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P 22 EPR study nitric oxide production in rats spinal cord and heart after disorders of moving activity (hypokinesia and spinal cord injury)

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Investigations of influence of hypokinesia (restriction of moving activity) on the organism is the actual problem of physiology. The restriction of moving activity leads to morphofunctional changes in basic life-supporting systems and affects the cell genetic apparatus. During hypokinesia (HK) locomotor apparatus changes most significantly. Restriction of muscle activity is one of the most important components of symptoms of hypokinetic syndrome. The problems associated with the HK are significant at a number of diseases, first of all at spinal cord injury. Heavy spinal injury, complicated by spinal cord injury in the form of its compression, crush zone, a partial or complete tear, remains one of the most urgent medicosocial problems, because it leads to deep disability. High frequency of spine-spinal cord injury combined with the complexity of the pathogenesis of traumatic disease of spinal cord, and the current lack of adequate methods of treatment and rehabilitation of patients with consequences of severe injuries of spinal cord endure this problem beyond the purely medical aspects. There are evidences that suggest that NO actively participates in the processes of neuronal damage in trauma of spinal cord and in HK. However, at present there is no common opinion about the role of NO in the formation of HK and in the pathogenesis of traumatic disease of spinal cord. Therefore the study of the dynamics of the content of NO in the tissues of the heart, liver, brain and spinal cord at different stages of formation of the HK and pathogenesis of traumatic disease of spinal cord is very important.

The studies were conducted on white laboratory mongrel rats breeding herd. Using the method of EPR spectroscopy, studied the content of NO in the tissues of the heart, liver, brain and spinal cord were carried out. The complex of Fe²⁺ with diethyldithiocarbamate (DETC) - (DETC)₂-Fe²⁺-NO was used as a spin trap. Registration of signals from prepared samples was conducted on the X-band BRUKER EPR spectrometers EMX/plus and ER 200E SRC. We have found that the amount of NO produced in the tissues of the ventricles and atria of the heart and the liver after 30, 60, and 90 days of HK increases in 2-3 times. It was also shown that in 3 days after injury of spinal cord the level of NO production in tissues of spinal cord was 3 times higher than that for intact animals. Later on some decrease of the production level is observed, but it still remains about 2 times higher than the reference values.

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