GRC 2018, Carotenoids Gordon Research Conference, June 17-22, 2018, Newry, ME, US

Impact of a fucoxanthin-rich *Phaeodactylum tricornutum* extract on diet-induced obesity in C57Bl/6J mice

A. Gille[1], K. Briviba[1], A. Palou[2], J. Ribot[2], M.L. Bonet[2]

[1]*Department of Physiology and Biochemistry of Nutrition, Max Rubner-Institut, Federal Research Institute of Nutrition and Food*
[2]*Laboratory of Molecular Biology, Nutrition and Biotechnology (*LBNB*) of the University of the Balearic Islands (*UIB*)*

Anti-inflammatory, anti-obesity and anti-diabetic effects have been attributed to the carotenoid fucoxanthin. The edible brown microalgae *Phaeodactylum tricornutum* (*P.t*.) is rich in this carotenoid, and therefore, awaked interest as potential modulator of obesity-related modifications. This study aimed to investigate the effect of a lipophilic *P.t.* extract on energy metabolism in C57Bl/6J mice fed on a high fat diet (HFD).

Photoautotrophically cultivated *P.t.* biomass (freeze-dried, ball-milled) was applied for subcritical fluid extraction with ethanol to gain a lipophilic *P.t.* extract (PTE). For applying PTE in C57Bl/6 mice, the ethanol was evaporated and the residue resolved in oil/water (2/1, v/v). 6-8 week-old male C57Bl/6J mice were switched to HFD, and, at the same time, received orally the vehicle or PTE at a dose of 100 mg/kg body weight/day or 300 mg/kg body weight/day, respectively. Body weight, body composition and food intake were regularly monitored. After 25 days, the animals were sacrificed; blood and tissue samples were collected. Brown and white adipose tissues (BAT and WAT) were used for analysis of carotenoid spectrum as well as measurement of expression of energy metabolism-related genes.

Supplementation with PTE was well accepted by the mice. There was no difference in food intake between the study groups. However, there was a tendency for a decrease in body weight gain, adipose mass and inguinal WAT adipocyte size at the higher dose of PTE. At the molecular level, PTE supplementation was associated with a decreased expression of *Mest* (marker of adipose tissue expandability) and an increased expression of genes key to thermogenesis and fatty acid oxidation (*Ucp1*, *Cpt1*) in inguinal WAT, but not in BAT. In the latter tissue, expression of genes related to lipolysis and lipogenesis (*Atgl*, *Hsl*, *Srebp1c*, *Fasn*) were decreased after PTE uptake. Chromatographic analysis revealed a modification of the carotenoid profile due to the PTE supplementation.

In conclusion *P.t.* might be of high interest for human nutrition due to the occurrence of proposed bioactive compounds. This data provide information about the potential use of a lipophilic *P.t.* extract to ameliorate obesity-originated effects *in vivo*.