

Körber European Science Prize 1986

Retrovirus Research (AIDS)

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In the context of the Körber Prize, researchers discovered that HI viruses remain hidden in a surprisingly large number of cells in the immune system – an almost unassailable reservoir out of which the still unvanquished, malignant pathogen can always become active.



Luc Montagnier having an interview during the presentation of the Körber European Science Prize 1986. Twenty-two years later he was awarded the Nobel Prize in Medicine. (Photo: Körber Foundation)

When the first cases of AIDS became known in 1981 and then the pathogen – later to be given the name HIV (Human Immunodeficiency Virus) – was identified less than three years later, modern medicine recorded a major triumph: Never before had the period of time between the appearance of a disease and the clarification of its cause been shorter. Nevertheless, to this day no effective therapy and no vaccination are possible. Clearly, the AIDS virus is a particularly sophisticated – or expressed in human terms, insidious – germ which constantly succeeds in outwitting the immune system. Knowledge of how the virus achieves this would provide key pointers for new ways of treating the disease – and precisely this was the approach of the Körber Prizewinners.

"We will attempt to determine all cell and tissue types that are infected by this virus, and we will examine all immunological reactions brought about by the virus in the carrier," said Professor Luc Montagnier during the award ceremony in 1986, outlining the field of research. Once the AIDS virus infests the human body, it settles above all in certain cells of the immune system, remains there and then at some point – possible after many years – becomes active and starts to destroy the cells. As more and more of these cells are lost, the body's 'health police' are so weakened that they can no longer cope with otherwise harmless germs to which the patient ultimately succumbs.

It is above all in the CD4+ lymphocytes – also known as T helper cells – that the AIDS viruses lodge themselves. The number of these cells and additional signals in the blood can therefore provide important clues as to the progress of the disease. This was the approach taken by, among others, Professor Dr. George Janosy and his team at the Royal Free Hospital in London. They analyzed the changes in the number of CD4+ and other lymphocytes and can now draw certain conclusions on the progress of the disease and the efficacy of preventive measures. The findings of the working group headed by Professor Dr. Paul RÁCz and Dr. Klara Tenner-RÁCz at the Bernhard Nocht Institute of Tropical Medicine in Hamburg could well be even more important. The researchers discovered that the lymphatic organs, in particular the lymph nodes, act as a kind of reservoir for the AIDS viruses. This is where the pathogens are to be found before they occur in larger numbers in the blood and the patients begin to exhibit symptoms. Most of the infected CD4+ lymphocytes were found in the vicinity of the follicular dendritic cells. It also emerged that these cells carry free AIDS viruses attached to their surface.

The follicular dendritic cells practically give the pathogens a piggyback ride on their travels through the lymph nodes to new CD4+ lymphocytes for them to infect.

Besides cells that produce viruses, the Rácz team also searched for cells which carry copies of the AIDS pathogen in their genetic make-up without the viruses being active. The surprising result: 20 to 30 percent of the CD4+ lymphocytes are already latently infected with HI viruses in early stages. These cells are thus a kind of Trojan horse in which the pathogens wait in hiding. As it is difficult to attack them there, researchers now hope to develop new strategies to contain the viruses in the cells and thus prevent the outbreak of the disease symptoms – or for an Achilles' heel to reveal itself in the insidious pathogens.

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