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GLIAL RESPONSE TO INTRACEREBRAL INJECTION OF THIAMINE PYROPHOSPHATE. A PRELIMINARY STUDY.

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Glial cells play an important role in the metabolism of thiamine in the CNS. It has been established that thiamine deficiency causes early alterations in glial cells, which induces myelin destruction and neuronal degeneration. However, the effects produced by higher levels of thiamine on the nervous tissue are unknown. The purpose of the present work is the study of glial response to intracerebral injection of thiamine.

Adult anesthetized rats were injected stereotaxically in the CA1 hippocampal region with 5 ul of thiamine pyrophosphate (8,6 mM) in glucosaline solution. After 24 hours of survival, animals were fixed by perfusion, brains removed, and vibratomic sections of selected areas were processed for a) histochemical demonstration of thiamine pyrophosphatase (TPPase) and inosine diphosphatase (IDPase), b) immunocytochemical demonstration of GFAP and Vimentine. Control animals receiving glucosaline injections were included in the study.

Our observations show that except for a lightly astrocytic hypertrophy, the initial glial reaction in the CA1 hippocampal region is restricted to microglial cells. These cells are identified as TPPase and IDPase positive cells. Considerable alterations in the morphology and the spatial distribution of microglial cell populations are observed: Reactive microglial cells, characterized by a strong histochemical staining, show appreciable enlargement of cell body and discernible retraction of cell processes. Frequently, elongated forms are found. Moreover, whereas a considerable reduction in the number of microglial cells in both stratum oriens and stratum radiatum is observed, the number of microglial cells is, however, increased in the pyramidal cell layer and alveus.

In conclusion, our observations indicate that microglial cells are the first cellular elements which respond to higher levels of thiamine in the central nervous system.