

Proteomic Characterization of Mosquito Host Cell Glycoproteins during Dengue Virus Egress

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Every year, over 2.5 billion people are at risk of dengue virus infection, killing over 25,000 of the people infected. Currently, details of the budding mechanism by which dengue virus infects host cells is unknown. It was unknown if mosquito host cell proteins budded onto egressing virions in a mosquito, as there was no information concerning incorporation of cell proteins in a host. It was proposed that DENV-2 incorporates proteins originating from the mosquito host cell before viral egress to strengthen dissemination inside of a host and to increase the uptake of the virus in a vertebrate host. To test this hypothesis, Click-iT chemistry was used to attach an azide-modified palmitic acid (PAA) molecule to membrane proteins through post-translational modification (PTM), which were then detected through sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE), western blots, mass spectrometry and immunofluorescence microscopy. On the uninfected C6/36 *Aedes albopictus* cells, 97 Palmitic Acid-azide labeled proteins were identified, all of which may be involved in the transmission process. On the dengue virus samples, 564 proteins were discovered. Of the 97 proteins, 28 were labeled as significant because of the lack of a label by the DMSO control. Of those 28 proteins, 11 were shown to be significant, as they also appeared on the dengue virus. The data gathered at this point strongly supports the hypothesis — mosquito cell membrane proteins are incorporated into the DENV-2 viral envelope from the host cell during virus budding and egress.

Awards Won:

First Award of \$5,000