

Acrylamide-Induced Thoracic Spinal Cord Axonopathy

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Abstract : This study was conducted to determine the neurotoxic effects of different doses of ACR on the thoracic axons of the spinal cord of rat. To evaluate this hypothesis in the thoracic axons, amino-cupric silver staining technique of the de Olmos was conducted to define the histopathologic characteristic (argyrophilia) of axonal damage following ACR exposure. For this purpose 60 adult male rats (Wistar, approximately 250 g) were selected. Rats were housed in polycarbonate boxes as two per each. Randomly assigned groups of rats (10 rats per exposure group, total 5 exposure groups as A, B, C, D and E) were exposed to 0.5, 5, 50, 100 and 500 mg/kg per day×11days intraperitoneal injection (IP injection) respectively. The remaining 10 rats were housed in group (F) as control group. Control rats received daily injections of 0.9% saline (3ml/kg). As indices of developing neurotoxicity, weight gain, gait scores and landing hindlimb foot splay (LHF) were determined. Weight gains were measured daily prior to injection. Gait scoring involved observation of spontaneous open field locomotion, included evaluations of ataxia, hopping, rearing and hind foot placement, and hindlimb foot splay were determined 3-4 times per week. Gait score was assigned from 1-4. After 11 days, two rats for silver stain, were randomly selected, dissected and proper samples were collected from thoracic portion of the spinal cord of rat. Results did show no neurological behavior in groups A, B and F, whereas severe neurotoxicity was observed in groups C and D. Rats in groups E died within 1-2 hours due to severe toxemia. In histopathological studies based on the de Olmos technique no argyrophilic neurons or processes were observed in stained sections obtained from the thoracic portion of the spinal cord of rats belong to groups A, B and F, while moderate to severe argyrophilic changes were observed in different stained sections obtained from the thoracic portion of the spinal cord of rats belong to groups C and D.

Keywords : acrylamide, rat, axonopathy, argyrophily, de Olmos

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