ABSTRACT:

Type 1 diabetes mellitus (T1DM) is an insulin-dependent autoimmune disease. Its onset is characterized by an autoreactive self-destruction of β-cells within pancreatic islets. T1DM is influenced by multiple genetic predispositions, but since the incidence of the disease has increased dramatically in the past decades, especially in developed, western-type countries, the importance of the environmental factors has become obvious. There are various significant environmental influences that need to be addressed in the equation of variables. This bachelor thesis deals with the environmental variables and their mechanisms in T1DM and focuses on several areas of interest. It introduces frequently used spontaneous animal model of T1DM, pathogenetic mechanisms and T-cells in T1DM as well as regulatory immune cells and their mechanisms, in the light of hygiene and another hypothesis. Next it addresses the role of intestinal microbiota, dietary factors, mucosal immunity, their mechanisms and interactions in T1DM and extends to other, less researched, but important environmental variables such as circadian rhythm in connection with circadian gene expression depending on the rhythmicity of light/dark rotation and timing of food intake throughout the day, psychological/oxidative stress, and the effects of vitamin D deficiency or toxins present in water and the environment. The aim of the bachelor thesis is thus to introduce environmental factors, hygiene hypothesis, the NOD mouse model and to provide a comprehensive overview on environmental factors, some of them underestimated, and their mechanisms in prevention and pathogenesis of T1DM. Several of the environmental factors and their mechanisms, if better identified and understood, represent safe and promising strategies for secondary prevention or even at onset therapeutical interventions in T1DM.

KEY WORDS:

Type 1 diabetes, environmental factors, microbiome, bacteria, immune mechanisms, mucosal immunity, prevention, pathogenesis, NOD mice