

Analysis of renal ultrastructure in acute intoxicated mice with Cadmium.

L. Marcano., I. Carruyo., X. Montiel.

Universidad del Zulia. Facultad Experimental de Ciencias. Departamento de Biología. Maracaibo - Zulia – Venezuela.

In the present exists a great interest to study the effects of heavy metals on the organisms because these elements have increased with the development of the modern industry. Among the inorganic pollutants present in the ecosystems, the cadmium presents particular characteristics that take it to consider like one of the most dangerous from the point of view of the environmental contamination (1). This work makes an analysis of renal ultrastructure in acute intoxicated mice with Cadmium. Male mice (*Mus musculus*), weighting between 22 and 24 gr., were divided in 3 groups of 20 mice each one: Group I (control) with ingest administration of water by 100 days. Group II and III, with ingest administration of CdCl₂ 100 ppm and 150 ppm respectively by 100 days. The animals were sacrificed after experimental proceedings and samples of kidney of each animal were fixed and processed by standard methods for electron microscopy studies and embedded in Epon 812. Fine cuts of 60 nm thickness were carried out, contrasted with acetate of uranyl and citrate of alkaline lead and observed in an electron microscope Hitachi H-7000. The analyses of micrographs show alterations in the cells treated. In Fig. 1 normal glomerulus and tubules it present; Fig. 2 Show glomerulus treated whit Cd⁺² (100 ppm), it observed irregular basal membrane with loss pedicels and alteration of cellular architecture illustrate in details in fig 3, characterized by great vacuolization of cytoplasm, alteration of mitochondria, dilatation of cisterns of the RE with loss of ribosome of the RER. In addition, occasionally intramembranous deposits show fingerprinting type substructure. In the cadmium treated cells to 150 ppm, similar but more severe changes were observed, whit presence of multivesicular bodies and cellular detritus zones (Fig, 4). Some cells show necrotic characteristic with tumefaction and fragmentation nuclear (cariorrexis) (Fig. 5). The obtained results allow us to suggest that cadmium induced a citotoxic effects in the cell population, possibility inducing changes in the permeability of the plasmatic membrane (2), associate to a production of superoxide radicals (activated oxygen), with formation of lipid peroxide which could be converted into lipid free radicals that generate lesions of cell membranes. (3).

References.-

1. OSHA. Std. 29CFR. 1910-1927. 1992.
2. Koizumi, T., et al. Toxicology. 114:125 - 134. 1996.
3. Shaikh, Z., et al. Toxicol. Appl. Pharmacol. 154: 256-263. 1999

Acknowledgments.-

This work was financed by the Consejo de Desarrollo Científico y Humanístico de la Universidad del Zulia. We thank TSU. Pedro Salas, Unidad de Microscopía Electrónica. Universidad Francisco de Miranda. (UNEFM). Coro-Falcon-Venezuela, for this assistance technique.

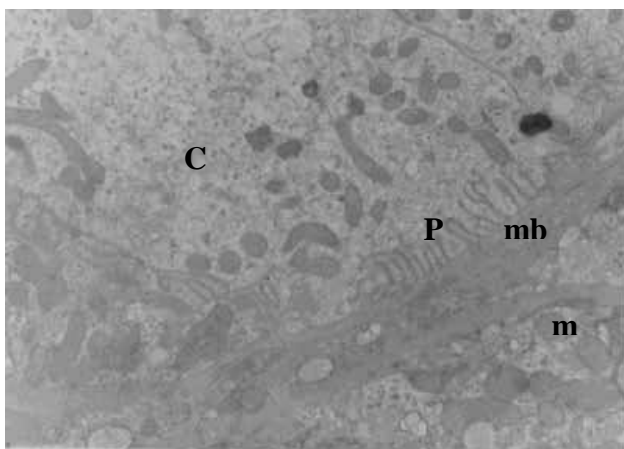


Fig 1.- Ultrastructure of normal glomerulus showing basal membrane (mb), pedicels (P), cytoplasm (C), mitochondria (m). 10.000 X

