PHASE CHANGES IN THE PATTERN OF RESPIRATION, ENERGY METABOLISM AND LUNG INJURY IN EXPERIMENTAL PNEUMONIA AND ITS CORRECTION

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Recently, the search for possible means capable of minimizing the consequences of lung damage in pneumonia has become more and more relevant. One such agent could be cerium oxide nanoparticles (nanocerium), which are being tested as a drug with an antioxidant effect. In rats with experimental pneumonia unduced by intratracheal administration of bacterial lipopolysaccharide (LPS), we found the phase nature of metabolic changes. The hypometabolic phase lasted up to 14 days and was accompanied by isoventilator rearrangement of respiratory pattern, decrease in alveolar ventilation and respiratory efficiency. After a short transitional phase, a hypermetabolic phase developed, which was characterized by a significant increase in energy metabolism, a reverse restructuring of the breathing regime, gas exchange, and an increase in respiratory efficiency. On the 28th day, an adaptation phase was observed, but pattern of breathing and gas exchange were reduced. Under correction with nanocerium, a reliable leveling of phase changes of energy metabolism was observed, in particular, the fall of metabolism during the hypometabolic phase was limited. Experimental correction also reduced morphological signs of inflammation in the lungs. Thus, nanocerium can be a promising drug for the correction of metabolic and inflammatory changes in pneumonia.