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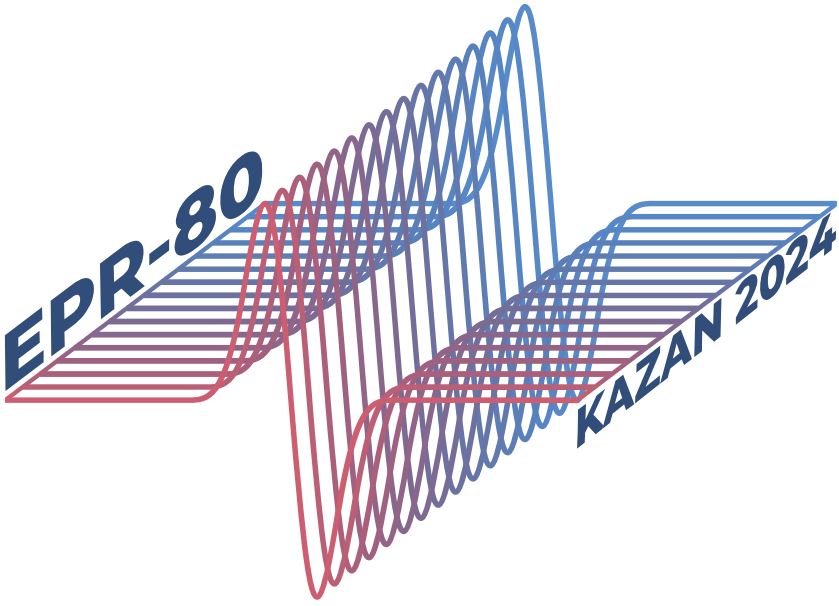

BOOK OF ABSTRACTS

Effect of motor activity restriction on copper content in rat liver

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One of the most important trace elements for the normal functioning of the human body is copper. Copper is involved in cellular respiration, iron metabolism, neurotransmitter production, pigment formation, connective tissue biosynthesis, hormonal regulation, and immune disorders. Copper is a constituent of many essential enzymes such as ceruloplasmin, cytochrome oxidase, tyrosinase, ascorbinase, amine oxidase [1, 2]. Copper is involved in the body's antioxidant defense system, being a cofactor of the enzyme superoxide dismutase (SOD) [2-6]. SOD is an essential component of the antioxidant system. Modern living conditions lead to a decrease in the share of physical activity at work and at home. Limitation of motor activity is caused by automation and mechanization of work, professional activity, long bed rest, lifestyle. Physical activity and motor activity constitute a biological necessity for human life and health. The problem of changes in physiological functions and mechanisms of their development of the growing organism in conditions of reduced motor activity has acquired great relevance. Given the vital role of copper in organisms, accurate regulation of copper content is critical to maintaining homeostasis in living organisms. In connection with a significant decrease in physical activity, especially in school-age children, it is relevant to study the effect of restriction of motor activity on the growing organism. The aim of the study was to investigate the intensity of copper formation in liver tissues of growing rats after restriction of motor activity. Electron paramagnetic resonance (EPR) spectroscopy was used to detect and quantify copper in liver samples. The copper content in the liver of rats after 30-day restriction of motor activity was studied by EPR spectroscopy. To simulate increasing restriction of motor activity, rats were kept in individual pen cages for 30 days starting at 21 days of age; the details of this method have been described by us previously [7]. The copper content in rat organs was determined by a technique developed at the Institute of Chemical Physics of the Russian Academy of Sciences by Prof. A.F. Vanin and coworkers, which uses the spin capture method. The details of the experiment and methodology have been described by us previously [8, 9]. Components of the spin trap were administered to anesthetized animals. As anesthesia we used 25% urethane solution at the rate of 800 mg/kg of animal weight, which was administered intraperitoneally. All drugs used by us were diluted in physiological solution. Measurements of the spectra of a complex of biological samples Cu^{2+}-$(DETC)_2$ was performed on a Bruker X-band spectrometer (9.5320 GHz) EMX/plus. The amount of Cu was estimated by the intensity of the characteristic EPR signal belonging to the Cu^{2+}-$(DETC)_2$ complex. It was found that after restriction of motor activity for 30 days there is an average 3-fold increase in copper content in liver tissues ($p<0.05$). The increase of copper content at restriction of motor activity allows us to conclude that

there is a close relationship between the level of copper in the body and the mode of motor activity.

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