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DETECTION OF ANTIBODIES TO THE WESTERN AND THE EASTERN TYPE OF HAEMORRHAGIC FEVER WITH RENAL SYNDROME IN PATIENT'S SERA FROM SLOVAKIA

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Summary. — We present serological evidence of infection with western and eastern type of haemorrhagic fever with renal syndrome (HFRS) virus in patient's sera from Slovakia by indirect immunofluorescence. Treatment of sera with 2-mercaptoethanol decreased levels of haemagglutination-inhibition (HI) antibodies to the eastern type of HFRS suggesting primary infection of the patients by this virus.

Key words: haemorrhagic fever with renal syndrome (HFRS); eastern and western types of HFRS; Fojnica strain; serum antibodies

Introduction

In 1984 we detected the antigen of western haemorrhagic fever with renal syndrome (HFRS) in the lungs of small rodents in Eastern Slovakia (Grešíková *et al.*, 1984). It was found by complement-fixation reaction that the antigens were closely related to the western type of HFRS Puumala (Karabatsos, 1985). Antibodies to the western type of HFRS were detected in the sera of *Clethrionomys glareolus*, *Apodemus agrarius*, *Pitymys subterraneus* collected in Eastern Slovakia and in the sera of *Clethrionomys glareolus*, *Apodemus sylvaticus*, *Microtus arvalis* and *Microtus economus* collected in western Slovakia (Grešíková *et al.*, 1986). The western type of HFRS antigen was demonstrated in *Clethrionomys glareolus* and *Microtus arvalis* (Grešíková *et al.*, 1984; Daneš *et al.*, 1986). The eastern type of HFRS antigen Hantaan (Karabatsos, 1985) was found in *Apodemus agrarius* (Daneš *et al.*, 1986; Grešíková *et al.*, 1988).

The antigen for haemagglutination and for HI test was prepared from the brain of suckling mice infected with Fojnica virus (the eastern type of HFRS kindly supplied by Dr. A. Gligič, Institute of Immunology and Virology, "Torlak," Beograd, Yugoslavia) by sucrose-acetone extraction (Clarke and Casals, 1958). The immunofluorescence procedure for the sera of patients was made according to Tkachenko *et al.* (1981). The haemagglutination and the HI tests were

Table 1. Immunofluorescent antibody (IFA) titres to HFRS in patient's sera

The name of patients	Clinical diagnosis	The date of sample collection	IFA titres with antigen	
			Hantaan	CG-1820
D.L.	HFRS	12. X. 87	16	64
D.L.	HFRS	23. X. 87	16	512
D.L.	HFRS	30. X. 87	16	512
D.L.	HFRS	1. XII. 87	16	512
R.M.	Nephritis	7. XII. 87	512	16
R.M.	Nephritis	18. XII. 87	512	16
T.L.	Nephritis	1. VI. 88	128	0
M.M.	Influenza	18. VIII. 88	128	2048
B.R.	HFRS	29. IX. 88	128	16
Z.J.	HFRS	3. VIII. 88	0	0

HFRS = Haemorrhagic fever with renal syndrome
CG-1820 = The western type of HFRS

performed as described by Clarke and Casals (1958). The sera were treated by 2-mercaptoethanol and then extracted by acetone and adsorbed on concentrated goose erythrocytes.

During the years 1987 and 1988 sera were obtained from patients with clinical diagnosis of haemorrhagic fever with renal syndrome, nephritis and/or influenza. The results of immunofluorescent (IFA) tests are shown in Table 1. Out of 6 patient's sera examined by IFA tests, 5 have been positive. Higher antibody titres to Hantaan 76—118 virus strain (the eastern type of HFRS) were detected in 3 patient's sera; on the other hand, higher antibody titres to CG—1820 virus strain (the western type of HFRS) were found in the sera of 2 patients.

The results of class IgM HI antibodies to the Fojnica antigen of HFRS virus are presented in Table 2. The positive control sera (acute — phase sera collected from patients in Bulgaria and Yugoslavia) were found to possess IgM antibodies along with 2 out of 9 patient's sera examined to the eastern serotype of HFRS.

It has been proved that the eastern type of HFRS occurs in Far Eastern Asia (Korea, China, Far East of the U.S.S.R.) while the western type of HFRS in Europe (Gajdusek, 1982; Baškircev *et al.*, 1984). Yugoslavian sera from febrile nephropathy patients reacted as high with Hantaan antigen as with Puumala antigen (Gajdusek, 1982). The European form of HFRS is considered to be less haemorrhagic than the Korean haemorrhagic fever. However, in Slovakia, the first HFRS cases had fatal outcome (Plank *et al.*, 1961).

Both the eastern type (Hantaan) and the western type (Puumala) of HFRS virus have been already detected in small rodents in Slovakia (Grešíková *et al.*, 1984; Daneš *et al.*, 1986; Grešíková *et al.*, 1988). *Clethrionomys glareolus* and *Microtus arvalis* have been the common hosts for the western type of

Table 2. Haemagglutination-inhibiting (HI) titres to haemorrhagic fever with renal syndrome (HFRS) antigen in patient's sera

Serum	Clinical diagnosis	HI titres	HI titres after 2-mercaptoethanol treatment
Patient from Bulgaria	HFRS	80	10
Patient from Yugoslavia	HFRS	80	<10
Human from the U.S.A.	HFRS	40	20
Negative human	Healthy	0	0
D.L.	MFRS	10	<10
R.M.	Nephritis	160	40
T.L.	Nephritis	80	10
M.M.	Influenza	<10	<10
B.R.	HFRS	10	10
Z.J.	HFRS	<10	<10
Š.S.	HFRS	<10	<10
U.L.	HFRS	<10	<10

HFRS and correlated with the mild form of disease. *Apodemus species* seems to be the host for the eastern type of HFRS and related with severe form of HFRS.

It is of interest that we have been able to demonstrate specific IgM antibodies to Hantavirus (Fojnica strain) by HI tests. By IFA tests, however, antibodies were detected to both the eastern and western types of HFRS.

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