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THE ROLE OF PROTEOLYSIS IN LUNGS HEALING PROCESSES AFTER INFLAMMATION AND THEIR REMODELING

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Background. The processes of proteolysis play an important role in the development of broncho-pulmonary pathology. The role of proteases in process of lung inflammation and destructive diseases due to less control of the proteolysis inhibitors has been investigated rather thoroughly. However, the mechanisms of recovery and reconstruction of the lungs after acute and chronic inflammation at the level of cellular and molecular interactions have been studied extremely poorly. The aim of the study was to explore the character of the reactions of processes of proteolysis in the lungs at different stages of recovery after experimental inflammation and the possibility of their remodeling using various methods of treatment.
Design. Experiments were carried out on 83 male rats of Wistar line. Acute (2 weeks) and chronic (2 months) pneumonia was simulated, using an obstructive model of inflammation. Recovery processes in the lungs were studied for a month after elimination of the etiological factor. Drug correction of inflammation in the lungs was performed using an antibiotic, nonsteroid anti-inflammatory drug and including a specific correction with proteinase inhibitors and antioxidants. Indicators of protease-inhibitor system of blood serum and bronchoalveolar lavage (BAL) were assessed by the level of elastase-like (ELA) and trypsine-like (TLA) activities and that of acid-stable inhibitors (ASI) and acid-nonstable antitrypsine activity (ATA).
Results. In the process of recovery after acute inflammation, indicators of proteinase-inhibitory system of blood serum became almost normal, changes characteristic of inflammatory reactions persisting in the BAL. 2 weeks after the elimination of the etiologic factors there was nearly doubled increase in activity of ELA and ASI. There was no complete normalization of indices in either blood or BAL during a month after recovery of chronic inflammation. Particularly marked changes were observed in BAL, where there were still high values of ELA and TLA, and increased of the ATA. Experimental correction of inflammation in the lungs with anti-inflammatory and antibiotic drugs reduced the inflammatory manifestations in the blood serum, but had almost no effect on the decrease in ELA and TLA in BAL. Using proteolytic inhibitors with antioxidants to treat experimental pneumonia led to less inflammatory manifestations in the lungs and decrease in the activity of specific proteases in both blood serum and BAL.
Conclusion. Thus, changes in indicators of protease-inhibitor system in BAL in the recovery process after the development of lung inflammation are preserved for a longer time than the changes in the blood. In chronic inflammation, the persisting increased activity of proteases may contribute to the further formation of destructive changes in the lungs. The use of anti-inflammatory and antibiotic therapy does not reduce the activity of proteases, whereas the use of protease inhibitors on the background of antioxidants leads to the correction of local

changes in protease-inhibitor system. The results suggest possible perspectives of correction of protease-inhibitor system in patients with inflammatory pathology of the lungs.

Keywords: proteases, protease inhibitors, pneumonia, recovery