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Poster abstract submission

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Poster title
Preclinical evaluation of Klebsiella pneumoniae vaccine antigen candidates in a mouse model of K. pneumoniae-induced sepsis.

Poster abstract
Klebsiella pneumoniae, a Gram-negative bacterium that accounts for approximately 600,000 deaths per annum, is a World Health Organisation (WHO) Critical Priority pathogen. This highly antimicrobial-resistant (AMR) pathogen causes serious infections, particularly in immunocompromised patients. It is one of the leading causes of multi-drug resistant hospital acquired pneumonia (HAP) worldwide; with strains showing resistance to ampicillin, amoxicillin, cephalosporins, carbapenems and even the last-line of defence: colistin. Vaccines have promise both in the prevention and/or treatment of bacterial infections and also in reducing AMR. There are currently no licenced vaccines available for the prevention or treatment of K. pneumoniae infection. Using our novel cell-blot platform, we identified K. pneumoniae proteins involved in bacterial attachment to human lung epithelial cells with potential as effective vaccine antigen candidates. Several of these proteins were cloned and expressed in Escherichia coli and purified for further evaluation. Three lead candidates showed protection in a mouse model of K. pneumoniae-induced sepsis, reducing bacterial burdens by between 2.7 to 1.54 log10 CFU, while also reducing bacterial dissemination to the spleen. The antigens stimulated potent serological and cellular immune responses (T-cell and NK-cell) in immunised animals. Recall responses of two lead antigens in combination with the experimental vaccine adjuvant, SAS, showed stimulation of IL-17 and IL-22 responses, compared to the adjuvant-only controls. This suggests a role for these cytokines in the protection against K. pneumoniae infection. We are currently evaluating alternative adjuvants to optimise the protective immunological responses to develop the most efficacious vaccine to protect vulnerable populations against this priority pathogen.

Research topic Vaccines