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Media Contact: Stacey May
703-459-7677
mays@aaps.org

Novel Gene Therapy Approach to Treating Methamphetamine Abuse

SAN DIEGO, Nov. 13, 2017 — While there are no FDA-approved medicines to treat methamphetamine (meth) use disorders, researchers are reporting early findings of a second-generation gene therapy in animal models for meth abuse. Results being presented today at the [2017 American Association of Pharmaceutical Scientists \(AAPS\) Annual Meeting and Exposition](#) demonstrate that the therapy lasts for over eight months, reducing the amount of meth in the brain and meth-induced stimulant effects.

The study, “Novel Anti-METH AAV-scFvs are Capable of Binding and Sequestering Methamphetamine and the Active Metabolite Amphetamine in the Blood” focused on the development of a long-lasting gene therapy treatment, which makes the body generate antibodies against meth. These antibodies tightly bind to both meth and amphetamine, an active metabolite of meth, in the blood stream and prevent it from traveling to the brain.

Eric Peterson, Ph.D., and his team from the [University of Arkansas for Medical Science](#) redesigned the therapy to deliver DNA to cells via a viral capsid, which then triggers the development of a protein to counter meth. Results achieved significantly higher concentrations of protective antibodies in the bloodstream of mice (n=8). Meth and amphetamine concentrations were 33 percent lower in brain tissue at 30 and 60 minutes, increasing to 50 and 68 percent respectively after 120 minutes. In a separate behavioral-based study, the medication was effective at reducing or abolishing meth-induced hyperactive movement in the mice at moderate doses of meth.

Peterson noted, “Imagine an IV bag delivering a constant infusion of the antibody, that is what this therapy is doing, using the body’s own machinery to translate DNA to RNA to protein and have that circulate throughout the body, providing continuous meth protection.”

Researchers will continue to characterize this anti-meth gene therapy in three primary ways. First, testing how effective the therapy is at keeping methamphetamine in the blood and out of the brain at several doses. Second, determining to what extent the therapy can protect against methamphetamine’s behavioral effects. Third, assessing how well it protects the brain against meth-induced effects, such as inflammation and stability of the blood-brain barrier.

“Even though our research is in the early stages, this treatment could ideally be effective for months to years after a single injection,” said the study’s lead author Charles Hay, M.S. “One day we envision that this treatment, or similar treatments could be combined with behavioral therapies to help users to quit using meth.”

[Novel Anti-METH AAV-scFvs are Capable of Binding and Sequestering Methamphetamine and the Active Metabolite Amphetamine in the Blood](#) will be presented Monday, Nov. 13, 3:00 p.m. – 4:00 p.m. (PST), Poster Forum 4 in the San Diego Convention Center.

The [2017 AAPS Annual Meeting and Exposition](#) is taking place in San Diego November 12 – 15. It will bring together more than 6,000 scientists, business leaders, government officials, and students from around the world to share and learn the latest scientific advances and industry developments. The meeting will feature 100 scientific sessions and 2,200 posters, workshops, and short courses. Download the [AAPS mobile application](#) for additional information.

Editor's Note: All media must provide press credentials to attend this meeting and register on-site at San Diego Convention Center, main registration. To schedule an interview with Charles Hay or for any other press inquiries, please contact Stacey May at 703-459-7677 or mays@aaps.org or Hillarie Turner at hillarie@vanepere.com. For the most up-to-date program information, please click [here](#).

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About AAPS: The [American Association of Pharmaceutical Scientists](#) (AAPS) is a professional, scientific organization of approximately 9,000 members employed in academia, industry, government, and other research institutes worldwide. Founded in 1986, AAPS advances the capacity of pharmaceutical scientists to develop products and therapies that improve global health. Visit www.aaps.org and follow us on [Facebook](#) and Twitter [@AAPSComms](#). The official Twitter hashtag for the meeting is: #AAPS2017.