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PROFIBROTIC MCP-1 AND ANTIFIBROTIC METALLOPROTEINASES IN EXPERIMENTAL CARRAGEENAN-INDUCED GASTROENTEROCOLITIS

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Introduction. Carrageenan (E407) is a heteropolysaccharide extracted from red algae that is used as a thickener in food industry. However, it has been reported that this food additive is able to induce inflammatory processes, including chronic gastroenterocolitis. Chronic inflammation is known to be associated with the development of fibrosis. Thus, the aim of our research was to study the content of profibrotic chemokine monocyte chemoattractant protein-1 (MCP-1) and antifibrotic metalloproteinase-2 (MMP-2) and metalloproteinase-9 (MMP-9) in blood serum of rats with chronic carrageenan-induced gastroenterocolitis.

Materials and methods. Twenty white WAG rats participated in the experiment. They were divided into two groups. The first control group consisted of intact healthy animals (n=10). The second group included animals with chronic carrageenan-induced gastroenterocolitis, which had been caused by oral intake of 1% carrageenan solution in drinking water during four weeks (n=10). The development of the disease was confirmed histologically. The levels of MCP-1, MMP-2, and MMP-9 in blood serum of rats were determined by ELISA. The GraphPad Prism 5 application was used to process the data obtained in the experiment. The provisions of the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (Strasbourg, 1986) were strictly followed while carrying out our experiment.

Results. It was found that the MCP-1 concentration in rats with gastroenterocolitis was 527.3 ± 13.54 pg / ml, i.e. 10.5-fold higher compared to the control group, which indicated the activation of fibrosis. The levels of MMP-2 and MMP-9 were 1.6 and 3.6 times higher in animals with chronic gastroenterocolitis than in the control group. MMP-2 and MMP-9 are proteolytic enzymes that have collagenase activity and are involved in degradation of extracellular matrix. Therefore, their elevation compensates for the activation of profibrotic MCP-1.

Conclusions. The pronounced increase in MCP-1 concentration against the background of the slight activation of MMP-9 and MMP-2 in blood serum of rats with chronic carrageenan-induced gastroenterocolitis indicates the inadequacy of compensatory mechanisms and the development of sclerosis.