Overview of Division of Emerging and Transfusion Transmitted Diseases (DETTD)

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Division of Emerging and Transfusion Transmitted Diseases organizational Chart

• Personnel in the immediate office of the Director include:
  – Hira Nakhasi, PhD. Director; J. Peyton Hobson, PhD., Deputy Director; Anne Eder, MD, PhD., Associate Deputy Director for Policy and Medicine; Sayah Nedjar, PhD., Associate Director for Managed Review.

• There are 3 research/review laboratories that include Laboratory of Bacterial and TSE agents (LBTSE); Laboratory of Molecular Virology (LMV); Laboratory of Emerging Pathogens (LEP) and one Product Review branch (PRB)

• The chief of PRB is David Leiby, PhD. There are 11 full time reviewers in that branch

• The chief of LBTSE is David Asher, MD and there are two Principal investigators including him

• The chief of LMV is Indira Hewlett, PhD and there are three Principal investigators including her

• The Chief of LEP is Sanjai Kumar, PhD and there are six Principal investigators including him
DETTD Mission

• Plans and conducts research:
  – Development, pathogenesis and proof-of-concept for detection assays for blood borne pathogens
  – Viral (HIV, HTLV, Hepatitis (HBV, HCV, HEV, HAV), Arboviruses (WNV, Dengue virus, CHIKV, ZIKV)
  – Parasitic (Leishmania, Malaria, Chagas, Babesia)
  – Bacterial
  – Biodefense agents (preparedness for Pan Flu, Ebola virus)
  – Transmissible Spongiform Encephalopathy agents or “prions”
  – Development of biomarkers for vaccine safety of blood-borne parasitic agents (CBER priority)

• Proactively ensuring the safety of the blood supply through:
  – Regulation of tests for blood screening and diagnostic
  – Evaluation of new technologies for rapid and multiplex screening of the blood supply
  – Develop policies in the form of guidances for users of blood screening and diagnostic products.
DETTD Mission-cont.

• **Reference materials for lot release testing:**
  – Develop and validate reference materials for lot release testing of test kits
  – Collaborate and develop International Standards for infectious agents assays

• **Investigational testing**
  – Inspections
  – Consultation

• **scientific and technical advice to other Agencies and Government components e.g. CDC, DOD, DHHS etc.**

• **Outreach:**
  – Blood Product Advisory Committee
  – DHHS Advisory Committee on Blood Organ and Tissue Safety Availability
  – Liaison to committees of blood establishments and device manufacturer
  – World Health Organization Collaborating Center for IVDs
Blood Safety and Availability: Impact on the US Public Health

• ~14 Millions of units are transfused annually

  – Risk of transmission through transfusion has significantly reduced with the introduction of tests:
  – Currently approved tests (NAT or serological):
    – HIV1/2/O, HTLVI/II, HCV, HBV, WNV, T. cruzi, Syphilis, CMV
  – In addition, blood is also screened using Investigational Assays for:
    • ZIKV NAT assay (nation wide)
    • Babesia using Investigation NAT and serological assays (in high risk areas)
Challenges for Blood Safety and Availability

• Re-emerging pathogens:
  – E.g. HIV variants, Dengue virus (DV), Chikungunya virus (CHIKv), Syphilis etc.
• Emerging pathogens:
  – Babesia, West Nile virus (WNV), ZIKV, Biodefense agents (Pan Flu, Ebola virus), Tick-borne pathogens, TSE agents
• Neglected Tropical Disease pathogens:
  – Parasitic- *Leishmania*, Malaria, *T. cruzi*
  – Arboviruses-DV, CHIKv, Yellow Fever virus
• Lack of assays to detect some of the pathogens
• Lack of assays to detect the blood borne pathogens in a multiplex format
• Lack of confirmatory assays
• Potential impact of travel-based deferrals on adequacy of the blood supply
• Pathogenesis of blood borne pathogens
Mission Relevant regulatory Research

- Studies on pathogenesis and standards development of HIV and other retroviruses and its impact on blood safety
- Studies on pathogenesis and standards development of WNV, DV and Zika virus infections and its impact on blood safety
- Studies on hepatitis viruses and development of standards for hepatitis virus assays
- Evaluation of advance detection technologies for reducing the risk of transfusion transmission of infectious agents
- Studies on evaluation of tests for detecting transmissible spongiform encephalopathies to ensure safety of blood and other biologics
Mission Relevant regulatory Research- cont.

• Safety of blood and blood products from the risk of transfusion transmitted malaria and *Babesia* and to ensure safety and efficacy of malarial vaccines.

• Reducing the risk of Leishmaniasis through vaccination- *Target Product profile for Leishmania vaccines*.

• Studies on diagnosis and vaccine efficacy of Ebola virus and its impact on blood safety.

• Developing methods to improve blood safety by reducing the risk of transmission of *Trypanosoma cruzi* parasites by blood transfusion.
Select Examples of Significant Mission Relevant Research publications in DETTD

- CD47 regulates the phagocytic clearance and replication of the Plasmodium yoelii malaria parasite.

- Expression, Purification, and Biological Characterization of Babesia microti Apical Membrane Antigen 1.

- Role of pro-inflammatory cytokine IL-17 in Leishmania pathogenesis and in protective immunity by Leishmania vaccines.

- Live Attenuated Leishmania donovani Centrin Knock Out Parasites Generate Non-inferior Protective Immune Response in Aged Mice against Visceral Leishmaniasis.

Select Examples of Significant Mission Relevant Research publications in DETTD- cont.


- Development of a microarray-based assay for rapid monitoring of genetic variants of West Nile virus circulating in the United States

- Comparison of multiplex PCR hybridization-based and single-plex real-time PCR-based assays for detection of low prevalence pathogens in spiked samples.

- Blood reference materials from macaques infected with variant Creutzfeldt-Jakob disease agent.
Development and evaluation of reference reagents and standards for assay development

- Babesia antibody
- Babesia RNA
- DV RNA
- CHIKv RNA
- ZIKV RNA
- vCJD
- *Plasmodium* antibody
- HIV-1 genotype RNA
- HIV-2 RNA
- HIV-Ag
- *T. cruzi* antibody
Research and Regulatory Output for FY’16

• 11 Principle Investigators:
  – Support Staff- 52 FTEs
  – Contract Fellows- 23

• Research Publications- 44

• Review applications- 429
  – BLAs, PMAs, BLA and PMA suppl., INDS and IDES, Presubmissions, Guidances for Industry
Thank You