

Abstract

Lung cancer is the leading cause of cancer mortality worldwide. Understanding biological processes of specific antitumor immune response remains of an eminent interest and represents necessity for designing successful antitumor immunotherapeutic strategies. The theoretical part of the thesis describes components of the immune system that are involved in antitumor response and discusses their role in the hitherto known and used lung cancer immunotherapy. In the practical part of the thesis, two studies studying different aspects of anticancer immune response are described. Both studies were conducted in cooperation with 3rd Surgical Department 1st Faculty of Medicine, Charles University and University Hospital Motol and with the biotechnology company Sotio a.s. The first study is focused on the humoral component of the specific antitumor response and prospectively analyses serum frequency of antitumor antibodies against NY-ESO-1, Her2/*neu* and MAGE-A4 antigens in 121 patients with NSCLC. Here it was shown for the first time that tobacco smoking significantly increases the frequency of NY-ESO-1 antibodies in sera of smokers in comparison to ex-smokers and non-smokers. The second study is focused on the cellular component of the specific antitumor response investigating the activity of the dendritic cell-based vaccine to present antigens of lung cancer cells killed by high hydrostatic pressure (DC-HHP vaccine) to T cells. High hydrostatic pressure (HHP) induces immunogenic death in tumor cells, which is crucial for induction of an effective antitumor immune response. DC-HHP vaccine displays mature dendritic cell phenotype, produces pro-inflammatory cytokines, increases the chemotactic migration and more importantly induces tumor-specific CD8⁺ and CD4⁺ T lymphocytes in blood of NSCLC patients.