Bao-Zhong Wang et al., J Infect Dis Ther 2015, 3:4
http://dx.doi.org/10.4172/2332-0877.C1.005

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immunity

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Nanoparticles from antigenic proteins are highly immunogenic because of the novel quality brought from their particulate structures. We developed a two-step procedure to generate protein nanoparticles (nanoclusters) from recombinant trimeric structure-stabilized H7N9 HA (stHA). ese nanoclusters have an average diameter of 273.6 nm with a similar Zeta potential to the soluble protein, demonstrating their comparable solution stability. In a dendritic cell culture, these nanoclusters were reactive to upregulate the CD86 expression and stimulate the production of TNF- . To evaluate the immunogenicity of the nanoclusters, mice were immunized with either intramuscular (i.m.) or intranasal (i.n.) route. We found that these nanoclusters induced extremely high levels of serum IgG with high neutralization activity as well by i.m route. One i.m. immunization with 10µg of the nanoclusters provided complete protection against a 10 LD50 live H7N9 virus challenge with slight bodyweight loss decreases. Two immunizations with either i.m. or i.n. route protected immunized mice against virus challenges without any disease symptoms. Systemic antibody responses were found to be durable up to six month: Ig levels were not signi cantly di erent in the rst three months but dropped in six months. However, the neutralization activity and hemagglutination inhibition (HAI) titers were not dropped signi cantly, demonstrating the durability of the protective antibodies. Because of the high immunogenicity and time-e cient egg-independent production (a few weeks not several months), stHA nanoclusters have potentials to be developed into a new generation of in uenza vaccines, particularly for ghting an emerging in uenza pandemic.

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