

Cocoa Procyanidin and β -Cell Proliferation

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Introduction:

In the United States, over 29 million people are estimated to have diabetes, costing the country over \$245 billion dollars annually in medical and reduced productivity-related expenses. Type 1 diabetes results from the destruction of β -cells in the pancreas that are responsible for the production of insulin to regulate blood sugar level. In type 2 diabetes, the body's cells lose their ability to respond to insulin. Both types of diabetes eventually result in reduced mass of beta cells and reduced production of insulin. A new and burgeoning field of study is now focusing on treatments that increase the mass of beta-cells. Most experimental treatments resulted in decreased secretion of insulin, early apoptosis, or destruction of β -cells. Preliminary studies, however, show that flavanols present in cocoa, such as polymeric cocoa procyanidins, may show great promise in increasing β -cell mass, reducing hyperglycemia, and preventing the onset of both type 1 and type 2 diabetes.

Materials and Methods: In this study, we investigated this question: are polymeric cocoa procyanidins effective in proliferation of β -cells in diabetic rats. We induced rats with type 1 diabetes via streptozotocin (STZ) and treated them with polymeric cocoa procyanidins, which contain epicatechin and other flavanol compounds. Epicatechin is shown to increase levels of insulin secretion, whereas procyanidin oligomers are expected to prevent apoptosis and aid in β -cell proliferation. This compound was administered daily over a period of two weeks via oral gavage treatment, after which the rats' pancreases were harvested.

Results and Discussion: Compared to the control group that received only a placebo treatment of thickened water, rats that received the diabetic treatment of procyanidin polymers were found to have elevated fasting glucose levels (see chart 1). Further analysis will be conducted pending histological results.

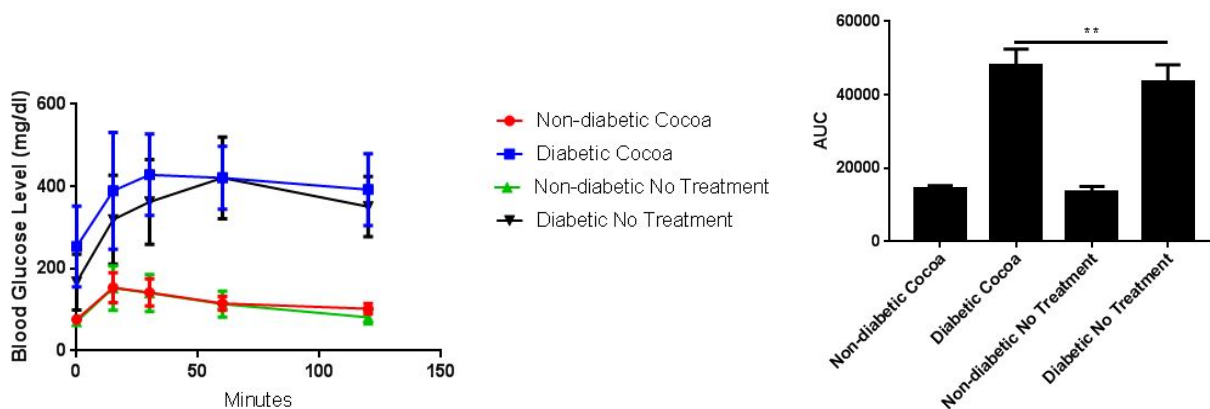


Chart 1 shows the results of the glucose tolerance test. Treatment rats started with higher fasting blood glucose levels. Chart 2 shows the area under the curve for chart 1. These figures show that the rats receiving treatment had elevated fasting glucose levels as opposed to those that received a placebo.

Conclusion: These findings seem to indicate that procyanidin polymers may increase β -cell proliferation and decrease apoptosis, but the results were not conclusive. Further analysis of the histology may help identify the effect of the procyanidin treatment.