

Dissecting the roles of formins in cell cortex formation

Jan Faix

**Medizinische Hochschule Hannover, Department of
Physical Chemistry, Hannover**

Abstract:

Morphogenesis, the immune response or the spread of cancer all depend on the ability of cells to migrate. Cell migration is driven by the establishment of disparity between the cortical properties of the softer front and the more rigid rear to allowing front extension and actomyosin-based rear contraction but depends on cell type and environmental context. The contractile actin cortex is a thin layer of bundled or crosslinked actin filaments, non-muscle myosin II, and associated proteins beneath the plasma membrane of eukaryotic cells. Assembly and contraction of this layer generates cortical tension and plays a central role in migration, cell division, and tissue morphogenesis. Despite its significance, the assembly, structural organization, membrane attachment and mechanics of the actin-rich cortex are still not well understood. Using a combination of imaging, molecular biology and biophysics we have identified a number of formins as key regulators and seek to understand the functions of these proteins cell cortex function, the underlying pathways and principles that underlie migration through complex environments.

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