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Fasting increases FGF21 expression in liver and changes gene expressions in metabolic organs in a sex-specific manner in mice

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Fasting is often used for obesity correction. Fibroblast Growth Factor-21 (FGF21) is a hormone secreted by the liver during fasting that elicits diverse aspects of the adaptive fasting response. In mice, FGF21 is induced through a peroxisome proliferator-activated receptor α (PPAR α)-dependent mechanism. It is unknown that whether fasting increases the FGF21 expression in the liver in a sex-specific manner. We found, that in females, 24 hours-fasting increased hepatic PPARα and FGF21 gene expressions and blood FGF21 and adiponectin levels to a greater extent than in males. Fasting-induced changes in hepatic expression of genes related to gluconeogenesis, glucose oxidation and fatty acid synthesis were the same in males and females. In females, adaptation to fasting was associated with up-regulation of UCP3 and CPT1 expressions in muscle and multidirectional changes in SLC2A4 gene expressions: Increased in muscle and decreased in visceral White Adipose Tissue (WAT). In males, down-regulation of PPARγ in visceral and subcutaneous WAT was the only adaptation to fasting. Thus fasting induced more pronounced increase in the FGF21 signaling and wider range of transcriptional responses in females compare to males. These data can be taken into account when using fasting for body weight regulation. This study was supported by the Russian Science Foundation, grant No 17-15-01036.

Biography

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