

New vaccine candidate neutralizes fentanyl

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LA JOLLA - Looking to curb the addictive effects of fentanyl and reduce the number of overdose-related deaths, researchers at the La Jolla-based Scripps Research have developed a new vaccine candidate that could neutralize the drug before it reaches the brain.

Fentanyl, while considered effective in managing severe pain, poses risks for both addiction and respiratory depression.

In a paper published in the medical journal ACS Medicinal Chemistry on Jan. 22, the lab of Dr. Kim Janda, PhD, modified fentanyl's molecular structure to preserve pain relief while reducing respiratory depression, considered one of its most serious and dangerous side effects.

Since then, researchers attached the modified structure further to a carrier protein and administered four doses to mice in the form of a vaccine.

The same lab's latest paper, published May 12 in the Journal of Medicinal Chemistry, suggests that the vaccine candidate can produce antibodies that bind to Fentanyl, thus neutralizing the

drug before it reaches the brain.

The intent, researchers say, is to block both the good (such as pain relief) and the bad (such as respiratory depression and possible addiction or overdose) of fentanyl so the brain gets no reward from taking the drug, thereby reducing the addictive qualities.

Janda, the Ely R. Callaway Jr. Professor of Chemistry at Scripps Research and senior author of the latest paper, said their findings also point to the vaccine fighting off fentanyl-like “designer drugs” created to evade detection or boost its effect.

“Nowadays, while there’s fentanyl out there (illegal drug manufacturers are) making small alterations in fentanyl to still keep the potency but to subvert this detection,” Janda said. “My idea was instead of always making a new vaccine against a new fentanyl analog, let’s try to make something that can create an immune response that would basically track down what the cartels are doing.”

Research associate and first author Arran Stewart further explained their ability to stay ahead of the curve.

“They do change the structure but there are certain parts of (fentanyl) that they will have to keep consistent,” Stewart said of illicit drug manufacturers. “They won’t be able to change it because if they did, it just straight up wouldn’t work. Because of that, we were able to create something From Page 1 that recognized the ‘molecular fingerprints’ of all these different compounds that would classify them as these fentanyl class compounds.”

According to the National Institute on Drug Abuse, repeated use of fentanyl changes brain activity causing people to abuse the drug even when experiencing negative side effects. The institute added that most fentanyl contributing to the current overdose crisis is manufactured illegally.

Stewart says their latest findings are intended for people who are in the throes of addiction. “It’s not a vaccine you would want to give a six-month-old when you get your MMR vaccine - it’s absolutely nothing like that,” he explained. “But if you are especially a recovering addict or something like that or just in life, if you’re in a place where you’re more likely to start taking again, this is more protective.”

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