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## Researchers Advance the Use of Nanoparticles to Deliver HIV/AIDS Drugs to the Brain

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The Human Immunodeficiency Virus (HIV) is sneaky. It likes to hide in places that anti-viral drugs have a hard time reaching, like the brain. The blood-brain barrier (BBB) protects the brain from bad actors like germs or toxic substances. But in doing so, it also prevents most drugs from entering. HIV takes advantage of this and accumulates in viral reservoirs in the brain.

Herbert Wertheim College of Medicine ([HWCOC](#)) researchers have pioneered the use of nanotechnology to deliver HIV-fighting drugs across the BBB. In 2013, HWCOC researchers headed by Madhavan Nair, chair of the Department of Immunology and NanoMedicine, developed a revolutionary technique using tiny magneto-electric nanoparticles to carry the anti-HIV drug AZTTP to the brain.

HWCOC scientists working with colleagues at the [University of Miami](#) have now reported a way to deliver HIV drugs to the brain and target viral reservoirs using a special nanoparticle — a biodegradable polymer nanoparticle.

“We found that this delivery system can reduce HIV/AIDS viral reservoirs in the brain. It can reduce the viral load, the amount of virus present, which normally contributes to neurological problems,” said Nagesh Kolishetti, one of the study’s corresponding authors (along with UM researcher Shanta Dhar). The HWCOC research team included Professor Nair and Research Associate Royden Ramirez.

The study, “Brain-Accumulating Nanoparticles for Assisting Astrocytes to Reduce Human Immunodeficiency Virus and Drug Abuse-Induced Neuroinflammation and Oxidative Stress,” was published recently in the American Chemical Society journal, [ACS Nano](#).

HIV infection of the brain can cause neurological impairments like confusion, memory loss and dementia. These conditions are magnified by recreational drug use. This was also addressed in the study.

“Using experimental mice models, we also delivered antioxidants and anti-inflammatory medications that protect brain cells from stress and inflammation caused by drug abuse,” Kolishetti said.

The research revealed that “this type of combination therapy with the nanoparticles could result in a highly effective treatment regimen for the HIV-infected population who are addicted to a substance of abuse.”

Read the [original article](#) on Florida International University (FIU).