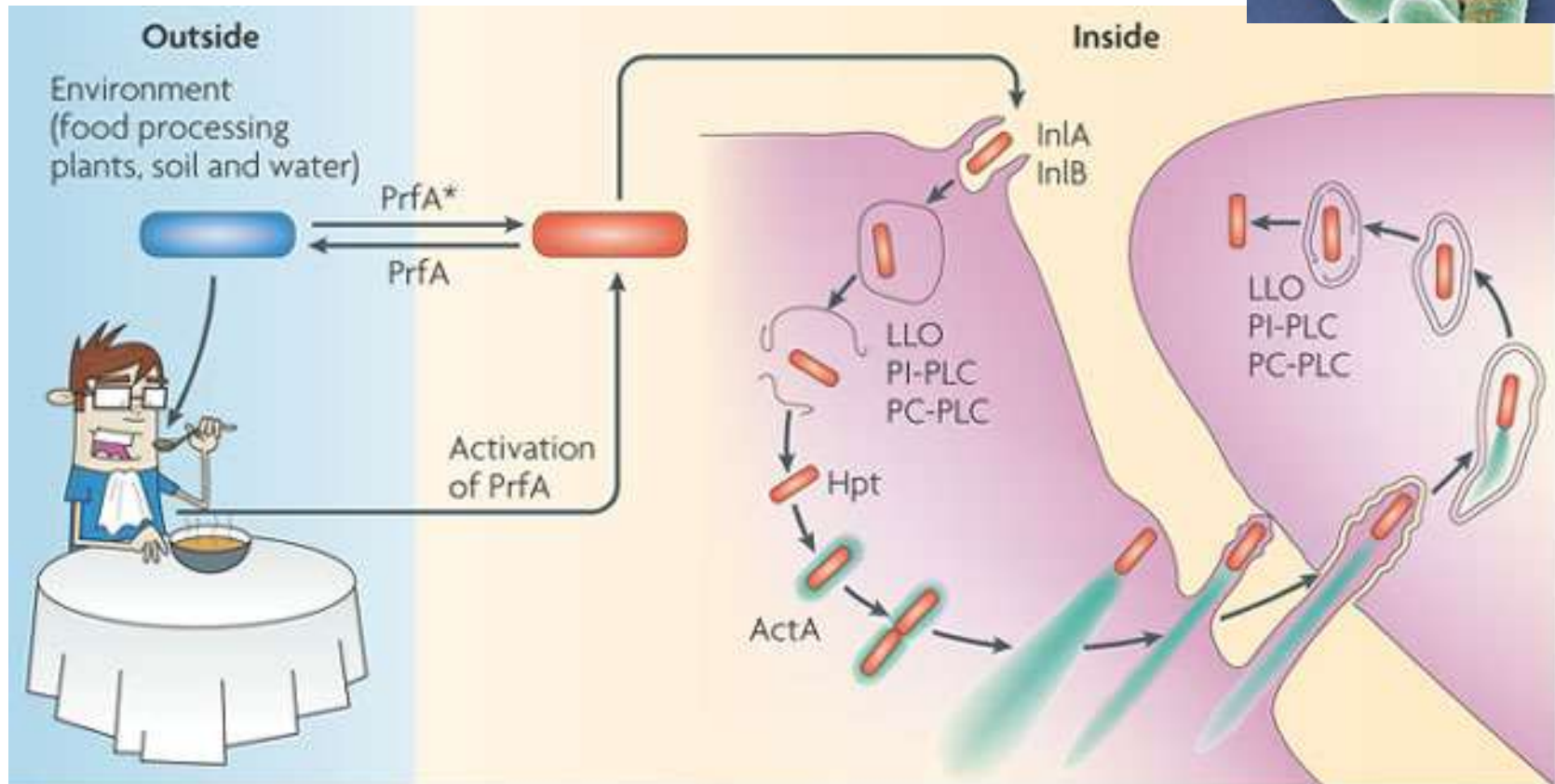
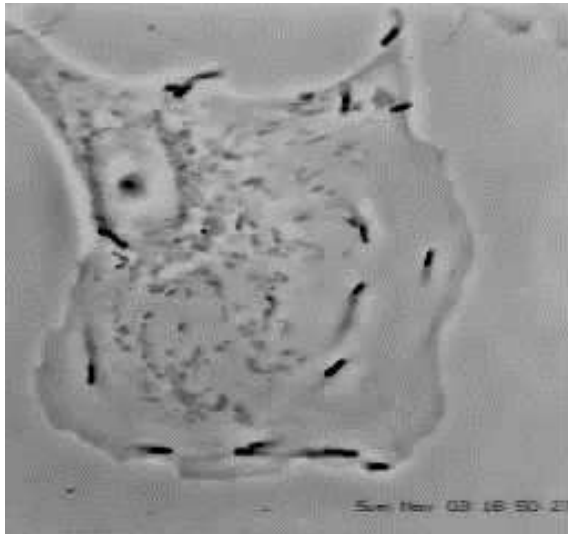


