Then rRSV-F was purified in three chromatographic steps at the ZHAW. The trimeric membrane protein was solubilized from the cell membranes with a detergent and purified and concentrated in a first step by ion exchange chromatography. With the subsequent chromatography steps a purity of >95% with high yield was obtained. To develop the purification process, extensive screening tests of different detergents, chromatography materials and conditions were necessary. Various analytical methods were used for in-process and quality controls, including ELISA, Western Blot, HCP and DNA analysis. In addition, the glycosylation pattern of the rRSV-F was analysed.

The rRSV-F protein we purified was formulated by Pevion into a virosome vaccine and tested in mice. The vaccinated mice produced antibodies that neutralized the RS virus, which demonstrated the efficacy of the vaccine. An upscale and process transfer for production of material for clinical trials in accordance with GMP guidelines is planned.



Model of a virosome vaccine
(©Pevion Biotech, 2007)

Research project

Development of an RSV Vaccine Based on Recombinant RSV-F Expressed in Mammalian Cells and Formulated in Influenza Virosomes

Leadership ZHAW:	Prof. Dr. Christiane Zaborosch
Project duration:	2 years
Partners:	Pevion Biotech Ltd.; Laboratory of Cellular Biotechnology, EPFL, Prof. Dr. F. Wurm
Funding:	Commission for Technology and Innovation CTI, Bern
Project volume:	CHF 1 100 000.–