Injectable Implant Could Provide HIV Treatment or PrEP for 1 Year

A major plus of the implant is that it can be easily removed if necessary.

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Researchers have made progress in devising an injectable, removable, biodegradable implant that could potentially provide HIV treatment or pre-exposure prophylaxis (PrEP) for up to one year.

Publishing their findings in Nature Communications, researchers at the University of North Carolina (UNC) at Chapel Hill have conducted seven years of research in animals to design the injectable drug-delivery system.

“This technology is not only promising for HIV but for any kind of condition that requires a daily intake of medication,” Rahima Benhabbour, PhD, MSc, first author of the study and assistant professor in the UNC–North Carolina State University joint department of biomedical engineering, said in a press release. “We’re talking about a safe, removable, long-lasting injection that takes away the burden of adhering to a daily medication regimen.”

The implant is made up of an organic solvent, a polymer and one or more medications. Together, they form a honeylike liquid that, once injected under the skin, becomes a solid. Then the solvent is absorbed by the body, leaving only the solid, medication-infused polymer.

The study authors tested six antiretrovirals (ARVs), including the integrase inhibitors MK-2048 and dolutegravir (sold in pill form as Tivicay), the protease inhibitors darunavir (Prezista) and atazanavir (Reyataz) and the non-nucleoside reverse transcriptase inhibitor rilpivirine (Edurant). They also used the boosting agent ritonavir in some combinations.

All six ARVs diffused from the implant at levels high enough to treat or prevent HIV, for periods ranging between one and 12 months.

Once the implant is removed, virtually all ARVs leave the body within one week. This addresses a critical problem related to the method of long-acting injectable HIV treatment currently poised for regulatory approval: its long so-called tail. Following the last such injection, medication can remain in the body at subtherapeutic levels for months or even up to one year.

“If a patient needs to withdraw from the treatment because they’ve had a bad reaction to the

[drug or drugs], or maybe a woman has become pregnant, our implant can be easily surgically removed," said Martina Kovarova, PhD, contributing author of the study and associate professor of medicine at the UNC School of Medicine.

If the implant is left in place, it biodegrades over time and is absorbed by the body.

The investigators will continue to develop this drug-delivery mechanism with a goal of moving it into human trials.

To read a press release about the study, click here.

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