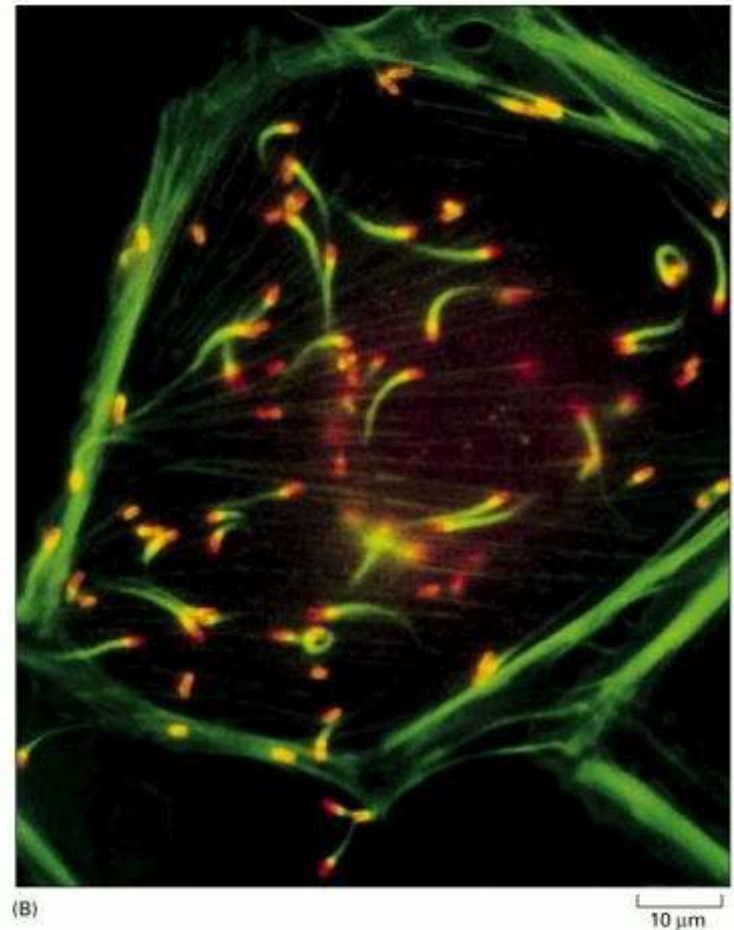
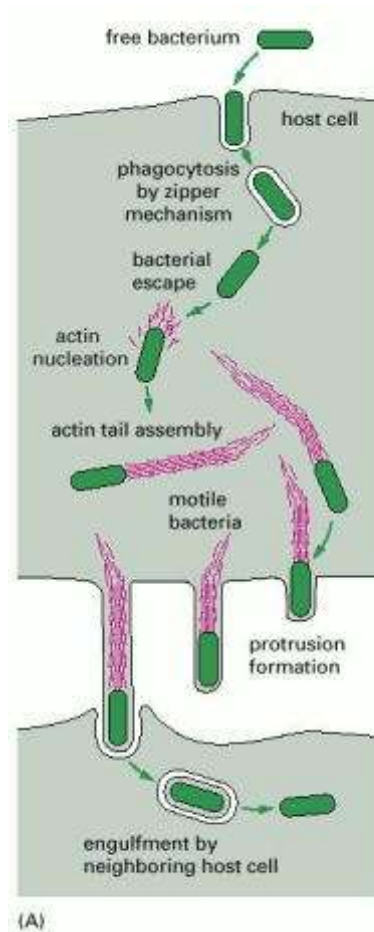
Listeria monocytogenes



