

BSTR-31

Genotype-specific Cytokine Response of Human Cells to the Effects of Hydrogen Peroxide

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Background & Hypothesis:

Intensity and duration of cytokine activity may determine cellular redox status and course of pathological processes. We investigated the H₂O₂-induced pro- and anti-inflammatory cytokines profile in cultures of human peripheral blood lymphocytes in interrelation with genotype features of cells such as allelic variants of cytokine genes.

Methods:

Blood cells were cultured in an artificial medium which contained RPMI-1640, human serum, phytohemagglutinin. 10 mM H₂O₂ was used as an external adverse effect. Cellular redox state was defined by measuring of the quick flash intensity and the light sum of chemiluminescence. Concentration of *IL-1*, *IL-6*, *IL-10*, *TNF-α* was measured by using ELISA. Allelic variants of cytokine genes (*rs1143627*), (*rs1800795*), (*rs1800872*), (*rs1800871*), (*rs1800896*), (*rs1800629*) were identified by using allele-specific PCR.

Results:

The balance between pro- and anti-oxidant components ($r = 0,908$, $P < 0,05$) has been identified. The addition of H₂O₂ increased the concentration of *IL-6* and TNFα in fluid medium in comparison with the control group ($P < 0.05$). It was found that there is an association between the presence or absence of a polymorphic variant of the *IL-10* (*rs1800872*) and the level of *IL-6*.

Discussion & Conclusion:

The main function of *IL-10* is to inhibit an excessive synthesis of pro-inflammatory cytokines. According to this study, the presence of polymorphic variant *IL-10* gene correlates with decreasing *IL-6* concentration. Polymorphic variants of cytokine genes change the functioning of the interconnected and interdependent cytokine system and determine the individual character of the cell's reaction to external stimuli. Thereby, genotype-specific cytokine response of cells to external stimuli is not in doubt. This study was carried on the equipment of Center for collective use "High Technology"