LafB-mRNA LNP: Advancing *S. pneumoniae* Vaccination

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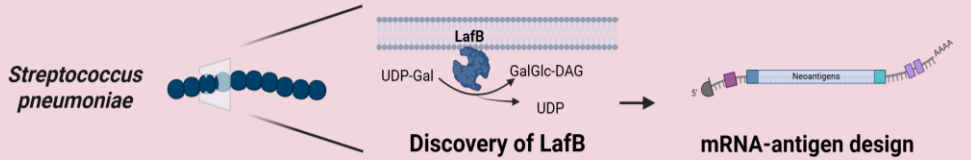
INTRODUCTION

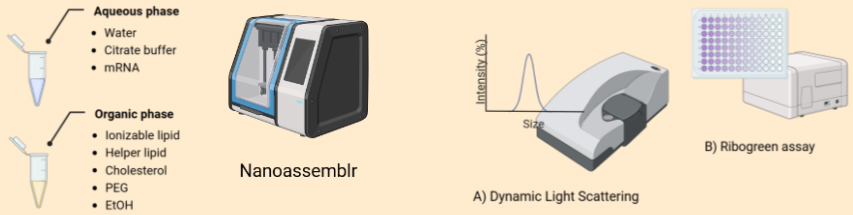
***Streptococcus pneumoniae* is the leading cause of pneumonia, sepsis, and meningitis in infants and the elderly (1).** Current vaccines protect against only ~20% of serotypes (2). LafB, a recently identified protein, offers promising alternative antigens (3). **In this study, we developed two mRNA-LNP formulations encoding distinct LafB antigens (LafB1 and LafB2) as a potential vaccine platform against *S. pneumoniae* infection.**

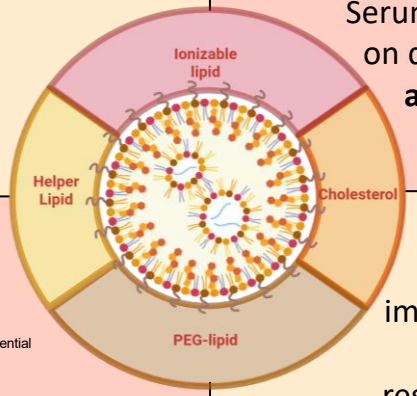


(1) Narciso AR, Dookie R, Nannapaneni P, et al. Nat Rev Microbiol. 2024.
(2) Løchen A, Croucher NJ, Anderson RM. Sci Rep. 2020;10:18977.
(3) Liu X, Van Maele L, Matarazzo L, et al. Cell Host Microbe. 2024.13;32(3):304-314.e8.

METHODS

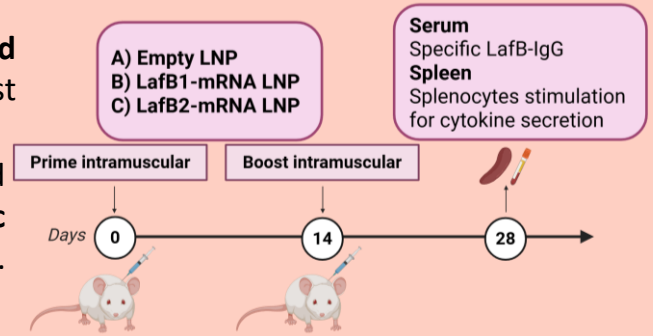
LNPs were formulated according to the **microfluidics technique.** Particle size, ζ-potential, and polydispersity index were characterized by dynamic light scattering. RNA encapsulation was assessed using the RiboGreen assay.





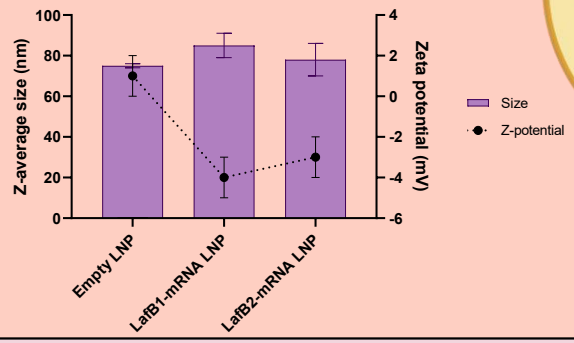
C57BL/6 mice were immunized intramuscularly with a prime/boost schedule.

Serum and spleens were harvested on day 28 to analyse **LafB-specific antibody and T-cell responses**.



CHARACTERIZATION

LNPs exhibited **sizes around 80 nm, neutral surface charge, polydispersity index < 0.2, and encapsulation efficiency of 90%.**



IMMUNE RESPONSES

Both mRNA-formulations elicited LafB-specific antibody and cellular immune responses in mice, whereas the empty LNP did not induce any response. Notably, **LafB1-mRNA LNP demonstrated superior performance**.

Disclaimer: Representative data shown; actual results are confidential.

LafB-specific immune responses	Serum	Splenocytes	
	IgG	IFN-γ	IL-17
Empty LNP	-	-	-
LafB1-mRNA LNP	+++	+++	++
LafB2-mRNA LNP	++	++	+

CONCLUSION

We successfully developed mRNA-LNPs encoding LafB antigens for *Streptococcus pneumoniae*. **The LafB1-mRNA-LNP induced strong immune responses *in vivo*, suggesting potential as a protective novel vaccine,** encouraging the use of mRNA-LNPs for bacterial diseases.

ACKNOWLEDGEMENTS

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