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THE NATURE OF SPINDLE-SHAPED-CELLS APPEARING IN GLIAL SCARS AFTER BRAIN INJURY.

B. González, B. Castellano and J.M. Vela. Cellular Biology and Physiology. Autonomous University of Barcelona. Spain.

Presence of spindle-shaped-cells in glial scars of injured nervous tissue has been described by several authors. The source of such cells is, however, unknown, although microglial or astrocytic origin could be suspected. This study aims to clarify the nature of spindle-shaped-cells found in glial scars using histochemical and immunocytochemical cell markers.

Twelve adult quails (Coturnix coturnix) were used in this study. Anesthetized animals receive unilateral stab wounds in the brain. After three weeks of survival, animals were perfused, brains removed, and lesioned areas were dissected out. Vibratomic sections were processed a) histochemically for demonstration of thiamine pyrophosphatase (TPPase) and inosine diphosphatase (IDPase) for microglial identification, and b) immunocytochemically for detection of glial fibrillary acidic protein (GFAP), an astrocytic marker. Some sections were embedded in Araldite for electron microscopic study.

Our findings showed that intense TPPase and IDPase reaction are observed in the glial scar area. Round cells (macrophages) and ramified microglial-like cells were identified as TPPase and IDPase positive cells. No TPPase or IDPase positive spindle-shaped cells have been found. GFAP immunocytochemistry shows an important participation of hypertrophied astrocytic processes in the glial scar. Moreover, positive GFAP spindle-shaped cells in the lesioned area were observed. In agreement with this findings, electron microscopic study revealed the existence of numerous filaments in the cytoplasm of the spindle-shaped cells. Moreover, a constant feature of these cells at the ultrastructural level was the presence of cytoplasmic vesicles inside cytoplasm and processes. Finally, an interesting find was the observation of a close relation-ship between processes of the spindle shaped cells and macrophages, suggesting some kind of interaction between both cellular populations. In conclusion, our results indicate that spindle-shaped cells participating in glial scars are of astroglial origin and could play an important role in immunological reactions.