

## **MOLECULAR PATHWAYS LINKING NON SHIVERING THERMOGENESIS AND OBESITY**

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**INTRODUCTION:** An increase in energy intake and a decrease in energy expenditure lead to fat storage, causing overweight and obesity phenotypes. The main objective of the present systematic review was to analyse, for the first time, all the recently-published evidence regarding the molecular pathways linking non-shivering thermogenesis (NST) and obesity.

**METHOD:** Two major databases were scanned from 2006 to 2012 using “brown adipose tissue” AND “uncoupling protein-1” AND “mammalian thermoregulation” AND “obesity” as key words. A total of 41 articles were retrieved using the search criteria.

**RESULTS:** The main finding of this systematic review is that uncoupling protein-1 (UCP1) activity can be stimulated, either directly or indirectly, by factors including low temperature, diet, and molecular treatments. Moreover, there is strong evidence to support that UCP1 activity is stimulated by the effect and interaction of different pathways such as hormone-receptor interaction, transcription factors, neuronal transmission, sex hormones, sex steroid receptors and sympathetic nervous system signals.

**DISCUSSION:** All these mechanisms should be considered when designing pertinent studies given their key roles in both mammalian NST and obesity development.

**CONCLUSION:** Future research should address factors affecting these mechanisms which, in turn, may result in the discovery of molecular targets for anti-obesity pharmaceutical treatments. The basic processes that regulate adipose tissue plasticity must be also projected in future research, particularly the molecular pathways involved in the differentiation of white adipose tissue stroma vascular cells in brown adipocyte-like cells.

### **REFERENCES**

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