Abstract

Type 1 Diabetes (T1D) is organ-specific autoimmune disease which causes pancreatic beta cells to be irreversibly destroyed. The only possible treatment represents life-lasting insulin administration. The real trigger of destructive insulitis isn't known. T1D is a multifactorial disease involving both external and internal factors in the disease pathogenesis. The presence of autoreactive T lymphocytes in pancreas is necessary for development of diabetes. T regulatory cells have protective function in the destructive insulitis.

The aim of this diploma thesis was to study cord blood T regulatory cells and their connection to type 1 diabetes development. We tried to find the difference among T regulatory cells in mononuclear cord blood cells (CBMC) in different study groups. Samples were collected from mothers suffering from T1D, gestational diabetes. Healthy controls were tested as well. Sixty-eight samples of cord blood were included in the study among the years 2009 - 2011.

Samples were divided into 3 groups (CBMC from children born to T1D mothers, mothers with gestational diabetes and healthy mothers without T1D). CBMC were analysed by flow cytometry. T regulatory cells (defined as CD4+CD25+) were isolated by magnetic separation (MACS). The functional capacity of these cells was studied as well by analysing the effect of different T regulatory cells concentrations to IFN-γ productionin CBMC (this cytokine is a typical representative of Th1 cytokines which are supposed to be prodiabetogeneic).

Results from flow cytometry have shown significantly decreased level of T regulatory cells from Th lymphocytes in CBMC from children born to T1D mothers in comparison to samples obtained from babies born to mothers without T1D ($p = 0{,}043$).

Production of IFN-gama was tested by ELISA and ELISpot. The different concentrations of T regulatory cells were analysed but no significant differnce in IFN-γ was observed when different concentrations of these cells were added to CBMC.

Keywords: Type 1 diabetes - T regulatory cells - cord blood