

Submitter Name: Qun Wang

Email: qunwang@iastate.edu

Targeting Delivery of Therapeutic Vaccines to Treat HIV People Who Use Drugs

Qun Wang

Department of Chemical and Biological Engineering, Iowa State University

My *long-term goal* is to explore new mucosal vaccines to prevent and treat HIV people who use drugs (PWUD). The *working objective* of this project is to determine how mucosa-targeting vaccine delivery systems transport within an immunologically relevant intestinal mucosa built by intestinal organoids. I *hypothesize* that the induction of M cells into the Minigut organoid model will create an *ex vivo* mucosal system that better mimics the actual mucosal antigen uptake of the GI tract. Drug and substance abuse have been inextricably associated with HIV/AIDS since the beginning of the pandemic in the 1980s. Generally, risky behavior linked with drug and substance abuse fuels the spread of HIV. PWUD are also unlikely to benefit from antiretroviral therapy (ART) because of their chaotic lifestyle delays and interruptions in obtaining HIV treatment. Therefore, there is an *urgent need* to explore alternative strategies of immunization that can specifically target and transport high levels of an antigen or antibody across the gut mucosa and into the mucosal-associated lymphoid tissue to stimulate a strong, long-lasting, effective, and protective immune response. Since HIV is a mucosal infection and disease wherein the gut is a central factory for this virus, new mucosal vaccines to enhance immunity at this site are essential for treating HIV. Since daily oral administration of antiretroviral drugs is the first option for HIV treatment, the *significance* for my research is that I will provide new long-acting, user-friendly, and precisely targeted mucosal therapeutic vaccines for oral administration as a substantial advancement for ART.