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CISPLATIN AND DEXAMETHASONE SEPARATE AND COMBINED ACTION ON LIPID PEROXIDATION IN NUCLEAR FRACTIONS OF RAT BRAIN AND KIDNEY CELLS

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ABSTRACT

It is well known, that antitumor drug cisplatin is an antineoplastic drug which widely used in chemotherapy. However, the usage has been limited due to cisplatin-caused various side effects. It has been established that toxic effects of cisplatin are the result of oxidative stress. Oxidative stress is the result of the excessive formation of reactive oxygen species, that can be induced by cisplatin.

The reactive oxygen species in turn can interact with DNA, lipids and proteins, leading to lipid peroxidation and DNA damage.

Dexamethasone is being used in chemotherapy practice as concomitant agent to mitigate the side effects of antitumor drug cisplatin. It is known that both cisplatin and dexamethasone are capable of stimulating the production of reactive oxygen species, which in turn target various biomolecules, including lipids.

The aim of this study was to evaluate the quantitative alterations in lipid peroxidation products within the nuclei of cells from various rat tissues following the separate and combined administration of cisplatin and dexamethasone.

The amount of lipid peroxidation products was determined using a spectrophotometric method, following extraction with a heptane- isopropanol mixture. When administered individually, cisplatin and dexamethasone increase the formation of lipid peroxidation products in the examined tissues of rats to varying degrees.

As a result, these alterations led to corresponding changes in the oxidation index values of the analyzed nuclear preparations. During the combined administration of cisplatin and dexamethasone, some antagonistic effects were observed in the actions of these agents. Contrary to the expected synergistic enhancement of lipid peroxidation processes, a reduction in cisplatin's effect by dexamethasone was observed.

Thus, it is hypothesized that such antagonistic effect of dexamethasone together with its anti-inflammatory and immunomodulatory properties allows to mitigate the side effects of cisplatin.

KEYWORDS: cisplatin, dexamethasone, lipid peroxidation, unsaturated fatty acids, diene conjugates, triene conjugates, oxidative index.

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