Antigenic Characterization of RSV Pre-fusogenic F Nanoparticle Vaccine, Pre-F, and Post-F Proteins against a Broad Range of Neutralizing Monoclonal Antibodies and Epitope Responses in Cotton Rats

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BACKGROUND
Respiratory Syncytial Virus (RSV) is one of the most common causes of lower respiratory tract infections (LRTI) among infants and young children worldwide. Severe cases of LRTI can result in inflammation of the small airways of the lungs (bronchiolitis) or pneumonia. ResVax (Pre-fusogenic RSV F nanoparticle vaccine) is currently being assessed in the Prepare™ (Phase 3) trial for the protection of infants via maternal immunization in healthy third trimester pregnant women. In animal and clinical studies, pre-fusogenic F nanoparticle vaccine has been shown to induce broadly neutralizing antibodies. Here, we characterize the binding efficiency and competitive binning of a panel of well characterized neutralizing monoclonal antibodies.

OBJECTIVES
To study and compare antigenic characterization of different forms of the RSV F protein against a broad range of neutralizing monoclonal antibodies and epitope responses in cotton rats.

RESULTS

Fig 1. Antibody Epitope Binning on RSV F Proteins
A. Pre-fusogenic F Nanoparticle Vaccine

B. NVAX Pre-fusion F

C. Post-fusion F

Fig 2. Immune Responses to RSV F Proteins on Day 42

Fig 3. RSV Lung Virus and RSVA Neutralization Titers

Fig 4. CAE Responses and Anti-F IgG vs RSV/A Neutralization Titer

Fig 5. Human Serum Adsorption with Pre-F and Post-F Proteins

CONCLUSIONS
Antibody epitope binning reveals the differences of antigenic sites present on Pre-fusogenic F, Pre-F and Post-F proteins.

Epitope binning shows presence of both Pre-F and Post-F specific antigenic sites on Pre-fusogenic F nanoparticle vaccine.

Pre-fusogenic F nanoparticle vaccine with adjuvant elicited robust anti-RSV F IgG responses, Pre-F and Post-F antigenic site responses, and potent RSV neutralization in cotton rats.

Increased CAE to all RSV F antigenic sites specific to Pre-F, Post-F and p27 was observed with Pre-fusogenic F nanoparticle vaccine compared to Pre-F and Post-F protein.

Adsorption studies with post vaccinated human serum on RSV Pre-F and Post-F proteins confirms that Pre-fusogenic F nanoparticle vaccine induce antibodies against Pre-F epitopes.

REFERENCES

Conflict of Interest Disclosure: NP, JHT, HL, KJ, MGX, GG and GS are employees of Novavax, Inc. The authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter of materials discussed in the poster apart from those disclosed.

Poster # 70

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