**SUMMARY**

CD4+ T helper cells type 2 (Th2) that can synthesize cytokines including IL-4, IL-5, IL-13 play a significant role in the initiation and intensification of allergic inflammation in the course of allergic diseases, such as allergic rhinitis, bronchial asthma or atopic dermatitis. The subpopulation of CD4+ T cells with suppressory properties, defined as regulatory T cells (Treg), has been described relatively recently. Distinguishing characteristic of Treg cells is co-expression of CD25 receptor, transcription factor FoxP3 and low or lack of CD127 receptor expression. The *in vitro* studies proved the role of Treg cells in the inhibition of Th2 cells proliferation.

The allergen immunotherapy (AIT) relies on repeated administration of increasing doses, followed by maintenance doses, of sensitizing allergen applied subcutaneously or sublingually. The aim of the therapy is induction of immune tolerance manifested by reduction or elimination of clinical symptoms of allergic disease. One of the considered mechanisms influencing the effectiveness of allergen immunotherapy is suppression of Th2 cells. Taking into consideration interlinkage between Treg and Th2 cells, one of the reasons of induction and intensification of allergic reaction may be due to Treg cells dysfunction. The evaluation of Treg cells activation level could serve as an indicator of tolerance induction efficiency for allergen in patients treated with AIT.

On the basis of the above data, the aim of this study is the evaluation of the role of regulatory T cells in allergen tolerance induction in patients who suffer from intermittent allergic rhinitis (IAR), allergic to grass pollen, undergoing allergen immunotherapy.

The study group consisted of 90 grass pollen sensitive patients of both genders, aged 21. to 62. years (mean 38,5±12,3 years), suffering from intermittent allergic rhinitis with at least 2-year period of medical history. IAR diagnosis was based on commonly used criteria that included occurrence of symptoms for less than 4 days a week or for less than 4 consecutive weeks a year. All patients were treated with allergen immunotherapy with an extract of grass pollen mixture (Purethal, Hal Allergy B.V. Leiden, Holland) for the period of three years. The control group included 30 grass pollen sensitive patients, suffering from intermittent allergic rhinitis, untreated with AIT.

To investigate the change dynamics of the estimated parameters, the research was conducted for each patient in the period of intensified allergen exposure, from the beginning of June until the end of July (summer assessment) and outside the pollen season, from the beginning of January until the end of February (winter assessment).

Biological material used in this study was venous blood collected with anticoagulant EDTA and without the anticoagulant. In the laboratory tests, for each patient was evaluated total and allergen-specific immunoglobulin E serum concentration, and in the peripheral blood samples the percentage and absolute values of lymphocytes, percentage of CD3+, CD4+, CD8+ T cells, CD19+ B cells, CD16+CD56+ NK cells, percentage of CD3+, CD4+, CD8+ cells with expression level of cytoplasmic cytokines IL-4 and IFN-γ, percentage of CD4+ T cells with co-expression of CD25 receptor, percentage of regulatory T cells (cells CD4+ with high expression of CD25 and low expression of CD127).

Achieved research results entitle us to draw the following conclusions:

* The success of allergen immunotherapy with an extract of grass pollen mixture seems to be decided not so much by the values evaluated in the period of intensive allergen exposure but the values’ stability manifested by no significant differences between summer and winter assessment.
* One of the parameters determining good clinical response of allergen immunotherapy is reduction in the percentage value of CD3+ lymphocytes that was observed in the period of intensified allergen exposure compared with corresponding values assessed in the absence of allergen exposure period.
* Good clinical effect seems to correspond not so much to the absolute value of CD4+ and CD8+ lymphocytes with co-expression of IL-4 or IFN-γ, as to their proportion and stability on which intensified allergen exposure had no influence.
* Good clinical effect seems to correspond to numerical stability of regulatory T cells demonstrated by no changes in the period of intensified allergen exposure compared with analogous values assessed during winter period.
* Bad clinical effect or lack of response to therapy may be associated with primary irresponsiveness of lymphocytes with suppressor-cytotoxic activity in majority, which is manifested by decrease of percentage value of both NK and CD8+ cells in the period of intense allergen exposure.
* Allergen immunotherapy does not include changes in the scope of CD19+ cells number assessed directly after the completion of therapy. Therefore, B lymphocytes do not seem to play a significant role in creation of tolerance to antigen that would affect the success of allergen immunotherapy.