

Enhancing Pneumococcal Vaccines

S. pneumoniae is a major human pathogen causing up to 1 million deaths per year worldwide and leading the number of life years lost among other bacterial infectious agents (Lancet 2022; 400: 2221–48).

In at-risk populations such as children, the elderly and the immunosuppressed, an otherwise harmless colonization by *S. pneumoniae* can develop into severe invasive disease manifesting as pneumonia, bacteremia, and meningitis.

Vaccines to prevent these invasive stages of disease are available with an expected global market valuation of 10 billion USD by 2025 (Allied Market Research 2019; Pneumonia Vaccine Market).

Current vaccines are limited to a subset of the strains relevant for human health, targeting the outer layers of the bacteria and show limited protection following viral infections.

TECHNOLOGY OVERVIEW

This innovation describes a novel protein target from *S. pneumoniae* that serves as an effective universal antigen for preventative vaccination.

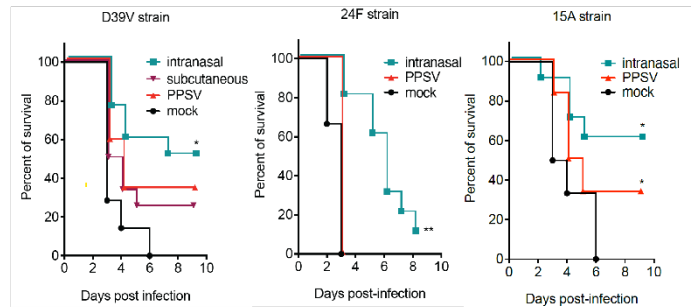
The protein was discovered via a novel in-vivo screening method in a manner unbiased by preconceived candidate characteristics. The candidate is an intracellular membrane-associated factor not obvious as a vaccine candidate

APPLICATIONS

A preventative vaccination against invasive disease of *S. pneumoniae* in all at-risk groups. Unlike current market alternatives, protection by this vaccine is independent of *S. pneumoniae* serotype. The application as nasal vaccine ensures protection via the mucosal response at the place of contact with the pathogen.

REFERENCE

IDF 21-20



Murine survival comparison of vaccination with novel vaccine against different *S. pneumoniae* serotypes (intranasal or subcutaneous) with market alternative (PPSV, MSD) or mock.

COMPETITIVE ADVANTAGES

- Vaccine using a novel internal protein.
- Broad protection against all *S. pneumoniae* serotypes.
- Heterologous expression in *E. coli* enables production at scale
- Intranasal administration
- Works during superinfection following influenza
- Up to 50% higher protection efficiency than vaccines on the market

STAGE OF DEVELOPMENT

Candidates have been tested in immunological and efficacy tests in vitro and in vivo in mice. Optimization of purification and formulation are in progress. Project currently in advance preclinical stage Technology Readiness Level (TLR4):4.

INTELLECTUAL PROPERTY

Patent application EP21188570.2 extended in PCT/EP2022/071098. "Novel pneumococcal polypeptide antigens" publication WO2023/006825 Priority date: July, 29 2021

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KEY PUBLICATION:

Liu et al. 2023. A conserved antigen induces respiratory Th17-mediated serotype-independent protection against pneumococcal superinfection. bioRxiv (revising for Cell Host & Microbe)
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OPPORTUNITY

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