# Harnessing immune cells' adaptability to design an effective HIV vaccine

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In infected individuals, HIV mutates rapidly to escape recognition by immune cells. This process of continuous evolution is the main obstacle to natural immunity and the development of an effective vaccine. A new study published by Cell Press in the March 21 issue of the journal *Immunity* reveals that the immune system has the capacity to adapt such that it can recognize mutations in HIV. The findings suggest that our immune cells' adaptability could be harnessed to help in the fight against AIDS.

An international collaboration between research groups in France, England, Japan, and Australia discovered that immune cells from certain infected individuals were able to recognize HIV mutants. Researchers found that the immune cells' ability to recognize such mutant forms of the virus was associated with a protective response against HIV. This discovery begs the question: if mutant HIV can be recognized by immune cells, how then does HIV often escape immune detection? The researchers explain that the answer lies in HIV's ability to conceal itself from immune surveillance altogether. It does so by blocking infected cells from breaking down its viral particles and from then displaying them on the cells' surface to alert the immune system.

"Using a spectrum of advanced immune profiling techniques, our work illustrates the sophisticated mechanisms that underlie the continuous competition, or 'molecular arms race,' between immune cells and HIV," says senior author Dr. Victor Appay, of Hôpital Pitié-Salpêtrière in Paris. "Overall, our study reveals the intricacies of immune cell efficacy against HIV."

Although immune cells not be able to recognize every mutant HIV, a vaccine that stimulates immune cells that recognize certain key mutant forms of the virus may be effective against viral infection and the development of AIDS.

**More information:** *Immunity*, Ladell et al.: "A molecular basis for the control of pre-immune escape variants by HIV-specific CD8+ T-cells." dx.doi.org/10.1016/j.immuni.2012.11.021

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