

**Title: PULMONARY IMMUNIZATION OF MICE WITH NANOPARTICLES CONTAINING THE ANTIGEN PspA (PNEUMOCOCCAL SURFACE PROTEIN A)**

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**Abstract:**

A range of diseases, including otitis media, pneumonia, bacteremia and meningitis, can be caused by *Streptococcus pneumoniae*. This pathogen is one of the most important causes of death in children around the world. Currently licensed vaccines are based on the induction of antibodies against the capsular polysaccharide (PS) and PS-conjugated vaccines are very effective against invasive disease caused by vaccine serotypes. Since there are more than 90 serotypes described currently, increase in colonization and disease by non-vaccine serotypes has been reported in several countries. An interesting alternative to overcome this problem is the use of protein antigens in a vaccine formulation. Among surface proteins, the Pneumococcal surface protein A (PspA) is an important candidate antigen for the induction of protection against different strains. Therefore, the purpose of this study is to analyze the effectiveness of poly(glycerol adipate-co- $\omega$ -pentadecalactone) (PGA-co-PDL) nanoparticles (NP's) containing PspA formulated as nanocomposite microparticle carriers (NCMPs) for the development of a dry-powder vaccine against pneumococcal pneumonia. Anesthetized female BALB/c mice were inoculated with one dose of the NCMPs containing 1  $\mu$ g PspA into the lungs using an insufflator. After 21 days, blood samples and bronchoalveolar lavage fluid (BALF) were collected for the analysis of induction IgG anti-PspA. Pulmonary lymph nodes were also collected for the analysis of cytokine production after *in vitro* stimulation with PspA. Preliminary results showed very low levels of IgG anti-PspA both in serum and BALF samples of mice immunized with the NPs. We did not observe the secretion of cytokines by cells recovered from pulmonary lymph nodes. These results indicate that the animals were probably primed by the immunization with the NPs, but strategies to boost the response are necessary.

**Keywords:** *Streptococcus pneumoniae*, Vaccine, PspA, Pneumonia.

**Support:** FAPESP (Brazil)