The Panganiban Lab: RNA Viruses

Because they use the host cell's protein synthesis machinery and other cellular components to replicate, viruses are much more difficult to target than bacteria during pathogenetic infection. RNA viruses in particular are notoriously difficult to treat. This diverse group of pathogens includes retroviruses like HIV, flaviviruses like Zika and yellow fever, and bunyaviruses like Rift Valley Fever Viruses, and represent significant human health and animal health concerns. **Nito Panganiban** has been studying RNA viruses like these for his entire career- from both basic biology and treatment/disease model angles. Using this synergistic approach, the lab is well-positioned to utilize their expertise to help develop new treatments for these diseases.

Modeling Zika Virus Infection

The mosquito-borne Zika virus infection is a relative newcomer to the global health stage. Nevertheless, it poses a significant public health concern, especially given its potential effects on the developing fetuses when pregnant women are infected.

The Panganiban lab studies multiple aspects of this virus using a nonhuman primate (NPH) model at the Tulane National Primate Research Center (TNPRC). Alongside other experts in infectious disease, they are using this model to study the details of the virus' replication cycle. In addition to studying the basic biology of the Zika virus, the lab tests treatment and vaccine candidates, bridging basic and translational research within the same laboratory group.

Dengue Virus: A Vaccine Challenge

Dengue virus is endemic in many parts of the world and can exert a profound public health burden in those areas. The virus can cause a highly lethal hemorrhagic fever in its most severe cases. There are five main genetic groups of related dengue virus, called serotypes. Because of the differences between these groups, making a vaccine that is effective against all five is extremely challenging. Further complicating matters, infection with a second serotype following infection and clearance of a first serotype can cause a lethal system immune response.

Infectious Disease

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Dengue Virus; Continued

Thus, if a vaccine is incomplete, subsequent infection with a non-immunized serotype of virus can be lethal. In collaboration with AI drug discovery company Atomwise, the Panganiban lab is working to develop an inhibitor of the serotype-shared protease which the virus uses to mature during its replication cycle.

Host Factors in Virus Replication

All viruses need to utilize host factors to complete their replication cycles. The bunyaviruses are a large, diverse family of RNA viruses that cause significant public health burdens across the US, South America, and Asia. Additionally, these viruses are of economic concern due to their ability to infect livestock.

By identifying common host factors used by a wide array of bunyaviruses, the Lab is developing common treatments and preventative measures that are effective against many different types of bunyaviruses. This program is comprehensive in approach, utilizing molecular biology and genetic techniques in tissue culture as well as NPH modeling at the TNPRC.

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