The Brain as the Ideal Reservoir for HIV, Foiling Eradication Attempts

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With the blood-brain barrier preventing antiretrovirals (ARVs) from gaining easy access to its tissues, the brain provides a protected reservoir for HIV, where the virus develops brain-specific mutations that allow it to become more virulent against the central nervous system (CNS). Publishing their commentary and review of available literature in Current Opinion in HIV and AIDS, Australian scientists describe HIV's unique relationship with the brain.

HIV, they write, establishes a reservoir in the brain shortly after infection and causes neurocognitive dysfunction, a mild form of which continues notwithstanding treatment with ARVs. A reason for this may be that ARVs do not fully control the viral reservoir in the brain. The virus infects macrophage and astrocyte cells where it may find safe harbor for long periods thanks to the fact that these cells are some of the longest living in the body. During this time, the virus evolves to develop the capacity to infect cells with low CD4 expression, thus amplifying its ability to damage the CNS.

There are concerns that attempting to eradicate the virus from various reservoirs, but not from the brain, could result in a mutated form of the virus from the brain later replenishing the other reservoirs. Furthermore, the refurbished immune system may then attack the virus in the brain, which could lead to devastating encephalitis (swelling of the brain). Eradication efforts, therefore, should attempt to prevent HIV's entry into the brain or to find ways to keep the virus in a latent state there, considering that purging the virus from the brain may not be feasible with currently available approaches.

To read the study abstract, click here.

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