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THIN FILAMENTS AND MICROFILAMENTS – FUNCTIONAL COMPLEXES OF ACTIN AND TROPOMYOSIN

Summary

Actin is a universal protein highly conserved in evolution. In cells, actin exists in equilibrium between a monomeric and filamentous form. In spite of a conservative structure, actin plays amazingly versatile functions. This is possible due to its interactions with numerous actin-binding proteins, among them with myosin motors and proteins regulating dynamic polymerization and depolymerization of actin. Tropomyosins, superhelical proteins, which polymerize along the filament and stabilize actin by preventing its depolymerization, are superior actin filament regulators. Tropomyosins control the access and activity of various actin-binding proteins. Tropomyosins act thus as actin “gate-keepers” which control actin interactions leading to the segregation of actin-binding proteins into specific cell compartments where they perform specific cellular functions. This article discusses tropomyosin-dependent mechanisms of regulation of actin interactions with some myosins as well as Arp2/3 and cofilin – the proteins, which initiate branching, polymerization and depolymerization of actin filaments.

Key words: actin, dynamics, filament, regulation, tropomyosin