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Changes in the activity of various platelet antiplatelet agents when exposed to a high-intensity pulsed magnetic field

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Abstract

Pulse magnetic fields are widely used in modern technology. We studied the antiaggregation properties of pentoxifylline and aspirin irradiated by a pulsed magnetic field at certain parameters: intensity H, frequency f, number of pulses n. The impact of a pulsed magnetic field was carried out both on powdered and dissolved drugs in solution.

The aim of the study is to study the effect of high-intensity PMF on the antiplatelet activity of pentoxifylline and aspirin

Evaluation of the anti-aggregation effect was carried out using the method of thromboelastography. on a TEG 5000 apparatus. In the analysis of thromboelastograms, the general coagulation tendency was, the functional activity of platelets and fibrinogen, the activity of fibrinolysis, and the physicomechanical properties of the formed clots were determined. Since thrombosis poses a threat to human health, today the use of antiplatelet agents for the prevention of cardiovascular disease is beyond doubt.

It was found that exposure to a pulsed magnetic field causes significant changes in the antiplatelet activity of only the pentoxifylline molecule. The effect of PMF on the aspirin molecule has not been identified. This is due, in one hand, to a significant difference in the structure of molecules, as well as to the reaction mechanism in which the studied antiplatelet agents are involved.

It can be predicted that the effect of pulsed fields on drugs, which are heterocyclic compounds, antimetabolites, and competitive enzyme inhibitors, can enhance the biological effect of these drugs.

A hypothesis was put forward to increase the antiplatelet activity of pentoxifylline by exposure to PMF associated with a change in the conformation of the molecule and an increase in affinity for the active site of cAMP-phosphodiesterase.

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