Towards a Universal Flu Vaccine: Investigating Binding Preferences of Broadly Neutralizing Antibody Progenitors to the Influenza Virus Spike

Name: Diana Yang

SFU Faculty/Major: Faculty of Science, Biological Sciences

Presentation Description:

The threat of an influenza pandemic is ever-present. Vaccines that protect against seasonal strains and possible pandemic ones are therefore desirable. I will present my investigations of binding preferences of progenitor forms of neutralizing antibodies for the flu hemagglutinin spike to help inform strategies for eliciting similar antibodies in people.

Abstract:

The efficacy of seasonal influenza vaccines over the last 10 years ranges from 19-60% in the US. Generally, protection against seasonal flu lasts for only 6-12 months before new variants arise. As with other viral vaccines, flu vaccines elicit neutralizing antibodies (nAbs) that help to protect against infection or disease. Most nAbs elicited by flu vaccines target the hemagglutinin (HA) spike protein on the surface of flu viruses. However, these nAbs tend to recognize sites on HA that are variable among diverse flu variants and easily mutable. The goal of a universal flu vaccine would be to induce highly cross-reactive nAbs (aka broadly neutralizing antibodies; bnAbs) that target an HA site conserved across diverse flu strains, including a potential pandemic strain. As such, a universal flu vaccine would eliminate the need for regular shots. The elicitation of the desired bnAbs might be informed by understanding the binding preferences of progenitor forms of these antibodies for flu HA, with the goal of developing an HA-based vaccination regimen to produce the 'correct' antibodies. Previous work from our lab shows that progenitor forms of select bnAbs bind only a few HA proteins. To expand on this work, I utilized immunological techniques such as flow cytometry to determine the binding preference of one class of bnAb progenitors to a variety of HA proteins.

Results corroborate findings obtained with progenitors from another group of bnAbs, thus supporting the notion that one avenue to a universal vaccine could be by immunizing with select HA proteins.