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Pressemitteilung

Heinrich-Pette-Institut für Experimentelle Virologie und Immunologie an der Universität Hamburg (
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HIV kicked out: Fundament for a new therapy established

A new enzyme eradicates the AIDS-virus from the host-cell genome A complete cure from an HIV-infection is currently not available. At present, lifelong treatment regimes are required to block the outbreak of AIDS, and these treatments do not eliminate the integrated provirus from infected cells. Now, scientists from the Heinrich-Pette-Institute for Experimental Virology and Immunology (HPI) in Hamburg and the Max-Planck-Institute of Molecular Cell Biology und Genetics in Dresden (MPI-CBG) have developed an enzyme that specifically cuts out the viral genome and eradicates the virus from the host cell. (Science, June, 29th 2007)

HIV introduces its genetic material into the DNA of body cells permanently. In particular, the immune cells are doomed due to the production of new viruses. The teams of Joachim Hauber from the HPI and Frank Buchholz from the MPI-CBG have now succeeded in specifically removing the viral DNA from infected cells. "We got rid of the virus from the infected cells; nobody has done this before", the scientists commented.

To achieve this result they genetically engineered a recombinase, an enzyme that works like molecular scissors. Recombinases cut and paste DNA sequences at specific sites. "Naturally occurring recombinases do not recognize viral sequences and are therefore not useful for an anti-viral approach", said Buchholz: "So we had to develop a recombinase that recognizes the viral sequence and removes the virus with precision."

The molecular biologists started from a recombinase that naturally is found in a bacteriophage. This enzyme, termed "Cre", does not recognize sequences from the HIV genome. Using the forces of evolution the scientists used more than 120 generation cycles to breed the enzyme "Tre", which is now able to recognize HIV sequences.

"Although Tre has so far only been tested in tissue culture cells, this work lays the technical foundation for a novel therapeutic approach that one day might be used to eradicate the HIV from cells of infected patients" said Hauber. However, it is still a long way until this approach can be used in clinical practice. "We will first go back to the bench to further improve the enzyme and then test whether the recombinase can be delivered efficiently and safely to cells in the human body", said Buchholz and Hauber.

Original publication
Indrani Sarkar, Ilona Hauber, Joachim Hauber, Frank Buchholz
HIV-1 Proviral DNA Excision Using an Evolved Recombinase
Science, June, 29th, 2007

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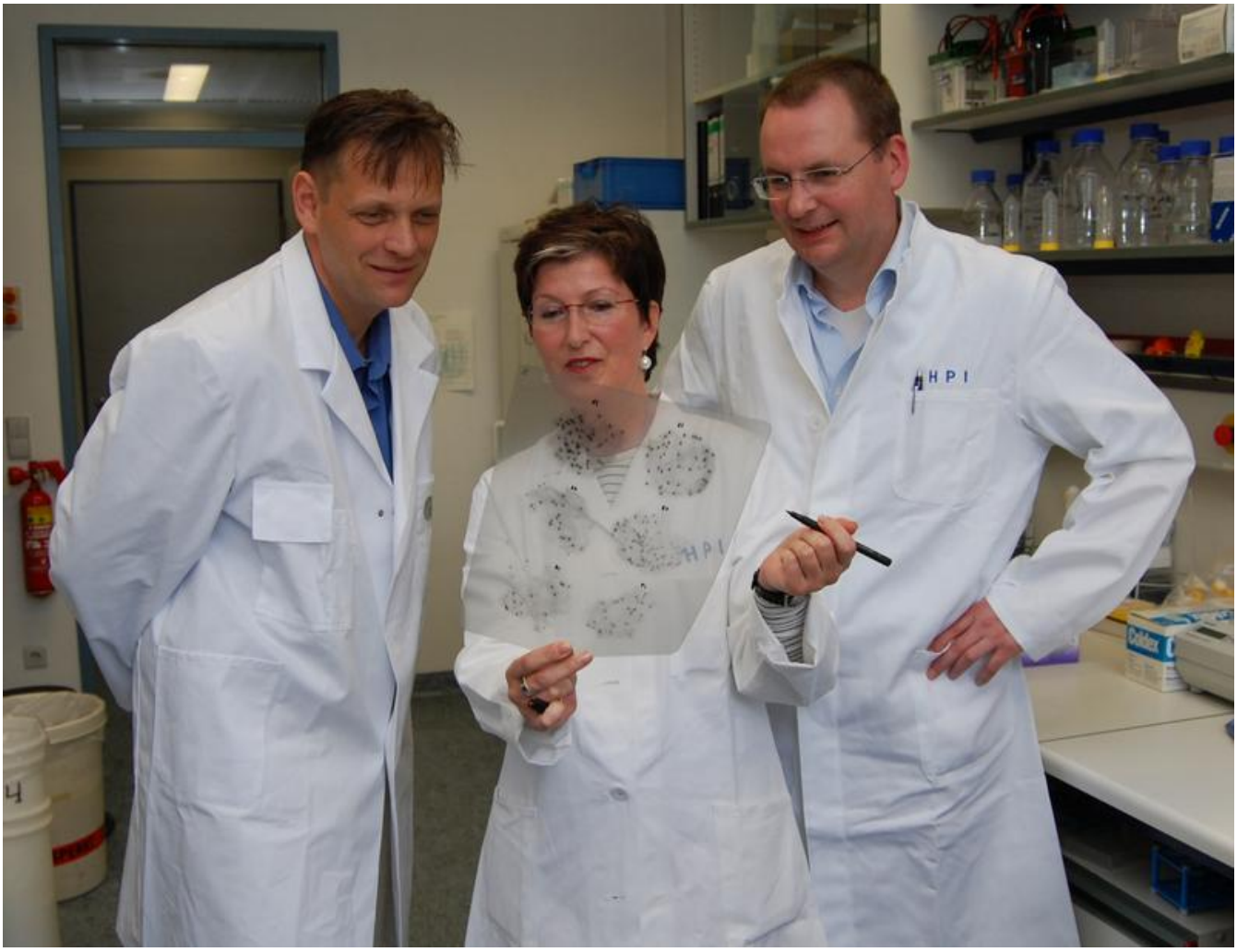
URL zur Pressemitteilung: www.max-wissen.de/?find=me&id;=5197 - Max-Wissen "Evolution im Reagenzglas"

URL zur Pressemitteilung: www.hpi-hamburg.de - Heinrich-Pette-Institut für Experimentelle Virologie und Immunologie an der Universität Hamburg

URL zur Pressemitteilung: www.mpi-cbg.de - Max-Planck-Institut für Molekulare Zellbiologie und Genetik



The scientists Frank Buchholz (MPI for Molecular Cell Biology and Genetics, Dresden), Ilona Hauber and Joachim Hauber (both Heinrich-Pette-Institute for Experimental Virology and Immunology, Hamburg)
Picture: HPI