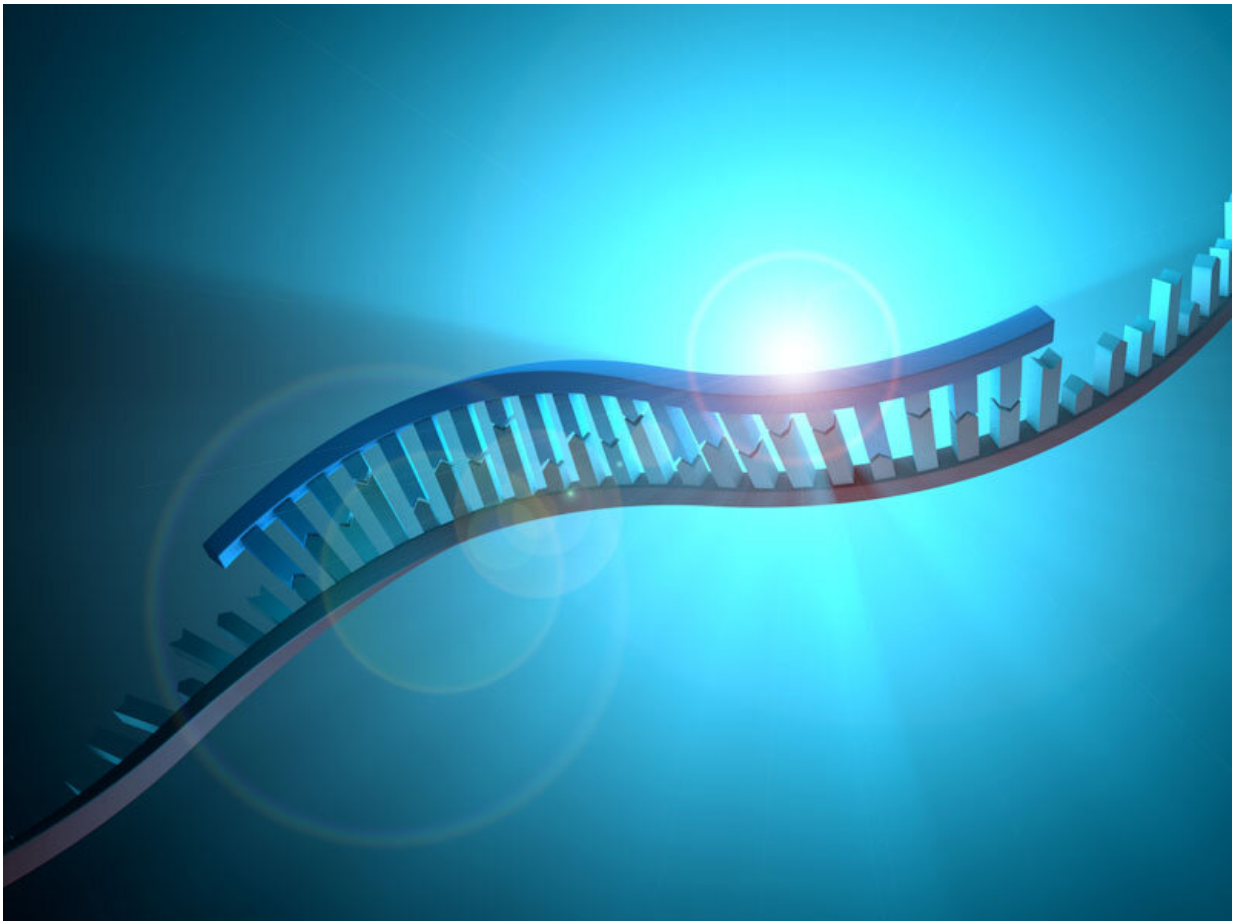


# New vaccine prevents herpes in mice, guinea pigs

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An illustration of mRNA. Credit: Chris Bickel

Researchers from the Perelman School of Medicine at the University of

Pennsylvania have developed a vaccine to protect against genital herpes. Tested on both mice and guinea pigs, the immunization led to "mostly sterilizing immunity" from the virus—the strongest type of immunity. The results of the study are published today in *Science Immunology*.

In the study, researchers delivered the Penn-developed [vaccine](#) to 64 mice and then exposed them to [genital herpes](#). After 28 days, 63 of the mice were found to have sterilizing immunity, meaning there was no trace of herpes infection or disease after the exposure. The one remaining mouse developed dormant infection without any prior genital disease. Similarly, 10 [guinea pigs](#), which have responses to herpes infections that more closely resemble that of humans, were also given the vaccine and exposed to the virus. No animal developed genital lesions and only two showed any evidence that they became infected, but the infection was not in a form that animals could transmit the virus.

"We're extremely encouraged by the substantial immunizing effect our vaccine had in these animal models," said the study's principal investigator Harvey Friedman, MD, a professor of Infectious Diseases. "Based on these results, it is our hope that this vaccine could be translated into [human studies](#) to test both the safety and efficacy of our approach."

Building on the approaches of many cutting-edge cancer and immunotherapy researchers, the Penn team filled their vaccine with specific messenger RNA (mRNA), which can create proteins necessary for a strong immune response. This vaccine stimulates three types of antibodies: one that blocks the [herpes virus](#) from entering cells, and two others that ensure the virus doesn't "turn off" innate immune system protective functions. This approach differs from other herpes vaccines, which often only rely on blocking virus's entry as the mode to attack the virus.

This vaccine was developed with funding from NIH and as part of a collaboration between Penn Medicine and BioNTech, entered into in October 2018, to research and develop mRNA vaccines for various infectious diseases.

Genital herpes, also called Herpes simplex virus type 2 or HSV-2, is the most common sexually-transmitted disease. Approximately 14 percent of Americans ages 14 to 59, and 11 percent of people in the same age range across the world, are infected. HSV-2 may lead to painful sores, which can spread to other areas of the body. The virus increases one's risk of contracting HIV, and infected [pregnant women](#) may pass herpes onto their fetus, or more commonly, to their baby during delivery.

"Along with physical symptoms, HSV-2 takes an emotional toll," said Friedman. "People worry over transmission of the disease, and it can certainly have a [negative effect](#) on [intimate relationships](#)."

Since herpes is so widespread but also often undetected, as it is only visible during an outbreak, researchers say a successful vaccine would be invaluable to many adults across the world.

**More information:** S. Awasthi et al., "Nucleoside-modified mRNA encoding HSV-2 glycoproteins C, D, and E prevents clinical and subclinical genital herpes," *Science Immunology* (2019).

[immunology.sciencemag.org/look.../6/sciimmunol.aaw7083](https://immunology.sciencemag.org/look.../6/sciimmunol.aaw7083)

Provided by Perelman School of Medicine at the University of Pennsylvania

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