Non-coding RNA of Extracellular vesicles in type 1 diabetes

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Type 1 diabetes is an autoimmune disease associated with pancreatic Langerhans beta-cells destruction, resulting in a lack of endogenous insulin, impaired glucose homeostasis, and a decrease in the quality of patient's life. The etiology of the disease is still not well established due to the inaccessibility of the affected endocrine pancreatic beta-cells. The insight into the physiological processes in the affected beta-cells can be achieved with the study of extracellular vesicles, which can be biomarkers and mediators of the disease development. In our study, a fraction of blood plasma extracellular vesicles positive for membrane proteins potentially associated with insulin-producing beta-cells was observed, which indicates beta-cell communication with other tissues and the immune system. The next-generation sequencing was used to analyze blood plasma extracellular vesicle RNA-fractions of type 1 diabetes individuals and intensive beta-cell destruction in Langerhans islets transplantation. The immunomodulatory role of the selected differentially expressed extracellular vesicle miRNAs was evaluated with the whole human blood samples *in vitro* stimulation, which resulted in vesicle-miRNAs accumulation in phagocytes endolysosomal pathway and the activation of the immune system. The immune system activation presented with the increased degranulation and proliferation of NK and T-cells, as well as increased cytokine/chemokine release, while the miRNA transfection together with the chloroquine inhibitor resulted in the decreased inhibition of the immune system response. The cloroquine inhibition indicated TLR7/8 responsible for vesicle delivered miRNA recognition. Vesicle delivered miRNAs in type 1 diabetes show the complexly of extracellular vesicles RNA in the regulation of the immune system and a potential involvement in the development of autoimmunity. The TLR7/8 signaling also emphasizes the implications for developing strategies for disease prevention.