

Indirect immunofluorescence study on the cytoskeleton of normal (FG) and neoplastic (SGS/3A) Cadmium treated fibroblasts

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SUMMARY

Cadmium is a heavy metal dangerous for the environment and for the human health, with well shown carcinogenic potentiality. Many studies have related the professional exposure of the Cadmium with human pulmonary, prostatic and renal tumors, and it would be a role also in the tumors of the liver, of the hemopoietic system, of the bladder and of the stomach. The aim of the current study is to examine in normal and neoplastic fibroblasts culture cells the modifications induced by the Cadmium at cellular level, in particular on the cytoskeleton, responsible not only of the intracellular transport of vesicles and cell organules, but also of their positioning and of the cellular integrity. Two fibroblastic cellular strains, normal (FG) and neoplastic (SGS/3A), have been incubated in a 5 μ M Cadmium acetate added medium for 1, 8, 24 hours and studied by indirect immunofluorescence methods, particularly for the following proteins: Actin, Tubulin and Vimentin. The observations show in normal and neoplastic fibroblasts comparables modifications and anomalies of cytoskeletal shape. In both the cases the cellular morphology suffers drastic modifications, gradually evolving through intermediary shapes: from triangular and spindle-shaped in the normal fibroblasts to irregular, star-shaped, and globular in the neoplastic ones. The Cadmium action on the morphology of the normal and tumoral cells changes according to the time of incubation, producing structural alterations of the cytoskeletal. The modifications that start to be observable at the first hour of incubation are more evident after the eighth hour of exposure, reaching the maximum expression at the twenty-fourth hour, often with reduction of the total volume of the cells and loss of their ability to adhere to the substratum. Such modifications can be related to great alterations of the cellular membrane, producing the change of shape and the progressive partial separation from the substratum. The intermediary filaments seem to be less sensitive, from a morphological but not functional point of view, to the action of the Cadmium in comparison to the Actin and the microtubules that, on the contrary, seem to lose their proper morphological characteristics.