

Researchers test effectiveness of anti-opioid vaccine

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Matthew Banks, Pharm.D., Ph.D. Credit: VCU

Virginia Commonwealth University researchers are testing a vaccine against opioid abuse developed by the Scripps Research Institute in California. The vaccine is meant to block the effects of heroin and fentanyl in patients with opioid use disorder.

The methodology of VCU's preclinical tests was recently featured in the journal *Trends in Pharmacological Sciences*. Lead author Matthew Banks, Pharm.D., Ph.D., associate professor in the Department of Pharmacology and Toxicology in the VCU School of Medicine, also explains the workings of the vaccine, and reviews the landscape of opioid immunotherapy research and hurdles to vaccine development. The article is part of the journal's "Science & Society" series, which highlights pharmacological research efforts to combat the opioid crisis in language accessible to lay readers. Banks is currently in the process of submitting [test results](#) for peer review.

Researchers at the Minneapolis Medical Research Foundation and at Walter Reed Army Institute of Research are testing other anti-heroin and anti-oxycodone vaccines, Banks said.

"Anti-opioid vaccines represent one promising research area for opioid use disorder, including relapse and overdose because they are mechanistically different from current FDA-approved therapeutics such as naloxone, methadone and naltrexone, which target opioid receptors," Banks writes. "The vaccines prompt an individual's body to generate anti-opioid antibodies."

The Scripps vaccine and other immunotherapies work by prompting the [immune system](#) to make antibodies that prevent [drug molecules](#), such as heroin or fentanyl, from crossing the blood brain barrier into the central nervous system, blocking the effects of opioids.

"If a person injects heroin or fentanyl after they have been vaccinated, those antibodies are there to capture the drugs in the bloodstream, which should prevent people from getting high," Banks said.

Similar to how the flu vaccine triggers [immune response](#) through exposure to flu viruses, opioid vaccines depend on some exposure to targeted [opioid](#) molecules to produce an immune response. Opioid molecules do not naturally produce an immune response, so they are attached to clinically available carrier proteins, such as the tetanus vaccine, to prompt the immune system to start producing antibodies. Scientists also added a chemical called an adjuvant to the vaccine to boost immune response.

Banks' team is testing the efficacy of the [vaccine](#) and predicting how an immunized person might respond when faced with the choice of drug use or engaging with a nondrug reinforcer, such as work, friends or family.

"We develop the models to help move therapeutics along and then we collaborate with medicinal chemists who are generating new molecules to try

to treat pain, and other collaborators developing novel therapeutics to treat [opioid use disorder](#)," Banks said. "We are working with the Scripps Research institute to take those tools through the scientific process to determine if they are going to be effective."

More information: Matthew L. Banks et al, Immunopharmacotherapies for Treating Opioid Use Disorder, *Trends in Pharmacological Sciences* (2018). [DOI: 10.1016/j.tips.2018.08.001](https://doi.org/10.1016/j.tips.2018.08.001)

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