Antibody Standards Derived from Trans-chrosomic Bovine

Presentation prepared by LCDR Nicholas J Martin, PhD for discussion at CONSISE Laboratory Working Group Meeting-September 3-4, 2013
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Background

- The Naval Medical Research Center (NMRC) has established a cooperative research and development agreement with Sanford Applied Biosciences (SAB) to develop antibody standards and therapeutics for viral diseases
  - SAB developed a large animal (bovine) trans-chrosomic (Tc) platform to produce fully human antibodies
    - These cattle have the entire human immunoglobulin (Ig) heavy (H) and light (L) chain loci
  - Animals are capable of producing 30-60 L of plasma (150-300 g purified human immunoglobulin) each month
Antibody Diversity is the key to successfully treating human disease

**diversiTAb™ platform**

- Lymph Tissue
- Screening of B-cells
- cDNA Library
- Binding Selection
- Generation of Human Antibody

**diversiImAbs™**

- Monoclonals
- Oligoclons

**diversiPAbs™**

The best system to make fully HUMAN polyclonal and monoclonal antibodies
Vaccination

Day 0 - Pre Vaccination Sample Collection

Day 1 - Administration of 1st Vaccination (V1)

Day 21 - Administration of 2nd Vaccination (V2)

Day 30 - Sample Collection (V2D9)

Day 42 - Administration of 3rd Vaccination (V3)

Day 52 - Sample Collection (V3D10)
## Results

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Tc animals generated cross reactive antibodies against flu viruses not in seasonal vaccine

Protective titers

HAI titers

* Titers ≥1,200
Conclusions

• The HAI results demonstrate the Tc-bovine produced high titers in response to the administered vaccine
  • MN assays were performed for a single time point resulting in 2-day MN titers of >5,000 against A/California/7/2009
• The high HAI and MN results, coupled with the ability of each animal to produce 30 - 60 L plasma/month could be leveraged to generate control plasma in 30-60 days
Future Work

• Additional work is planned to evaluate Ab generation following administration of inactivated virus and virus like particles (VLPs)
  • Leverages NMRC’s experience with virus inactivation and SAB’s Tc-bovine platform
  • Current/future efforts include evaluating immune responses against the following viruses:
    • Dengue types 1 – 4
    • MERS-CoV
    • Filovirus VLPs
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