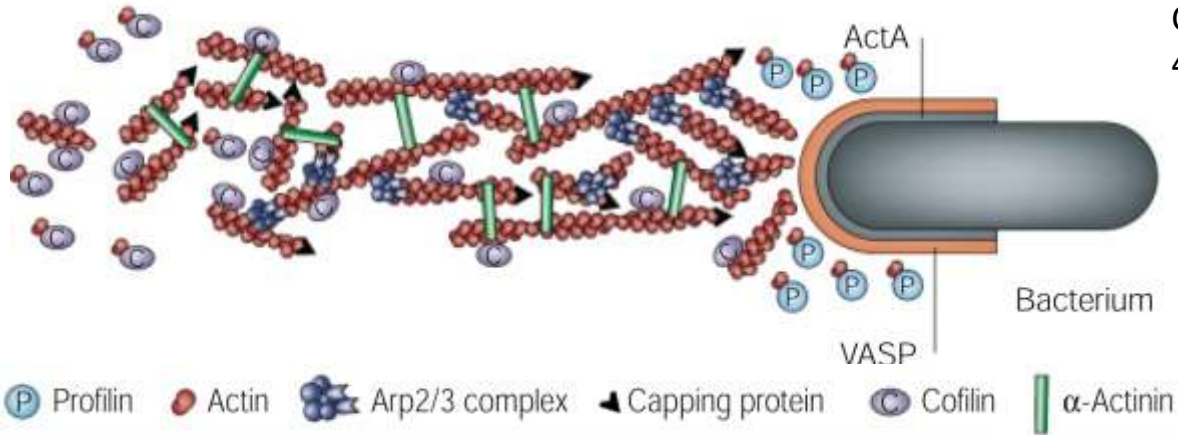
Listeria monocytogenes



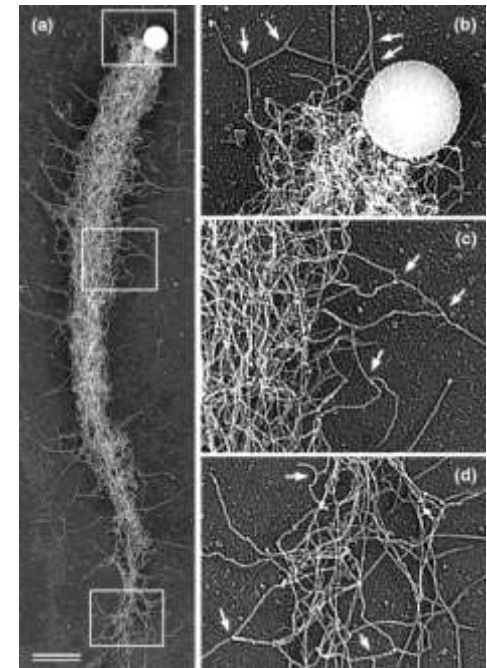
Listeria monocytogenes
moving in PtK2 cell
Speeded up 150x real time



