AIDS Caused by ’Cellular Suicide’

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For the first time, scientists have shed light on the precise, step-by-step process by which untreated HIV causes AIDS. Contrary to popular belief, HIV isn’t guilty of murdering CD4 cells, rather of instigating cellular suicide.

Ninety-five percent of CD4 cells are in a “resting,” or non-replicating, state at any given time and therefore cannot be infected with HIV. According to research conducted at Gladstone Institutes, an affiliate of University of California, San Francisco, after HIV attempts and fails to infect these resting CD4 cells—this is called an abortive infection—particles of the virus remain in the cell and are detected by a specific protein. This protein then signals an enzyme known as caspase-1 to instigate a highly inflammatory death of these CD4 cells. The inflammation attracts more CD4s to the “hot zone,” where they then fall prey to this self-reinforcing cycle of destruction.

These findings are particularly noteworthy because they are the first to draw a direct link between HIV’s two most destructive signatures: chronic inflammation and the depletion of the immune system.

The researchers have also identified an existing drug compound that inhibits caspase-1. Because the drug has already been researched in Phase IIb studies for the treatment of epilepsy and psoriasis, subsequent trials are more likely to proceed at an expedited clip.

“Most of the damage done by HIV can be inhibited by effective antiretroviral therapy,” says Steven G. Deeks, MD, a professor of medicine at UCSF who researches the role of chronic inflammation in people living with the virus. “For those who cannot access or tolerate these drugs, novel interventions aimed at preventing the harm of chronic inflammation might prove useful.”

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