ENCEPHALITOGENIC ACTIVITY OF Haemophilus pertussis ON VARIOUS ANIMALS

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In a comparative study of the encephalitogenic activity of Haemophilus pertussis using experimental allergic encephalomyelitis (EAE) as the model, the most sensitive animals were found to be guinea pigs. Rabbits of the chinchilla breed were less sensitive and albino rats more resistant still to the development of EAE. Albino mice were resistant to the development of EAE.

The encephalitogenic properties of Haemophilus pertussis in experiments on pure-line rats and also on noninbred guinea pigs have been described elsewhere [1-5]. It has been shown that cells of H. pertussis, if injected together with adjuvant of the Freund type and brain tissue, regularly cause the development of experimental allergic encephalomyelitis (EAE).

In the investigation described below a comparative study was made of the encephalitogenic activity of H. pertussis on various animals.

EXPERIMENTAL METHOD AND RESULTS

The encephalitogenic properties of inactivated H. pertussis cells (strain No. 305) were investigated. Experiments were carried out on 122 noninbred guinea pigs of both sexes weighing 300-350 g, 28 chinchilla rabbits weighing 2500-3500 g, 63 albino rats weighing 150-200 g, and 120 albino mice weighing 16-18 g.

Following injection of encephalitogenic mixture containing 15, 3, 1.2, 0.6, 0.12, and 0.012 mg of H. pertussis cells with brain antigen into guinea pigs, the animals developed the disease in 100% of cases, while if the dose was 0.0012 mg, 41.6% of guinea pigs became ill.

After a latent period of 8-17 days mild or moderately severe disturbances of movement coordination and paresis of the skeletal muscles of the hind limbs, and paresis of the sphincters of the pelvic organs developed. In some cases when the disease developed against the background of characteristic manifestations of EAE, it ended fatally.

Pathological investigation of sections of the brain and spinal cord showed thickening and round-cell infiltration of the pia mater, dilatation and thrombosis of the vessels, and perivascular zones of round-cell infiltration (cuffs), mainly in the white matter.

Sensitization of rabbits by H. pertussis cells in a dose of 15 mg per animal caused the disease in 44.4% of cases, and in a dose of 1.5 mg in 10%. The latent period was 13-35 days. The animals lost their appetite and became weak and then paretic, with pareses and paralyses of the skeletal muscles of both limbs and paresis of the sphincters of the pelvic organs. The disease lasted for between 1 and 60 days. Histological examination revealed changes in the meninges (thickening and infiltration) and numerous zones of perivacular round-cell infiltration (cuffs) mainly in the spinal cord.

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Rats were injected with H. pertussis cells in doses of 15, 3, 0.6, and 0.12 mg per animal together with adjuvant and brain tissue. After injection of 15 mg H. pertussis cells 33.3% of animals developed the disease, compared with 9.09% of animals receiving doses of 3 and 0.6 mg. A dose of 0.12 mg did not cause the disease. On the 13th-16th day the rats developed clinical manifestations of the disease: loss of appetite, paresis of skeletal muscles of all the limbs, flaccid paralysis of the muscles of the hind limbs, paresis of the sphincters of the pelvic organs. Round-cell submeningeal infiltration and perivascular infiltration, predominantly in the white matter of the brain, were found histologically.

After sensitization of albino mice with the encephalitogenic mixture in doses of 3, 1.2, and 0.6 mg H. pertussis cells per animal, none of the mice developed EAE.

Hence, the disease developed by guinea pigs, rabbits, and rats following injection of encephalitogenic mixture, in its clinical and pathomorphological picture resembled the typical EAE described after injection of encephalitogenic mixture in conjunction with cells of Mycobacterium tuberculosis and brain antigen [6, 7].

The results indicate that guinea pigs are the most sensitive animals to EAE when produced by sensitization with H. pertussis cells. Chinchilla rabbits are less sensitive, and albino rats more resistant still to the development of EAE (comparing the number of injected bacterial cells per 100 g body weight). Albino rats are completely resistant to the development of EAE.

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