Listeria monocytogenes



Comet tail assembled by bead with 40% surface coated with ActA

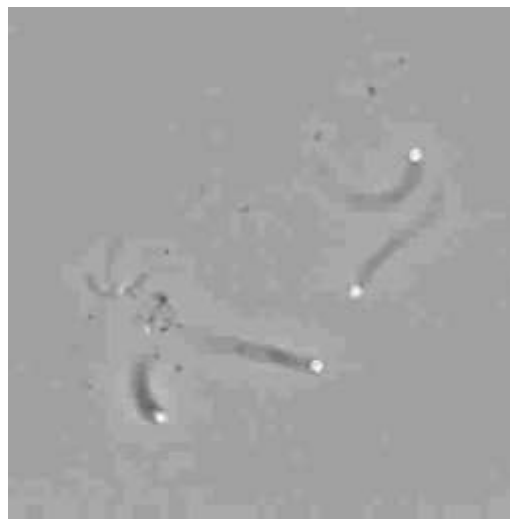


Cameron *et al.* Nature Reviews Molecular Cell Biology (2000)
DOI: 10.1038/35040061

Cameron *et al.* Curr. Biol. **11** (2001)
DOI: 10.1016/S0960-9822(01)00022-7
Cameron *et al.* PNAS **96** (1999)
DOI: 10.1073/pnas.96.9.4908

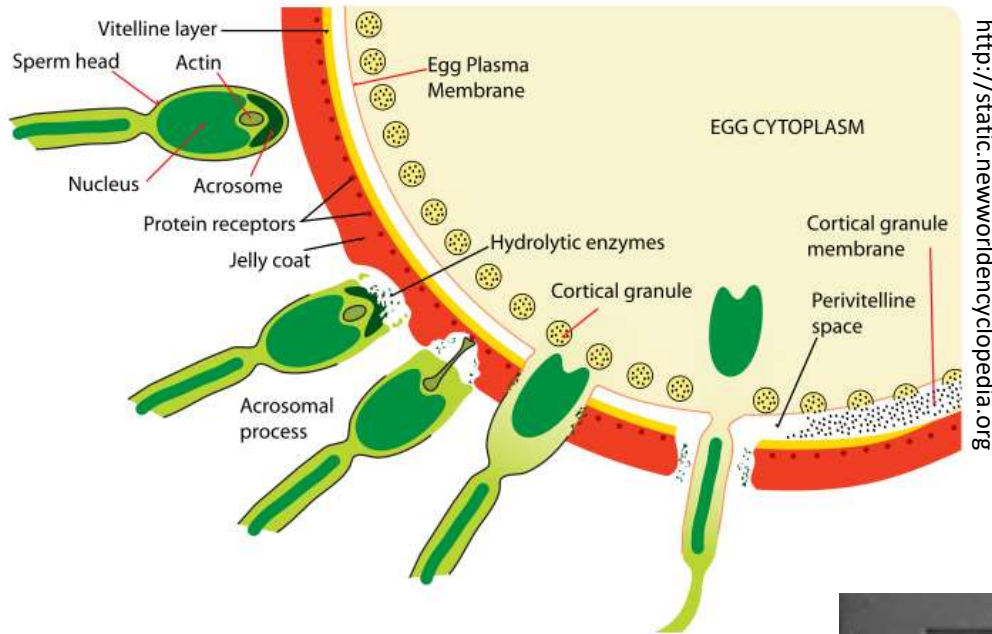
For more Information:

<http://tbilisitube.com/en/video/U-liQ2CsFqQ/Julie-Theriot-Stanford-Part-1-Cell-Motility>

