Meth Promotes Spread of Virus in HIV-Infected Users

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Researchers at the University at Buffalo have presented the first evidence that the addictive drug methamphetamine, or meth, also commonly known as "speed" or "crystal," increases production of a docking protein that promotes the spread of the HIV-1 virus in infected users.

The investigators found that meth increases expression of a receptor called DC-SIGN, a "virus-attachment factor," allowing more of the virus to invade the immune system.

"This finding shows that using meth is doubly dangerous," said Madhavan P.N. Nair, Ph.D., first author on the study, published in the online version of the *Journal of Neuroimmune Pharmacology*. The study will appear in print in the September issue of the journal.

"Meth reduces inhibitions, thus increasing the likelihood of risky sexual behavior and the potential to introduce the virus into the body, and at the same time allows more virus to get into the cell," said Nair, professor of medicine and a specialist in immunology in the UB School of Medicine and Biomedical Sciences.

His research centers on dendritic cells, which serve as the first line of defense again pathogens, and two receptors on these cells -- HIV binding/attachment receptors (DC-SIGN) and the meth-specific dopamine receptor. Dendritic cells overloaded with virus due to the action of methamphetamine can overwhelm the T cells, the major target

of HIV, and disrupt the immune response, promoting HIV infection.

"Now that we have identified the target receptor, we can develop ways to block that receptor and decrease the viral spread," said Nair. "We have to approach this disease from as many different perspectives as possible.

"If we could prevent the upregulation of the meth-specific dopamine receptor by blocking it, we may be able to prevent the interaction of meth with its specific receptors, thereby inhibiting the virus attachment receptor," said Nair.

"Right now, we don't know how the virus-attachment receptor and meth-specific receptors interact with each other, leading to the progression of HIV disease in meth-using HIV-infected subjects. That is the next question we want to answer.

"Since meth mediates its effects through interacting with dopamine receptors present on the cells, and meth increases DC-SIGN, which are the HIV attachment receptors, use of dopamine receptor blockers during HIV infection in meth users could be beneficial therapeutically to reduce HIV infection in these high-risk populations," Nair said.

Additional researchers on the publication, all from the UB Department of Medicine, are Supriya Mahajan, Ph.D., research assistant professor; Donald Sykes, Ph.D., research associate professor; Meghana V. Bapardekar, Ph.D., postdoctoral associate, and Jessica L. Reynolds, Ph.D., research assistant professor.

Source: University at Buffalo