VAC_07 - Intranasal Vaccinal strategy targeting mucosal surface for methicillin-resistant *Staphylococcus aureus* (MRSA) decolonization

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Introduction: Nasal colonization with *S. aureus* is a ubiquitous phenomenon wherein the microorganism inhabits the nasal cavity of 30% of people without eliciting overt symptoms. A prophylactic strategy to mitigate MRSA spread is to augment mucosal immunity within the nasal cavity, which is the first line of defense, and it might be enhanced through utilization of nasal vaccines. Stimulating the immune system can aid nasal colonization inhibition and decrease infection spread incidence. MRSA transpeptidase enzyme PBP2a has a crucial role conferring structural integrity and antibiotic resistance to the bacteria. As such, PBP2a is considered to be a highly desirable therapeutic target in order to eradicate the pathogen without causing deleterious effects to the commensal microbiome.

Objectives: Evaluate MRSA colonization time response in mice model using bioluminescent strain in live imaging for different intranasal vaccines formulations using PBP2a.

Methodology: Three vaccine formulations within PBP2a, alone plus two different adjuvants (AbISCO and Addavax), and negative control were administered in three doses scheduled, within 15 days apart. Time response comparison *in vivo* was realized by IVIS® In Vivo Imaging Software for Region of Interest (ROI) quantification once a day, until the signal vanished in all mice. Mice were then euthanized and organs which lighted during the experiment were collected for bacteria quantification.

Results: The formulations of PBP2a alone showed a homogeneous result in all mice tested with a reduction in colonization time by almost 60%, when compared with the control group which was maintained until 175h. Addavax adjuvant showed the shortest colonization time in one mouse, within 68h and AbISCO mice showed heterogeneous results with times of 42, 72 and 175h. One mouse in the control group showed a progressive increase in signal emission until the last day.

Conclusion: All formulations showed a reduction in colonization time, indicating that PBP2a is a good target for anti-MRSA decolonization strategies.

Keywords: MRSA colonization, PBP2a, mucosal vaccine