

How actin networks are actin'

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Dynamic networks of growing actin filaments are critical for many cellular processes, including cell migration, intracellular transport, and the recovery of proteins from the cell surface. In this week's issue of the open-access journal PLoS Biology, researchers at Washington University in St. Louis shed light on how multiple proteins cooperate to regulate the assembly of such actin networks.

A central player in generating actin networks is the Arp2/3 complex. In most cells, there are multiple proteins that can regulate the function of the Arp2/3 complex, although how the activities of these proteins are coordinated in the cell to generate the appropriate network of actin filaments in a complex, multi-step process remains unclear. To better understand how multiple Arp2/3 regulatory proteins are coordinated in the cell, Brian Galletta, Dennis Chuang, and John Cooper used a combination of live-cell imaging, computer-aided particle tracking, and quantitative motion analysis to determine how disruption of the function of each of these regulatory proteins, individually and its combination, altered the movement of actin patches in bakers yeast.

These studies have revealed that while Arp2/3 regulatory proteins sometimes play overlapping roles in this process, they often play unique roles. The molecular machinery contained in actin patches can be found throughout nature. Therefore, Brian Galletta says that, "these studies should shed light on how actin networks are regulated in human cells during normal cell function and allow for a better understanding of how actin misregulation might contribute to the progression of disease processes including cancer, inflammation, and infection."

Source: Public Library of Science

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