Method for Generating Highly Immunogenic Glycoprotein Vaccines

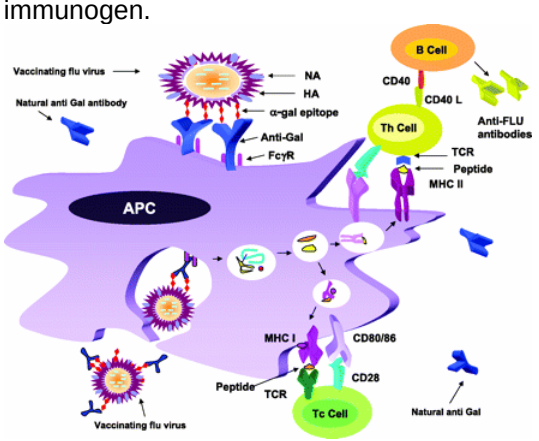
Keywords: α-Gal, Influenza, Flu, Virus, Vaccine

Background

According to CDC Fact sheet (2006) annual flu outbreaks affect 5-20% of US population. This underscores the need for continued development of highly effective vaccines for influenza. Research finding suggest that even in ***immunized*** populations, particularly the elderly, 25% to 50% of individuals may contract the disease during the flu season. One way to increase the suboptimal efficacy of current vaccines would be to develop technologies that can enhance the potency of current vaccine candidates.

Technology

Developed by UMass medical School Professor Dr. Uri Galili, the technology is comprised of composition and methods for generating novel vaccines by modifying influenza viruses (or other vaccine candidates) to incorporate α-Gal, a non natural sugar on their glycoproteins and sphingolipids. The modification can be achieved by either enzymatic treatment of viruses or by propagating viruses in a cell line engineered to express the enzyme *α-1-3 galactosyl transferase*. Administration of modified influenza virus to a subject would result in enhanced targeting of the virion to antigen presenting cells resulting in heightened antibody and cellular response to the virus. The heightened response is largely because human blood is pre-enriched with antibodies against α-Gal epitopes, thereby, shortening the immune response against the immunogen.



Reference: Abdel-Motal, et al. (2007) J Virol. *81, 9131-9141*

Application

Microbial vaccines particularly, Influenza Vaccines

Salient Features and Competitive Advantages

- ***Highly Immunogenic***: Vaccine containing inactivated PR8 virus processed to express α-Gal epitopes ($PR8_{\alpha gal}$) is much more immunogenic than the unprocessed inactivated virus.
- ***Robust and Specific Immune Response***: Antigen expressed will generate a strong immune response
- ***Broad Applicability.*** It can be easily adapted to developing vaccines for infectious diseases, novel therapies for cancer, and therapeutic protein delivery,
- ***Cost-Effectiveness.*** Lesser doses of highly immunogenic vaccine will be needed.
- ***Cell based methods:*** We have shown that engineered Vero cells, a cell line favored by WHO for vaccine production, can express α-Gal modified glycoproteins,
- **Ease of Manufacturing**: Can be manufactured by using uniform fermentation and purification procedures,
- ***Market Potential***: Influenza vaccine market reached $1.3 billion (2004) and is forecast to reach $3.7 billion by 2010. This method can be applied to other vaccines hence broadening its market potential.

Business Opportunity

UMass OTM is seeking statements of interest from parties interested in licensing and/or sponsoring collaborative research to further develop, evaluate, or commercialize this technology.

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