

For the first time, scientists at UC Davis and Mount Sinai School of Medicine have captured video footage showing the transfer of the human immunodeficiency virus (HIV) from an infected T-cell to an uninfected one through an adhesive structure called a virological synapse.

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Rapid Live Cell Microscopy of HIV Transfer Across T cell Virological Synapses

(<http://huserlab.ucdavis.edu/HIV-movies.html>)

REAL-TIME VISUALIZATION OF HIV ENTRY

The ability to visualize fluorescently labeled viruses in real time as they infect target cells will generate new understanding and potentially suggest novel targets for disease intervention. During infection, human immunodeficiency virus (HIV) is able to spread between immune cells without seeming to be exposed to neutralizing immune responses. Hübner *et al.* captured high-resolution images of the formation of infectious structures called virological synapses during HIV infection of T cells. Dynamic membrane trafficking and an endocytic pathway for HIV transfer between cells appeared to be triggered by cell-cell contact. Continuous long-duration imaging suggests that this pathway can promote infectious HIV spread between T cells.

Quantitative 3D Video Microscopy of HIV Transfer Across T Cell Virological Synapses

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The spread of HIV between immune cells is greatly enhanced by cell-cell adhesions called virological synapses, although the underlying mechanisms have been unclear. With use of an infectious, fluorescent clone of HIV, we tracked the movement of Gag in live CD4 T cells and captured the direct translocation of HIV across the virological synapse. Quantitative, high-speed three-dimensional (3D) video microscopy revealed the rapid formation of micrometer-sized "buttons" containing oligomerized viral Gag protein. Electron microscopy showed that these buttons were packed with budding viral crescents. Viral transfer events were observed to form virus-laden internal compartments within target cells. Continuous time-lapse monitoring showed preferential infection through synapses. Thus, HIV dissemination may be enhanced by virological synapse-mediated cell adhesion coupled to viral endocytosis.

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