Circadian Regulation Of Brown Adipose Thermogenesis

Fact Sheet

Project Information

aCROBAT
Grant agreement ID: 639382
Project website

Status
Closed project

Funded under
H2020-EU.1.1.

Overall budget
€ 1 497 007,51

EU contribution
€ 1 497 007,51

Hosted by
KOBENHAVNS UNIVERSITET
Denmark

Objective

Obesity and diabetes have reached pandemic proportions and new therapeutic strategies are critically needed. Brown adipose tissue (BAT), a major source of heat production, possesses significant energy-dissipating capacity and therefore represents a promising target to use in combating these diseases. Recently, I discovered a novel link between circadian rhythm and thermogenic stress in the control of the conserved, calorie-burning functions of BAT. Circadian and thermogenic signaling to BAT incorporates blood-borne hormonal and nutrient cues with direct neuronal input. Yet how these responses coordinately shape BAT energy-expending potential through the regulation of cell surface receptors, metabolic enzymes, and transcriptional effectors is still not understood. My primary goal is to investigate this previously unappreciated network of crosstalk that allows mammals to effectively orchestrate daily rhythms in BAT metabolism, while maintaining their ability to adapt to abrupt changes in energy demand. My group will address this
question using gain and loss-of-function in vitro and in vivo studies, newly-generated mouse models, customized physiological phenotyping, and cutting-edge advances in next generation RNA sequencing and mass spectrometry. Preliminary, small-scale validations of our methodologies have already yielded a number of novel candidates that may drive key facets of BAT metabolism. Additionally, we will extend our circadian and thermogenic studies into humans to evaluate the translational potential. Our results will advance the fundamental understanding of how daily oscillations in bioenergetic networks establish a framework for the anticipation of and adaptation to environmental challenges. Importantly, we expect that these mechanistic insights will reveal pharmacological targets through which we can unlock evolutionary constraints and harness the energy-expending potential of BAT for the prevention and treatment of obesity and diabetes.

Field of science

/medical and health sciences/clinical medicine/endocrinology/diabetes
/medical and health sciences/health sciences/epidemiology/pandemics
/natural sciences/chemical sciences/analytical chemistry/mass spectrometry
/natural sciences/biological sciences/biochemistry/biomolecules/proteins/enzymes

Programme(s)

Topic(s)

Call for proposal

ERC-2014-STG

Funding Scheme

ERC-STG - Starting Grant

Host institution

KOBENHAVNS UNIVERSITET

Address
Norregade 10
1165 Kobenhavn

Denmark

Activity type
Higher or Secondary Education Establishments

EU contribution
€ 1 497 007,51
Beneficiaries (1)

KOBENHAVNS UNIVERSITET

Denmark

EU contribution

€ 1 497 007,51

Address

Norregade 10
1165 Kobenhavn

Activity type

Higher or Secondary

Education Establishments

Website

Contact the organisation

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