Evaluation of a candidate WHO International Standard for Zika antibody as a vaccine reference reagent

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Challenges for Vaccine Development against Emerging Diseases

- Many emerging diseases agents require high containment facilities
  - Limited facilities for handling whole agent
  - Extremely limited facilities for pre-clinical challenge studies
  - Prevent academics and SME’s entering field

- Dispersed and fragmented research field
  - How to compare data from different groups
  - How to compare data throughout pre and clinical development

- The availability of a common reference standard addresses these difficulties
Aims

- To create a serological **vaccine** reference reagent which would
  - Set a benchmark for immunogenicity studies
  - Facilitate all stages of vaccine development by harmonising data
  - Overcome biocontainment / bio-security restrictions can limit vaccine development

- NIBSC works with the WHO to produce over 90% of the International Standards for biological medicines.
Anti-Zika Standard

- Candidate International Standard (IS) material (16/320-14)
- Freeze dried 0.25mL
- Included in WHO International collaborative study
- Convalescent plasma pooled (2 individuals)
## Old World vs. New World Models

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<th>Serology (d42pi)</th>
<th>Viremia</th>
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<td></td>
<td>Euroimmun ZIKV IgG (RU/mL)</td>
<td>Mikrogen RecomLine Tropical</td>
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<td>ZIKV NS1</td>
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<td>Old World</td>
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**PRVABC59 challenge.** Virus provided by NCPV.
Passive transfer model

- 25mLs administered intraperitoneal to Cynomolgus macaques.
- Challenge at 24 hours with PRVABC59 (sub-cut).
- Blood collected at set intervals.

Half-life approx. 18 days.
Results - Viremia

![Graph showing viremia levels over days with different samples labeled R1 to R13 and control labeled + Anti-Zika.](image-url)
Results - Serology

IgM

- Days PI

Challenge

Positive Cut-off

Challenge

Cut-off

IgG

- Days PI

Challenge

+ Anti-Zika

Control
In vitro neutralisation
Conclusions

- The anti-Zika reference material alone is sufficient to confer protection *in vivo*.
- Further study ongoing to establish the lowest titre that can provide protection.
- This study sets a paradigm to produce serological vaccine reference reagents for other Priority Emerging Pathogens.
Future projects

- Vaccine reference reagents will enable the efficacy of candidate vaccines to be compared.
Acknowledgements

NIBSC BTPAAD:

Neil Almond
Claire Ham
Jo Hall
Debbie Ferguson
Neil Berry

NIBSC Viral Vaccines:

Mark Page
Giada Mattiuzzo
James Ashall
Sophie Myhill
Valwynne Faulkner

Collaborative study participants.

Innovate UK

BocaBiolistics

Joseph Mauro, William Hill