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Sex-specific changes of gene expression in response to obesity are associated with different FGF21 expression in obese male and female mice

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Propensity to develop obesity-related metabolic complications is higher in males than in females. The liver-derived hormone FGF21 improves obesity-induced metabolic abnormalities. It is unknown if FGF21 is involved in sex-specific metabolic response to obesity. We studied expression of FGF21 and the genes, which are under its control (PPARg, CPT1, UCP1 and UCP3) or mediate its signaling (KLB) in fat tissues, muscles and liver of obese male and female C57BL mice. The gene expression response to obesity was sex and tissue-specific. The blood FGF21 concentrations and gene expression of FGF21 in liver and Brown Adipose Tissue (BAT) and CPT1 in the subcutaneous white adipose tissue were elevated in obese mice and were much higher in males than in females. Elevation of FGF21 in males was associated with inhibited CPT1B and UCP3 expression in muscles and inhibited KLB and PPARg expression in BAT, which was not observed in females. These changes indicate the development of resistance to FGF21 in muscles and BAT of males. The results suggest that sex-specific FGF21 expression in obese animals may contribute to the sex differences in fat accumulation and resistance to FGF21 in some tissues may be a reason of more male vulnerability to obesity complications. This study was supported by the Russian Science Foundation, grant No 17-15-01036.

Biography

Elena Makarova is currently a Senior Researcher in the Laboratory of Physiological Genetics in the Institute of Cytology and Genetics, Novosibirsk, Russia. Her researches focus on the studies of sex-specific influence of maternal leptin on metabolic characteristics in progeny of rodents. She along with her colleagues found maternal leptin retarded obesity development in male progeny of mice.

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