Popular Abstract (EN)

The principal objective of the DiabetHelp project is to understand unknown yet mechanisms of metabolic activity of steviol glucosides (SGs, such as *stevioside* and *rebaudioside A*) that have been approved as food additives (E960) in Europe and USA, as intense sweeteners. These compounds are produced by physico-chemical extraction of stevia plant (*stevia rebaudiana Bertoni*), are non-caloric and frequently substitute for artificial sweeteners (saccharine, aspartame, cyclamates) in foods. Steviol glucosides are sweeter by 200-300-fold compared to sucrose, considered as safe for human, do not accumulate in the body, exert a broad spectrum of physiological activities, even have some prophylactic-therapeutic potential (e.g. antioxidant, antibacterial, anti-fungial, hypotensive and hypoglycemic). Nutritional and health effects of stevia currently have been a subject of intense investigation in many research centers. Type 2 diabetes is a metabolic disease with increasing morbidity in the developed countries. In diabetes, carbohydrate and lipid metabolism is disturbed, which manifests in increased blood glucose. Chronic hyperglycemia leads to various complications, health decline and shortened life expectancy. Current therapy of diabetes involves tight blood glucose control by administration of appropriate dosages of insulin, hypoglycemic drugs, such as sulfonylurea, biguanidins, β-glucosidase, suitable physical activity and dietary modification. Pharmacological agents used in the treatment of diabetes have usually side effects, therefore there is a search for effective, safer and natural alternative approaches. Scientific reports of the last years suggest that stevia and its glucosides can affect glucose metabolism that can be useful in metabolic disorders in type 2 diabetes. However the mechanisms of SGs activity have not been fully understood. Similarly L-arginine (ARG) and microelement chromium(III) (Cr3) reveal some regulatory functions on glucose metabolism, have been the subject on extensive investigation. For these reasons, the main objectives of the DiabetHelp project will be elucidation of the mechanisms of SGs activity (alone and in the presence of ARG and Cr3) on insulin signaling pathway and glucose metabolism. Therefore for the execution of this goal, two-stage investigation has been designed: in vitro and in vivo. In the in vitro stage, the effect of SGs (*stevioside and rebaudioside A*) (alone and in the presence of ARG and Cr3) on lipogenesis, glucose uptake and cytotoxicity in murine 3T3-L1 cell line will be studied. In the in vivo stage, the effects of supplementary SGs (alone and in the presence of ARG and Cr3) on overall metabolism in type 2 diabetic model of rat will be carefully investigated.

The results of this project will contribute to better understanding of mechanisms of metabolic activity of SGs (alone and in the presence of ARG and Cr3) in regard to glucose metabolism that can be of significance for nutrition/diet therapy in type 2 diabetic subjects.