

Light and electron microscopy study of radioinduced injuries in rat cortex kidney vs. dose rate of irradiationL. Labejof^a, P. Galle^a, M.I. Severo^a, A. De Oliveira^b and J. Ferreira^a^a *Universidade Estadual de Santa Cruz, rod. Ilhéus itabuna, km 16, 45 650-000 Ilhéus/BA, Brazil;* ^b *Universidade Federal de Minas Gerais,, Laboratory of Nuclear Engineering, 311110-060 Belo-Horizonte/ MG, Brazil**llabejof@uesc.br*

In order to describe radiation induced alterations of renal cell morphology, adult rats were whole-body exposed to 60-cobalt gamma rays at various doses (1, 2, or 4 Gy) and two dose rates (1 Gy/min or 1 Gy/h). 24 h or 48 h after irradiation, kidneys were take off and cortex fragments were fixed and embedded. Paraffin sections were used for light microscope study and TUNEL assay, and epon ones for conventional transmission electron microscope observations. Morphological changes in numerous tubules of irradiated samples were observed mainly in cells of proximal convoluted tubules (PCT) and not in distal ones (DCT), as nuclear and cytoplasm lesions. Epithelial cells containing round and small nucleus with homogenous condensed chromatin were detected in 1 Gy/min samples, which number increased with dose and post-irradiation time. Cells protuberances were seen in PCT lumen and identified as cellular proliferations. Damaged cells appeared TUNEL assay positives when compared to same serial histological cuts. Large tubular necrosis areas were seen only at 4 Gy dose, 1Gy/min dose rate and 48 h post-irradiation time that involved all tubules. Ultrastructural lesions were observed in cortex kidneys 24 h after irradiation at 2 and 4 Gy doses and 1 Gy/min dose rate, displaying all features of apoptotic process mainly in PCT isolated cells. Their appeared with dense cytoplasm that contains clusters of enlarged mitochondrias, numerous light vesicles and condensed heterogeneous chromatin within atypical shape nuclei. Others subcellular alterations of epithelial cells were seen only in 4 Gy-irradiated samples as brush border irregular microvilli. Some cellular fragments were detected inside the lumen of intact DCT containing recognizable organelles that we suppose to be apoptotic bodies of injured PCT cells. When compared to controls, glomeruli changes were induced at 1 Gy/h dose rate, 24 h after exposition for the two doses of irradiation as detachment of enlarged podocytes from basal membrane, hypertrophy of mesangial cells, damaged endothelial cells and vacuolization of the parietal leaflet.