

**Abstract:**

**Immune mechanisms in the pathogenesis of periodontitis**

Periodontitis is a multifactorial chronic inflammatory disease of teeth supporting apparatus. Risk factors are genetic predispositions, dental plaque bacteria and immune reactions. Development and regulation of immune responses depend on local production of cytokines and many other factors.

The aim of diploma thesis was to assess the risk factors of parodontitis by studying single nucleotide polymorphism (SNP) in genes for cytokines, SNP relationship to immunity regulation in comparison with clinical status of periodontium.

The aim of the first part of the study, was introduction of multiplex cytokines analysis by LUMINEX method and application of this method in clinical practice. The method provides quick determination of many cytokines' concentrations in sample with a small volume.

In our study we focused on cytokine production monitoring (IL-1 $\alpha$ , IL-1 $\beta$ , IL-4, IL-5, IL-10, IL-6, IL-8, TNF- $\alpha$ , IFN -  $\gamma$ ) after stimulation of mononuclear cells by mitogens, dental plaque bacteria (*Actinobacillus actinomycetemcomitans*, *Escherichia coli*, *Tannerella forsythensis* and Heat Shock Protein 60 (HSP) in relation to SNP in patients with chronic periodontitis.

In our study we confirmed that the SNP in cytokine genes influence the function of mononuclear cells. We found that mononuclear cells isolated from peripheral blood of patients with proved SNP IL-1 $\beta$  in position 3953 produced significantly decreased amount of IL-1 $\beta$ , IL-4, IFN- $\gamma$ , IL-6 and IL-10 (after stimulation by *A.a.*, *E. coli*, *T.f.* and HSP) and significantly increased amount of IL-5 (after stimulation by *A.a.*) and IL-8 (after stimulation by *P.g.*). All proved SNP IL-4 (IL-4 C/T in position - 589, C/T in position -33, IL - 4 intron3 in position -254 or -184) indicate higher production of IL-4 after the stimulation by all bacteria and HSP while significantly higher production of IFN-  $\gamma$  was confirmed after the stimulation with *E.coli*.

In this preliminary study we confirmed the significant role of T<sub>H</sub>2 lymphocyte subpopulation in periodontal disease.

Key words: chronic periodontitis, dental plaque bacteria, genotype, single nucleotide polymorphism (SNP), cytokines, multiplex analysis