

NEW 3D PRINTED VACCINE PATCH OFFERS GREATER PROTECTION THAN JABS

Relevant for: Science & Technology | Topic: Computer Technology incl. 3-D Printing

The ease of using a vaccine patch may also lead to higher vaccination rates, according to the researchers. | Photo Credit: [Photo by special arrangement](#)

Scientists have developed a three-dimensional (3D) printed vaccine patch that provides greater protection than a typical immunisation shot.

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The team at Stanford University and the University of North Carolina at Chapel Hill (UNC) in the US applied the vaccine patch directly to the skin of animals, which is full of immune cells that vaccines target.

The resulting immune response from the patch was 10 times greater than vaccine delivered into an arm muscle with a needle jab, according to the study published in the journal Proceedings of the National Academy of Sciences.

The technique uses 3D-printed microneedles lined up on a polymer patch and barely long enough to reach the skin to deliver vaccine.

"In developing this technology, we hope to set the foundation for even more rapid global development of vaccines, at lower doses, in a pain- and anxiety-free manner," said lead study author Joseph M De Simone, professor at Stanford University.

The ease and effectiveness of the new vaccine may lead to a new way to deliver vaccines that is painless, less invasive than a shot with a needle and can be self-administered.

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Study results show the vaccine patch generated a significant T-cell and antigen-specific antibody response that was far greater than an injection delivered under the skin.

That increased immune response could save vaccine doses as a microneedle vaccine patch uses a smaller dose to generate a similar immune response as a vaccine delivered with a needle, the researchers said.

"Our approach allows us to directly 3D print the microneedles which gives us lots of design latitude for making the best microneedles from a performance and cost point-of-view," said lead study author Shaomin Tian, researcher at the UNC School of Medicine.

The study overcomes some past challenges - through 3D printing, the microneedles can be easily customised to develop various vaccine patches for flu, measles, hepatitis or COVID-19 vaccines.

The COVID-19 pandemic has been a stark reminder of the difference made with timely

vaccination. However, getting a vaccine typically requires a visit to a clinic or hospital.

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The researchers said there are issues that can hinder mass vaccination - from cold storage of vaccines to needing trained professionals who can give the shots.

The vaccine patches, which incorporate vaccine-coated microneedles that dissolve into the skin, could be shipped anywhere in the world without special handling and people can apply the patch themselves, they said.

The ease of using a vaccine patch may also lead to higher vaccination rates, according to the researchers.

The team is now formulating RNA vaccines, like the Pfizer and Moderna COVID-19 vaccines, into microneedle patches for future testing.

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