

Diabetes mellitus is a serious metabolic disease that affects 5% of the world's population. Type 2 diabetes represents over 90% of all cases of this disease. The disease is accompanied by abnormalities in the secretion of the pancreatic hormone – insulin. Moreover, liver, muscle and fat cells become resistant to the hormone. As a result, the body is slowly destroyed because of excessive concentration of glucose in the blood, which leads to renal failure, myocardial dysfunction or problems with eyes. The researchers are looking for compounds, particularly of natural origin, which might mitigate the effects of type 2 diabetes. Resveratrol is a plant compound present i.a. in the skin of grapes, but also in red wine and grape juice and is known to exert many beneficial effects in human and animal organisms. Using rodents, it has been shown that resveratrol can also alleviate the symptoms of experimentally-induced diabetes. However, comparison of results obtained from animals studies with experimentally-induced diabetes rats to human is a serious problem for researchers. There are major changes in experimentally induced diabetes in rodents: insulin-secreting cells are damaged and, consequently, insulin concentration in the blood is greatly reduced and glucose concentration is strongly augmented while the sensitivity of cells to insulin remains unchanged. In my project, I plan to study the influence of resveratrol in mild diabetes. Goto Kakizaki rats (GK rats) are now considered to be the best animal model reflecting type 2 diabetes in humans. The aim of the project is to test whether resveratrol can produce beneficial effects in these rodents. GK rats are non-obese and they have got congenital type 2 diabetes, in which glucose and insulin concentrations are similar to type 2 diabetes in humans. Moreover, the cells of these animals similarly to humans with type 2 diabetes are characterized by resistance to insulin. Rats will be divided into 4 groups of 10 animals each: Group I - control animals (Wistar rats), Group II - control rats (Wistar rats) receiving resveratrol, Group III - GK rats and Group IV - GK rats receiving resveratrol. It is planned to administer resveratrol in an amount of 20 mg / kg body weight, intragastrically for 10 weeks. The study will be focused particularly on the resveratrol effects on insulin resistance, so insulin resistance indicators will be defined. Insulin binding to insulin receptor in liver and skeletal muscle of rats and the study of the expression of selected proteins in the liver, muscle and adipose tissue will provide additional data characterizing insulin resistance. Furthermore, in the blood, the concentrations of hormones important in metabolic regulation will be assayed. Moreover, parameters characterizing the carbohydrate-lipid metabolism will be determined in animal tissues. Due to the important role of free radicals and inflammatory factors in the development of diabetes and its complications, the analysis of the antioxidant defense in tissues and proinflammatory factors will be performed. The results obtained after implementation of the project will provide a lot of new information on various aspects of resveratrol role in a model of type 2 diabetes, especially in the context of ameliorating insulin resistance. A comprehensive approach to the problem it required to obtain results that allow to define the mechanism of resveratrol effect in the applied model of type 2 diabetes.