Currently, the main factors in the development of bronchial asthma are chronic inflammation and hyperresponsiveness of airways, the severity and nature of which determine both the severity of the disease and the effectiveness of anti-inflammatory basic therapy.

The latest scientific information suggest that chronic airways inflammation is associated with degree of bronchial hyperreactivity to exercise and, at the same time, the pathogenetic mechanisms of exercise-induced bronchoconstriction contribute to further inflammation persistence and bronchial epithelial layer damage. Published data regarding the association of the exercise-induced asthma phenotype with exact variant of the chronic airway inflammatory response (eosinophilic, noneosinophilic, paucigranulicytic) remains controversial and, at the same time, not studied enough in children population.

**The aim.** To study the particularities of the cytological profile of induced sputum in school-age children with exercise-induced asthma phenotype.

**Materials and methods.** In pulmonology department of the Chernovtsy Regional Children Clinical Hospital 41 school age child with persistent BA have been examined. Depending on the airway responsiveness to the exercise two clinical groups of observation have been formed. The first (I) clinical group has been formed from 22 children with exercise-induced asthma (EIA), demonstrated a percentage fall in forced expiratory volume in 1 sec (FEV1) from baseline after exercise challenge of ≥ 15% (%FEV1 fall). The second (II) clinical group included the remaining 19 patients with BA without exercise-induced bronchoconstriction (%FEV1 fall <15%). A cytological analysis of induced sputum obtained by inhalation of serial dilutions of hypertonic solutions (3%, 5%, 7%) of sodium chloride has been performed to all children by the method of Pavord I.D. in modification of Pizzichini M.M. (1996). The comparison groups did not differ significantly on the main (sex, age, place of residence) clinical characteristics. These survey results were analyzed by parametric (Pt, Students’ criteria) and nonparametric (Pφ, Fisher's angular transformation) methods of calculation.
Results. The cellular composition of the induced sputum of children with EIA was: 6,6±1,5% of eosinophilic granulocytes, 50,3±4,7% of neutrophilic granulocytes, 31,2±6,0% of alveolar macrophages, 12,1±3,3% of lymphocytes and 0,4±0,4% of must cells. In the cytological profile of bronchial secretions of patients of II-nd group there have been included, respectively: 7,4±2,1% of eosinophils (Pt>0,05), 55,9±5,2% of neutrophils (Pt>0,05), 26,9±3,9% of macrophages (Pt>0,05), 9,8±3,6% of lymphocytes (Pt>0,05) and no one must cell.

In majority of patients with EIA an eosinophilic response of airways has been observed. Thus, a significant eosinophilia of bronchial secretions (number of eosinophilic granulocytes ≥12% in induced sputum) was determined only in 63,2% of cases in the II-nd group, however, was recorded in 81,8% of patients with EIA phenotype (Pφ>0,05). At the same time, expressive lymphocytic inflammatory response of airways has been observed in children with EIA. Thus, a relatively moderate lymphocytosis of airways (lymphocyte counts in sputum ≥11%) has been observed almost in every fourth (22,7%) patients with EIA phenotype, but only in 10,5% cases in the II-nd comparison group (Pφ>0,05).

In school-aged asthma patients without exercise-induced bronchoconstriction an intensive neutrophilic type of airway inflammation has been registered three times as often compared to a cohort of patients with EIA phenotype. Thus, significant amount (≥ 69%) of neutrophilic leucocytes in induced sputum has been registered in 36,8% patients of the II-nd group of observation, but only in 13,6% children with EIA (Pφ<0,05). Neutrophilic type of airway inflammation has been associated with significant damage of bronchial epithelium that has been expressed by increased number of desquamated epithelial cell in cellular sediment of the induced sputum. Thus, the number of cylindrical epithelial cells in bronchial secretion ≥40% was recorded only in 40,9% patients with EIA, but in the most cases (68,4% patients) in the II-nd comparison group (Pφ<0,05). Probably, in children without exercise-induced bronchoconstriction significant damage of respiratory epithelium due to chronic inflammation favours the
development of airways remodeling, associated with low grade bronchial reactivity to hyperventilation and exercise.

**Conclusions.** It has been observed that exercise-induced asthma phenotype in school-age children characterized by oligocellular (eosinophilic response with hyperlymphocytic reaction) type of chronic airways inflammation, associated with moderate damage of bronchial epithelial layer. Cytological profile of induced sputum of school-age asthma patients without exercise-induced bronchoconstriction indicates multicellular mixed (neutrophilic-eosinophilic response with moderate lymphocytic reaction) type of airways inflammation, associated with expressive respiratory epithelium damage and airways remodeling.