

A flu vaccine that lasts: Scientists consider prospects for a universal influenza vaccine

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The costly, time-consuming process of making, distributing and administering millions of seasonal flu vaccines would become obsolete if researchers could design a vaccine that confers decades-long protection from any flu virus strain. Making such a universal influenza vaccine is feasible but licensing it may require innovation on several fronts, including finding new ways to evaluate the efficacy of vaccine candidates in clinical trials, conclude scientists from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health.

In a *Nature Medicine* commentary, authors Anthony S. Fauci, M.D., NIAID director, and Gary J. Nabel, M.D., Ph.D., director of the NIAID [Vaccine](#) Research Center, contrast the envisioned universal [influenza vaccine](#) with today's seasonal influenza vaccines. Current seasonal flu vaccines prompt immune responses that mimic those made following natural exposure to the flu virus. Both exposure and vaccination elicit antibodies directed at the roundish head portion of a lollypop-shaped flu protein called hemagglutinin (HA). But the composition of HA's head changes from year to year, gradually becoming unrecognizable to previously made antibodies. Thus, vaccination—which induces antibodies tailored to that year's HA head region—must be repeated annually to maintain immunity to the virus.

A universal flu vaccine would have to elicit a type of [immune response](#) that rarely occurs naturally, note Drs. Fauci and Nabel. A detailed understanding of flu virus structure may make such a vaccine possible,

they add. For example, scientists have identified a region of HA's stem that is shared among diverse strains, and a research group at NIAID's Vaccine Research Center recently created influenza vaccines that elicit antibodies aimed at this shared region, rather than at the quick-changing head. Animals that received the experimental vaccines were protected from a diverse array of [flu virus](#) strains.

In essence, say the authors, thanks to the growing body of knowledge about flu viruses and their interactions with the cells of humans and animals they infect, it may one day be possible to make a universal flu vaccine that improves on nature. They also outline how such a vaccine might proceed through stages of clinical testing and on toward licensing. For example, they sort the 16 known influenza virus subtypes into three tiers based on their likelihood of causing widespread disease in humans. Drs. Fauci and Nabel suggest that vaccine development might be prioritized to produce first-generation universal influenza vaccine candidates that protect against multiple virus strains within the highest priority group.

More information: GJ Nabel and AS Fauci. Induction of unnatural immunity: Prospects for a broadly protective universal influenza vaccine. *Nature Medicine* [DOI:10.1038/nm.2272](https://doi.org/10.1038/nm.2272) (2010)

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