ЖУРНАЛ ЭВОЛЮЦИОННОЙ БИОХИМИИ И ФИЗИОЛОГИИ, 2020, том 56, № 7, с. 735

МАТЕРИАЛЫ КОНФЕРЕНЦИИ И ШКОЛЫ

SEX DIMORPHISM OF PHYSIOLOGICAL MECHANISMS OF ADAPTATION TO SWEET-FAT DIET IN MICE

© 2020 г. N. M. Bazhan[1,*], T. V. Yakovleva[1], A. D. Dubinina[1], and E. N. Makarova[1]

[1] *Institute of Cytology and Genetics, Novosibirsk, Russia*

**e-mail: bazhan-nm@yandex.ru*

DOI: 10.31857/S004445292007150X

In rodents, the most adequate model of diet-induced obesity in humans is obesity caused by the consumption of a sweet-fat diet (SFD), which is characterized by more pronounced adiposity in females than in males. The aim of the work was to evaluate the influence of SFD on the expression of genes involved in the regulation of carbohydrate-lipid metabolism in the liver, brown and white fat.

C57Bl/6J mice consumed SFD or laboratory chow for 10 weeks. We measured body weight, weights of liver, brown and white gonadal and subcutaneous adipose tissues, blood levels of metabolites and hormones, as well as the expression of genes involved in the oxidation of fatty acids (*Fgf21, Pparα, Cpt1*), lipolysis (*Lipe*), adipogenesis (*Pparγ*), lipogenesis (*Fasn*, *Lpl*), thermogenesis (*Ucp1*), glucose metabolism (*Slc2a2*, *Slca4*, *G6p*, *Pklr*, *Gck*, *Pck*). The level of mRNA was evaluated by RT-PCR.

Females fed SFD (SFD females) had a white fat index greater than that of SFD males. Relatively low white fat adiposity in males was associated with hyperinsulinemia and a 1000-fold increase in blood level of the protein hormone fibroblast growth factor 21 (FGF21), as well as a 16-fold increase in hepatic *Fgf21* gene expression. In addition, the expression of hepatic *Pklr* gene involved in glycolysis was significantly increased, relative to the control, in SFD males. In males only, SFD increased the expression of the *Cpt1α* gene, a marker of fatty acid oxidation, in both depots of white adipose tissue. In females, adaptation to the SFD was not accompanied by an increase in the expression of any gene in the liver, white and brown adipose tissues. In white gonadal fat, SFD, in contrast, reduced the expression of lipogenic, adipogenic, and lipolytic genes in females, which suggests a reduction in energy expenditure on lipid metabolism. Thus, adaptive strategies to long SFD consumption at the transcriptional level differ in males and females. It must be taken into account when developing approaches to the pharmacological correction of obesity.

Supported by the RSF 17-15-01036-P.