

Flu Drugs Show Promise Against Cognitive Decline, Aging-Related Diseases

Study in people with HIV and mice identifies new mechanism—and drug target—for memory decline.

June 9, 2026 By Northwestern University

- Study links degradation in sugar molecules to cognitive decline in people with HIV.
- Scientists analyzed blood samples and immune cells from people with HIV.
- In mice, flu drugs preserved the sugar molecules, reduced inflammation and protected memory.

Chicago — A class of flu drugs may reduce cognitive decline and premature aging in people living with chronic viral infection, reports a new study led by Northwestern University that began with blood samples from people with HIV and extended into preclinical drug trials.

The findings point to a potential new therapy for cognitive problems in people with HIV, with broader implications for other aging-related diseases, such as dementia.

The study [was published \[June 5\]](#) in *Med*, a journal from Cell Press.

At least a quarter of people living with HIV develop problems with memory and thinking, even with effective antiretroviral treatment. Reasons for these cognitive symptoms have remained unclear. In this study, the Northwestern scientists identified a new biological culprit: the degradation of protective sugar molecules in our bodies, known as glycans, that normally help keep inflammation in check. When inflammation becomes chronic, it can accelerate biological aging by driving the immune system to overreact for too long.

The scientists identified the new sugar mechanism by analyzing blood samples from more than 100 individuals with HIV, both with and without cognitive impairment. Then, the research team conducted lab and mouse studies, where they found that flu drugs (a combination of Tamiflu and another experimental drug) preserved the sugar molecules and protected the brain.

“We are not saying yet that people should take flu drugs to prevent cognitive decline,” explained

study lead author [Mohamed Abdel-Mohsen](#), associate professor of medicine in the division of infectious diseases at Northwestern University Feinberg School of Medicine. “We are saying that our findings open the door to testing whether this drug class, or better next-generation versions, could be repurposed for brain and aging-related complications,” he added.

How the study was conducted

First, the scientists analyzed blood samples from people with HIV enrolled in the [AIDS Clinical Trials Group](#). All participants were on HIV treatment and were characterized as having either normal cognition or cognitive impairment based on clinical testing. Abdel-Mohsen’s team analyzed sugar patterns on the people’s blood proteins and found that there was a clear link between degradation of the sugar molecules and cognitive decline.

Then, the team used immune cells from people living with HIV and mouse models with HIV to test whether the sugar degradation increased inflammation. Finally, the Northwestern scientists used the flu drugs to show that, in mice, preserving the sugar molecules reduced inflammation, slowed biological aging and protected memory.

The flu drugs are called sialidase inhibitors and include Tamiflu, also known as oseltamivir. These drugs typically treat the flu by blocking a viral enzyme that helps the virus spread. In this study, the scientists used them differently by blocking other enzymes in the body that degrade the protective sugar molecules.

Stronger effects in women

The sugar degradation was more pronounced in women in the study. Abdel-Mohsen says in men, these sugar changes tend to occur gradually and steadily with aging. But in women, the degradation starts slower and then accelerates around menopause.

“Before menopause, women show a slower loss of anti-inflammatory glycans and slower accumulation of pro-inflammatory glycans compared with men, but around menopause there is a rapid shift toward a more inflammatory glycan profile,” said Abdel-Mohsen, who also is a member of Feinberg’s Potocsnak Longevity Institute.

Next steps

Abdel-Mohsen said his team is now working on two fronts: optimizing potential treatment strategies with the flu drugs and determining whether the sugar molecules can predict future cognitive decline via new blood biomarker tests.

“On the treatment side, we want to do more preclinical work to optimize the approach. Although some sialidase inhibitors are already used safely in people for influenza, they have not been tested for this purpose, dose or duration,” he said.

Other Northwestern study authors include first author [Leila Bertoni Giron](#) and co-authors

Shalini Singh and [Frank Palella](#).

The study is titled, “Inhibiting Glycan Degradation Prevents HIV-Induced Inflammation and Cognitive Impairment.” It was supported by the National Institutes of Health, (grants R01NS117458, R01AG092241, R01AI189353, R01AI165079, R01AA029859 and R01DK123733) and the AIDS Clinical Trials Group (grant NWCS 539).

This [news release](#) was published by Northwestern University on June 5, 2026.

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