Molecular mechanisms of muscle atrophy

M. Sandri, Venetian Institute of Molecular Medicine, University of Padova, via Orus 2, 35129 Padova, Italy.

Skeletal muscle is a plastic organ that is modulated by multiple pathways regulating cell and protein turnover. During muscle atrophy, proteolytic systems are activated and contractile proteins are removed together with organelles, resulting in the shrinkage of muscle fibres. The excessive loss of muscle mass is associated with poor prognosis in several diseases, including myopathies and muscular dystrophies, as well as in systemic disorders such as cancer, diabetes, sepsis and heart failure. Muscle loss also occurs during aging. Protein synthesis and degradation are coordinately regulated by signaling pathways that are influenced by mechanical stress, physical activity, and the availability of nutrients and growth factors. Understanding how these pathways regulate muscle mass may provide therapeutic targets for the prevention and treatment of muscle atrophy in metabolic and neuromuscular diseases.