

Natural defense against HIV discovered

September 16 2015



Researchers at Michigan State University were part of a team to discover a new natural defense against HIV infection. Credit: G.L. Kohuth

Researchers at Michigan State University were part of a team to discover a new natural defense against HIV infection.

The team's discovery, featured in the current issue of the Journal of



Biological Chemistry, focuses on ERManI, a protein that prevents the HIV virus from replicating.

"In earlier studies, we knew that we could interfere with the spread of HIV-1, but we couldn't identify the mechanism that was stopping the process," said Yong-Hui Zheng, MSU associate professor of microbiology and molecular genetics and co-author of the study. "We now know that ERManI is an essential key, and that it has the potential as a <u>antiretroviral treatment</u>."

Antiretroviral treatments are not vaccines; they simply keep HIV in check in low levels in the body. While it could be decades before an ERManI-based treatment can be prescribed for HIV-1 patients, these results provide a strong path for future research involving human cells, and later, clinical tests.

The next steps will be to test if HIV resistance can be promoted by increasing ERManI levels, said Zheng, who worked on the study with scientists from the Harbin Veterinary Research Institute, the Chinese Academy of Agricultural Sciences and the University of Georgia.

Most viruses have viral envelopes, or protective skins, that comprise similar building blocks of the host the pathogens are trying to infect. On the surface of the envelope, there are viral glycoproteins, known as Env spikes, which act as valets, leading viruses to binding sites that allow infections to spread at the molecular level. They serve as a key of sorts that gives viruses entry into the host to begin spreading.

Zheng's lab was the first to show that HIV-1 envelope glycoprotein biosynthesis can be specifically inhibited by ERManI, which is a host enzyme to add sugars to proteins. By identifying ERManI as the target that slows the spread of HIV-1, the team has revealed a target in which future natural therapies can be developed.



More than 1.2 million people in the United States have HIV. In China, doctors diagnosed 104,000 new cases of HIV/AIDS in 2014. The number of infections is rising, though overall the country still has a low rate of infection.

Currently, there is no cure for HIV-1; once patients have it, they have it for life. While there are antiretroviral therapies available, they can only prolong life, albeit dramatically, but they cannot cure the disease. Current drug treatments have to be taken for a lifetime, which causes side effects and many other issues, Zheng said.

"We see a way to treat this disease by helping the body protect itself," he said. "That's why we continue to move our research forward, seemingly slowly at times, because finding a cure will take years. We feel that's it's important enough, on a world-wide scale, to dedicate our work to fighting this disease."

Provided by Michigan State University

Citation: Natural defense against HIV discovered (2015, September 16) retrieved 4 May 2024 from <u>https://medicalxpress.com/news/2015-09-natural-defense-hiv.html</u>

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