



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 ³H-H₂O 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 H₂O-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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