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The beneficial effect of oligosaccharides on the lipid profile of type 1 diabetic rats

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Oligosaccharides are potential prebiotics promoting the growth and activity of beneficial gut bacteria. These carbohydrates are resistant to digestion and their fermentation by the intestinal bacteria leads to the production of short-chain fatty acids (SCFA), that act as ligands to several receptors and exert a number of positive effects on human health. This has contributed to their wide use in the treatment of many chronic diseases including diabetes. In our study we examined the effect of the prebiotics xylooligosaccharide (XOS) and galactooligosaccharide (GOS) on parameters of the lipid profile of rats with streptozotocin-induced diabetes type 1. The rats were divided into four groups: 1) diabetic rats treated with XOS; 2) diabetic rats treated with GOS; 3) diabetic rats on a standard diet and 4) healthy rats on a standard diet. The obtained results showed that diabetic rats treated both with XOS and GOS have lower serum total cholesterol concentration compared with the diabetic rats on a standard diet ($p=0.023$ and $p=0.014$ respectively). A proposed mechanism for the reduction of the serum cholesterol levels by the dietary oligosaccharides includes reduced cholesterol absorption and increased excretion in the feces. Although the difference is not statistically significant ($p>0.05$) XOS and GOS supplementation also managed to slightly decrease the serum triacylglycerol (TAG) levels compared with the diabetic rats on a standard diet. The reduction of the TAG levels might be due to increased production of SCFA that bind to several G-protein coupled receptors and lead to a release of anorectic peptides such as protein YY. In summary, the obtained results show that both oligosaccharides exert a beneficial effect on the serum concentration of total cholesterol and TAG and could be used in the complex therapy of diabetic patients as well as for prevention of cardiovascular complications that are typical of diabetes.

Biography

Mariya Choneva graduated from the medical university of plovdiv in 2019 and has a master's degree in pharmacy. Since early 2020 she is an assistant professor in the department of medical biochemistry in medical university – plovdiv and is currently working on her PhD thesis that includes studying the beneficial effect of prebiotics on the metabolism of diabetic rats. She has participated in several conferences and has one published article and another one that is accepted and about to be published.

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