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Cell immunity parameters in *K. pneumoniae* experimental generalized pyo-inflammatory process

Abstract. The study of the immune system in pyo-inflammatory process caused by *K. pneumoniae* set the development of an immune response that is activated by the humoral link (significant increase in the content of B-cells, IgM) and suppressed by T-cell level (significant reduction of populations of T cells - CD3+, CD4+, CD8+). There is also a suppression of nonspecific resistance such as a significant reduction of neutrophils (CD18+) and phagocytes (CD11β+).

Key words: *K. pneumoniae*, pyo-inflammatory process, immune response.

Background. Modern data of the immune functional system state in pyo-inflammatory process caused by *K. pneumoniae* are mixed, sometimes describe

various, even opposite changes of parameters in some patients. The absolute number of B-lymphocytes in the peripheral blood under mentioned condition often substantially not changed, although some researches indicate an increase¹ or reduction of the index in the active period of disease. Proliferative activity of circulating B-lymphocytes is decreased². Synthesis of immunoglobulins in pyoinflammatory process, caused by *K. pneumoniae*, is activated, a high level of gamma globulins is registered. Long-term high increase of IgM may show a persistent antigenic stimulation or disorders in regulatory shift mechanisms of antibody synthesis³.

Materials and methods. Experimental model of generalized pyoinflammatory process⁴ was conducted on mice, male, inbred line C57Bl/J6Sto, weigh 20-22 g, which were under a standard laboratory conditions and nutrition. We used septic toxicological model of peritonitis adapted for *K. pneumoniae*. All painful procedures were performed under the European Convention for the Protection of vertebrate animals used for experimental research or other scientific purposes⁵. Immune cells were determined using monoclonal antibodies of company Serotec, levels of immunoglobulins were detected in ELISA. The percent of cells that glow in fluorescent microscope (lens x90) was evaluated when viewing 200-300 cells. Identification of lymphocytes was performed by "phase contrast". Digital data were processed by methods of variation statistics.

Results. Obtained results revealed inhibition of T-cell immunity, a significant decline in CD3+ ($24,9 \pm 2,3$ %), CD4+ ($19,7 \pm 1,5$ %), CD8+ ($21,9 \pm 2,3$ %) in infected animals compared to control group and activation of B-cell production, due to the influence of virulence factors of *K. pneumoniae*. Activation of B-cell immunity leads to increased production of IgM. Comparing of blood indicators in

¹ Иммунологические методы исследований / Под ред. И. Лефковитса, П. Пернуса; пер. с англ. // Швейцария. Базельский ин-т иммунологии. – М.: Мир, 1988. – 527 с.

² Змушко Е.И., Белозеров Е.С., Митин Ю.А. Клиническая иммунология: Руководство для врачей. – С-Пб: Питер, 2002. – 576 с.

³ Дранник Г.Н. Клиническая иммунология и аллергология. – Одесса: Астропринт, 2010. – 604 с.

⁴ Першин Г.Н. Методы экспериментальной химиотерапии: Практическое руководство. – М.: Медицина, 1971. – 539 с.

⁵ European Study on Community-Acquired Pneumonia Committee. Guidelines for management of adult community-acquired lower respiratory tract infections // European Respiratory Journal. – 2006. – №11. – P. 986 - 991.

both groups of mice such as the level of CD11 β ⁺ (18,9 \pm 0,8 %) and CD18⁺ (26,9 \pm 1,8 %) showed that in pyo-inflammatory process caused by *K. pneumoniae* these indicators are decreased, so it can be explained by the action of capsular polysaccharide and cytolysin of *K. pneumoniae*.

Conclusions. Thus, the study of the immune system in pyo-inflammatory process caused by *K. pneumoniae* set the development of an immune response that is activated by the humoral link (significant increase in the content of B-cells, IgM) and suppressed by T-cell level (significant reduction of populations of T cells – CD3⁺, CD4⁺, CD8⁺). There is also a suppression of nonspecific resistance such as a significant reduction of neutrophils (CD18⁺) and phagocytes (CD11 β ⁺).

Further research may be related to the development of schemes of combine therapy for the correction of the immune state in pyo-inflammatory process caused by *K. pneumoniae*.

References:

1. Иммунологические методы исследований / Под ред. И. Лефковитса, П. Перниса; пер. с англ. // Швейцария. Базельский ин-т иммунологии. – М.: Мир, 1988. – 527 с.
2. Змушко Е.И., Белозеров Е.С., Митин Ю.А. Клиническая иммунология: Руководство для врачей. – С-Пб: Питер, 2002. – 576 с.
3. Дранник Г.Н. Клиническая иммунология и аллергология. – Одесса: Астропринт, 2010. – 604 с.
4. Першин Г.Н. Методы экспериментальной химиотерапии: Практическое руководство. – М.: Медицина, 1971. – 539 с.
5. European Study on Community-Acquired Pneumonia Committee. Guidelines for management of adult community-acquired lower respiratory tract infections // European Respiratory Journal. – 2006. – №11. – P. 986 - 991.