WWTF Project MA09-004

# Mathematical modeling of actin driven cell migration


## Abstract

For living cells, the cytoskeleton performs, on a nano-scale, functions analogous to the skeleton, the muscular system, the blood and lymphatic circulation, and the nervous system in the human body. It is responsible for mechanical stability, movement, transportation of substances and signalling within the cell. The cytoskeleton consists of polymer filaments. A central role in cell migration is played by the lamellipodium, which is not only the main movement organ of many crawling cells, it is also believed to be the main site of actin filament initiation and polymerization. In this project, the structure and the dynamics of the cytoskeleton in the lamellipodium are studied by a combination of microscopy and mathematical modelling. In an interdisciplinary cooperation between a mathematical and a biological group, both partners contribute unique approaches: electron tomography for three-dimensional imaging and, respectively, a new type of continuum mechanics model for the dynamics of the lamellipodium.



Keywords:
cytoskeleton, lamellipodium, actin filaments



| | |
|---|---|
| Principal Investigator: | Christian Schmeiser |
| Institution: | University of Vienna |
| Further collaborators: | John Victor Small (Austrian Academy of Sciences) |



Status: Completed (01.01.2010 - 31.12.2013) 48 months

Funding volume: EUR 505,100


Further links about the involved persons and regarding the project you can find at
https://archiv.wwtf.at/programmes/mathematics/MA09-004