The Mucosis vaccine

SynGEM®

A highly stable prefusion F vaccine against RSV

Introduction RSV

RSV infection can cause pneumonia and bronchiolitis among premature infants, children younger than age 2 with heart or lung problems, people with weakened immune systems and the elderly. In the US alone, CDC estimates that RSV yearly causes more than 57,000 hospitalizations in under 5 years old and more than 177,000 hospitalizations in over 65 years old. Globally, RSV infections are estimated to cause more than 250,000 deaths each year. Currently no vaccine to prevent RSV infection is available, despite multiple concepts being taken forward. A most promising recent finding is that the RSV-F antigen in its prefusion state exposes unique sites that are highly neutralization sensitive. These sites however are lost when the antigen undergoes a massive rearrangement from its labile pre-fusion state to its stable post-fusion state. Mucosis developed a vaccination strategy that stably captured the full-length RSV-F antigen in its prefusion state. By coupling the antigen to its proprietary bacterium-like particle platform, Mucosis generated the SynGEM® RSV vaccine. SynGEM was developed for intranasal administration. This unique vaccine concept is now available for acquisition or licensing.

The Mucosis prefusion F antigen

- A stable and soluble antigen was generated by replacing the C terminal transmembrane and cytoplasmic domain by a soluble trimerization domain keeping the antigen in its natural trimeric state. Moreover, furin cleavage sites were mutated by replacing R⍰K.
- Expression of the RSV-F was established in a CHO platform. A stable MCB was designed and a GMP batch produced.
- Stability of the prefusion F antigen was demonstrated for as long as 150 days.
- The Mucosis prefusion F sequence was designed to optimally mimic wild type RSV-F *(Fig 1)*.

The SynGEM® RSV vaccine, preclinical and clinical development

- Applying the company's Mimopath® technology, the prefusion-F antigen was expressed with a Protan-tag and non-covalently bound to a bacterium-like particle *(Fig 2)*.
- The SynGEM vaccine was fully tested in pre-clinical models, demonstrating safety, a balanced immune response and protection against challenge.
- The SynGEM vaccine was clinically tested in Phase I, demonstrating safety and immunogenicity data.

The transfer package

The SynGEM RSV technology includes:

- An extensive IPR portfolio, providing patent protection at least until March 2033 including patents covering the BLP technology, Protan linker technology and the heat-stable RSV prefusion F construct (WO 2014/140083, granted in EU and US, and pending in multiple other countries).
- An extensive tech transfer package including all-encompassing procedures for the production of BLPs, RSV-F Ag and the Syn-GEM vaccine as well as QA and QC protocols and safety data.
- Clinical trial data: IMPD, Phase I clinical trial data.
- GMP grade cell lines and bacterial strains: RSV-F producing CHO cell lines (preseed, MCB and WCB) and Lactococcus Lactis MCB.
- Clinical trial material; GMP and non-GMP grade research material.

The package is available for acquisition and for complete or partial licensing.

Company history · *Mucosis had developed vaccines for over 10 years, until the share holders discontinued financing in June 2017. The shareholders' decision was based upon the immunogenicity data of a phase I clinical trial with the Mucosis RSV vaccine, which required a new phase I study using a higher dose. The District Court of 'Noord-Nederland, locatie Groningen', the Netherlands, declared bankruptcy on June 27 and appointed Mr. R. G. Holtz LLM as trustee. On behalf of the trustee, sale of the Mucosis assets is executed by Ernst Soethout of Virtuvax BV.*

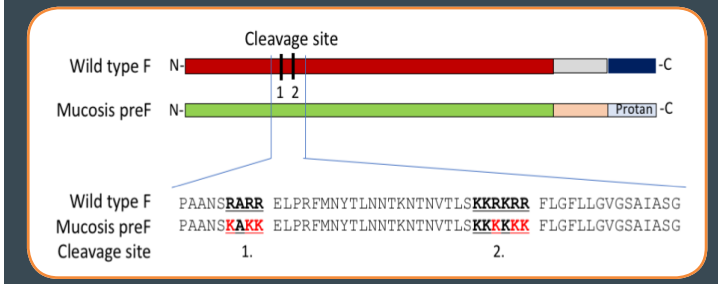

Fig 1: The Mucosis prefusion RSV-F antigen

The Mucosis antigen is highly similar to the wild type RSV-F, expressing a Protan-tag (upper panel) and showing R →K replacements in the cleavage sites 1 and 2 (lower panel).

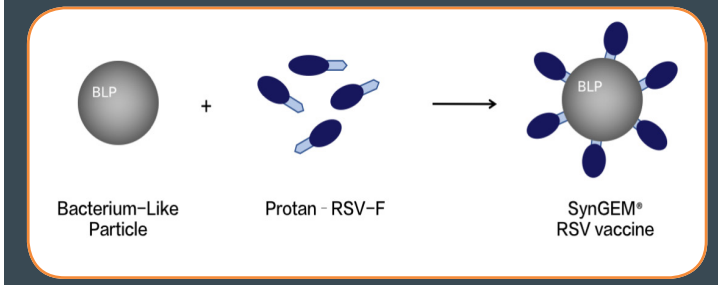

Fig 2: The RSV SynGEM vaccine

The SynGEM RSV vaccine expresses the prefusion F antigen of RSV on the BLP platform of Mucosis. The Bacterium-Like Particle acts as a carrier and immunostimulator and is non-covalently bound to the RSV-F antigen, through the peptide linker Protan.

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