New, More Accurate HIV Reservoir Test Is Big Advance for Cure Research

The inability to precisely assess reservoir size has greatly hindered efforts to determine the effects of experimental cure therapies.

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Researchers have developed a new test to measure the size of the HIV viral reservoir that is 10 to 100 times more accurate, not to mention faster, than an assay that is commonly in use. The scientists' successful efforts represent a considerable advancement for the HIV cure field, given how crucial it is for researchers to be able to quickly and accurately measure how a particular experimental cure therapy affects the reservoir.

Some of the CD4 cells that HIV infects will enter a dormant state. Also known as latency, this form of cellular hibernation means that the CD4 cell is not replicating and not producing new copies of virus. Because standard antiretroviral (ARV) treatment works only on replicating cells, latently infected cells remain under the radar of such medications. Research indicates that such cells can remain in a state of latency for years before waking and potentially repopulating the body with virus—that is, if such new virus is not confronted by ARV medications.

So the key goal of HIV cure research is to find ways to shrink and, in an ideal scenario, eliminate the viral reservoir.

These days, HIV cure researchers typically measure the reservoir by conducting a PCR test, which assesses the amount of viral DNA inside the body's CD4 cells. The problem with such a test is that it cannot determine which of these cells contain HIV that is replication competent, meaning it can produce viable new copies of the virus, and which cells contain defective copies of HIV that pose no threat. Perhaps 98 percent of HIV hidden in latently infected cells are duds, or replication incompetent.

Enter the prominent HIV cure research lab of Robert F. Siliciano, MD, PhD, a professor at Johns Hopkins Medicine. Publishing their findings in the journal Nature, Siliciano and his colleagues developed a PCR test capable of distinguishing between replication competent and incompetent viral DNA inside CD4 cells.

The team accomplished this feat by relying on a pair of fluorescent probes of different colors. The probes are attracted to certain viral mutations associated with defects and ultimately provide

researchers with a color-coded guide to the size of the viral reservoir, including the proportion of latently infected cells that are replication competent versus incompetent.

“For decades, the field has been clamoring for an accurate measure for these hidden viral templates,” Siliciano said in a press release. “Now, we have a good way to know if we are making a dent in their numbers. “We may still be a long way from a cure, but now at least we can measure our progress.”

To read a feature article from the print edition of POZ on the future of HIV cure research, click here. (Note: This article predates the new study about the reservoir test; as such, passages that refer to the lack of a precise reservoir assay are out of date.)

To read a press release about the study, click here.

To read the study abstract, click here.

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