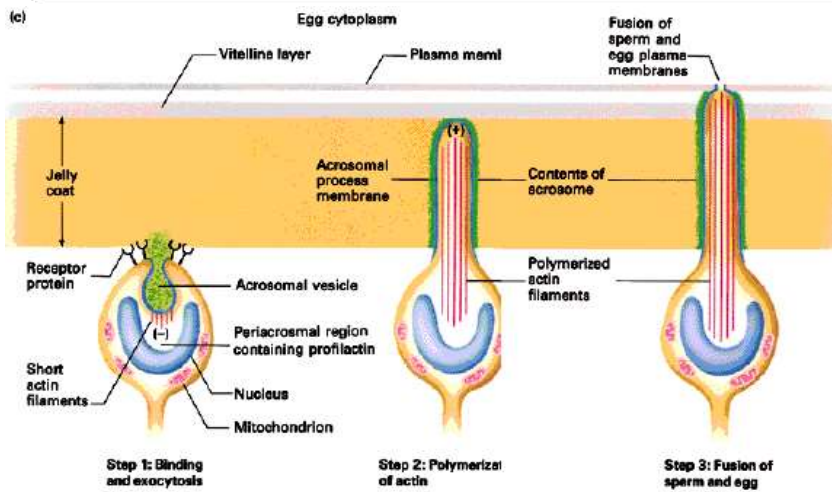


Wiesner *et al.* JCB **160** (2003)
DOI: 10.1083/jcb.200207148

The Acrosome Reaction

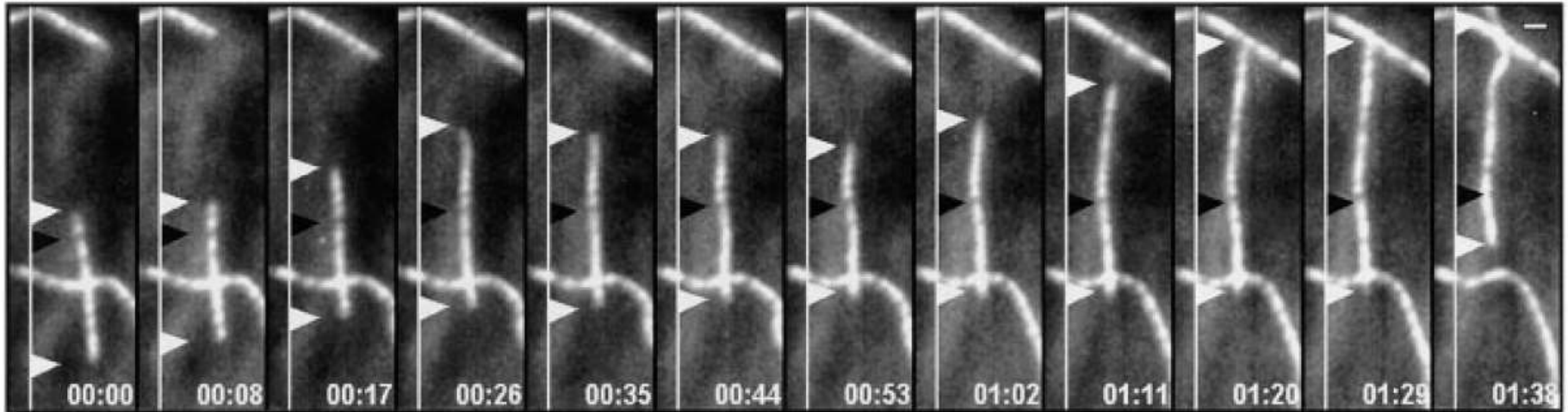


Thyone (sea cucumber) sperm
Real time (!) video microscopy



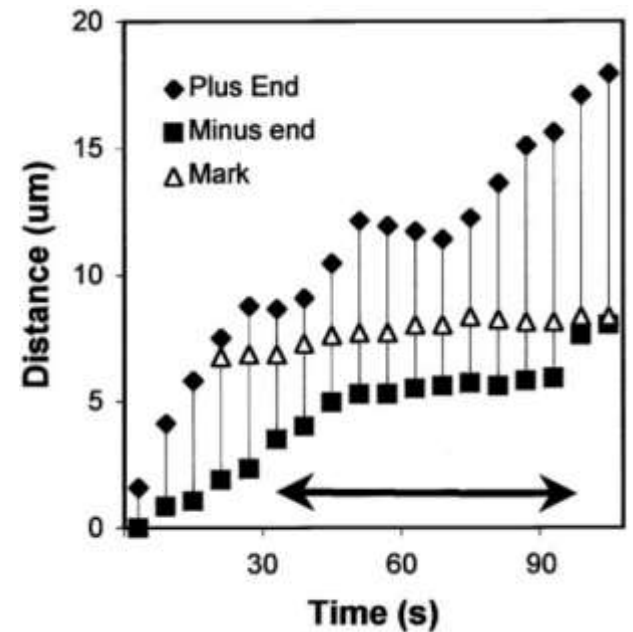
Tilney *et al.* Acrosomal reaction of Thyone sperm III. J. Cell. Biol. **100** (1985)

