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The Use of Quercetin for Correction of Disorders in Rats with Diabetes Mellitus

Quercetin is the dietary flavonoid that has attracted the attention mainly because of its biological activity and its widespread availability in dietary sources: fruits and vegetables. Quercetin has different pharmacological actions including anti-inflammatory, anticancer, antidiabetic, neuroprotective, cardioprotective, anti-allergic etc. (M. Bulea et al., 2019). But the best form of its intake and the mechanisms of its antidiabetic action are unclear now.

To solve these issues, at least partially, an experiment was performed on Sprague-Dawley rats (n=62). The animals were divided into 7 groups (G): the G1-control, the rest were injected with 10% solution of alloxan (0.1 ml/100 g body mass) to produce diabetes mellitus (DM). Animals of G1 and G2 were kept on standard diet, rats of G3-G7 took quercetin (5 mg /100 g b.m.) per os. Rats of G3 and G4 received the initial quercetin, G5 - quercetin, adsorbed on the surface of cellulose; G6 - quercetin, mechanochemically adsorbed on cellulose; G7 - quercetin, encapsulated in the cellulose molecule.

It was found that the initial quercetin (G3-G4) reduced the blood glucose concentration already on the 3-d day of the study from 33.3 to 25 mmol/l, but only for 3 days, while adsorbed on the surface (G5) and encapsulated quercetin (G7) significantly decreased the level of glucose to 18.4 mmol/l only from the 9-th day of observation till the end of experiment - the 24-th day.

Analysis of the glycogen content in the liver revealed that in animals with DM, consuming standard food, there was a decrease of polysaccharide from 402±38 to 221±60* mg/100 g of wet weight, while in rats receiving adsorbed and encapsulated quercetin the glycogen content was significantly higher and almost reached the control level - 322±33 and 328±44 mg/100 g of wet weight, respectively.

Plasma analysis showed that all forms of quercetin, but especially G5 and G7, contributed to a decrease (in mmol/l), compare with G2, in such parameters as creatinine (from 109.910±6.87 to 68.2±2.3), urea (from 18.3±1.6 to 7.0±0.6), uric acid (from 105.3±10.2 to 33.8±3.6), phosphorus (from 3.23±0.6 to 2.0±0.2) and also increased the total protein to control values (from 41.0±1.0 to 70.2±1.6).

Thus, the adsorbed and encapsulated quercetin had the most pronounced effects on some parameters of carbohydrate, lipid, protein and mineral metabolism in rats. The mechanisms of their action require the further study.

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Biography:

Aizman Roman is the Head of the Dept. of Human Anatomy, Physiology and Life Safety, Director of the Scientific Research Institute of Health and Safety, Professor of Novosibirsk State Pedagogical University, Russia.