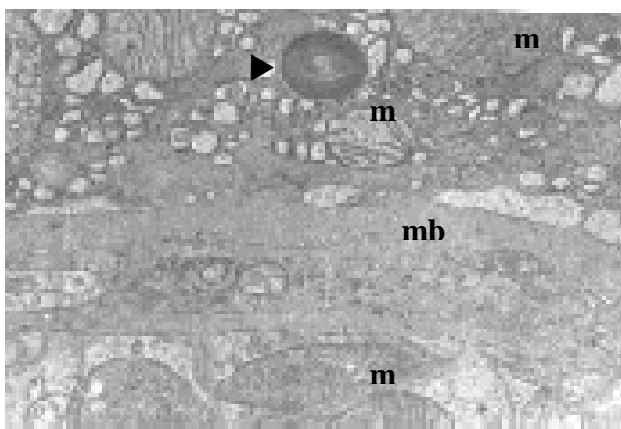


Fig 2.- Glomerulus treated whit Cd⁺² 100 ppm, it show irregular basal membrane (mb) with alteration of cellular architecture, mitochondria (m), deposits fingerprinting type (▶). 8.800 X

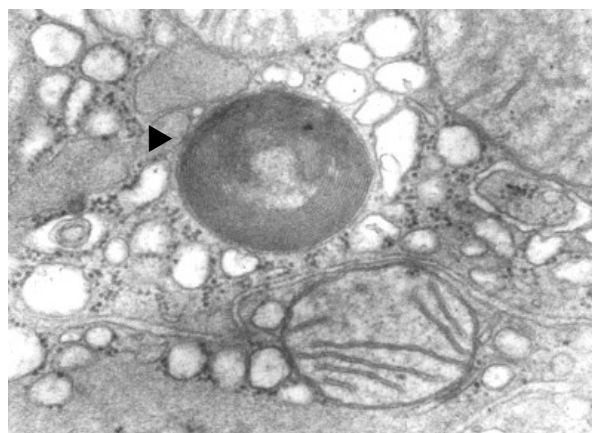


Fig 3.- Details fig. 2; it point up vacuolization of cytoplasm; dilatation of cisterns of the RE, with loss of ribosome of the RER; intramembranous deposits fingerprinting type (▶). 37.500 X

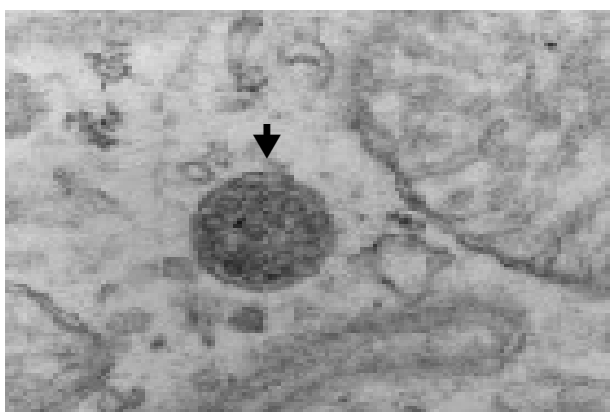


Fig 4.- Cells treated whit Cd⁺² 150 ppm.- Similar but more severe changes were observed whit presence of multivesicular bodies (▼) and cellular detritus zones. 33.000 X

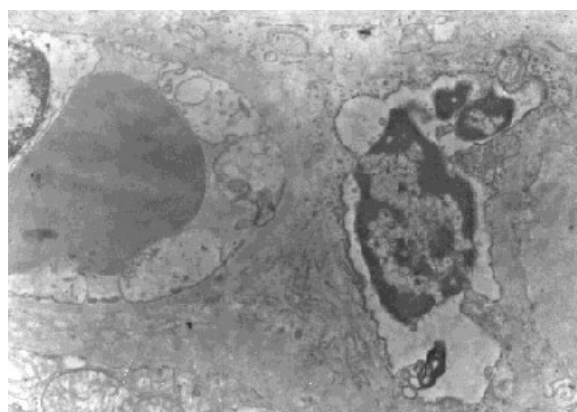


Fig 5.- Cells showing necrotic characteristic with tumefaction and fragmentation nuclear (cariorrhexis). 10.000 X.

