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Universal Flu Vaccination May Soon be a Reality

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Universal Flu Vaccination May Soon be a Reality

Amrit Ammanamanchi

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According to the CDC, more than 230,000 hospitalizations, 10 million hospital visits, and 14,000 [fatalities](#) were due to the Influenza virus between October 1st and December 31st, 2022. The “flu” is made up of [four principal species: Influenza A, B, C, and D](#). Only Influenza A and [Influenza B have](#) significant clinical effects. At the same time, Influenza D does not affect humans. Influenza A is further classified based on which of the 18 hemagglutinin (H) and 11 neuraminidase (N) surface proteins are expressed. For example, the H1N1 virus expresses the first type of hemagglutinin and neuraminidase proteins. H1N1 and H3N2 are the two primary seasonal subtypes of Influenza A. In contrast, Influenza B is classified by its lineages (either Victoria or Yamagata) instead of its [subtypes](#). Influenza B has fewer clinically significant [variants than Influenza A and](#) is typically slower to mutate.

Due to mRNA vaccine technology successfully used to mitigate the SARS-CoV-2 (COVID-19) pandemic, a comprehensive “universal” flu vaccine is on the horizon. [Hemagglutinin and neuraminidase are the critically](#) antigenic surface proteins for both Influenza A and B infections. This commonality allowed Dr. Scott Hensley at the University of Pennsylvania Perelman School of Medicine to develop a nucleoside-modified mRNA lipid nanoparticle vaccine which incorporated 20 hemagglutinin antigens (both the 18 of Influenza A and 2 of Influenza B, 1 from each lineage) or [all of the known subtypes of Influenza A and B](#). The vaccine was highly effective in both the mice and ferret models and was shown to protect against matched and mismatched strains due to antibody production. The universal flu vaccine

attaches an antigen to a nanoparticle to form an ‘immunogen’ sphere with all antigens directed outwards.

An mRNA-based universal vaccine solution could be implemented worldwide and prevent or mitigate a variety of infectious diseases. There are still many steps to be done before such a solution could become a reality, notwithstanding the geopolitical hurdles to universal vaccination in the current political square. However, recent advances point to a light at the end of the tunnel regarding a more permanent universal vaccination solution for Influenza.

The author has no conflicts to report