

The role of actin, myosin II and cadherins in the cortex of living cells.

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Adhesion induces dramatic morphological and mechanical changes to cells, which are reflected by changes to the actin cortex. Among the many different proteins involved in this sub-membranous layer, motor proteins (e.g., nonmuscle myosin II) and actin nucleators (e.g., Arp2/3, formins) are known to have significant influences on its dynamics and structure. In this work, we present the interplay between the dynamics, structure, and mechanics of the actin cortex in adhered cells and in cells in suspension and the different roles of NMII, Arp2/3, and formins. We will outline how we plan to continue this study to investigate the structure of the actin cortex of healthy and cancerous cells in the context of E-cadherin based cell-cell contacts. Our data build towards a comprehensive understanding of the actin cortex. This understanding allows the prediction and control of cortical changes, which is essential for the study of general cellular processes, such as cell migration, metastasis, and differentiation.