Title: Brown adipose tissue: updates in cellular and molecular biology

Authors: Thereza Cristina Lonzetti Bargut R.D., Ph.D. Marcia Barbosa Aguila R.D., Ph.D. Carlos Alberto Mandarim-de-Lacerda M.D., Ph.D.

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Running title: Brown adipose tissue updates

Thereza Cristina Lonzetti Bargut, Marcia Barbosa Aguila, Carlos Alberto Mandarim-de-Lacerda* mandarim@uerj.br

Laboratory of Morphometry, Metabolism and Cardiovascular Diseases, Institute of Biology, State University of Rio de Janeiro, Brazil.

*Corresponding author.: Laboratorio de Morfometria, Metabolismo e Doenca Cardiovascular, Instituto de Biologia, Universidade do Estado do Rio de Janeiro, 20551-030 Rio de Janeiro, Brazil. Tel.: (+55.21) 2868-8316, Fax: 2868-8033. Website: www.lmmc.uerj.br.

Graphical Abstract

Graphical abstract. Acute thermogenic effects on brown adipose tissue. Norepinephrine released from the sympathetic nervous system binds to its adrenergic receptor beta 3 (AR-beta3) with consistent production of cyclic adenosine monophosphate (cAMP) and activation of protein kinase A (PKA). PKA, in turn, activates adipose triglyceride lipase (ATGL) and hormone-sensitive lipase (HSL) and impairs (through phosphorylation) perilipin activity, therefore, initiating lipolysis. The released free fatty acids (FFA) are channeled to mitochondria, through carnitine palmitoyltransferase 1 (CPT1), for serving as fuel to beta-oxidation and, at the same time, they activate uncoupling protein 1 (UCP1), initializing thermogenesis.