

HIV's effect on white blood cells questioned by new research

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Scientists have refuted a longstanding theory of how HIV slowly depletes the body's capacity to fight infection, in new research published today.

The researchers were looking at T helper cells, a class of white blood cells which recognise infection and co-ordinate the body's immune defences. They are attacked by HIV, and their numbers gradually decline in HIV positive patients. It has long been a major puzzle why this process of depletion is so slow, often taking 10 years or more.

One popular theory has been the "runaway" hypothesis, which says that T cells infected by HIV produce more HIV virus particles, which activate more T cells, that in turn become infected, leading to an uncontrolled cycle of T cell activation, infection, HIV production and cell destruction.

However, today's new study in *PLoS Medicine* shows that this theory cannot explain the very slow pace of depletion that occurs in HIV infection. The research team used a mathematical model of the processes by which T cells are produced and eliminated to show that if the runaway theory was correct, then T helper cell numbers would fall to very low levels over a number of months, not years.

One of the paper's authors is Jaroslav Stark, Professor of Mathematics at Imperial College London, and Director of the Centre of Integrative Systems Biology at Imperial. He said: "Scientists have never had a full understanding of the processes by which T helper cells are depleted in

HIV, and therefore they've been unable to fully explain why HIV destroys the body's supply of these cells at such a slow rate. Our new interdisciplinary research has thrown serious doubt on one popular theory of how HIV affects these cells, and means that further studies are required to understand the mechanism behind HIV's distinctive slow process of cellular destruction."

The research team think that one possible explanation could be that the virus slowly adapts itself over the course of the infection, but they stress that further analysis is needed to verify this alternative theory.

Professor Stark adds: "If the specific process by which HIV depletes this kind of white blood cells can be identified, it could pave the way for potential new approaches to treatment."

Source: Imperial College London

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