Improving glycogenesis in Streptozocin (STZ) diabetic mice after administration of green algae Chlorella.

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Abstract
Chlorella, a type of unicellular fresh water algae, has been a popular foodstuff in Japan and Taiwan. Studies have shown the hypoglycemic effects of Chlorella in alloxan-induced and Streptozocin (STZ)-induced diabetic animals. However, the mechanisms by which Chlorella treatment affects blood glucose homeostasis have not been studied. Diabetes in ICR mice was induced by injection of STZ. Lipogenesis in vivo was measured by incorporating $^{3}$H-H$_2$O into lipids in brown and white adipose tissues. Glucose uptake in the liver and soleus muscles was measured by assaying 2-deoxy-D-[1,2-3H] glucose levels. The effects of Chlorella on serum non-esterified fatty acids (NEFA) were measured with commercial assay kits. Insulin-stimulated lipogenic rates in brown and white adipose tissues were unaffected by Chlorella. However, Chlorella increased 2-deoxyglucose uptake in the livers and soleus muscles in normal and STZ mice compared to that in their respective controls ($p < 0.01$). In addition, fasting NEFA levels were lower in Chlorella-treated STZ mice compared to H$_2$O-treated STZ mice ($p < 0.005$). The current results suggest that the hypoglycemic effects of Chlorella are due to an enhancement of glucose uptake in the liver and in soleus muscles. The improved insulin sensitivity after Chlorella treatment could be also due to lower NEFA levels, since insulin sensitivity is usually blunted by elevated NEFA in diabetes.

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