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Autore	Martorell, Joanot
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Autore	Andrey V. Kuznetsov
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Sommario/riassunto	Mitochondrion, a sub-cellular organelle originated from primary endosymbiosis, plays a vital role in energy metabolism of eukaryotic

cells. The transfer of electrons through the electron transport chain (ETC) to molecular oxygen accompanied by the extrusion of protons from the matrix generate an electrochemical gradient across the inner mitochondrial membrane (IMM) that is used for ATP synthesis by oxidative phosphorylation. Despite many aspects of ATP synthesis have been delineated, regulatory mechanisms responsible for energy synthesis and transfer still remain to be uncovered. In addition to energy function, mitochondria play a crucial role in cell metabolism under both physiological and pathological conditions through their participation in many intracellular signalling pathways. Studies over the last 30 years provide strong evidence that mitochondria are the nexus of various stresses which initiate cell death through apoptosis, oncosis, necrosis and autophagy depending on the severity of the stress and cellular energy status. The release of several pro-apoptotic proteins such as cytochrome c, Smac/DIABLO, AIF, endonuclease G from intermembrane space initiates both caspase-dependent and caspase-independent apoptosis. The formation of the mitochondrial permeability transition pore in the IMM promotes cell death mostly through necrosis whereas a mild stress activates autophagy. Due to their critical roles in both cell death and survival mitochondria have been widely considered as an important target for various pharmacological and conditional therapeutic approaches. Currently, a large number of mitochondria-targeted agents are suggested to prevent (in ischemia reperfusion injury, cardiovascular, neurodegenerative and other diseases) or stimulate (in various cancers) cell death. This Research Topic will focus on the role of mitochondria in the regulation of cell metabolism and signalling under physiological and pathological conditions. Studies performed on cultured cells and isolated organs/tissues using different animal and cellular models of various diseases will be also included and discussed.