Insulin Secretory Actions of Spirulina platensis in Perfused Rat Pancreas, Isolated Mouse Islets, and Clonal Pancreatic B-Cells

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Abstract : Spirulina platensis (SP, Blue-green algae) have been accepted as a supplement for the treatment of pre and postdiabetes. The present study investigated the effects of butanol fraction from ethanol extract of S. platensis on insulin release from BRIN BD11 cells, isolated mouse islets, and perfused rat pancreas, as well as glucose homeostasis in type 2 diabetic rats and their molecular pathways. In a dose-dependent manner, S. platensis increased insulin release from mouse islets and pancreatic β -cells. The extract also elevated insulin release in perfused rat pancreas. Glucose, isobutylmethylxanthine, tolbutamide, and a depolarizing concentration of KCl significantly potentiated insulin release from BRIN BD11 cells. The effect of diazoxide and verapamil, as well as the absence of extracellular Ca2+ showed a reduction in insulin secretion. When administered orally together with glucose (2.5g/kg bw), S. platensis extract improved fasting and postprandial blood glucose in type 2 diabetes. These data suggest that the anti-diabetic activity of S. platensis is partly mediated by insulin secretion via the KATP channel-dependent pathway/the intracellular CAMP pathway.

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