

4. HIV-X – Understanding the latent viral reservoir

In Switzerland, around 15,000 people are estimated to live with a diagnosis of HIV. Highly effective combination therapies prevent replication of the virus, but fail to eliminate it completely. This is because the virus integrates its own genome into the human genome and establishes long-lived viral reservoirs. If treatment is stopped, the virus begins to multiply again. The MRD Project HIV-X therefore wants to learn more about this latent viral reservoir.

“We know that the size of the latent viral reservoir varies from patient to patient, but after an initial drop upon initiation of treatment, it generally stays constant over time,” says Huldrych Günthard, professor at the University Hospital Zurich. “With the HIV-X project, we want to find out what causes these size differences between patients. We still don’t know how to reduce or eliminate these reservoirs either.” The HIV-X research team is therefore looking to identify the host and viral factors that play a role in a reservoir’s mechanisms. On the basis of these results, the researchers aim to develop models which could be used to predict how a patient responds to a particular treatment. In doing so, the scientists also hope to contribute to the development of more effective treatments that might eliminate the reservoirs for good.

Thanks to the Swiss HIV Cohort Study (SHCS), which has collected clinical data as well as cell and plasma samples from more than half of those registered with HIV in Switzerland since 1988, the scientists have access to a unique and considerable data set. The researchers are examining samples from around 1,200 patients who have received antiretroviral therapy for at least five years, and whose blood virus



levels were below the limit of detection over this period. They are analyzing the extent of the viral reservoir, as well as the genomes of both host and virus, for each patient in this group.

“The amount of data collected during this project is immense, and we would never be able to cope with it alone. This is why we’re dependent on close collaboration with other institutes,” says Günthard. The team wants to use their results to find factors in the patients or virus that have an effect on the size of the viral reservoir.

“This project is our opportunity to do something big. So far, no other research groups have carried out such a comprehensive study.” If it turns out that the reservoirs of particular genotypes respond differently to certain drugs, the therapy could be tailored accordingly. “This would be a step in the direction of personalized medicine in the field of HIV treatment,” says the infectious diseases specialist. “I myself am very pleased that SystemsX.ch launched the MRD Projects, which promote clinical research with a systems approach.”

HIV-X at a glance

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Further information: Swiss HIV Cohort Study, www.shcs.ch

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HIV-X
Deciphering Host-Virus
Interactions to
Cure HIV