

## SEROLOGICAL SURVEY WITH THE ANTIGEN OF HAEMORRHAGIC FEVER VIRUS WITH RENAL SYNDROME IN SMALL RODENTS IN SLOVAKIA

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**Summary.** — Results of serological survey in small rodents with the antigen of haemorrhagic fever with renal syndrome (HFRS) virus indicate the existence of a natural focus of this virus in Slovakia. Antibodies were found in the following free-living rodent species: *Clethrionomys glareolus*, *Apodemus agrarius*, *Apodemus sylvaticus*, *Pitymys subterraneus*, *Microtus arvalis* and *Microtus economus*. A total 10 out of 120 (8.2%) small rodents trapped in investigated localities of Western and Eastern Slovakia had antibodies to the HFRS virus antigen as detected by complement fixation (CF) and/or immunofluorescence (IF) tests.

**Key words:** haemorrhagic fever with renal syndrome (HFRS); serological survey; small rodents

### Introduction

HFRS virus was isolated from small rodents, namely from *Apodemus agrarius* in Korea (Lee *et al.*, 1981) and *Clethrionomys glareolus* in Finland (Brummer-Korvenkontio *et al.*, 1981); in the U.S.S.R. the virus antigen was detected in the lungs of further small rodent species (Gavrilovskaya *et al.*, 1983). With regard to the wide spectrum of the hosts of HFRS virus, the disease which it causes was named "rodent-borne viral nephropathy" (Gajdusek, 1982).

Occurrence of HFRS was described in Slovakia based on clinical and pathological findings (Plank *et al.*, 1961). The antigen of HFRS virus was detected in the lungs of *Cl. glareolus*, *A. agrarius* and *Apodemus flavicollis* trapped in Eastern Slovakia (Grešíková *et al.*, 1984). The purpose of this study was to find out incidence of HFRS antibodies in small rodents.

### Materials and Methods

**Small rodents.** Free-living small rodents (*Cl. glareolus*, *A. agrarius*, *A. flavicollis*, *Pitymys subterraneus*, *Microtus arvalis* and *Microtus economus*) were captured alive into the traps of Swedish type in September and November 1983 and 1984 in localities of Eastern Slovakia



(in horn-bean-oak forest at the margin of Tarnava village at the Laborec river; shrubbery bound at the village of Ruská Poruba) as well as of Western Slovakia (swampy meadow and the forest edge at Čičov village). Blood samples for serological examination were collected from sinus orbitalis of trapped small rodents and sera obtained were kept frozen at  $-20^{\circ}\text{C}$  until examined.

*Serological examination.* The rodent sera were examined by complement-fixation (CF) and immunofluorescence (IF) tests. Antigen (*Apodemus agrarius* 32) for the CF test was prepared from the lungs of infected rats (Grešíková *et al.*, 1984). The IF test was performed according to the method described by Brummer-Korvenkontio *et al.* (1980).

### Results

Altogether 120 small rodent serum samples were examined for the presence of antibodies to the antigen of HFRS virus in CF and IF tests. Of them, 92 sera were coming from small rodents trapped in Eastern Slovakia, 28 sera

**Table 1.** Detection of antibodies to HFES virus antigen in sera of small rodents trapped in Slovakia

Region investigated	Rodent species	Number of positive out of examined animals	Test used
Eastern Slovakia	<i>Cl. glareolus</i>	1/5	CF
	<i>A. agrarius</i>	1/34*	IF
	<i>M. arvalis</i>	0/5	CF, IF
	<i>P. subterraneus</i>	1/7	CF
	<i>A. flavicollis</i>	0/41*	IF
Western Slovakia	<i>Cl. glareolus</i>	2/6	IF
	<i>A. sylvaticus</i>	2/18	IF
	<i>M. arvalis</i>	2/2	IF
	<i>M. economicus</i>	1/2	IF
Examined in total		10/120	CF, IF

\* Sera examined by Dr. Brummer-Korvenkontio.

from those trapped in Western Slovakia. In sera from Western Slovakia antibodies were detected in *Cl. glareolus*, *A. sylvaticus*, *M. arvalis* and *M. economicus* species; antibodies were detected also in sera from Eastern Slovakia in species *Cl. glareolus*, *A. agrarius* and *P. subterraneus* (Table 1). Overall infection with HFRS virus of small rodents in the localities under study was 8.2%. The results obtained with two tests, namely CF and IF are considered to be comparable, based on the finding of full correspondence of these two tests in our previous study (Grešíková *et al.*, 1984).

### Discussion

In our previous study the antigen to HFRS virus was detected in the lungs of *Cl. glareolus*, *A. agrarius* and *A. flavicollis* (Grešíková *et al.*, 1984). In the present study antibodies to HFRS virus antigen were demonstrated not only in *C. glareolus* and *A. agrarius*, i.e. already known hosts of HFRS



virus, but also in *P. subterraneus*, *A. sylvaticus*, *M. arvalis* and *M. economus* species. With regard to the wide spectrum of the rodent hosts, the designation "rodent-borne viral nephropathy" for HFRS (Gajdusek, 1982) is fully justified.

Taking into consideration the short living of small rodents and rapid alternation of their populations, it can be assumed that HFRS virus circulates also in Slovakia. As follows from our present examinations, higher positive rate was found in sera of species of Microtinae (*Cl. glareolus*, *M. arvalis*, *M. economus*) than in those of Murinae subfamily (*A. flavicollis*, *A. agrarius*, *A. sylvaticus*), which corresponds to data found in Scandinavia (Brummer-Korvenkontio *et al.*, 1980) and in the European part of the U.S.S.R. (Gavrilovskaya *et al.*, 1983). Since HFRS pose a serious public health problem in Euroasia (Gajdusek, 1982), we have tried to contribute in our study to the revealing of natural foci of HFRS virus in Western and Eastern Slovakia also by serological survey in small free-living rodents.

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