عنوان مقاله:

Cadmium chloride treatment of rats significantly impairs membrane integrity of mesenchymal stem cells via electrolyte imbalance and lipid peroxidation, a possible explanation of Cd related osteoporosis

محل انتشار:

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نویسندگان:

Mohammad Husein Abnosi - *Department of Biology, Faculty of Sciences, Arak University, Arak, Iran*

Someyeh Golami - *Department of Biology, Faculty of Sciences, Arak University, Arak, Iran*

خلاصه مقاله:

Objective(s): Bone marrow mesenchymal stem cells (MSCs) play an important role in bone health. Cadmium causes osteoporosis, but the exact mechanisms of its effect on MSCs are not known. Materials and Methods: Rats were treated with cadmium chloride (۴۰ mg/l) in drinking water for six weeks, and then the biochemical and morphological studies on MSCs were carried out as a cellular backup for osteoblasts. Viability and proliferation properties of the cells were evaluated using MTT assay, trypan blue, population doubling number, and colony forming assay. Morphology of the cells and biochemical parameters including activity of metabolic (ALP, AST, and ALT) and antioxidant enzymes (SOD, CAT, and POX) as well as the MDA level (as an indication of lipid peroxidation) were investigated. In addition, intracellular calcium, potassium, and sodium content were estimated. Data was analyzed statistically and P Results: The results showed a significant reduction in viability and proliferation ability of extracted cells when compared to the controls. In addition, it was revealed that the cadmium treatment of rats caused a significant reduction in nuclear diameter and cytoplasm area. Also, there was significant increase in (ALT) and (AST) activity and intracellular calcium and potassium content but no change was observed with sodium content and ALP activity. The results showed [a] significant reduction in the antioxidant enzyme activity and increases in the MDA level. Conclusion: Based on the present study, reduction of viability and proliferation ability of MSCs might be a causative factor of osteoporosis in .industrial areas

کلمات کلیدی:

Alanine transaminase, Aspartate transaminase, Lipid Peroxidation, MSCs, Proliferation, Viability