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ASTROGLIAL AND MICROGLIAL REACTIONS IN THE MOLECULAR LAYER OF THE RAT FASCIA DENTATA AFTER PERFORANT PATH LESIONS

B. GONZALEZ¹ and J. ZIMMER², ¹Dept. biol. Cel. y Fisiol. Subun. Histologia, Fac. Med. U.A.B., Barcelona, Spain. ²Department of Neurobiology, Institute of Anatomy, University of Aarhus, Denmark.

The reactions of astrocytes and microglial cells to central nervous injury was examined in the adult rat fascia dentata, using histochemical and immunocytochemical cell markers. Fifteen, adult Wistar rats received lesions of the entorhinal cortex, hence damaging the perforant path projection to the dentate molecular layer. After 3, 7, 14 and 28 days survival, alternate brain sections were stained by immunocytochemistry for glial fibrillary acidic protein (GFAP), found in normal and reactive astrocytes, and vimentin (VIM), found in developing and reactive astrocytes, and by histochemistry for thiamine pyrofosfatase (TPPase), a microglial marker. Sections were also stained for acetylcholinesterase (AChE) in order to correlate the glial reactions with the induced sprouting of septal cholinergic fibers.

The glial reactions in the dentate molecular layer were restricted to the zones with axonal degeneration. Strong TPPase-positive microglial cells and VIM-positive, astroglia-like cells appeared as early reacting cells 3 days after the lesion. Hypertrophied GFAP-positive astrocytes were prominent at 7 days when also changes in the AChE-pattern had occurred. Later, as the AChE-staining increased in the denervated zones, there was a gradual decrease in glial reactivity. In conclusion, our results have demonstrated that the astroglial hypertrophy is preceded by an early microglial reaction located to the zones with acute axonal degeneration.