THE HYPOGLYCEMIC IMPORTANCE OF PROBIOTICS IN DIABETES

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Abstract: Objective: We explored the hypoglycemic effect of probiotic Lactobacillus in alloxan-induced diabetic mices.
Methods: We use diabetic mice that diabetes appeared by intra venous injection of alloxan and supplying 10% glucose in water. We observed the body weight,blood glucose level's changes.
Results: The probiotic combination significantly declined blood glucose, rose the body weight of mice than another groups at seven week .
Conclusion: The combination of probiotics and 10% glucose significantly inhibited hyperglycemia. The probiotic combination was beneficial for improving important values in diabetes.
Keywords: diabetes mellitus, alloxan, probiotics, , 10% glucose, blood glucose level, hypoglycemic effect

Introduction: Type 2 diabetes mellitus (DM) is spreading at a catastrophic rate in all countries and continents, turning into a real epidemic of the 21st century. Diabetes is an important public health problem that occurs when the pancreas doesn't produce enough insulin (a hormone that regulates blood glucose) or the body doesn't respond to the insulin it makes. Currently, more than 422 million patients with diabetes are registered on Earth - one of the most common diseases in the civilized world [1]. The global prevalence of diabetes in adults aged 20–79 is currently 7.3% (4.8–11.9%), which is estimated to reach 8.3% (5.6–13.9%) by 2045, the number of registered patients with diabetes in the Republic of Uzbekistan exceeded 157,000.

The prevalence of diabetes is higher than the recorded indicators and is 5.2–9.1% according to epidemiological studies. Blood glucose levels can be controlled through diet and lifestyle changes. And we know,there are many hypoglycemic drugs that apply to treat diabetes mellitus in the worldwide.Sure enough, they are effective

for treatment diabetes and significantly decrease high blood glucose levels. They are: Sulfonylureas, biguanides, glinides, α-glucosidase inhibitors, thiazolidinediones, dipeptidyl peptidase IV (DPP-4) inhibitors and glucagon-like peptide 1 (GLP-1) receptor agonists . But , these preparations have a number of side effects and limitations such as sequelae and secondary failure .So ,many patients suffer from diabetes mellitus type 2 prefer using natural products.We can use omega-3 fatty acids , dairy products , pistachios and coffee , Jerusalem artichoke, radiola to prevent diabetes or related complications. These natural dietary components can improve glycemic control or reduce the risk of diabetes.; so much effort has focused on natural products as complementary or alternative treatments for diabetes without side effects or toxicity .Disadvantages of natural hypoglycemic drugs are effect slowly ,we lose many time.Thats way , farmacalogical drugs use together with natural products and phytotherapy. There are average 10^{14} microorganisms/ml in human gastrointestinal flora, and from this over 5000 bacterial species. Approximately 90%   are Bacteroidetes phyla among gastrointestinal bacterias , consist mainly of Gram– bacteria, and the Firmicutes phyla, mainly of Gram + bacteria. The intestinal microbiota composition is associated with conditions such as, diabetes, cardiovascular diseases allergies , dyslipidaemia [1,2]. The intestinal microbiota increase intestinal permeability and mucosal immune response, decrease the development of diabetes. The probiotics reduce tight junction proteins, the translocation of bacterial lipopolysaccharide (LPS). The translocation of bacterial lipopolysaccharide caused by metabolic endotoxemia and insulin resistance [3,4] As we know, probiotics can directly consume glucose in the host's gut, while little work is being done to assess the link between probiotic glucose intake and diabetes management. The present study evaluates hypoglycemic effect of probiotics with high blood glucose level at mice and examines their effect on intestinal and islet function.

Objective of the study: To evaluate the hypoglycemic effect of probiotics in diabetes mellitus.

