

Title: Role of cytoskeleton controlling muscle cell's contraction

Project scope:

Muscle contraction is fundamental for body locomotion, breathing and heart beating. Muscle cells have a unique cellular structure called triads to convert signals from the motor neurons into muscle contractions. These cellular structures are regulated by the cytoskeleton of actin and microtubules. The Arp2/3 complex consisting of seven protein subunits is essential to stimulate dynamic branched actin networks during multiple fundamental cellular processes. We found that specific Arp2/3 isoforms are essential for normal muscle development, specifically the position of the nucleus in the periphery of the myofibers and the formation of muscle triads (Roman et al. 2017).

The proposed project will use structural, biochemical and cellular approaches to understand the regulation and properties of the eight different human Arp2/3 complexes during muscle development and regeneration. We use state-of-the-art microscopy techniques (multicolor time-lapse fluorescent microscopy, photo-activation and photo-switchable techniques, fluorescence recovery after photobleaching - FRAP) combined with molecular biology, biochemistry and micromanipulation (microinjection) approaches to address this process both in vitro and in vivo

The mechanisms that we will identify are potential targets for therapies to correct muscle disorders.

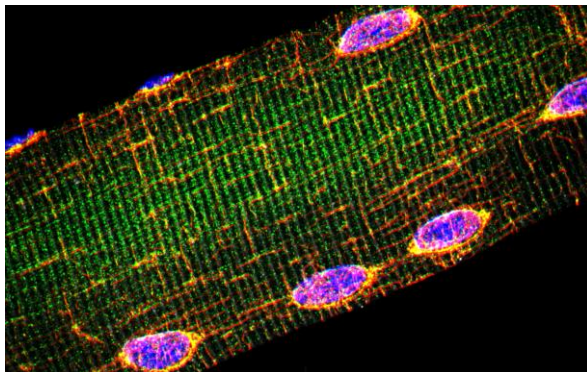


Figure 1.

Isolated myofiber with peripheral nuclei.

Green - Gamma actin

Red - Microtubules

Blue - Nucleus

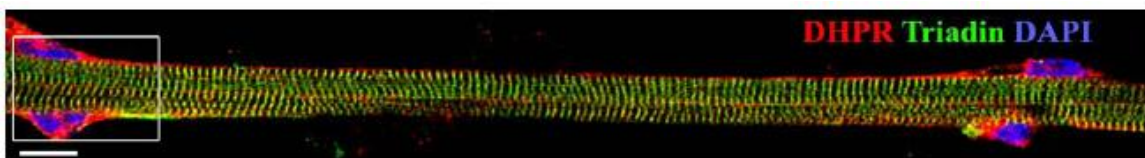


Figure 2- Skeletal muscle fiber, differentiated in vitro, with peripheral nuclei (blue) and fully formed triads (Red and Green).

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For more information on the Gomes laboratory, please visit our website [here](#).

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