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MONDAY, MARCH 21, 2016
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Illinois study shows interactions between HIV and cellular defender

Published on Monday, Mar 7, 2016 @ 7:56pm (/stories/2016/mar) by Vaccine News Reports (/author/vaccine-news-reports)

Scientists hope to use this research to develop better prevention and treatment for HIV infections. | File photo

A new University of Illinois study offers a clear view of how an HIV capsid, which is a protein coat allowing HIV to attack the host's nucleus, can invade the human cells that are designed to defend the body.

The study shows an atomic-scale view of HIV invading cyclophilin A, a host protein.

Typically the immune system would rapidly locate and eliminate HIV from the body. Instead, cyclophilin A allows the capsid to bind to the cell and spread through the body without the immune

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system’s defense.

"What we think is happening is, where there is no cyclophilin the capsid is naked, so the cell can recognize it and trigger a process that destroys the virus," Juan Perilla, a postdoctoral researcher at the University of Illinois, said. "But if the capsid is fully occupied by cyclophilin A, it prevents recognition by the nuclear pore complex. So there is an optimal amount of cyclophilin bound to the capsid such that it allows the HIV infection to go forward."

The moment when HIV takes over the host cells is an important stage in the virus’s invasion of the human body. Scientists hope to use this research to develop better prevention and treatment for HIV infections.

"The HIV capsid has to show some of its surface to the nuclear pore complex so that it docks there properly and can inject its genetic material into the nucleus," Klaus Schulten, a University of Illinois physics professor, said. "Now, we understand a little bit better the HIV virus' strategy for evading cellular defenses. That gives insight into battling the system."

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