TITLE: PRODUCTION OF TYPE I AND III FIMBRIAE SUBUNITS FROM *Klebsiella pneumoniae* AND IN SILICO EVALUATION OF THEIR VACCINE POTENTIAL

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ABSTRACT:

Klebsiella pneumoniae is a bacterium capable of colonizing mucous membranes and causing serious infections. To date, there are no vaccines available against infection by *K. pneumoniae*. Recombinant vaccines based on bacterial antigens are a promising option to be investigated, due to the conservation in different serotypes and accessibility to the immune system of these antigens. Fimbriae components play an important role during infection in the host, related to adhesion to biotic and abiotic surfaces, but also in the formation of biofilms and intracellular bacterial communities. In this work, type I and III fimbriae subunits will be evaluated as potential vaccine candidates against infection by *K. pneumoniae*.

In silico models confirmed the immunogenic potential of the proteins, while peptide mapping revealed the presence of B cell, T CD4 cell and IFN-γ epitopes. The adhesins MrkD (type I) and FimH (type III), and the type I fimbriae shaft protein MrkA were cloned into pQE-30 and pAE-6xHis expression vectors. MrkA was expressed in *E. coli* BL21DE3 as a soluble protein. Subsequently, the proteins will be evaluated for their immunogenic and protective potential in animal models of bacterial sepsis and pneumonia, and the induced immune responses will be investigated.

Together, the results of this study will contribute to the development of prophylactic strategies against *K. pneumoniae*, as well as elucidating the contribution of fimbriae to the virulence of the bacterium

Keywords: *Klebsiella pneumoniae*; Vaccines; Fimbriae; adhesins.

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