Cure Watch

One man’s cure could lead to a cure for all.

March 28, 2011 By Laura Whitehorn

In December 2010, a man was declared cured of HIV. While his example won’t be widely repeated, it could lead to more useful strategies for a cure.

Timothy Ray Brown is “the Berlin patient.” He needed a stem-cell transplant to fight recurrent leukemia. His doctor, Gero Huetter, MD, knew that a small percent of people of northern European ancestry have a genetic variant called double CCR5 delta-32 deletion that seems to protect them from HIV. The virus attaches to CCR5 receptors on CD4 immune cells in order to enter and infect the cells (another attachment protein, CXCR4, is less commonly used). People genetically prevented from producing CCR5 receptors don’t contract HIV despite exposure.

For Brown’s transplant, Huetter found a match who had the genetic variant. After two transplants, Brown found that his HIV receded along with his cancer. Now, nearly four years after the second transplant, he remains free of HIV—without meds.

This cure is not widely useful, and not only because of its expense. Stem cell transplants rank among the most dangerous of medical procedures. Also called bone marrow transplants, they involve wiping out the immune system with high-dose radiation and chemotherapy before infusing stem cells from a donor. The body then grows a new immune system matching the donor’s. During chemo and radiation and before the new immunity takes hold, the recipient is vulnerable to infections and at serious risk of organ damage and other life-threatening conditions. There is also significant danger that the recipient’s body will reject the transplant.

Yet Brown’s case opens vistas for HIV eradication. While meds (entry inhibitors) blocking CCR5 attachment are in the HIV-treatment arsenal, they do not erase the virus and must be taken continuously. Brown’s experience shows that if CCR5 receptors can be genetically altered, the virus might be wiped out, making a lifetime of HIV meds unnecessary.

Researchers are working on exactly that, using technology called “zinc finger DNA-binding protein nuclease” to modify CD4 cells to match those of people with the double CCR5 delta-32 deletion. Several current studies ask whether infusing such cells—without the life-threatening transplant—will allow the Berlin cure to go global.

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