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Photo courtesy of Richard D'Aquila

Seeking a Global Cure for HIV

Richard D'Aquila leads the Northwestern HIV Translational Research Center's efforts to develop a cure for HIV that can be deployed globally.

Because HIV persists within latent cellular reservoirs and can “rebound” quickly if treatment stops, patients must continue antiretroviral therapy (ART) for life. However, ART does not prevent HIV-induced abnormal inflammation, which can lead to cardiovascular disease and other morbidities, such as early impaired cognition.

D'Aquila's research team wants to achieve a cure that blocks HIV's rebound when ART stops. They sought, and discovered, boosters of APOBEC3G (A3), a cellular defense against HIV that they learned is more robust among the small number of HIV-infected individuals who control the virus naturally without ART. They posit that strengthening this defense for a time after discontinuing ART could prevent HIV's rebound among the rest of the infected population. Since A3s are also implicated in cancer and autoimmune disorders such as lupus, the boosters have wider potential as well.

In addition, the team is pursuing candidate medicines that block HIV's access to sugar and other nutrients it needs to grow but that do not harm critical immunity-orchestrating host cells. Any cure would also need to halt smoldering virus growth during ART, as such growth is now thought to trigger the inflammation that accelerates aging-associated disorders.

Annually, 50,000 Americans still become infected with HIV, and in recent years new cases have increased among certain groups. A cure could stop transmission from those who are infected and miss treatment doses. In addition, these new types of medicines might prevent infection if used by those at risk for HIV.

The NIH-funded, Chicago-wide Third Coast Center for AIDS Research (CFAR) that D'Aquila leads will help disseminate research on improving prevention and treatment — as well as achieving a cure — to the broader community, thereby spurring greater engagement and education.

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