Genetically Engineered Antibodies Protect Mice From HIV

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Engineering immune cells to produce “broadly neutralizing antibodies” (BNAs) protects mice that have immune systems modified to resemble those of humans against HIV infection. Researchers funded by the National Institutes of Health and working in the laboratory of Nobel laureate David Baltimore, PhD, at the California Institute of Technology published their findings in Nature Medicine.

BNAs prevent infection by blocking the receptors HIV uses to latch onto human cells. About one in five people produce them as a response to HIV, but usually do so too late to thwart a chronic infection; scientists are seeking ways to prompt the development of BNAs before HIV exposure.

The researchers in this study spliced genes for HIV-specific BNA called VRC01 into what’s known as a vector, which is a virus that is not harmful but can deliver the genetic coding into immune cells. Then they infected mice with the vector, prompting particular cells to produce the BNAs over extended periods of time.

The investigators sought to replicate human sexual transmission of HIV by repeatedly exposing the mice to low doses of HIV. In one experiment, two out of 10 mice that received the VRC01 vector became infected with the laboratory strain of the virus following 13 to 15 exposures. Meanwhile, all of the nine mice that did not receive the BNA-inducing vector were infected within just six exposures to the virus. In a second experiment, the researchers used a modified version of VRC01 as their vector, called VRC07, and exposed the mice to an HIV strain that is common in humans. The mice that received the VRC07 vector were totally resistant to HIV.

To read the NIH press release on the study, click here.

To read the study abstract, click here.