Observations on the Histopathology of Dengue Virus Infections in Mice

Histopathological studies have been carried out on young mice infected with the four, antigenically distinct types of Dengue virus. This investigation represents a collaborative effort by members of the Department of Epidemiology and Microbiology, Graduate School of Public Health, University of Pittsburgh (G.E. Sather, W.McD. Hammon) and of the Department of Pathology, Peter Bent Brigham Hospital (J.E. Craighead, G.J. Dammin).

Each of the Dengue viruses (types 1, 2, 3 and 4) was administered in several dosages to newborn mice by the intracerebral, intraperitoneal and subcutaneous routes. The mice were sacrificed when obviously ill or moribund and whole body sections of the carcasses were prepared for study.

Lesions were found in the central nervous system of mice infected with all four viruses. Changes, consisting of neuronolysis and glial cell infiltration, were located in the cerebral hemispheres but rarely in the cerebellum, brain stem or spinal cord. Although the dosage and site of inoculation influenced the extent and localization of lesions, considerable variation was noted in individual animals receiving the same amount of virus by the same route. Often the pathological pictures were different in mice exhibiting similar incubation periods and patterns of illness. Widespread alterations were usually found in the brain following intracerebral inoculation. A spectrum of changes, ranging from diffuse lysis to focal meningeal infiltration, was demonstrated in mice receiving virus by the intraperitoneal and subcutaneous routes. None of the four types of Dengue virus induced a consistent pattern of lesions in the central nervous system.

No significant changes were observed in the visceral organs of virus-infected mice. Focal myocarditis and myositis were found in some animals; however, these lesions were minimal and probably unimportant. While alterations were occasionally recognized in the lymphoid tissue and bone marrow, they were never consistent.