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Resveratrol increases brown adipose tissue thermogenesis markers by increasing SIRT1 and energy expenditure and decreasing fat accumulation in adipose tissue of mice fed a standard diet

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Adipose tissue is central to the regulation of energy balance. Two functionally different fat pads are present in mammals: White adipose tissue, the primary site of triglyceride storage, and brown adipose tissue (BAT), which is specialized in heat production. In this context, new strategies capable of modulating the development and function of white and BAT become relevant. In the present study, we analyzed the influence of resveratrol (sirtuin activator) on energy balance and the expression of thermogenesis markers. Mice were divided into two groups: standard diet (ST) and standard diet plus resveratrol (ST + RSV). After two months of treatment, ST + RSV mice presented significantly decreased fat accumulation in adipose tissue, with diminished total cholesterol and glucose plasma levels. Additionally, increased oxygen consumption was observed in ST + RSV group. Analyses of mRNA of thermogenesis-related genes showed significant increase in UCP1, SIRT1, PTEN and BMP-7 expression in BAT. Our data suggest that improved metabolism produced by oral administration of resveratrol is, at least in part, associated with increased thermogenesis followed by high expression of UCP1 and SIRT1, which can mediate higher energy expenditure and decreased fat accumulation in adipose tissue.

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