

Abstract

Although the relationship between the effects of cold and infection has been studied for a long time, the mechanisms contributing to this phenomenon have not yet been discovered. While short-term exposure to cold triggers a stress response and the production of proinflammatory cytokines, long-term cold exposure induces adaptation and anti-inflammatory shift. The role of cold adaptation in the development and the process of the organism's response to infection remains an unresolved issue. In this diploma thesis, we focused on determining the effect of cold stress or cold adaptation on the immune system of rats which was stimulated by ligands of Toll-like receptors (TLRs). The obtained results showed the importance of $\gamma\delta$ T lymphocytes and their cytokine production in the process of cold adaptation. To determine how cold adaptation affects the response to infectious agents, we studied changes in the proportion of different immune cell populations in rats treated with the TLR2/6 ligand Pam2CSK4. We determined significant changes in the activation of myeloid cells and B lymphocytes, but also in the population of $\gamma\delta$ T lymphocytes. Our obtained results suggested the importance of $\gamma\delta$ T lymphocytes and the protective effect of cold adaptation.

Key words: immune system, cold stress, cold adaptation, infection, Toll-like receptors, Toll-like receptor ligands