

New flu vaccine uses mRNA to target four viral proteins that change little between strains

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An international team of researchers has used mRNA technology to develop an influenza vaccine that targets four proteins that tend to change little across viral strains. In their paper published in *Proceedings of the National Academy of Sciences*, the group describes their approach to developing a new kind of flu vaccine and how well it has worked in test mice.

Because the two main types of flu strains, A and B, adapt so quickly to annual vaccines, new ones have to be developed every year. This approach is not only expensive, but also hit-and-miss—the [medical community](#) sometimes encounters a surprise variant that their newly created vaccine cannot fight. Because of that, [medical researchers](#) have been looking for a better alternative.

In this new effort, the researchers built on lessons learned from the pandemic. The two main vaccines developed to protect people against COVID-19 are based on messenger RNA technology (mRNA), in which pieces of genetic code are administered, prompting the [immune system](#) to produce proteins

that target the SARS-CoV-2 virus should it appear.

To develop a similar type of vaccine for influenza, the researchers used multiple bits of genetic code to get the body to produce antigens for matrix protein 2, the stalk part of hemagglutinin, nucleoprotein and neuraminidase.

The team then tested their vaccine on mice, none of which had ever been infected by the influenza virus. In all, 20 mice were injected with combinations of the new vaccine. Some were injected with a vaccine for just two of the mRNA segments, for example, while others got all four. They also injected some of the mice more than once.

Blood testing showed that all of the mice produced some degree of an increase in [antibody production](#), but only the mice who got the quadrivalent shot were fully protected, though there was one exception—the mice that got a monovalent vaccine with just nucleoprotein. The researchers also found that some of the combinations led to an increase in production of cytotoxic T cells, which prior research has shown play a major role in combating flu infections in both mice and humans.

More information: McMahon, Meagan et al, Assessment of a quadrivalent nucleoside-modified mRNA vaccine that protects against group 2 influenza viruses, *Proceedings of the National Academy of Sciences* (2022). DOI: [10.1073/pnas.2206333119](https://doi.org/10.1073/pnas.2206333119). www.pnas.org/cgi/doi/10.1073/pnas.2206333119

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