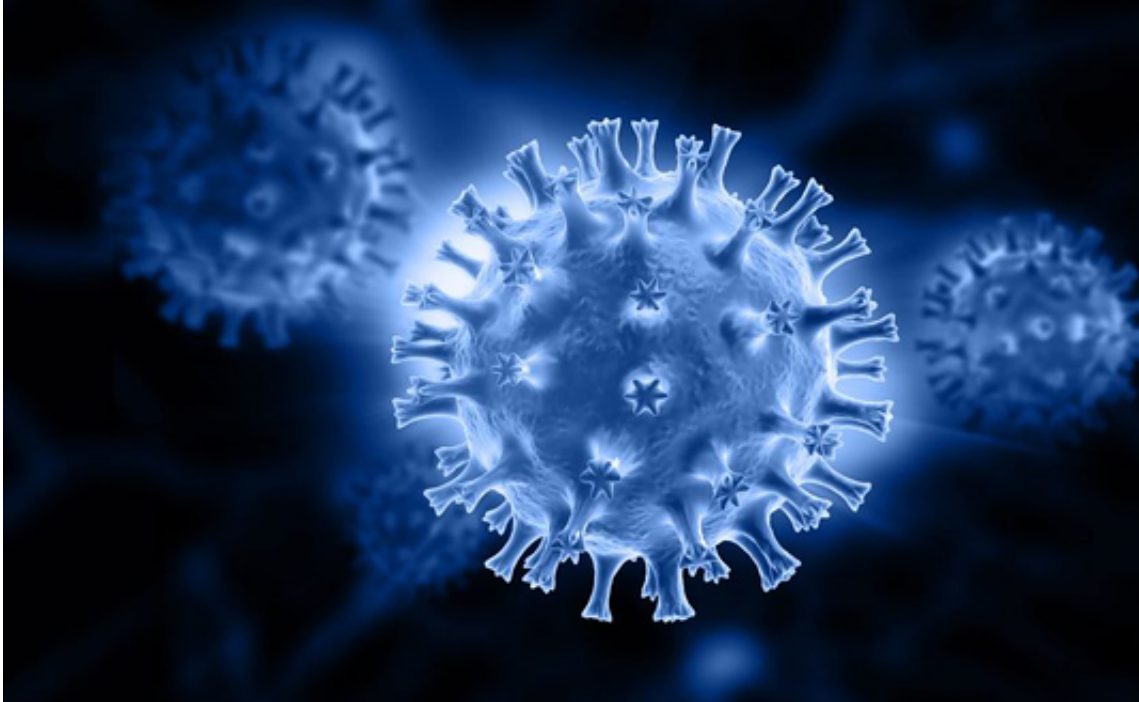


# Children who keep HIV in check

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Some HIV-infected - and untreated - children do not develop AIDS. A new study shows that they control the virus in a different way from the few infected adults who remain disease-free, and sheds light on the reasons for this difference.

Children who are HIV-positive but remain free of AIDS are very rare. In the absence of antiretroviral therapy, over 99% of individuals infected with HIV go on to develop full-blown AIDS, and the condition evolves

more rapidly in children than in adults. However, between 5 and 10% of perinatally infected HIV-positive children avoid this fate, as an international research collaboration, led by Dr. Maximilian Muenchhoff at LMU's Max von Pettenkofer Institute and colleagues based at the University of Oxford (Professor Philip Goulder), report in the current issue of the journal *Science Translational Medicine*. The group has characterized the immunological responses of a cohort of these so-called non-progressors - HIV-positive children in South Africa who contracted the infection from their mothers but who remain healthy. At the time of the study, the average age of the cohort was just under 8½ years old.

The investigations reveal that these children have high concentrations of circulating HIV particles, although their immune system remains fully functional. "Interestingly however, these infected but healthy children exhibit only low levels of immune activation. In addition, while the spectrum of cell types that contain the [virus](#) - the so-called viral reservoir - is very complex it is predominantly restricted to short-lived CD4+ T cells in these young non-progressors," says Dr. Maximilian Muenchhoff. In addition, the researchers found that most of these children have high levels of potent and broadly neutralizing antibodies directed against HIV.

These features of the immune response in healthy HIV-infected children show a striking resemblance to that observed in the more than 40 species of African monkeys which are the natural hosts of Simian Immunodeficiency Virus (SIV) - from which HIV itself is derived. Although the virus replicates very efficiently in these primates, infected animals show no signs of immune dysfunction. Here too, short-lived CD4+ T cells serve as the primary viral reservoir, and levels of immune activation are low, as seen in the study cohort. In contrast to this picture, the vast majority of HIV-infected AIDS patients, both adults and children, display all the signs of chronic activation of the immune system. Furthermore, this condition persists even under anti-retroviral therapy which effectively reduces viral numbers, and it is also associated

with long-term complications, such as an increased risk of cardiovascular disease.

The new findings are therefore of interest not only with respect to the development of effective HIV vaccines, they may also provide pointers toward potential interventions for patients with chronic HIV infections. "This is a remarkable clinical study from the epicenter of the HIV pandemic. The ability of these children to maintain an intact immune system in the face of ongoing viral replication and in the absence of [antiretroviral therapy](#) can provide us with new insights into hitherto unknown defense mechanisms, which could eventually benefit other HIV patients", says Professor Oliver T. Keppler, Chair of Virology at the Pettenkofer Institute, and former head of the German Reference Center for Retroviruses in Frankfurt am Main.

The 170 members of the study cohort in Durban, South Africa, were infected with HIV by mother-to-child transmission. However, since these [children](#) showed no symptoms of disease, the fact that they were infected was, in most cases, discovered only several years later when their mothers had developed AIDS and sought medical attention.

**More information:** A. Chahroudi et al, What pediatric nonprogressors and natural SIV hosts teach us about HIV, *Science Translational Medicine* (2016). [DOI: 10.1126/scitranslmed.aaj1874](https://doi.org/10.1126/scitranslmed.aaj1874)

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