

Targeted alpha therapy's potential to eliminate HIV-infected cells

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HIV (yellow) infecting a human immune cell. Credit: Seth Pincus, Elizabeth Fischer and Austin Athman, National Institute of Allergy and Infectious Diseases, National Institutes of Health

Targeted alpha therapy has the potential to selectively eliminate HIV infected cells from the central nervous system, according to a recent study co-authored by the JRC. The study shows that a specific human antibody labelled with the alpha emitter bismuth-213 can penetrate the blood brain barrier and selectively target and destroy HIV-infected cells while sparing non-infected healthy cells. These findings may open new options for the treatment of HIV associated neurocognitive disorders.

The in vitro study that was at the basis of the scientific article was conducted in a consortium of various research organisations, including Albert Einstein College of Medicine in New York and the JRC. It has shown that the novel alpha emitter radioactive drug can penetrate a simulated human [blood brain barrier](#) without causing damage to it and selectively bind and kill HIV-infected cells residing in the central nervous system. The approach is based on the unique physical properties of alpha radiation, in particular its high energy and short path length in human tissue, to selectively address and destroy diseased [cells](#) while sparing surrounding healthy tissue.

Combined therapy against the virus (cART) allows HIV-positive patients to live much longer. There are however reservoirs within the body where the virus persists and continues to cause damage. In particular the treatment of infections of the central [nervous system](#) poses a particular challenge as the blood brain barrier limits many cART drugs from reaching effective levels in the brain. Currently, about half of all HIV infected patients are suffering from mild to moderate neurological disorders.

The study was co-funded by Bill and Melinda Gates foundation and the National Institute of Health. Albert Einstein College of Medicine and JRC have been collaborating for a decade on the joint development of targeted alpha therapy of bacterial, fungal and viral infections, including HIV.

More information: Ekaterina Dadachova et al. Targeted Killing of Virally Infected Cells by Radiolabeled Antibodies to Viral Proteins, *PLoS Medicine* (2006). [DOI: 10.1371/journal.pmed.0030427](https://doi.org/10.1371/journal.pmed.0030427)

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