WRAIR
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Heroin Vaccine Technology Advances as Researchers are Awarded Grant for Further Testing

NIH grant will help advance a novel tool that has potential to help combat the opioid crisis

Researchers at the U.S. Military HIV Research Program (MHRP) at the Walter Reed Army Institute of Research (WRAIR) and SUNY Upstate Medical University in Syracuse, N.Y., have been awarded a grant to advance an experimental heroin vaccine through Phase I/IIa clinical trials to assess both its safety and its efficacy against a morphine challenge.

In preclinical studies, the vaccine induced antibodies that prevented heroin from crossing the blood-brain barrier in mice and rats for a period of up to three months. By binding heroin in the blood and thus reducing its passage into the brain, the vaccine aims to block the euphoria and addictive effects of heroin and other commonly misused opioids.

Dr. Gary Matyas, Chief of Adjuvants and Formulations for the U.S. Military Research Program (MHRP), WRAIR said. "Our goal is to develop a safe and effective vaccine that could be used as an additional therapy for people with heroin use disorder. By blocking the effects of heroin in the brain, we hope to give people a window so they can overcome their addiction."

The heroin vaccine was co-developed by researchers at MHRP and the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health. The new grant (1UG3DA048351-01) from the National Institutes of Health will fund pilot production of the vaccine candidate and preliminary safety testing. If successful, the candidate heroin vaccine will progress to a clinical trial evaluating the efficacy of the technology in human volunteers, which would be led by Dr. Stephen Thomas at Upstate Medical University. The first phase of clinical testing is expected to begin late fall of 2020. The grant also funds pre-clinical development of a fentanyl vaccine.

The misuse of opioids, which include heroin and fentanyl, is a growing problem in the United States. Among the more than 72,000 drug overdose deaths estimated in 2017, the sharpest increase occurred among deaths related to fentanyl and synthetic opioids with nearly 30,000 overdose deaths. Most pharmacological treatments for opioid misuse involve opioid management therapy (OMT), but treatment access is an issue. In addition, adherence varies greatly and relapse rates can be high. To end the opioid overdose crisis, many different medical tools, treatments and medications are needed to meet the needs of individuals addicted to these drugs.

WRAIR researchers leveraged their expertise in vaccine development and novel adjuvants research to develop this experimental heroin vaccine with their partners at NIDA. The vaccine includes a potent adjuvant to stimulate the immune system called the Army Liposome Formulation (ALF), which was also developed by researchers at WRAIR. The vaccine was developed jointly with intramural scientists at the Drug Design and Synthesis Section (Dr. Kenner C. Rice, Chief), Molecular Targets and Medications Discovery Branch, NIDA.

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About MHRP

MHRP, centered at the Walter Reed Army Institute of Research (WRAIR), aims to protect the U.S. Military from HIV and improve global health by conducting research to develop an HIV vaccine, reduce new infections and advance strategies to induce long-term HIV remission. Long-term, researchers plan to combine the heroin vaccine with an HIV vaccine candidate. For more information, visit www.hivresearch.org.