# New model to study HIV latency in brain cells

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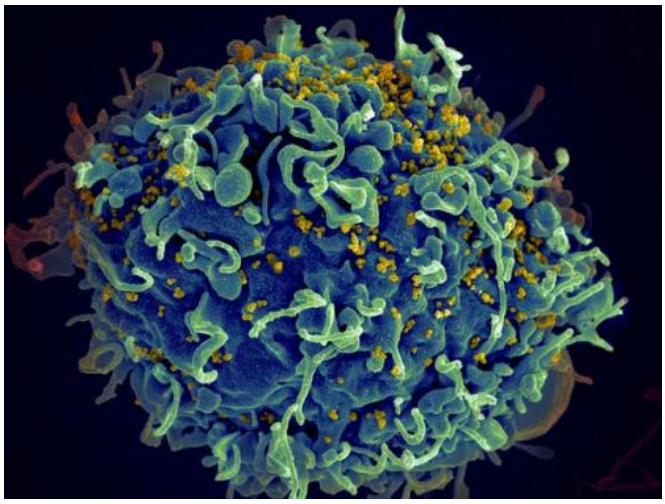

HIV, the AIDS virus (yellow), infecting a human immune cell. Credit: Seth Pincus, Elizabeth Fischer and Austin Athman, National Institute of Allergy and Infectious Diseases, National Institutes of Health.

Over 35 million people worldwide are currently infected by HIV. Antiviral therapies can keep the virus from multiplying. However, no drug can cure infection so far, because various cell types continue to carry the virus in a latent, i.e. quiescent, state. Scientists of Helmholtz Zentrum München have now established a model for latent HIV infection of brain cells. The researchers used this model to identify various compounds that affect latency of the virus in the brain. This study was published in the journal *AIDS*.

"Chronic infection is caused by long-lived cells with resting viral genomes that are activated by different factors," explained Prof. Dr. Ruth Brack-Werner of the Institute of Virology. "These so-called latently infected cells occur in the blood and in the brain, among others. HIV latency in the brain is particularly difficult to investigate," she added. Her research group is studying HIV persistence in a very important type of brain cells called astrocytes. The human brain contains billions of them. The many functions of astrocytes include protecting the brain from injury and harmful agents and providing essential support for nerve cells. Mature astrocytes can have a very long lifespan and may exist for years.

Recent studies identified HIV genomes in up to 19% of astrocytes in brain tissues from deceased HIV-1 infected individuals. So far, no experimental model has existed to study HIV latency in these cells. "With our model system, we can simulate latent HIV infection in astrocytes," said Dr. Martha Schneider, first author of the study. The researchers showed that various substances, including the cytokine TNF-alpha, can reactivate the inactive virus. Conversely, it was also possible to inhibit the reactivation of the virus by treating the cells with certain compounds. "These results identify drug candidates that may prevent activation of latent viruses in astrocytes", Schneider concluded.

In the future, the scientists plan to use this system to study the effect of these and other compounds that may prevent the activation of HIV-1 in the brain. As study director Brack-Werner explained: "Several viral proteins are toxic to neurons and may cause immune damage in the brain. Since only limited replacement of astrocytes occurs in the brain, loss of these cells may cause serious damage. Thus silencing the virus in brain cells is an important goal." In addition, the researchers plan to test the effect of approved drugs and thus to improve the clinical care of HIV-1 patients in the future.

**More information:** "A new model for post-integration latency in macroglial cells to study HIV-1 reservoirs of the brain," *AIDS*, DOI: 10.1097/QAD.0000000000000691