

## 10. Milestones and frontiers in cellular physiology of muscle fiber types

Juan C. Calderón<sup>1</sup>, Andrés F. Milán<sup>1</sup>, Erika Arenas<sup>1</sup>

The functional properties of a muscle derive from its fiber type composition. Research of the last century discovered four fiber types in trunk and extremities of mammalian muscle: I, IIA, IIX and IIB. The molecular marker of a fiber type is the isoform of myosin heavy chain (MHC) present in a fiber. Other markers, such as oxidative or glycolytic enzymes allow us to characterize the metabolic profile of a fiber type, but are not the markers for classification. Despite the availability of a lot of biochemical information on fiber types, physiological and pathophysiological research has not always been conducted to generate fiber types-focused (FTF) information. This kind of information is important because fiber types are differentially involved in sports and physical performance, metabolic health, muscle and neuromuscular diseases, and normal muscle function. There are two approaches for FTF studies: knowing fiber types a posteriori, or a priori. The first method is widely used but time-consuming. We propose that having an enriched preparation with a unique fiber type will help us perform experiments knowing a fiber type a priori. For this, we have focused on classifying fiber types in muscles not used for physiological experiments up to now and started studies to analyze fiber types in cells suspensions after enzymatic dissociation. Also, experiments characterizing Ca<sup>2+</sup> transients and their relation to fiber types thought us that Ca<sup>2+</sup> transients' kinetics could be used to study a specific fiber. In conclusion, studies on muscle role in normal physiology, sports, health and diseases should be FTF. We continue working to develop new models for studies on fiber types.

### BIBLIOGRAPHY

1. Calderón J, Bolaños P, Caputo C. The excitation-contraction coupling mechanism in skeletal muscle. *Bio-phys Rev* 2014;6:133-160.
2. Londoño FJ, Calderón JC, Gallo J. Association between thigh muscle development and the metabolic syndrome in adults. *Ann Nutr Metab* 2012;61(1):41-6.

.....  
1 PHYSIS Group, Department of Physiology and Biochemistry, Faculty of Medicine, University of Antioquia, Medellín  
Correspondencia: Juan Camilo Calderón; jcalderon00@yahoo.com