Antibody Response of Self-Assembled Peptide Amphiphile Micelle Influenza Vaccine in Mice

Carmen Shum, Megan Schulte, and Bret D. Ulery

Vaccines are continuing to prove to be vital tools in preventing the aggressive spread of infectious diseases. Traditional vaccines for influenza, an acute respiratory disease, are administered every year to combat differing strains during each flu season in addition they take multiple months to produce. To address these challenges, a vaccine of self-assembled peptide amphiphile micelles (PAMs) containing an amino acid sequence of a highly conserved region of the influenza M2 protein ($M2_{1-24}$) was fabricated. Incorporating $M2_{1-24}$ antigen into PAMs can improve antigen stability and immunogenicity as well as time-efficient production. PAMs were synthesized, then characterized using dynamic light scattering (DLS) and a critical micelle concentration (CMC) assay. After physically characterizing the PAMs, mice were vaccinated with various formulations containing the $M2_{1-24}$ antigen on Days 0 and 21. The immune response of vaccinated mice was evaluated by running enzyme linked immunosorbent assays (ELISAs) of blood samples taken on Days 14 and 35. The antibody titer (*i.e.*, measure of immunoglobulins) present in the blood provides insight into the protection potential of the vaccine, especially the ability for isotype switching from IgM to IgG to occur. A $M2_{1-24}$ antigen PAM vaccine generated significant IgG and IgM titers, though further investigation is needed to determine the protective capacity of this response again a live influenza challenge.