

**P044** Anillin is a scaffold protein that links RhoA, actin, and myosin during cytokinesis

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Active RhoA is essential for contractile ring formation and accumulates at the cell equator to promote the polymerization of actin and activation of myosin. Anillin is an actin and myosin-binding protein involved in cytokinesis and is an early marker of the cleavage furrow. However, anillin's molecular function is not well understood. Using a combination of localization and rescue-based assays in HeLa cells, we determined that a conserved C-terminal domain, the anillin homology domain (AHD), is required for anillin function and cleavage furrow localization. Cells depleted of anillin form furrows that partially ingress followed by dramatic cell oscillations and furrow regression. However, despite the high level of contractility, endogenous RhoA is not stable to fixation, suggesting that anillin and RhoA may interact *in vivo*. The AHD shares homology with Rhotekin, a RhoA-GTP binding protein, and we determined that the AHD also constitutes a RhoA binding region. In anillin-depleted cells, myosin accumulates at cell poles and triggers cellular oscillations. In cells depleted of both anillin and the centralspindlin component MKLP1, myosin mislocalizes around the entire cortex, and these cells fail to form cleavage furrows. These results indicate that anillin directly links RhoA to its downstream effectors, such as myosin, to retain them in the cleavage furrow and facilitate cytokinesis.