



Dr. Elisabeth Fischer-Friedrich

MPI für molekulare Zellbiologie und Genetik
Dresden

„Characterizing tension and stiffness of the cortex of mitotic HeLa cells”

At the entry to mitosis most animal cells change shape to become largely spherical. Thereby, cells gain a defined geometry, sufficient space for a mitotic spindle with proper orientation and correct chromosome segregation. It has been suggested that an increase of cell surface tension is a key player in this rounding process driving the cell towards a shape of minimal surface area.

Recent experiments (Stewart et al., Nature 2011) put forward the idea, that mitotic cells can be described by the simple mechanical model of pressurized sacs filled with liquid. In this picture, the excess of hydrostatic pressure in the cell is balanced by an effective surface tension stemming from the active tension in the acto-myosin cortex and membrane tension. The force balance at the cell boundary is then described by the Laplace law.

In collaboration with Jonne Helenius (ETH, Basel), we have applied uniaxial parallel plate compression to mitotic HeLa cells, verifying Laplace's law as the determinant of cell shape. We have quantified the increase of surface tension during mitosis.

Furthermore, I use this assay of parallel plate compression of cells to stretch the cell envelope by a defined amount, which allows to extract rheological parameters of the cell envelope. Calculated area stiffnesses point to Young's moduli of the cortex that are significantly higher than values obtained by AFM indentation and application of the Hertz model.

Dienstag, 22. Oktober 2013, 14.00 c.t.

Gebäude E2 6, Seminarraum E.04

Saarbrücken

Der Gast wird betreut von Karsten Kruse (Tel. 2763)

Alle Interessenten sind herzlich eingeladen.

Die Sprecher des SFB und des GRK
Heiko Rieger, Ludger Santen und Manfred Lücke