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Autore	Gilles Gouspillou
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Sommario/riassunto

Skeletal muscle is the most abudant tissue of the human body, making up to 40 to 50% of the human body mass. While the importance of optimal muscle function is well recognized in the athletic field, its significance for general health is often underappreciated. In fact, the evidence that muscle mass, strength and metabolism are essential for our overall health is overwhelming. As the largest protein reservoir in the human body, muscles are essential in the acute response to critical illness such as sepsis, advanced cancer, and traumatic injury. Loss of skeletal muscle mass has also been associated with weakness, fatigue, insulin resistance, falls, fractures, frailty, disability, several chronic diseases and death. As a consequence, maintaining skeletal muscle mass, strength and metabolism throughout the lifespan is critical to the maintenance of whole body health. Mitochondria are fascinating organelles regulating many critical cellular processes for skeletal muscle physiology, including for instance energy supply, reactive oxygen species production, calcium homeostasis and the regulation of apoptosis. It is therefore not surprising that mitochondrial dysfunction has been implicated in a large number of adverse events/conditions and pathologies affecting skeletal muscle health. While the importance of normal mitochondrial function is well recognized for muscle physiology, there are important aspects of mitochondrial biology that are still poorly understood. These include mitochondrial dynamics (fusion and fission processes), morphology and processes involved in

mitochondrial quality control (mitophagy). Defining the mechanisms regulating these different aspects of mitochondrial biology, their importance for muscle physiology, as well as the interrelations will be critical for expanding understanding of the role played by mitochondria in skeletal muscle physiology and health. The present research topic provides readers with novel experimental approaches, knowledge, hypotheses and findings related to all aspects of mitochondrial biology in healthy and diseased muscle cells.Skeletal muscle is the most abudant tissue of the human body, making up to 40 to 50% of the human body mass. While the importance of optimal muscle function is well recognized in the athletic field, its significance for general health is often underappreciated. In fact, the evidence that muscle mass, strength and metabolism are essential for our overall health is overwhelming. As the largest protein reservoir in the human body, muscles are essential in the acute response to critical illness such as sepsis, advanced cancer, and traumatic injury. Loss of skeletal muscle mass has also been associated with weakness, fatigue, insulin resistance, falls, fractures, frailty, disability, several chronic diseases and death. As a consequence, maintaining skeletal muscle mass, strength and metabolism throughout the lifespan is critical to the maintenance of whole body health. Mitochondria are fascinating organelles regulating many critical cellular processes for skeletal muscle physiology, including for instance energy supply, reactive oxygen species production, calcium homeostasis and the regulation of apoptosis. It is therefore not surprising that mitochondrial dysfunction has been implicated in a large number of adverse events/conditions and pathologies affecting skeletal muscle health. While the importance of normal mitochondrial function is well recognized for muscle physiology, there are important aspects of mitochondrial biology that are still poorly understood. These include mitochondrial dynamics (fusion and fission processes), morphology and processes involved in mitochondrial quality control (mitophagy). Defining the mechanisms regulating these different aspects of mitochondrial biology, their importance for muscle physiology, as well as the interrelations will be critical for expanding understanding of the role played by mitochondria in skeletal muscle physiology and health. The present research topic provides readers with novel experimental approaches, knowledge, hypotheses and findings related to all aspects of mitochondrial biology in healthy and diseased muscle cells.