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**Title:** IL-4, IFN-gamma and TNF-alpha levels in serum of patients with COPD, bronchial asthma and GERD

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**Body:** Gastroesophageal reflux disease (GERD) is tightly linked to bronchial asthma and COPD. In our study we evaluated serum of 54 patients. Diagnoses was as follows: asthma (n=14), COPD (n=12), GERD (n=20), asthma and GERD (n=8). Serum of 19 volunteers was studied as a control group. IL-4, IFN-gamma and TNF-alpha levels were detected by ELISA. All patients underwent upper gastrointestinal endoscopy and spirometry. For statistics nonparametric method of Kruskal-Wallis and Spearman's correlation were used. Results. The IL-4 and IFN-gamma levels in all groups of patients were significantly higher than control ( $p=2.5E-09$  and  $1.76E-09$  respectively). Meanwhile TNF-alpha values in patients cohorts was lower than in control group ( $p=0.007$ ). Patients were divided into three groups according to endoscopy: (i) no symptoms (n=6), (ii) chronic gastritis (n=27), and (iii) reflux esophagitis (n=21). The level of IFN-gamma was lowest in no symptoms group ( $91.6\pm 41.9$  pg/mL), intermediate in gastritis patients ( $204.2\pm 255.8$  pg/mL), and highest in reflux eosophagitis group ( $404.8\pm 455.7$  pg/mL) —  $p=0.01$ . IFN-gamma/IL-4 ratio had similar dynamics ( $p=0.01$ ). TNF-alpha value was maximal in reflux esophagitis group ( $p=0.0004$ ). We investigated cytokines values depending on severity of respiratory failure. In patients with no respiratory failure level of IL-4 was minimal, stage 1 patients had medium elevation of IL-4 value, and in patients with stage 2 of RF level of cytokine was maximal ( $p=0.001$ ). Conclusion. In our study IL-4 exhibited a significant role in the severity of respiratory disorders, whereas IFN-gamma and TNF-alpha were determined degree of damage to the gastrointestinal tract.