Cellular and Molecular Mechanism of Arbovirus Pathogenesis: 
Implications for Disease Interventions

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Abstract:

Vector-borne infectious diseases have been emerging or resurging due to socio-
demographic changes, and to genetic mutations in the pathogens. The changing
disease pattern and adaptation of viruses from different mosquito vectors are
important new features that impact public health. Indeed, the spread of the Aedes
mosquito in temperate countries introduces a new risk of epidemics in countries
where the entire population is immunologically naïve.

Chikungunya fever has re-emerged as an important human arboviral infection,
causing severe morbidity with extensive incapacitation in naïve populations.
Importantly, the exact nature of the protective immune defense and the pathogenic
mechanisms of debilitating arthralgia and arthritis upon virus infection are still poorly
known. Studies have found that the interplay between the levels of viral load,
interferon-stimulated genes (ISGs), TLRs, and the induction of neutralizing antibodies,
could mediate efficient viral clearance and protect against severe diseases.
More recently, another arbovirus, the Zika virus has taken the world by storm. Today more than 20 countries in the Americas, including Mexico have reported autochthonous cases. More alarmingly, the ZIKV outbreaks in Brazil have reported a 20x increase in the incidence of microcephaly. This led the WHO to issue a global alert recognizing the possible association between ZIKV and microcephaly. There is a race against time to decipher the pathogenesis and immune responses against this infection. Understanding some of these cellular and molecular mechanisms will provide insight into future control and therapeutic strategies.

Singapore Immunology Network (SIgN): [https://www.a-star.edu.sg/sign/](https://www.a-star.edu.sg/sign/)