BioSpectrum
the business of Bio & Health Sciences
ASIA EDITION

Duke-NUS researchers reveal novel immune study on dengue

February 8, 2019 | News

A sentinel immune cell in the skin surprises researchers by forming a physical connection with a virus-killing T cell.



Researchers at Duke-NUS Medical School have demonstrated for the first time a physical interaction between two types of immune cells that plays an important role in the early fight against dengue virus infection.

Dengue virus infection incidence has grown dramatically in recent years, with estimates suggesting 390 million infections annually.

“We need much better vaccinations for dengue and for related viral pathogens that are injected into the skin by mosquitoes,” said Dr Ashley St. John, Assistant Professor of DukeNUS’ Emerging Infectious Diseases (EID) Signature Research Programme and corresponding author of the study.

Dr St. John and study co-author Dr Chinmay Mantri, a Research Fellow in the EID Programme, investigated the role played by a type of immune cell, called a mast cell, which patrols the skin to guard against infections. Mast cells are largely known for recruiting other types of immune cells through the release of special attracting chemicals. Much is understood about how mast cells react in the presence of bacteria and parasites, but investigations into their roles with viruses have only recently begun. The researchers analysed how the dengue virus reacted in an animal model without any mast cells and compared the responses to animals with normal numbers of mast cells in order to determine which reactions were dependent on the presence of mast cells.

They found that mast cells attracted several types of immune cells to the site of infection. One of these is called gamma delta (??) T cells. Not only were ?? T cells attracted to the infection site, they also physically interacted with the mast cells, something not previously observed in viral infections. The ?? T cells bound to a receptor present on the mast cells called the endothelial protein C receptor. This so-called ‘immune synapse’ led to the T cells activating, proliferating, and producing interferon gamma, which initiated their role in killing cells infected with dengue.

The authors next plan to use the results of their research to work toward the development of better vaccines for viruses, like dengue, that are spread by mosquitoes.