

Chronic Obstructive Pulmonary Disease

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Biological mechanisms of muscle mass loss and cachexia in patients with COPD

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Muscle dysfunction is a major systemic manifestation in patients with lung diseases, especially in those with chronic obstructive pulmonary disease (COPD). The difference between respiratory and limb muscle dysfunction needs to be made as the diaphragm must contract at a specific resting length, which is not the case in the limb muscles. A reduction in lower limb muscle strength (namely quadriceps weakness) and atrophy (smaller size of the muscle fibers) have important clinical implications as they are predictors of disease prognosis and mortality in COPD patients. In the last two decades, many different factors and biological mechanisms have been shown to participate in the multifactorial etiology of skeletal muscle dysfunction in COPD. Our group has extensively contributed to the understanding of part of those mechanisms such as muscle oxidative stress and inflammation, oxidation of specific key muscle proteins, systemic inflammation, proteolysis mediated by the ubiquitin-proteasome system, structural muscle alterations (myofibers and sarcomere disruptions), deficiency in key muscle proteins, nutritional abnormalities, signaling pathways of muscle atrophy, apoptosis, autophagy, epigenetics, unfolding of muscle proteins and modifications of these molecular and cellular events in response to several therapeutic strategies such as exercise and/or muscle training and rehabilitation. The conclusions are that until effective and safer pharmacological therapies emerge, exercise and muscle training modalities, alone or in combination with nutritional support, are undoubtedly the best treatment options to improve muscle mass and function and quality of life in COPD patients. In my talk, the most recent results shown to be involved in the pathophysiology of skeletal muscle dysfunction in patients with COPD will be shown and discussed.

Biography

Esther Barreiro coordinates a research group at Hospital del Mar-IMIM and Pompeu Fabra University, Barcelona, Spain. She has obtained more than 40 grants to conduct medical research in COPD and has published more than 140 articles in peer-reviewed international journals and several book chapters. She is an Editor-in-Chief of *Archivos de Bronconeumología* (July 2012), Associate Editor of *Journal of Applied Physiology* (July 2011) and a Member of the Editorial Board of *American Journal of Respiratory and Critical Care Medicine* (January 2012). She is also a Member of the American Thoracic, American Physiological, European Respiratory and Spanish Respiratory Societies.

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