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New compound could be alternative strategy for preventing HIV infection

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Stefan Sarafianosis developing a compound that is more potent and longer-lasting than current HIV therapies. Credit: Photo courtesy of MU News Bureau

With the help of effective drug therapies, HIV patients are living longer, healthier lives. Now, researchers want to improve these drug therapies and develop alternative preventative strategies, such as vaginal gels and creams that contain the same or related compounds used in treatments

for people infected with HIV. A University of Missouri researcher is developing a compound that is more potent and longer-lasting than current HIV therapies.

"This new compound, EFdA, is 60,000 times more potent than any other drug that is currently being used to treat HIV," said Stefan Sarafianos, assistant professor of microbiology and immunology in the MU School of Medicine and investigator in the Christopher Bond Life Sciences Center. "This compound has a different chemical makeup than other approved therapies and creates an exceptional amount of antiviral activity. EFdA is activated very quickly and stays long in the body to fight the virus and protect from infection."

When a person is exposed to HIV, the virus invades healthy cells that play an important role in keeping the body's immune system strong. In order to multiply itself and remain in the body, the HIV virus relies on certain proteins. One protein, known as reverse transcriptase, is the main HIV enzyme responsible for viral replication. Effective HIV drugs control the virus by blocking the functions of these viral proteins.

EFdA is a nucleoside reverse transcriptase inhibitor (NRTIs). NRTIs target reverse transcriptase and can stop the virus from duplicating and spreading. Currently, there are eight clinically approved NRTIs, but they can protect cells for only short periods of time. With EFdA, patients could be protected for two days instead of few hours and would not need to take the drug as often, Sarafianos said.

"Infection is the result of an overwhelming attack of the virus, but if you manage to keep the viral load low, the body has a mechanism to defend itself and clean up the virus on its own," Sarafianos said. "The goal of our research is to drop the virus to very low or "undetectable" levels. Patients with suppressed viral loads will have increased life expectancy. Not all drugs work with all patients, and new resistant viral strains

develop. Therefore, it's important to keep adding to our possible options for therapy."

Sarafianos hopes EFdA also can double as a preventative agent in the form of a vaginal gel or cream. This would provide additional protection to women whose partners refuse to use condoms.

More information: Sarafianos' recent research was published in *The Journal of Biological Chemistry.*

Provided by University of Missouri-Columbia

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