

Virus like particle vaccine expressing immune-modulating molecules

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Virus-like particle (VLP) technology is an attractive platform for seasonal and pandemic influenza vaccine development. We showed that influenza VLPs can be modified using immune-modulating molecules such as GM-CSF to enhance VLP immunogenicity. For this study, chimeric VLPs were incorporated with GM-CSF, to enhance anti-influenza immunogenicity. Our results indicate that immunizations with the chimeric HA/GM-CSF VLPs elicited more potent and broadly neutralizing antibodies and neuraminidase-inhibiting antibodies in sera, and induced higher numbers of hemagglutinin-specific antibody-secreting cells and germinal center B cell subsets in splenocytes. Immunization with the chimeric HA/GM-CSF VLPs induced stronger Th1 and Th2 cellular responses. The chimeric HA/GM-CSF VLPs showed heterologous protective immunity. It is our hope that these findings provide useful information for developing multi-subtype influenza vaccines.