

Preventive effects of epigallocatechin gallate (EGCG) against the onset/advance of diabetes in diabetic animals

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Diabetic complications are induced by oxidative stress due to hyperglycemia. Therefore, it is important to prevent the facilitation of oxidative stress in the blood of diabetes. We hypothesized that if it is possible to prevent the oxidative stress, the onset of diabetic complications such as dysfunction of pancreas and kidneys are suppressed. For this proposal, we focused on the effects of food antioxidants. Especially, epigallocatechin gallate (EGCG), which is included in green tea, has multi bioactivity such as anti-oxidative capacity and anti-obesity. Hence, it is predicted that the intake of EGCG is effective to prevent the onset and/or advance of diabetic complications.

In this study, we used Goto-Kakizaki (GK) rats, which present with hypoinsulinemia, as a diabetic model of animal. GK rats were given a high fat diet which include different concentration of EGCG [0 (control), 0.1, 0.2 and 0.5%, respectively] for 5 months. We performed oral glucose tolerance test (OGTT) before dissection against each groups. A raise in blood glucose tended to be prevented in 0.1%-EGCG group in comparison to control groups at 30 minutes after OGTT, then the blood insulin levels of 0.1%-EGCG group significantly increased. After dissection, we collected serum samples and diabetes-related tissues. First of all, we examined blood parameter such as blood glucose, triglyceride (TG), free fatty acid (FFA) and insulin in the nonfasting blood of each group. Blood glucose levels of 0.1%-EGCG group was significantly less than the other groups, whereas the blood glucose levels of 0.2- and 0.5%-EGCG groups tended to decrease compared with control group. On the other hand, the blood insulin levels significantly increased in 0.1%-EGCG group was observed, whereas TG and FFA levels did not change in all groups.

In conclusion, we observed the influence of blood glucose levels on the intake of 0.1% EGCG. Our results suggested that the intake of 0.1% EGCG was possible to induce a secretion of insulin and/or to keep nearly normal pancreatic function against diabetic model animals, and above 0.2% EGCG intake was not contributed to the improvement of diabetes, especially a secretion of insulin.