

## **Animal to human: hidden diseases**

European Commission

As well as climate change, social changes are also critical in the transmission of diseases. An example could be seen in the central and Baltic European countries following the collapse of the Soviet bloc. Economic troubles led to people going into the forest to gather mushrooms and berries. This led to an increase in diseases being transmitted through contact with ticks, insects and rodents.

Rodents transmit diseases like hemorrhagic fever with renal syndrome, a disease that most of the team of scientists working in the Konnevesi forest have suffered from. Rodents are a very important factor in the spreading of disease. A tick or mosquito that bites an infected rodent will be able to pass the disease on to humans. But even when certain diseases appear to have disappeared in humans and are thought to be eradicated, they will often be preserved in populations of rodents.

Biodiversity plays a key role in minimising the risk of rodent populations carrying a virus becoming too large. Normally there is a stable state of many species of rodents living in low densities. However, if forest is destroyed (e.g. for agriculture) there may be but one or two species that survive. This leads to a serious problem if one of the remaining species is carrying a virus, since their densities will become much higher with time.

Scientists, including those in the Konnevesi forest, are gathering rodent samples all over the world. Together with efforts to study the rodents in their natural habitats, the scientists wish to understand the rodents and exactly how a virus is transmitted to humans. Many of the samples are sent to the laboratories of the Department of Virology at the University of Helsinki in Finland, one of the best laboratories in Europe for animal to human disease transmission. They are bringing the ecology work, involving the collected samples, together with the virology, which involves studying the virus genomes as well as patient samples to see whether the viruses are causing diseases in humans.

Genetic analysis results are sent to the Centre for Biology and Management of Populations in Montpellier in southern France. After having classified each rodent, they find out whether a virus being carried by one species could be passed onto other species of rodents. In this way the scientists want to know if a given rodent species arriving in a new country or environment will be able to transmit viruses to the native rodent population. It may be that the local rodent species lacks a particular genetic characteristic, making it unsusceptible to certain diseases. This scenario represents a realistic threat: it is easy enough for a rodent, or another animal such as a mosquito, to take a ride in a plane or ship container and be introduced to a new environment.

The fact that disease does not recognise borders made it important for the project

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to involve as many as 48 institutions from 24 different countries. The ultimate goal is to understand what happens in local parts of Europe and to use that knowledge to create predictive models for how, where and when outbreaks might occur. The idea is to have a tool of anticipation, to know how a disease will spread before it does and be in a position to act in time.

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