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### Evaluation of oral application of a probiotic *Lactobacillus reuteri* strain in patients with chronic periodontitis

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**Background:** In earlier studies an antagonistic effect was demonstrated of *Lactobacillus* strains toward periopathogens (23rd ECCMID, Berlin, Germany, 2013, abstr. R2536). Therefore, this study aimed at evaluation of clinical indices (SBI, PPD, CAL) and pro-inflammatory cytokine response (TNF- $\alpha$ , IL-1 $\beta$  and IL-17) in gingival crevicular fluid (GCF) of patients with chronic periodontitis administered per os with a probiotic strain of *Lactobacillus reuteri*.

**Material/methods:** In the 38 adult patients with chronic periodontitis two weeks after performing the oral hygienization procedures clinical examination permitted to distinguish 2 groups of patients. In the 24 patients (group 1) by 2 weeks treatment with probiotic tablets containing *Lactobacillus reuteri* strain was conducted. In the remaining 14 patients no probiotic tablet treatment was applied (group 2 - control). From all patients in two terms, GCF was sampled using Hamilton syringes from all periodontal pockets. Estimation of TNF- $\alpha$ , IL-1 $\beta$  and IL-17 in GCF was performed using the ELISA method.

**Results:** After completion of the therapy with probiotic tablets, a significant reduction in levels of TNF- $\alpha$ , IL-1 $\beta$  and IL-17 has been noted in 18 (75%) patients forming the subgroup 1A. On the other hand, in the remaining 6 (25%) patients forming the subgroup 1B no clinical improvement has been detected and levels of estimated pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$  and IL-17) have not changed significantly. Moreover, levels of studied cytokines in patients of group 2, who did not obtain probiotic

tablets, were significantly higher as compared to patients of subgroup 1A, while they did not differ from the levels detected in the subgroup 1B. Results are presented in Table 1.

Table 1. Levels of TNF- $\alpha$ , IL-1 $\beta$  and IL-17 (pg/ml) in gingival crevicular fluid of patients in 1st and 2nd term of study.

Clinical indices	1st term of study		2nd term of study		
	Group 1 n = 24	Group 2 n = 14	Group 1 n=24		Group 2 n=14
			Subgroup 1A n = 18	Subgroup 1B n = 6	
TNF- $\alpha$ (pg/ml)	5.52 $\pm$ 0.94	5.42 $\pm$ 0.87	2.34 $\pm$ 0.87*	5.49 $\pm$ 0.84	5.27 $\pm$ 0.94
IL-1 $\beta$ (pg/ml)	20.74 $\pm$ 2.71	20.16 $\pm$ 2.46	6.83 $\pm$ 1.51*	19.86 $\pm$ 1.98	19.63 $\pm$ 2.21
IL-17 (pg/ml)	17.58 $\pm$ 3.23	17.23 $\pm$ 3.15	9.35 $\pm$ 1.71*	16.62 $\pm$ 2.29	15.93 $\pm$ 2.37

\* the difference between the 1st and the 2nd term is statistically significant in a given group of patients

**Conclusions:** The obtained results indicate that *Lactobacillus reuteri* exerts an immunomodulatory effect in patients with chronic periodontitis, reducing the pro-inflammatory cytokine response, which may result in an improvement of clinical periodontal parameters.