MedicalXpress

Researchers find a peptide that encourages HIV infection

May 10 2007

UCLA AIDS Institute researchers have discovered that when a crucial portion of a peptide structure in monkeys that defends against viruses, bacteria and other foreign invaders is reversed, the peptide actually encourages infection with HIV.

The findings, published in the April issue of AIDS Research and Human Retroviruses, could pave the way for the use of such peptides in gene therapy using HIV-based vectors as the delivery method.

"Although it may seem counterintuitive to value or even study a peptide that increases the ability of HIV-1 to enter a broad range of human cells, retroviral vectors are currently being explored as vehicles for gene therapy," the authors wrote. "In this area, at least, agents that enhance retroviral uptake could contribute to an emerging field of medicine."

"So many people have tried to deliver genes into different kinds of cells," said study co-author Shen Pang, adjunct associate professor at the UCLA School of Dentistry and a member of the UCLA AIDS Institute. "If you know of some method that can enhance gene delivery, you would have a useful tool."

Retrocyclin-1 (RC-100) is a circular peptide that has been shown in previous studies to inhibit the infection of CD4 cells with HIV. RC-111 is also cyclic and has the same amino acid sequence as retrocyclin-1. In both peptides, the amino acids are strung like 18 beads along the molecule's backbone. The amino acids in RC-111, however, are in

reverse order.

The researchers had initially wanted to quantify previous research by Dr. Robert I. Lehrer, distinguished professor of medicine in the division of infectious diseases at the David Geffen School of Medicine at UCLA and a co-author of the present study. Unexpectedly, the researchers discovered that while retrocyclin-1 inhibited infection of CD4 cells with HIV-1 by about 95 percent, the RC-111 variant enhanced viral infection five-fold.

There are three structural varieties of peptides, also known as defensins — alpha, beta and theta, Lehrer said. Humans have only alpha and beta; monkeys have all three.

"Here's a peptide whose normal structure allows it to protect against viruses, yet if you make the same peptide and place its amino acids in a reverse order, that lets the virus in," Lehrer said. "We would like to learn why it happens, but at the moment there's no explanation for this paradoxical result."

Still, the findings seem to show promise in gene therapy.

Source: University of California - Los Angeles