THE STUDY OF PROPAGATION AND SHEDDING OF HANTAVIRUS IN *RATTUS* SPECIES

Misako FUJIKI

Laboratory of public Health,
Department of Environmental Veterinary Sciences,
School of Veterinary Medicine,
Hokkaido University, Sapporo 060, Japan

To analyze the transmission route of hantavirus in rats, antibody production and distribution of the hantaviral genome in infected rats and urban rats were examined by the indirect immunofluorescnce antibody (IFA) test and a nested PCR system which amplified the S genome RNA segment. The results are summarized as follows.

1. Suckling and adult rats were inoculated with the KI–83–262 (KI) strain of Seoul virus by an intraperitoneal route. In the inoculated suckling rats, the viral genome was detected in clots, lungs, submaxillary glands, the rectum, saliva and urine from 7 to 28 days post inoculation (d. p. i.). On the other hand, in the inoculated adult rats, the viral genome was detected in lungs at 7 to 28 d. p. i. and in the rectum at 7 d. p. i. In both suckling and adult rats, the IgG-avidity value was low at the early stage of infection. However, the value increased linearly with the infection, then reached 1.0 in about 6 months after inoculation. Therefore, this value is useful to estimate the time of infection.

2. Suckling rats were inoculated with strain KI (400 focus-forming units) by the intranasal route. The viral genome was detected in lungs of the inoculated rats 18 d. p. i. Thus, the virus can be transmitted by the intranasal route.

3. Suckling rats were administered with urine derived from two infected rats by the intranasal route. These urine-administered rats produced antibodies and the viral genome was detected in the urine of these suckling rats. Therefore, the virus can be circulated via the intranasal route with virus-contaminated urine.

4. Rats (1 week old) infected by the intraperitoneal route transmitted hantavirus to their normal cagemates (1 day old). According to IgG avidity values, the cagemates were infected as soon as they started living with the infected rats. The viral genome was detected in the urine of the cagemates, even 128 days after they started living together.

5. Suckling rats were orally administered virus-infected Vero E6 cells. The rats acquired infection depending on the cell dose.

6. Dam rats infected as newborns had high levels of IgG antibodies in sera and milk without the viral genome in the milk. Their offspring also had high levels of IgG antibodies in sera without the viral genome in lungs. Thus, it was suggested that the maternal antibodies were effectively transmitted by milk from dams to their offspring.

7. Three of five urban rats in an enzootic focus of hantavirus had IgG antibodies against hantavirus. The viral genome was detected in lungs and urine in 2 of the 3 rats. Since these 3 rats were adults (more than 8 months old) and had low IgG-avidity values, it was suggested that they had acquired infections about one month earlier. Moreover, even in adult urban rats, the viruses were discharged in the urine at the early stage of infection. Therefore, the urine was suspected to be the source of the virus transmission through the respiratory tract.