Treadmilling



2 μm

Fluorescently labeled microtubule in a cell's lamella undergoing treadmilling (minus end left, plus end right)



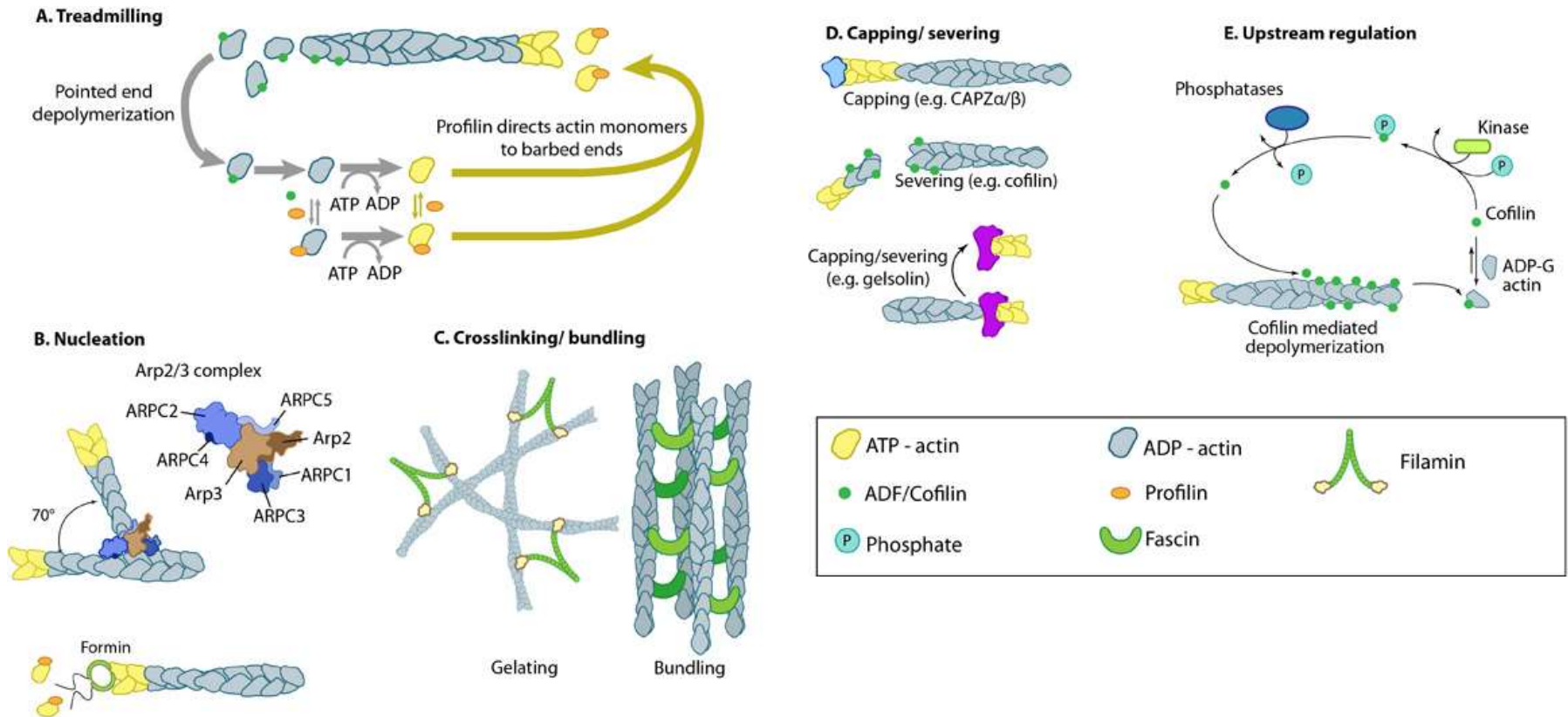
ATP/ADP Actin Dynamics

Actin Polymer Assembly

MB Info

Copyright 2012 by the author(s). All rights reserved. For personal use only.

