Zika Synthetic DNA (SD)-prME Vaccine

Nonclinical Protection and Clinical Immunogenicity

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Zika Virus Structure and Vaccine Antigen

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Immune Responses by Design: Antigen-Specific, Optimized, Best-in-Class

Identify gene sequence of selected antigen(s) from chosen strains/variants of the virus/cancer

Synthetically create optimal consensus gene sequence for the selected antigen
Novel, synthetic, DNA vaccine targeting the pre-membrane + envelope proteins of ZIKV expresses well and reacts with relevant antibodies to Zika E antigen domains.
Single Dose SD-prME vaccination protects against Zika challenge induced VL & pathogenesis in brain, testes & death in INFAR -/- model

Vaccine protects from lethality

Vaccine is protective in brain

Vaccine is protective in testes

- ZIKV infection causes severe brain and testis pathology
- Single immunization with SD prME vaccine lowers viral load, preserves brain and testicular tissue and protects from death
Intradermal Single Dose SD-prME Protects Against Viremia

**ELISA**

- **Week 0**
- **Week 2**

**Endpoint titers**

- **Week 0**
- **Week 2**

**IFNγ ELISPOT**

- **Week 0**
- **Week 2**

**Challenge Week 4**

- **Control**
- **Vaccine ID 1x**

Note: If viral load was undetectable (<50 copies), it was assigned a value of 25 for graphing purposes.
A phase I, open-label, dose-ranging study with 40 healthy subjects evaluating the safety, tolerability and immunogenicity of vaccine administered by the ID/EP route- this vaccine showed it was tolerable and immunogenic in this study.

A second study opened in Puerto Rico and will enroll 160 adult patients. Half of the patients will receive the Zika vaccine and the other half will receive placebo.
Interim Analysis: Clinical Responses to SD-prME Zika Vaccine

Binding ELISA

Characterization % Binding responders:

Neutralization Post Dose 2

Passive Transfer & Protection

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Passive Transfer & Protection
Summary

• Synthetic DNA prME vaccines generate protective immunity against Zika Virus
  • Rapid seroconversion & neutralizing activity
  • Robust T cell responses recognizing multiple epitopes in Zika prME

• Single vaccination induces 100% protection from pathogenesis (including neuronal & testicular disease), and death & suppression of VL in INFAR-/- murine model

• Single ID prME immunization 100% protective in NHP Zika challenge

• Ab responses from immunized NHP are protective in serum transfer experiments

• ID delivered SD prME in Phase I appears well tolerated and immunogenic
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