

Protection from H1N1 influenza virus challenge with a single dose HA subunit protein vaccine

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Subunit vaccines have much promise in solving unmet needs in vaccine development. There are many infectious diseases for which a killed pathogen is not practical, and for many infectious diseases, there is a single antigenic protein against which a protective immune response is made. For example, neutralizing antibodies against the H1N1 hemagglutinin protein (HA) of influenza are sufficient to attenuate pathogenicity, and improve survival after virus exposure. Many HA protein vaccines have been successfully tested as candidate vaccine alternatives to attenuated or killed virus made in eggs. However, most require two dose vaccine administration for full protection in influenza challenge studies. Our group has used conjugation of HA protein to plant-derived Tobacco Mosaic Virus (TMV) as a novel method of antigen delivery that profoundly improves subunit vaccine potency. TMV is easily produced at large scale in tobacco plants, is safe, non-infectious, and provides excellent antigen delivery to dendritic and other important antigen presenting cells. By conjugating HA protein to the surface of TMV, we are able to stimulate high titer IgG responses and inhibition of hemagglutination, with or without an adjuvant. Importantly, we can also protect 100% of mice from a lethal H1N1 Influenza virus challenge 30 days after single dose vaccination. Additional studies are underway to determine if a TMV-HA formulation can improve the potency of a subunit vaccine derived from H5N1. Our strategy represents a significant advance in subunit vaccine formulation, and has the potential to expand the development of other subunit vaccines that currently lack single dose potency.

Biography

Alison McCormick has completed her Ph.D. at University of California, San Diego, and postdoctoral studies from Stanford University School of Medicine. She has 15 years of industry experience in plant made vaccines and therapeutics, and is currently Professor of Biological and Pharmaceutical Sciences, College of Pharmacy, at Touro University California. She is considered an expert in plant-made vaccines.

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