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NT-PGC1-α promotes hepatic lipid metabolism without increasing gluconeogenesis

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Abstract

PGC-1α (PPARγcoactivator 1α) can promote the transcription of related target genes by interaction with many nuclear receptors. In muscle cells and adipocytes, PGC-1α functions as glucose and fat metabolism promotor. NT-PGC1-α, an isomer of PGC-1α, is reported by Zhang for the first time in 2009. Since it lacks the structural domain to interact with FOXO1, which facilitates gluconeogenesis, we came up with a new assumption which is that NT-PGC-1α can enhance fatty acid oxidation in liver, yet has no influence on hepatic gluconeogenesis. By the overexpression of NT-PGC-1α in hepatic cell system HepG2 and L02, it was proved that NT-PGC-1α cannot promote the expression of PEPCK (phosphoenolpyruvate carboxykinase, a key enzyme in gluconeogenesis process) and the hepatic production of glucose, but sharply induced the expression of CPT1A (carnitine palmitoyltransferase 1A, a key enzyme in fatty acid oxidation). Mouse primary hepatocytes induced by palmitate or FGF21 showed notably increased expression of NT-PGC-1α. We then treated mice models of alcoholic fatty liver with resveratrol, and the the expression of NT-PGC-1α increased remarkbly. This showed that NT-PGC-1α is involved in the process of resveratrol regulating hepatic fatty acid metabolism and proved that NT-PGC-1α participate in hepatic fatty acid metabolism in animals. In this case, the relation between NT-PGC-1α and hepatic fatty acid metabolism is discussed in cells and in animals, and has proved that NT-PGC-1α can enhance fatty acid oxidation in liver, yet has no influence on hepatic gluconeogenesis. According to these findings, NT-PGC-1α could be a new target in obesity or type 2 diabetic treatment.

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Biography

Qiang Xiao-yan received her Bacherlor's degree in Bioengineering at China Pharmaceutical University in 2010. With 2-years school-enterprise training, she finished her Master's degree in advance in 2012. She is currently working as a Ph.D student in Biochemical Pharmacy at China Pharmaceutical University. To date, she has published several papers in state core journals in China.