

VAC_03 - Recombinant influenza virus encoding a *Streptococcus pneumoniae* conserved antigen: a bivalent intranasal and intramuscular broad-spectrum vaccine against pneumonia and Flu

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Introduction: *Streptococcus pneumoniae* causes pneumonia and meningitis, besides secondary infections in influenza virus infected patients, resulting in great mortality worldwide. Pneumococcal vaccines, although effective, are specific serotype, resulting in circulating serotypes replacement for non-vaccinal serotypes. Based on this, we generated a recombinant influenza virus carrying a pneumococcus surface protein highly immunogenic, conserved and present in all serotypes (named SP protein), aiming the development of a bivalent vaccine against *S. pneumoniae* and influenza infections.

Objective: Evaluate the effectiveness of a vaccine protocol that uses a recombinant influenza virus encoding the SP protein (Flu-SP) as a bivalent intranasal and intramuscular vaccine against pneumococcus and influenza, in mice.

Methodology: The Flu-SP virus, constructed by reverse genetics technique, was used for C57BL/6 mice intranasally (IN) or intramuscularly (IM) immunizations with: Flu-SP and boost with adjuvanted SP protein (alum); Flu-Control (Flu-CT) and boost with alum; or 2x PBS. Posteriorly, blood samples were collected and serum IgG anti-SP and anti-influenza antibodies were assessed by ELISA. Lastly, the immunized mice were intranasally challenged with a lethal dose of a highly virulent pneumococcal strain (ATCC6303) and the survival was monitored for 10 days.

Results: After IN and IM immunizations, we observed significant ($p < 0.001$) high levels of anti-SP and anti-influenza IgG antibodies by both routes. In pneumococcal lethal challenges, were observed in vaccine group 65% and 100% protection rates with IN and IM immunization, respectively. The control groups didn't present relevant protection rates. Since specific antibodies are essential against these pathogens, it's possible that the high titers of anti-SP IgG antibodies may have contributed to the challenge protection, and that the anti-influenza IgG induced by the intramuscular immunization result in protection against influenza, as already previously observed with intranasal immunization.

Conclusion: Thus, these results demonstrate the effectiveness of this vaccine protocol both in intranasal and intramuscular immunization, being, therefore, a promising bivalent broad-spectrum vaccine candidate against pneumonia and Flu.

Keywords: Pneumonia; Flu; Bivalent vaccine