MICROGLIAL CELL REACTION IN THE CEREBRAL CORTEX OF THE RAT AFTER PERINATAL HYPOXIA.

P.J. Fabregas, B. González, I. Dalmau, J.M. Vela and B. Castellano.
Dept. Cell Biology and Physiology. Autonomous University of Barcelona.

It is well established that in adult rats experimental hypoxia produces a selective neuronal damage associated with a strong and specific glial reactivity. Similar studies using perinatal hypoxia models are however scarce and data on glial reactivity are not available. Thus the aim of the present study was to analyze the microglial reaction in response to experimental hypoxia at the perinatal age.

To perform this, several pregnant rats at 21 days of gestation were anesthetized in CO2 enriched atmosphere and subsequently sacrificed by cervical fracture. The fetuses were left in the uterus for 5 to 30 minutes. Then by opening the uterine wall, fetuses were removed, gently tapped to initiate respiration, and given to a foster mother. At 1, 4, 7, and 14 postnatal days, hypoxic rats were anesthetized and fixed by intracardiac perfusion. Brains were removed and coronal vibratome sections (50 um thick) containing hippocampus and cerebral cortex were obtained and immediately processed for the enzyme histochemical demonstration of NDPase, a specific microglial staining. Normal animals of the same age without any manipulation were used as controls.

Our observations showed that longer times of hypoxia produced a well characterized response of microglial cells, which was more apparent at postnatal day seven. This changes were particularly apparent in the cerebral cortex and were specially related to layers III and V. Substantial changes in the hippocampal formation were however difficult to establish. When compared with control animals, the cerebral cortex of animals suffering hypoxia showed a significant increase in the number of microglia. Here, microglial cells expressed a perceptible increase in their NDPase staining in addition to some changes in their morphology displaying an enlarged cell body with wider processes poorly ramified. Occasionally reactive microglial cells were found in clusters.

In conclusion experimental perinatal hypoxia in rats produced a well defined and transitory microglial response in the cerebral cortex. Similar changes in the hippocampus cannot be established.