forms (fALS). Defects in mitochondrial functioning and dynamics have been reported as an early symptoms of development of this disease. Unfortunately most of those investigations were carried out on animal or cellular models of familial form of ALS as there are no experimental models of sporadic form. In our study we comprehensively characterize and compare mitochondrial physiology and dynamics in primary fibroblasts derived from patients diagnosed with familial and sporadic form of ALS. Many of evaluated elements that characterize the state of mitochondria, like mitochondrial respiration rate, functioning of electron transport chain complexes, ATP level, mitochondrial membrane potential, calcium level, reactive oxygen species production or mitochondrial structure are different in ALS cells in comparison to control one, which suggests the existence of chronic mitochondrial stress. Therefore, we suppose that in these cells mitochondrial stress response is induced. For that reason we evaluated levels of proteins involved in mitochondrial biogenesis showing changes between control and patient's cells. The question if these observed changes are primary or secondary event in ALS pathophysiology still needs to be answered.

The study was supported by Polish National Science Centre grant number: 2013/08/M/N23/0070.

doi:10.1016/j.bbabio.2016.04.342

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A localized autophagic filter prevents entry of mitochondria carrying pathogenic Opa1 mutations in retinal ganglion cell axons

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Mutations in proteins that control mitochondrial shape result in neurodegenerative diseases like Autosomal Dominant Optic Atrophy (ADOA), associate to mutated Optic Atrophy 1 (Opa1) and caused by retinal ganglion cell (RGC) loss. Intense research on Opa1 elucidated its multiple functions in mitochondrial fusion, apoptosis and metabolism, but the pathomechanisms of ADOA remain unknown. Here we show that an autophagic filter reduces axonal mitochondria in RGCs expressing pathogenic Opa1. Mutated Opa1 triggers a loop of mitochondrial dysfunction and localized autophagosome accumulation at the axonal hillock. Pharmacological or genetic inhibition of autophagy restores axonal mitochondrial entry and rescues RGCs from excess apoptosis caused by mutated Opa1 *in vitro*. Genetic inhibition of autophagy rescues visual loss in Opa1-deficient mice. Thus localized autophagy contributes to define axonal mitochondria and pathogenesis of ADOA.

doi:10.1016/j.bbabio.2016.04.343