Lowering Non-Esterified Fatty Acid Level by Administration of *Chlorella pyrenoidosa* to streptozocin-induced Diabetic Mice

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Abstract:

Chlorella, a type of unicellular fresh water growth algae, has been shown to play some biochemical functions, such as promoting the growth rate of animals, boosting immune function, preventing stress-induced ulcer, and influencing the serum and hepatic lipid contents in ethionine treated rats. *Chlorella pyrenoidosa*, one strain of Chlorella, has also been shown to decrease blood glucose in alloxan-induced and streptozocin (STZ)-induced diabetic animal models. However, its effects on lipid mobilization have not been studied.

Mice received STZ (60 mg/kg, i.p. in 10 mM citrate buffer) as diabetic mice or buffer only as control mice. Mice subsequently received 100 mg/kg *Chlorella pyrenoidosa* or H_2O 1 hour prior to following studies. Lipogenesis were measured by incorporating ^3H-H_2O into lipids in brown (BAT) and white (WAT) adipose tissues. Fasting serum non-esterified fatty acids (NEFA) were measured by enzymatic hydrolysis commercialized assay kits.

Neither basal nor insulin-stimulated lipogenesis in BAT and WAT were affected by administration of Chlorella. However, the same treatment reduced fasting NEFA levels in STZ mice (0.91 ± 0.06 mmol/L) compared to H_2O-treated STZ mice (1.18 ± 0.14 mmol/L, $p<0.05$, t-test). Insulin sensitivity is usually blunted by elevated NEFA, thus lowering NEFA level by *Chlorella pyrenoidosa* can be a beneficial effect in diabetes.