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Poster abstract submission

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Poster title

A Dual-Use Vaccine Strategy Against Pseudomonas aeruginosa

Poster abstract

Pseudomonas aeruginosa is a WHO-designated priority antimicrobial-resistant pathogen and a major cause of chronic, life-limiting lung infection in people with cystic fibrosis, bronchiectasis and severe chronic obstructive pulmonary disease. Once established, infection is rarely cleared, even with repeated courses of high-dose antibiotics, driving progressive lung damage, recurrent hospitalisation and escalating antimicrobial resistance. Despite decades of effort, no licensed P. aeruginosa vaccine exists.

Here, we present a vaccine development strategy that challenges the prevailing assumption that antibacterial vaccines are exclusively prophylactic. Using a proprietary reverse-vaccinology pipeline, we identified conserved P. aeruginosa antigens and advanced a lead recombinant protein vaccine into biologically relevant preclinical infection models. Subcutaneous immunisation confers robust prophylactic protection against both systemic and mucosal infection, significantly reducing lung bacterial burden in wild-type mice and in a βENaC transgenic model that recapitulates key features of cystic fibrosis lung disease.

Critically, we demonstrate that the same vaccine also disrupts established chronic infection. In a chronic lung infection model, vaccination administered after infection is established results in a marked reduction in bacterial burden following booster immunisation, providing clear evidence of intrinsic therapeutic activity. This dual prophylactic–therapeutic efficacy distinguishes our approach from historical vaccine strategies and supports a paradigm shift in antibacterial vaccinology.

The programme is now advancing toward translational development, including manufacturing scale-up, formulation optimisation and regulatory-aligned preclinical studies to support first-in-human evaluation. Together, these data support the progression of a first-in-class anti-P. aeruginosa vaccine capable of both preventing infection and reducing established disease burden, directly addressing a critical unmet need in AMR and chronic respiratory infection.

Research topic

Vaccines

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