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Musculoskeletal

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Skeletal muscle wasting, defined as a decrease in muscle mass and resulting in severe weakness, is common, debilitating and without current treatment options. Muscle atrophy is observed in settings of disuse, cancer cachexia, Chronic Obstructive Pulmonary Disease, AIDS-related cachexia, congestive heart failure, severe burn, and as a side-effect of high-dose glucocorticoid treatment. The reduction in strength and endurance associated with the loss of muscle mass results in functional limitations, reduced quality of life, and increased mortality. Muscle wasting occurs by an imbalance between protein synthesis and degradation. During atrophy, there is a down-regulation of protein synthesis pathways, and a concomitant activation of protein breakdown pathways. In contrast, skeletal muscle hypertrophy is defined as an increase in muscle mass and is accompanied by an increase in protein synthesis and force and a decrease in protein degradation. Anabolic factors such as Insulin-like Growth Factor 1 (IGF-1) have been shown to induce skeletal muscle hypertrophy, increase force, and attenuate muscle wasting in various conditions. Therefore stimulation of anabolic pathways may be an effective therapeutic approach to treat skeletal muscle wasting.

My research aims at elucidating the molecular mechanisms implicated in the pathogenesis of skeletal muscle atrophy and at the development of innovative therapies for muscle atrophy that accompanies a number of diseases (e.g., cachexia, COPD, AIDS) or is associated with aging (sarcopenia).

Selected Publications

ATP citrate lyase improves mitochondrial function in skeletal muscle.
Das S, Morvan F, Jourde B, Meier V, Kahle P, Brebbia P, Toussaint G, Glass DJ, Fornaro M.
Cell Metab. 2015 Jun 2;21(6):868-76.

Gαi2 signaling is required for skeletal muscle growth, regeneration and satellite cell proliferation and differentiation.

Minetti GC, Feige JN, Bombard F, Heier A, Morvan F, Nürnberg B, Leiss V, Birnbaumer L, Glass DJ, Fornaro M.
Mol Cell Biol. 2014 Feb;34(4):619-30.

Gαi2 signaling promotes skeletal muscle hypertrophy, myoblast differentiation, and muscle regeneration.
Minetti GC, Feige JN, Rosenstiel A, Bombard F, Meier V, Werner A, Bassilana F, Sailer AW, Kahle P, Lambert C, Glass DJ, Fornaro M.
Sci Signal. 2011 Nov 29;4(201):ra80.

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