ABSTRACT

The topic of the presented thesis is the regulation of gene expression level of the three HSP70 genes in mononuclear cells. We investigated the dependence of expression regulation (induction) abiliy on selected point mutations, so-called SNPs (single nucleotide polymorphism) in the observed genes. The mononuclear cells were obtained from peripheral blood samples of healthy individuals. In order to analyze their gene expression, we selected individuals who were homozygous for at least one of the monitored point mutations. Taking into account the chosen criteria for healthy individuals we based on interviews with these individuals and their personal history. We determined the polymorphisms observed in two cell stress-inducible HSP70-1 (HSPA1A) and HSP70-2 (HSPA1B) genes and in one constitutively expressed gene HSP70-Hom (HSPA1L). Further, we have analyzed HSP70s gene expression regulation and the relation between the expression regulation and studied polymorphisms. We determined the degree of regulation of a gene expression in the studied genes in relation to two SNPs -110A/C (rs1008438), +190G /C (rs1043618) gene HSP70-1, and two SNPs +1267A/G (rs1061581), +2074G /C (rs539689) of the HSP70-2 gene, and the mutation of one five-nucleotide (rs9281590) HSP70-2 gene, and one SNP +2437T/C (rs2227956) of the gene HSP70-Hom. We have finally reached the induction with a higher gene expression of HSP70-1 and HSP70-2 genes in experimental conditions. Moreover, we have found that also the HSP70-Hom expression can be induced in restricted range. We have not confirmed statistically significant differences in a gene expression in relation to their genotypes located in studied gene. However, we have found a statistically significant association between gene polymorphisms and regulation of the expression of genes they are locked of these gene polymorphisms.

Keywords: major histocompatibility complex (MHC), heat-shock protein of 70kDa in size (HSP70), single nucleotide polymorphisms (SNP), gene expression, induction of gene expression