

# Activation of brown adipose tissue (BAT) might play a major and beneficial role against insulin resistance associated to inflammation. Beneficial effects of modulating SIRT1 activity.

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**Introduction:** Activation of brown adipose tissue (BAT) plays a promising role against metabolic diseases such as obesity or type 2 diabetes mellitus (T2DM). These conditions are associated with chronic low-grade systemic inflammation, which is considered a critical underlying factor in the development of insulin resistance.

Sirtuin 1 (SIRT1), a NAD<sup>+</sup>-dependent protein deacetylase, has emerged as a key metabolic sensor in various metabolic tissues that modulates a variety of cellular processes like energy metabolism or stress response. Although SIRT1 overexpression is protective against diverse metabolic complications, little is known about the etiology of these benefits.

**Material and methods:** To identify the mechanisms implicated in the potential therapeutic benefit of targeting SIRT1 in BAT to ameliorate inflammation-mediated insulin resistance we have used an in vivo model of lean mice with or without moderate SIRT1 overexpression. We performed an in vitro model of differentiated brown adipocytes obtained from these mice in order to study the role of this protein in thermogenesis and insulin signaling. The impact of SIRT1 in BAT inflammation was studied by an acute treatment with bacterial lipopolysaccharide (LPS). All these processes were analyzed by western blot and RT-PCR.

**Results:** Our results indicated that SIRT1 overexpression enhanced insulin sensitivity in BAT, and after an acute treatment with LPS, the induction of the proinflammatory cascades were attenuated in these cells.

**Conclusions:** Our results suggest that activation of SIRT1 in brown adipocytes might play a major and beneficial role against insulin resistance associated to inflammation.

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**Keywords:** BAT, SIRT1, INFLAMMATION.

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