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Estimation of redox potential of novel Pt(IV) complexes in the blood of rats

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Pt(IV) complexes offer the potential to overcome the cancer cell resistance to the most commonly used chemotherapeutic drug, cisplatin, with possible reduced adverse effects on healthy tissues. Novel Pt(IV) complexes with some esters of ethylenediamine-N,N'-di-S,S-(2,2'-dibenzyl)acetic acidpreviously showed cytotoxic effect stronger than cisplatin on chronic lymphocytic leukemia cells, but also a hepatotoxic effect. The present study investigates the effects of three novel Pt(IV) complexes containing ethyl-, propyl- and butyl-esters of the ethylenediamine-N, N'-di-S, S- (2,2'-dibenzyl) acetic acid compared to cisplatin, on hematological and oxidative stress parameters measured in the blood of rats. The 30 rats were randomly divided into five groups. Experimental groups received a single dose of Pt(IV) complexes (10 mg/kg) or cisplatin (7.5 mg/kg) intraperitoneally, while the control group received saline in the same manner. All three investigated complexes caused changes in measured hematological parameters. A decrease in the eythrocytes, hemoglobin, and hematocrit values and increase of mean cell volume, mean cell hemoglobin, mean cell hemoglobin concentration, and red cell distribution width compared to control were recorded. Cisplatin provoked an increase only of mean cell hemoglobin, mean cell hemoglobin concentration, and red cell distribution width. Further, used complexes significantly elevated the production of $O_2^{\cdot-}$, lipid peroxides and GSH, while the concentration of NO_2^- and H_2O_2 were decreased. Cisplatin also caused disturbance of redox homeostasis, but did not significantly increase the production of lipid peroxides and GSH. Investigated complexes showed stronger prooxidative potential than cisplatin. The obtained results indicate the ability of novel Pt(IV) complexes to induce oxidative stress in erythrocytes, leading to their dysfunction and destruction. These findings may be useful in further researches involving elucidation of the mechanisms of action of novel Pt(IV) complexes.

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