



Thermally stable vaccines could be delivered using slow-release polymer implants or microneedle patches. | Photo source [Journal of the American Chemical Society](#)

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A NEW WAY TO MANUFACTURE AND DELIVER THERMALLY STABLE VACCINES

 HEALTH & WELLBEING

Researchers are working on ways to create vaccines that do not need to be cooled to low temperatures and can be easily transported

Spotted: The global rollout of the COVID-19 vaccine has demonstrated the need for a vaccine technology that delivers a longer-lasting vaccine, and one that is easier to transport. Millions of coronavirus vaccines have spoiled after being left unrefrigerated for too long (the Moderna vaccine requires temperatures of between minus 58 and 5 degrees F; while Pfizer’s vaccine needs temps of between minus 130 degrees and minus 76 degrees F). Researcher Nicole Steinmetz has been working on this problem, and feels that “thermally stable” vaccines may be an answer.

Steinmetz is a professor of nanoengineering, and the director of the Center for Nano ImmunoEngineering at the University of California, San Diego. She and her team are working towards developing thermally stable vaccines that could come in the form of a microneedle patch, like a Bandaid. They are working to produce the vaccines using viruses from plants or bacteria. These are subunit vaccines, meaning they contain a fragment of the pathogen’s protein.

In developing their stable vaccine, the researchers first grew copies of the plant or bacteria virus into a cluster of nanoparticles, and then attached a fragment of the SARS-CoV-2 spike protein to the surface of the nanoparticles. The initial results have proven promising. If the technique works, it could be expanded to vaccines for other viruses.

Steinmetz [explains](#) how the process results in a thermally stable vaccine. “In our case, we’re not using the full-length spike protein, we’re just using ...snippets of the S protein, and we’ve narrowed it down to a few sequences that are recognized by the immune system and illicit neutralizing antibody

responses. Even though the plant virus is not infectious toward a human, it still to the immune system looks like a virus, so it makes a good immune stimulator.”

The Covid pandemic has resulted in a drive for new ideas in vaccine manufacture and delivery, as well as innovations in data analysis and treatment. Some of these include the use of [sewage analysis](#) to predict outbreaks of coronavirus that are just beginning and [drive-through hospital](#) care.

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Takeaway:

The development of thermally stable vaccines could be a game-changer, especially for those in places where it is challenging to maintain a cold chain, such as remote areas or those without electricity. The ability to deliver vaccines without an injection could also make a huge difference. Vaccines could be shipped to people’s homes, and they could then self-administer the patches. Or, they could be delivered as time-release implants, doing away with the need for multiple appointments for booster shots. The hope is that, having developed a system that works for COVID-19 vaccines, they now have a “plug-and-play” system in place that can be replicated for other pathogens.