Influenza Viral Neuraminidase: The Forgotten Antigen

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ABSTRACT
Influenza is the most common cause of vaccine preventable morbidity and mortality, despite the availability of the conventional trivalent inactivated vaccine (TIV) and the live attenuated vaccine (LAIV). These vaccines induce an immunity dominated by the response to hemagglutinin (HA) and are most effective when there is sufficient antigenic relatedness between the vaccine strain and the circulating wild-type virus' HA. Vaccine strategies against influenza may benefit from inclusion of other viral antigens in addition to HA. Epidemiologic evidence and studies in animals and humans indicate that anti-neuraminidase (NA) immunity will provide protection against severe illness or death in the event of a significant antigenic change in the HA component of the vaccine. However, there is little NA immunity induced by TIV and LAIV. The quantity of NA in influenza vaccines is not standardized and varies significantly among manufacturers, production lots, and tested strains. The activity and stability of the NA enzyme is influenced by concentration of divalent cations. If immunity against NA is desirable, a better understanding of how the enzymatic properties affect the immunogenicity is needed.

A fast track influenza virus vaccine produced in insect cells

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ABSTRACT
The viral surface protein hemagglutinin (HA) has been recognized as a key antigen in the host response to influenza virus in both natural infection and vaccination because neutralizing antibodies directed against HA can mitigate or prevent infection. The baculovirus-insect cell system can be used for the production of recombinant HA molecules and is suitable for influenza vaccine production where annual adjustment of the vaccine is required. This expression system is generally considered safe with minimal potential for growth of human pathogens. Extensive characterization of this novel cell substrate has been performed, none of which has revealed the presence of adventitious agents. Multiple clinical studies have demonstrated that the vaccine is safe, well tolerated and immunogenic. The baculovirus-insect cell system could, therefore, be used for the expedited production of a safe and efficacious influenza vaccine. As a result, this technology should provide a fast track worldwide solution for newly emerging influenza strains or pandemic preparedness within a few years.

Letter to the Editor:
An initiative to manufacture and characterize baculovirus reference material

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