## *Mechanistic Studies of Flavivirus Inhibition and Nanoparticle-catalyzed Decontamination*

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The proposed work focuses on basic research investigations on the mechanisms of action of novel anti-flavivirus peptides, antibodies and nanomaterials with unique properties for the containment and removal of viral threats. Dengue viruses, the causative agents of dengue fever, dengue hemorrhagic fever and dengue shock syndrome, have re-emerged in the past several decades as the most important mosquito borne viral diseases. We have designed peptide inhibitors that target the dengue virus entry process.

We propose to carefully characterize the mechanism of inhibition of these inhibitors. In particular, one affects the virus by forcing it to prematurely release its genome in the absence of an opposing membrane. In addition, we will map the epitopes of the first human monoclonal antibodies against dengue virus envelope protein to gain a fundamental understanding of the molecular basis of neutralizing and enhancing antibodies. TiO2 photocatalytic destruction can be enhanced by the application of a voltage during UV illumination in a process termed photo electrochemical destruction (PECD). We propose to investigate whether PECD is effective in enhancing decontamination by destroying a systematically chosen panel of model toxin targets and by examining the mechanism of destruction.

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