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The mitochondrial transcript factor and the interaction on cell aging

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The mitochondria are essential in numerous physiological processes, including energy production, redox potential, modulation of calcium and several metabolic pathways. When the number or mitochondrial activity is insufficient, the human body quickly goes into fatigue due to ATP deficiency. The oxidative capacity of muscle tissue and the preservation of mitochondria depend on the mitochondrial biogenesis that occurs through the transcription factor proliferator-activator receptor-γ coactivator1α (PGC-1α). The oxidative process and the progressive change in the biogenesis of mitochondria have direct influence on the aging of muscle tissue. The regulation of the biogenesis occurs through the PGC-1α combined with nuclear respiratory factor 1 (NRF1) and mitochondrial transcription factors (TFAM). Abnormalities in mitochondria and mutagenesis in mitochondrial DNA (mtDNA) are tied to multi-system degeneration, as well as intolerance to stress and decreased energy in aging in humans, rats and monkeys. The mitochondrial functions are dramatically altered in heart disease, demonstrating a decrease in expression of PGC-1α, which plays a key role in the coordination of energy metabolism. This process can be reversed by the PGC-1α itself. The identification of compounds capable of activating the transcription of PGC-1α could be part of future therapies to reverse pathologies associated with the decline of this organelle. Morphophysiological and biochemical changes of these organelles directly reflect the physiological performance of all body tissues. Evidence demonstrated that physical activity both in young and aged is a major ally in mitochondrial biogenesis by activating the transcription of PGC - 1α and those future nutritional interventions may be of great aid in the health and performance of mitochondria. However, further studies are needed in order to understand and clarify this operation, since currently these mechanisms are only partially known.

Biography

Marcelo S Ferrois a Nutritionist is a former athlete, who completed his Postgraduate studies in Clinical Pharmacology and Master in Aging Science (Gerontology) in organelles of cardiomyocytes, he is a Nutritionist holder of the Paralympic judo team of Brazil and former University Professor of Biochemistry and Nutrition, and acts as Technical Coordinator in companies processing of nutritional supplements in Brazil. He has also worked in partnership with the Group of Pain in the Hospital das Clinicas (HC-USP) as Nutritionist for several years in Sao Paulo, Brazil.

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