

ABSTRACT

Allergy as one of the most frequent pathologies worldwide belongs to illnesses with constantly increasing incidence even amongst young children. It develops in genetically predisposed individuals whose dendritic cells (DC) are, after contact with allergen, able to polarize the immune response predominantly to Th2, while Th1 response is suppressed. One of the possible preventive measures to avoid an allergic disease development could be an early postnatal supplementation of chosen probiotic bacterial strains or their mixtures. One of them is a well characterized strain *Escherichia coli* O83:K24:H31 (*E. coli* O83). Administering of this probiotic vaccine called Colifant Newborn is showing to be an effective prophylaxis to decrease the incidence of allergies in children with predisposition to their development.

The aim of my diploma thesis was to experimentally confirm the capacity of *E. coli* O83 to support maturation of two main subpopulations of newborn DC available from cord blood: myeloid dendritic cells – mDC and plasmacytoid dendritic cells – pDC. This DC subpopulations were isolated from cord blood of children born to healthy (non-allergic) mothers who had a low risk of allergy development or from children of allergic mothers who had an increased risk of allergy development. Subsequently, after co-cultivation of mDC or pDC with naive CD4⁺ cells and their co-stimulation with the *E. coli* O83, the levels of cytokine production and transcriptional factors typical for differentiation of CD4⁺ T-lymphocytes to Th1, Th2, Th17 subpopulations as well as to regulating T-cells (Treg) were set by means of flow cytometry.

Our results have shown a significantly increased presence of activation marker CD83 on mDC after the stimulation with the *E. coli* O83 in children of allergic mothers when compared to children of healthy mothers.

In pDC there were no significant differences detected between healthy and allergic group. After co-cultivation of mDC with CD4⁺ without the stimulation with the *E. coli* O83, an increase of production of IL-4 in CD4⁺ T-cells in the children of healthy mothers occurred when compared to CD4⁺ T-cells in the children of allergic mothers. We can say, that the *E. coli* O83 induces the maturation of DC and the production of IL-4 in CD4⁺ T-cells co-cultivated with mDC. We did not detect any differences between healthy and allergic group in pDC, not even after co-cultivation with CD4⁺ T cells.

Keywords: allergy, myeloid dendritic cells, plasmacytoid dendritic cells, dendritic cells, cord blood, *E. coli* O83, children of healthy mothers, children of allergic mothers.