A novel function of microRNA 130a-3p in hepatic insulin sensitivity and liver steatosis

With the support by the National Natural Science Foundation of China and the Ministry of Science and Technology of China, Prof. Guo Feifan's laboratory at the Institute for Nutritional Sciences, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, reported a novel function of microRNA130a-3p in hepatic insulin sensitivity and liver steatosis, which was published in *Diabetes* (2014, 63(8): 2631—42).

In recent years, there has been an increase in the global prevalence of type 2 diabetes (T2D) and nonalcoholic fatty liver disease (NAFLD). Exploring the underlying mechanism may provide effective treatment to T2D and NAFLD. MicroRNAs (miRNAs) are endogenous, noncoding, short, single-stranded RNAs that are evolutionarily conserved and believed to play a role in controlling a variety of biological processes. Recently, several studies have highlighted the significance of miRNAs in maintaining metabolic homeostasis. MiR-130a is first identified in mice and exerts important functions on cell cycle, angiogenesis, and so on. It is unknown, however, whether miR-130a is involved in the regulation of insulin sensitivity and fatty liver. In this study, Prof. Guo and her colleagues found that overexpression of miR-130a-3p increases insulin signaling in both HepG2 cells and primary mouse hepatocytes, while silencing of miR-130a-3p has the opposite effects. However, miR-130a-5p has no effect in the regulation of insulin signaling. Consistently, whole body and hepatic insulin sensitivity is improved in the mice injected with adenoviruses that over-express miR-130a-3p (Ad-miR-130a-3p). Furthermore, they provided evidence showing that growth factor receptor-bound protein (GRB)10 is required for miR-130a-3p-regulated insulin sensitivity. On the other hand, they observed that expression of miR-130a-3p is decreased in the livers of *db/db* mice and that adenovirus-mediated overexpression of miR-130a-3p reverses insulin resistance and liver steatosis, the latter of which is achieved via suppressing fatty acid synthase (FAS) expression in these mice.

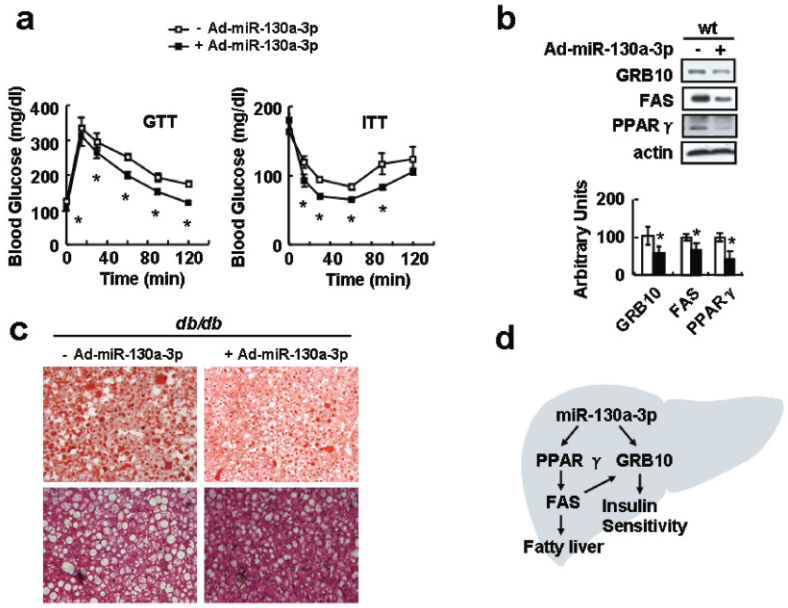

Figure MicroRNA 130a-3p regulates hepatic insulin sensitivity and liver steatosis by targeting GRB10 and FAS, respectively. a, Overexpression of miR-130a-3p by Ad-miR-130a-3p improves insulin sensitivity in wild-type mice. b, miR-130a-3p targets GRB10 and FAS. c, Overexpression of miR-130a-3p reverses hepatic steatosis in *db/db* mice. d, Working model.