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Targeting adipose browning with Rhein: An innovative Chinese Medicine-Based approach to treating obesity and metabolic syndrome

Abstract:

Brown adipose is capable of dissipating extra energy in the form of heat. Studies in the past decade have shown that enhancing adipose tissue browning is sufficient to confer protection against obesity, diabetes and cardiovascular diseases. Therefore enhancing adipose tissue activity in adult human is clinically feasible and is now regarded as a new therapeutic strategy to combat obesity and metabolic diseases. Rhubarb has been implicated to have anti-obese, anti-diabetic effect, but the mechanism underlying this phenomenon is unclear. By evaluating the major components in Rhubarb, we found one of the components, rhein, is potent in potentiating adipose browning in mouse and human brown adipocyte and adipose tissues. Mice fed with rhein showed significantly improved obesity, adiposity, and insulin resistance, which is accompanied by increased adipose tissue browning, and whole body energy expenditure rate. By immunoprecipitation, we characterized ARGLU1 as the direct target of rhein to mediate its action, which is a key co-activator of glucocorticoid receptor. Subsequent in vitro and in vivo studies showed that rhein treatment enhances adipose tissue browning via mitigating glucocorticoid-induced suppression of brown adipose activity. Interestingly the anti-inflammatory effect of glucocorticoid is not affected. In summary, the current study demonstrates rhein as the major component in Rhubarb that enhances adipose browning and energy expenditure. The results will shed new light on the benefits of rhein in adipose browning, and support Rhubarb as the Chinese medicine used to improve adipose browning.

Biography

Dr. Hannah XY Hui has completed her PhD in Chinese Academy of Sciences and continued her postdoc training in The University of Hong Kong. She is currently the assistant professor in School of Biomedical Sciences, The Chinese University of Hong Kong. Her research interest lies on adipose tissue, in particular how adipose tissue is remodeled in response to different nutritional conditions and stresses. Her work recently uncovered the role of various physiological, hormonal and nutritional cues in adipose tissue remodeling, such as lactate, androgen, thyroid hormones. She has published over 40 peer-reviewed papers including *Cell Metab*, *Nat Commun*, *Adv Sci*, *Sci Adv*, *J Clin Invest*, *EMBO rep*, *Diabetes*, *Brit J Pharmacol*.