



Zika Virus Research

Overview: Zika Capabilities

Tulane University has a strong and long-standing research track record with viruses closely related to Zika, such as Dengue Virus and West Nile Virus. In addition, the university is uniquely equipped to respond rapidly to public health threats such as the recent Ebola outbreaks and the emerging Zika virus expansion thanks to its closely interconnected Schools of Medicine, Public Health and Tropical Medicine, Science and Engineering, and its National Primate Research Center. Because of our extensive experience with other flaviviruses, together with interdisciplinary and collaborative capabilities, Tulane is able to rapidly deploy a complete multi-faceted approach to Zika Virus research. Knowledge and expertise developed during prior and current research with Dengue Virus has been easily transferred into work with the Zika Virus.

With major strengths in virology, immunology, epidemiology, public health, antibody production, diagnostics, and ecology, together with its National Primate Research Center, Tulane is unquestionably one of the most well-positioned universities to respond rapidly to the current need for research and development related to the Zika Virus threat. Numerous Tulane researchers have developed research projects in the areas of immunology, basic virology, molecular biology, modeling of transmission and exposure, epidemiology, pathology, congenital transmission, development of rapid diagnostic tests, and related areas. Collaborations with institutions located outside of Louisiana - including Texas, Yucatan, Argentina, Brazil, and Honduras - are already in progress.

Non-Human Primate Zika Model

A research team at the TNPRC (headed by Nito Pangani-ban, Nick Maness, and Skip Bohm) have successfully developed a NHP model to study maternal-fetal trans-placental virus transmission, pathogenesis, and virus-associated fetal demise. This model is being used for evaluating multiple facets of virus-host interaction, and for testing anti-viral strategies and vaccines. The team welcomes partnerships with biotech and industry to further explore the efficacy of additional strategies for abrogating the effect of Zika and other flaviviruses.

Rapid-Diagnostic Zika Exposure Test

Based on his past success with Ebola Bob Garry was approached to develop a rapid diagnostic Zika test. With the Zika genome available, his lab does not require the actual virus and is synthesizing the necessary genes. Collaboration is underway with Public Health officials in Brazil and the Dominican Republic in order to acquire samples for testing.

Mechanism of Zika Pathogenesis

John Schieffelin investigates whether immunological cross-reactions among different serotypes of Zika (or similar viruses) can result in a situation where exposure to one serotype enhances the efficiency of infection of another serotype. This research track will involve Schieffelin, Garry, Robinson, and others, including collaborators at Florida Gulf Coast University. James Robinson is also working on creating a pseudovirus that expresses Zika envelope proteins for use in related studies.

Modeling Zika Transmission

Based on their extensive experience with transmission dynamics and modeling involving similar mosquito-borne viruses (i.e.: West Nile virus, chikungunya, and Dengue fever), Dawn Wesson and Mac Hyman are collaborating to create new models to predict and understand the spread of Zika. Dr. Wesson is also collaborating with the TNPRC on their nonhuman primate model work to study Zika infection via multiple routes, including mosquito. Zhuolin Qu (Center for Scientific Computing) is modeling different strategies for infecting wild mosquito populations with Wolbachia so they are less able to transmit Zika and other viral mosquito-borne diseases.

Impact of Zika On Pregnancy

Pierre Buekens is currently conducting an epidemiological study on the impact of congenital transmission of Zika on pregnancy in Honduras, in collaboration with colleagues from Argentina. His research group is well-positioned for this study as a result of similar recent research involving Dengue Virus and West Nile Virus.

Zika-related Placental Infection

Development of a Guinea Pig model to study the effects of viral infection on placental and fetal development is currently being pursued by Cindy Morris.

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