Zinc Fingers to the Fore

June 30, 2008

Naturally occurring proteins called zinc fingers can be used to genetically modify CD4 cells and potentially treat HIV infection, according to a press release reviewing the results of laboratory studies conducted by scientists at the University of Pennsylvania School of Medicine and Sangamo BioSciences. A planned human study will determine if this approach holds promise for people infected with HIV.

Zinc fingers have been eyed as a potential treatment for HIV for several years. They work by forcing mutations in the gene responsible for the expression of CCR5—one of two coreceptors on the surface of CD4 cells—and potentially reduce the ability of the virus to infect the cells and replicate. Like Selzentry (maraviroc), an approved antiretroviral that blocks CCR5 through a different mechanism, zinc fingers will likely be of benefit only to people with HIV exclusively targeting CCR5, not CXCR4 (or HIV targeting both coreceptors).

The researchers showed that, using zinc fingers, they could reduce the viral load of immune-deficient mice transplanted with engineered CD4 cells. “We followed them over time and showed that those mice that received the zinc-finger-treated cells showed less viral load than controls and improved CD4 counts,” says Elena Prerez, MD, PhD, an assistant professor of pediatrics at Penn and a lead investigator of the study.

Dr. Perez and her colleagues are now planning a clinical trial in humans in which CD4 cells from people living with HIV would have their CCR5 gene deliberately knocked out using the zinc finger proteins. These modified CD4 cells would then be infused back into the patients to re-establish their immune system and decrease their viral load.

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