

■ SCIENCE

'Small step closer to curing HIV'

STAFF REPORTER

A NEW study involving nine women from South Africa has revealed that a disproportionately high number of their viruses at the time of antiretroviral initiation went into a hidden state in their bodies to evade treatment, providing new opportunities to develop a cure for HIV.

These findings from a joint study by UCT, the Centre for the Aids Programme of Research in South Africa (Caprisa) and the University of North Carolina (UNC) – Chapel Hill were published this week in the journal *Science Translational Medicine* and featured as the cover article.

With antiretroviral treatment, HIV becomes undetectable in the blood, but it remains deep within certain cells (known as the viral reservoir) where treatment cannot reach these viruses (known as latent viruses).

People living with HIV have to take antiretroviral treatment for life because strains of HIV hidden in the long-lived viral reservoirs return quickly into their blood if antiretroviral treatment is stopped, even briefly.

Until now, this viral reservoir was believed to form continuously over many years, starting from the onset of infection.

The new study investigated nine women on antiretroviral treatment and who have had no detectable virus for at least four years. These women had been studied over the last 10 to 15 years as part of the Caprisa 002 cohort study in KwaZulu-Natal.

In these women, the joint SA-US team of researchers were surprised to find that most of the viral strains in the reservoir were those which had been circulating in the blood at the time of antiretroviral treatment initiation.

This new information creates the opportunity to develop new approaches to curing HIV as this discovery indicates that the reservoir could be changed markedly through additional interventions at the time of antiretroviral treatment initiation.

The viral reservoir is the biggest barrier to a cure for HIV.

"The path to a cure for HIV is long and complicated," said Professor Salim Abdool Karim, director of Caprisa and co-lead investigator of the Caprisa 002 study.

"The hidden viruses that evade antiretroviral treatment and the body's immune response are key to developing a cure. This study's findings take us just one more small step forward in the search for a cure for HIV."

Dr Melissa-Rose Abrahams, a UCT researcher and primary author of the findings, said: "An HIV cure or a state of disease control in the absence of treatment is badly needed. Our finding is important not only because it informs new strategies and interventions to restrict the latent viruses in the viral reservoir, but also because it was identified in a key population, African women, who are among the worst affected in the global HIV epidemic."

"Our work suggests that if we could understand the reservoir-forming process better, we might be able to intervene at the start of treatment to reduce the majority of the reservoir that forms at this time," said co-senior author Professor Ronald Swanstrom of the UNC School of Medicine.

The UCT team at the Department of Virology led by Professor Carolyn Williamson collaborated with Swanstrom's UNC team to analyse the genetic sequences of HIV from the Caprisa 002 cohort women over a period of several years before and after they began antiretroviral treatment, in order to compare the latent viruses during treatment with the viruses each year prior to treatment initiation.

The researchers used genetic information on the pre-treatment strains and the reservoir strains to decipher clues to when and how the viral reservoir formed. For the nine women in this study, most of their viral reservoirs – about 71% on average – consisted of viral strains that were closely related to the strains circulating just before they started antiretroviral treatment.

The UN estimated that last year there were about 38 million people living with HIV, 22 million people on life-long antiretroviral treatment and almost 1 million HIV-related deaths. There is no cure for HIV infection.