ISOLATION OF ENTEROVIRUSES FROM WATER

*O. E. Ivanova, V. A. Kazantseva, I. V. Krasilnikov, *I. Procházková, S. S. Savinskaya, A. G. Andjaparidze, *L. Daneš, M. S. Balayan, S. G. Drozdov*

Institute of Poliomyelitis and Viral Encephalitides, U.S.S.R. Academy Medical Sciences, 142782 Moscow, U.S.S.R. and *Institute of Hygiene and Epidemiology, 10042 Prague, Šrobárova 48, Czechoslovakia

Received December 27, 1985

The surveillance on virus content in natural water reservoirs is an essential component in epidemiological studies of infectious diseases where water is an important vehicle of transmission, e. g. in enterovirus infections including hepatitis A. We investigated routine water samples from different sources: waste water, river water, tap water collected in the U.S.S.R. and in Czechoslovakia. Adsorption chromatography on porous silica has been employed for virus concentration. Earlier this method has been successfully applied for concentration and purification of some viruses (*1*, *2*). Viruses from the suspension were adsorbed onto sorbent surface and then eluted under certain osmotic conditions in the form of a narrow peak in which 10-100 times concentrated virus could be recovered (*2*).

Source	Sample No.	No. of positives		Virus
		A	B	
Waste (pipe)	6	0	2	Polio type 1 and 2
river	3	0	1	Hepatitis A
tap	8	0	1	ECHO-7

A = before concentration; B = after concentration

The samples were layered on chromatography column (1 × 4 cm) with porous silica (pore diameter 250 nm, total porosity 2.3 cm^3/g); Tris-HCl buffered 2 mol/l NaCl solution, pH 11.3 was used for elution. Viruses present in water samples were assayed by plaque technique using primary vervet monkey kidney cell cultures (*7*) and enzyme-immunoassay — EIA (*3*). No viruses could be detected in the samples before concentration (Table). Meanwhile, altogether 4 different viruses have been found and identified in the concentrated water samples. Using this procedure hepatitis A virus has been detected for the first time in the river water. Detection of hepatitis A virus from waste water (*4*, *5*, *6*) and well-water (*5*) have been earlier reported.

We feel that adsorption chromatography on porous silica can be a useful tool for concentration and further identification of enteroviruses, including hepatitis A virus, in environmental water.

References

1. Balayan, M. S., Bespalova, G. I., Bresler, S. E., *et al.*, *Vop. Virus.* **16**: 478, 1971.
2. Bresler, S. E., Kolikov, V. M., Krasilnikov, I. V., *et al.*, *Dokl. Akad. Nauk SSSR* **234**: 940, 1977.
3. Duermeyer, W., van der Veen, J., and Koster, B., *Lancet* **1**: 823, 1978.
4. Elkana, Y., Manaa, A., Marzouk, Y., *et al.*, *J. virol. Meth.* **7**: 259, 1983.
5. Hejkal, T. W., Kaswick, B., LaBelle, R. L., *et al.*, Am. Water Works Ass. **74**: 318, 1982.
6. Savinskaya, S. S., Kazantseva, V. A., Nastashenko, T. A., *et al.* MEMO-H-1715/1 *3*: March, 1980.
7. Wallis, C., and Melnick, J. L., *Prog. Rep. Biol. Med.* **19**: 683, 1961.