

Study of Changes of Protein Carbonyl Content and Lipid Peroxidation Product in Blood of Rats Exposed to Decimeter Electromagnetic Radiation (460MHz)

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Abstract — Most used in physiotherapy physical factors has an electromagnetic nature. Initially, the therapeutic effect of electromagnetic radiation in a wide range of frequencies associated with activation of metabolic processes in the exposed tissues. The most highly-absorbing ultra high frequency (UHF) energy of tissues are the blood, lymph, parenchymatous tissue, muscles. One of the most important factors in the mechanism of biological effects of electromagnetic radiation may be their effect on free radical processes. This mechanism may be mediated by a free radical chain process including lipid peroxidation (LPO). The effect of free radicals on different types of proteins leads to complicated modifications in the structure of the protein molecule and thus change its physico-chemical and biological properties. In this paper, we studied the changes in the protein carbonyl levels and lipid peroxidation in blood of rats chronically exposed to 460 MHz electromagnetic radiation up to 14 days (daily for 20 minutes at a power density 30 mW/cm² and 10 mW/cm²). The data obtained have shown that the content of Carbonyl derivatives of proteins in the plasma and blood serum is increased compared with control animals with high intensity, it is more pronounced in the serum. Also the ratio of Carbonyl derivatives in the serum and plasma is more dramatic for irradiated organism, and in low intensity decreases compared to the control. A content of malondialdehyde in high radiation intensity is increased compared to control, and at lower radiation intensity is decreased.

Keywords—protein carbonyl, lipid peroxidation, malondialdehyde, electromagnetic radiation, plasma, serum