

Arsenic Exposure During Early Postnatal Period Influences The Cytoarchitectural Features And Calcium Binding Protein Expression In Rat Nervous System

Dhar P (1), Mehra RD (1). 1. Department of Anatomy, All India Institute of Medical Sciences, Delhi, India

Objective: The present study was planned to evaluate the effects of sodium arsenite exposure during early postnatal period on cytoarchitectural features and calcium binding protein expression in cerebellum and hippocampus of rat. **Methods:** Aqueous solution of sodium arsenite in different dosages (1.0, 1.5 and 2.0 mg/kg body weight) was administered to Wistar rat pups (experimental groups II, III and IV) from postnatal day (PND) 4 to 10 by intraperitoneal (i.p.) route. The control group (I) received distilled water by the same route for the same period of time. At the end of the experimental period, the animals were perfusion fixed with 4% paraformaldehyde. The whole brain was dissected out and the hindbrain was separated at the level of inferior colliculus. After secondary fixation, the tissue blocks were processed for wax embedding (n=6/group) and cryopreservation for subsequent cryosectioning. The paraffin sections obtained from the cerebellum and hippocampus (8 μ m) were stained with Cresyl violet and observed under the microscope for cytoarchitectural features. The cryostat sections from the same regions (25 μ m) were subjected to routine immunohistochemical staining using monoclonal primary antibodies against calcium binding proteins- parvalbumin (anti parvalbumin) and calbindin (anti calbindin D28k) (Sigma Chemicals). The cytoarchitectural features and the pattern of immunoexpression of the calcium binding proteins was observed in the experimental animals and compared with that in control animals. **Results :** The cytoarchitectural observations revealed features of faulty migration and delayed maturation of purkinje cells in cerebellum and degenerative changes in pyramidal cells of hippocampus (cornu ammonis) in experimental animals. A differential expression of calcium binding proteins was observed in these regions of the brain. **Conclusion :** The qualitative and quantitative observations of the present study point towards developmental toxicity of sodium arsenite exposure during early postnatal period on rat nervous system.