

Guillaume Salbreux

MAX PLANCK INSTITUTE FOR THE PHYSICS OF COMPLEX SYSTEMS, DRESDEN
e-mail: salbreux@pks.mpg.de

Role of the polar actin cortex in cytokinesis

During cytokinesis, the process of physical separation of the cell into two daughter cells, actin filaments accumulate at the cleavage furrow, producing the force for the equatorial constriction. A cortical network is however also present at the membrane of the two cellular poles. The actin network is dynamically polymerized and depolymerized, and myosin molecular motors generate internal stresses in the layer, putting the cortex under tension. Here we show that for a sufficiently large value of the polar cortical tension, the symmetric shape of the dividing cell is theoretically unstable, and oscillations of the volume of the cellular poles are expected to occur for a sufficiently slow actin turnover rate. Such oscillations of dividing cells are experimentally observed and are well described by the theoretical framework we propose.