

A Visual and Biomechanical Approach to Sarcomere Dynamics

Michael Gotthardt

Max-Delbrück-Centrum für Molekulare Medizin, Berlin

Abstract:

When we think of muscle, we generally think of contractile function, although this comprises the minor part of its day. Indeed, when sarcomeres - the contractile units of muscle - are not assembled or disassembled, they are largely in a state of relaxation. This is not only crucial to conserve energy, but also to align actin and myosin and prepare the following contraction. The main determinant of muscle relaxation is the giant protein titin, which forms a continuous filament along the myofiber overlapping at the Z-disc and M-band of the sarcomere. Each titin molecule acts as a series of springs and the combined mechanical forces are regulated by differential binding of adaptor proteins, posttranslational modifications, and alternative splicing. We have used genetic engineering to generate animal models that allow us to follow titin in real-time and study its elastic properties and their regulation. Understanding how muscles relax has important implications for regeneration and increasing contractile efficiency.

Friday, October 21st, 2016, 13:00

Room PH 127