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Photobiomodulation affects mitochondria morphogenesis and function

The world's population is gradually aging. At the biological level, aging leads to the accumulation of a wide variety of molecular and cellular damage, and consequently to an increased cardiovascular and neurodegenerative diseases incidence. Most neurodegenerations are associated with a progressive neuron loss and their treatments focus on slowing down the progress of disease and to alleviate the symptoms. Thus, any additional neuroprotective and neuroregenerative approaches to the classical ones will have great socio-economic impact. Increasing number of studies show that impaired mitochondrial function and dynamics play crucial roles in aging and pathogenesis of neurodegenerative diseases such as Parkinson (PD), Alzheimer (AD), and Huntington disease (HD). Photobiomodulation (PBM) represents a very promising therapeutic approach that can improve mitochondria functionality, however, PBM mechanism of action are complex and not well understood. PBM effects are observed at the cellular and systemic level. In our study, we have focused on the acute PBM effects at the direct cellular level in control and rotenone challenged cells (PD model) with respect on mitochondria morphogenesis, cell viability and metabolism. Our results indicate that PBM effects depend on irradiation wavelength and dose. In both, control and rotenone challenged cells, we observed that PBM treatment resulted in significant increase in mitochondria fusion with corresponding improvement in mitochondria function. Thus, our data indicates that PBM has the potential to improve challenged mitochondria function.

Biography

Katarina Stroffekova received her PhD in 1997 from Institute of Molecular Physiology and Genetics SAS, Bratislava, Slovakia. She continued her Post-doctoral studies in USA at University of Cincinnati, Ohio and at Colorado State University, USA. She is an Associate Professor at the Department of Biophysics, PJ Šafárik University in Košice, Slovakia. She has published more than 19 peer reviewed articles and had more than 30 presentations at international conferences worldwide. She is a Member of the Biophysical Society, USA and Slovak Biophysocal Society, and has been serving as an Editorial Board Member of *General Physiology and Biophysics*.

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