

Accepted Manuscript

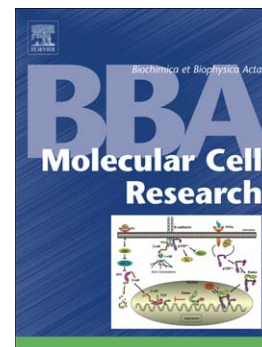
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PII: S0167-4889(15)00156-1
DOI: doi: [10.1016/j.bbamcr.2015.05.010](https://doi.org/10.1016/j.bbamcr.2015.05.010)
Reference: BBAMCR 17570

To appear in: *BBA - Molecular Cell Research*

Received date: 1 October 2014
Revised date: 23 April 2015
Accepted date: 7 May 2015



Please cite this article as: Su Melsler, Julie Lavie, Giovanni Bénard, Mitochondrial degradation and energy metabolism, *BBA - Molecular Cell Research* (2015), doi: [10.1016/j.bbamcr.2015.05.010](https://doi.org/10.1016/j.bbamcr.2015.05.010)

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Mitochondrial degradation and energy metabolism

Su Melser^{1,2,3}, Julie Lavie^{1,2}, and Giovanni Bénard^{2,4,*}

¹ EA4576, Maladies Rares: Génétique et Métabolisme, 33000 Bordeaux Cedex, France

² Université de Bordeaux, 33077 Bordeaux, France

³ Commonwealth Scientific and Industrial Research Organisation CSIRO, Private Bag No. 5, Wembley WA 6913, Australia

⁴ INSERM U862, Neurocentre Magendie, Physiopathologie de la plasticité neuronale, Endocannabinoids and Neuroadaptation, 33077 Bordeaux, France

* Correspondence: giovanni.benard@inserm.fr

Abstract:

Mitochondria are intracellular power plants that feed most eukaryotic cells with the ATP produced by the oxidative phosphorylation (OXPHOS). Mitochondrial energy production is controlled by many regulatory mechanisms. The control of mitochondrial mass through both mitochondrial biogenesis and degradation has been proposed to be one of the most important regulatory mechanisms. Recently, autophagic degradation of mitochondria has emerged as an important mechanism involved in the regulation of mitochondrial quantity and quality. In this review, we highlight the intricate connections between mitochondrial energy metabolism and mitochondrial autophagic degradation by showing the importance of mitochondrial bioenergetics in this process and illustrating the role of mitophagy in mitochondrial pathophysiology. Furthermore, we discuss how energy metabolism could coordinate the biogenesis and degradation of this organelle.

1. Introduction

Mitochondria produce energy through a complex interconnected metabolic network using multiple energy sources, such as amino acids, lipids and carbohydrate derivatives. This energy is produced in the form of ATP and is delivered to all cellular compartments to feed various cellular activities. Mitochondrial energy metabolism is highly regulated to constantly meet the energetic needs of the cell and to utilize the available energy substrates [1]. Among the multiple regulatory processes involved, the control of mitochondrial mass is a crucial determinant of the energy metabolism. In the steady state, the mitochondrial mass is

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