Materials and Methods: Probiotics were used in this study selected from fermented milk and screened by the rapid plate method at 20 degrees Celsius. These strains were cultured under anaerobic or aerobic conditions. Degree is 37 degrees Celsius The bacterial density was approximately 109 CFU / mL.We use to activate strains   MRS broth or LB broth. Mice took part in researchs lived in an animal room under standard conditions and gave a standard diet. We applied 350 mg/kg alloxan for every mouse,alloxan injected intra venous for 3 days. Mice were injected with the buffer in the control group. The therapeutic effect of probiotics were reported three days after injection on diabetes. The mice took part in research were separated into 4 groups: controlled group - C (ordinary drinking water, n = 7); alloxan-induced diabetic mice- Group S (with normal drinking water, n = 6); alloxan-induced diabetic

mice SG group (with 5% glucose in drinking water, n = 6); alloxan-induced diabetes SGP group (combination 5% glucose water and probiotics 5 × 109 CFU / ml, n = 6). Probiotics gave via a gastric tube to mice.Blood samples are collected by glucometr.Blood measure glucose level were taken from tail vein. When glucose levels were greater than 11 mmol / L in mice,these mice were considered diabetic mice.Glucose level were measured once a week after the initial diagnosis of diabetes. Blood samples were collected from the tail vein at 0, 30, 60, 90 and 120 minutes after glucose administration

Results: We observed the weight of mice, fecal glucose and blood glucose during seven weeks , and perceived that Alloxan injections are evidently **weight reduction**, and increased fecal and blood glucose in group S. The high glucose level decreased restored body weight in while taking in the alloxan-induced diabetes SPG group. The probiotic combination in the alloxan-induced diabetes SGP group significantly increased the body weight of mice (24.5-40.5 g), decreased fecal glucose (5.6-3.0 mmol / L) and blood glucose (21, 2-13.4 mmol / L) at seven weeks.

Evaluation of the hypoglicemic efficacy of probiotics

The body weight of all grouped mice before and after each treatment was carried out, the data are presented in Figure 1
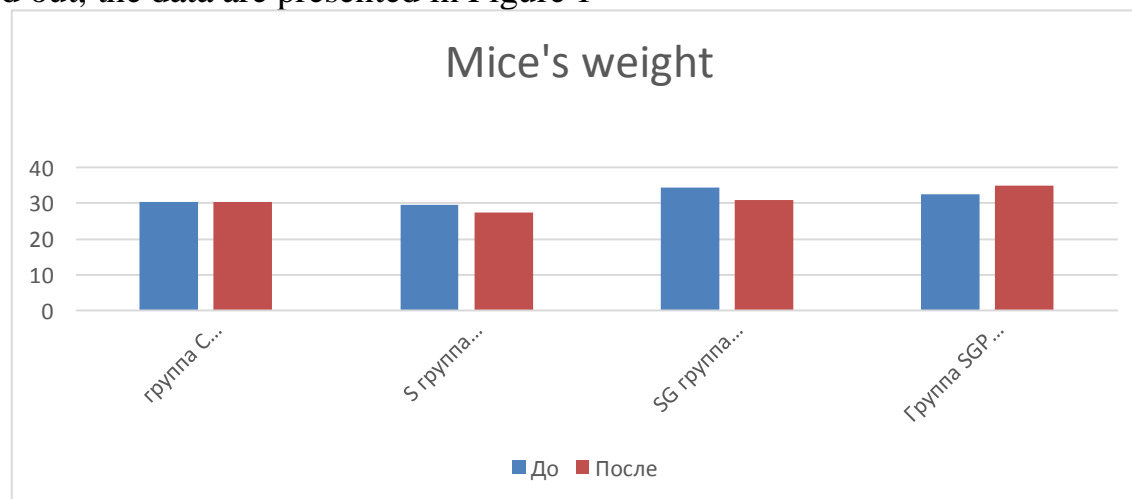

Fig. 1: Body weight of mice before and after examination

There were differences in the body weight of the mice. First, normal control showed no change, but there was a slight decrease in body weight in untreated diabetic mice, as well as diabetic mice and diabetic mice taking 5% glucose. However, diabetic mice taking probiotics showed a slight increase in body weight.

Assessment of blood glucose

Blood glucose was assessed after five weeks. All combination probiotics had a marked blood glucose lowering effect in diabetic-induced mice, however, blood glucose levels were significantly higher in untreated diabetes mice.

Conclusions: Thus, the results of our study indicate that intestinal probiotics with high glucose-lowering capacity may play an important role in the treatment of diabetes. And a combination of probiotics can improve inflammation in diabetics. Provides cost effective treatment for diabetes.

Gut microbiota, probiotics and diabetes.Aline Corado Gomes, Allain Amador Bueno, Rávila Graziany Machado de Souza & João Felipe Mota .*Nutrition Journal*

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