

CHANGES OF BRAIN GANGLIOSIDES IN RAT INFECTED
WITH JAPANESE ENCEPHALITIS VIRUS

M. Sugamata, T. Miura, T. *Abe

Department of Hygiene, *Department of Pediatrics, Teikyo University
School of Medicine, Itabashi, Tokyo 173, Japan

Received June 1, 1988

It has been reported that the lipid composition changed remarkably in the brain of a patient with Japanese encephalitis (JE) (1). In brain gray matter the contents of cholesterol-ester (Ch-E) increased and a remarkable increase of monosialogangliosides of G_{M2} and G_{M3} were found both the gray and white matter.

In order to analyze the influence of JE virus infection on brain lipid metabolism in experimental animals we tested mice and rats infected with JE virus as described (1). In mice, though Ch-E appeared in the brain by JE virus infection, we could not find changes of gangliosides (GSD) composition (2). In rats (Imamichi strain) inoculated with JE virus (G-1 strain), appearance of Ch-E and changes of GSD composition in the brain were repeatedly observed. In two rats inoculated with JE virus one week after birth (one i. c. and the other i.p.), Ch-E appeared in the brain of rats with severe clinical signs of encephalitis, the Ch-E:Ch ratio was 0.82 (i.c.) and 0.65 (i.p.), as compared to 0.0 in both i.c. and i.p. controls. An increase of G_{M2} in the distribution of total GSD was also observed (Table).

Table

Group	Species of GSD* (percent distribution)									
	G_{Q1}	G_{T1b}	G_{D1b}	G_{D2}	G_{T1a}	G_{D1a}	G_{D3}	G_{M1}	G_{M2}	G_{M3}
i.c. JE	1.2	16.0	12.8	0.1	3.1	39.8	1.6	15.8	4.3	5.1
cont.	1.3	16.8	13.1	0.5	2.3	44.1	1.2	14.8	0.3	5.8
i.p. JE	1.1	17.1	12.7	0.2	1.7	40.4	1.8	14.7	2.5	7.6
cont.	0.8	16.1	12.5	0.5	2.3	45.9	2.7	16.4	0.0	2.7

* According to the nomenclature of Svennerholm (3).

Changes of the lipid composition found in the brain of rats infected with JE virus were similar to those of the patient with JE. We suggest that the rat is probably the most useful experimental animal to analyze the mechanisms of altered brain lipid metabolism caused by JE virus infection.

References

1. Sugamata, M., Fujiwara, H., and Abe, T.: *Acta virol.* **26**, 400, 1982.
2. Sugamata, M., Miura, T., and Abe, T.: *Med. Biology* **107**, 139, 1983 (in Japanese).
3. Svennerholm, L.: *J. Neurochem.* **10**, 613, 1963.