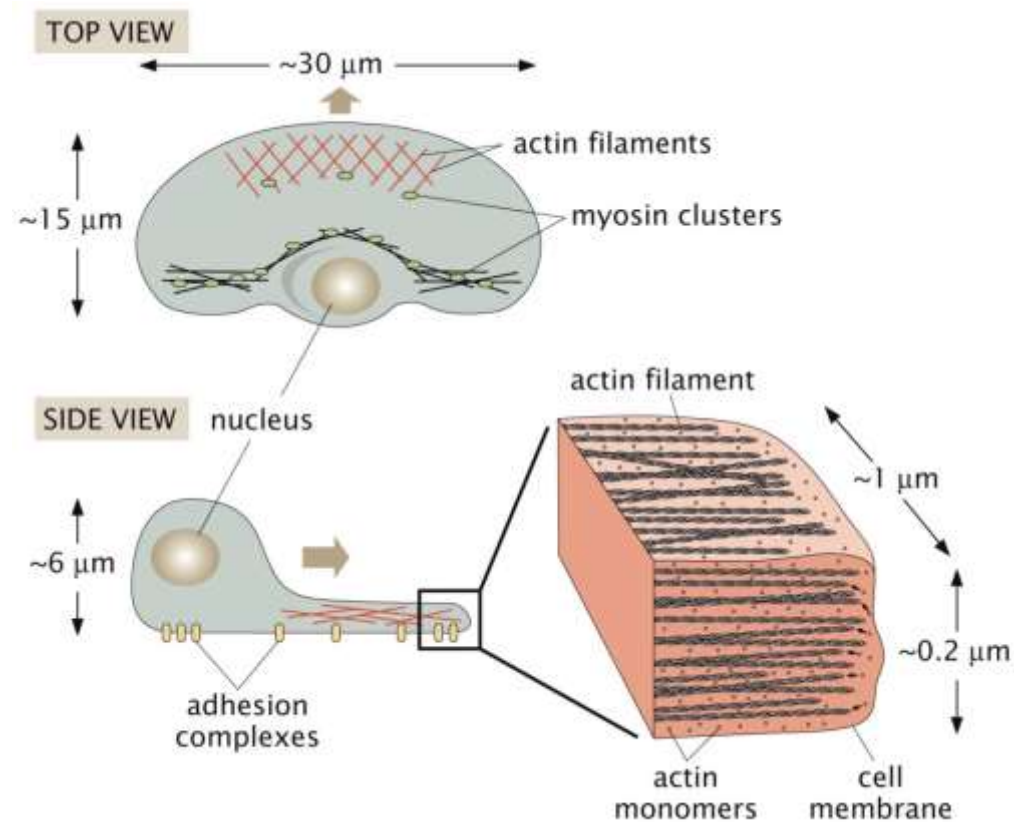
Actin binding proteins influence actin dynamics



Actin-Based Cell Motility



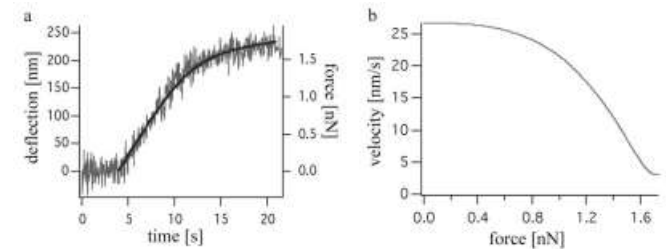
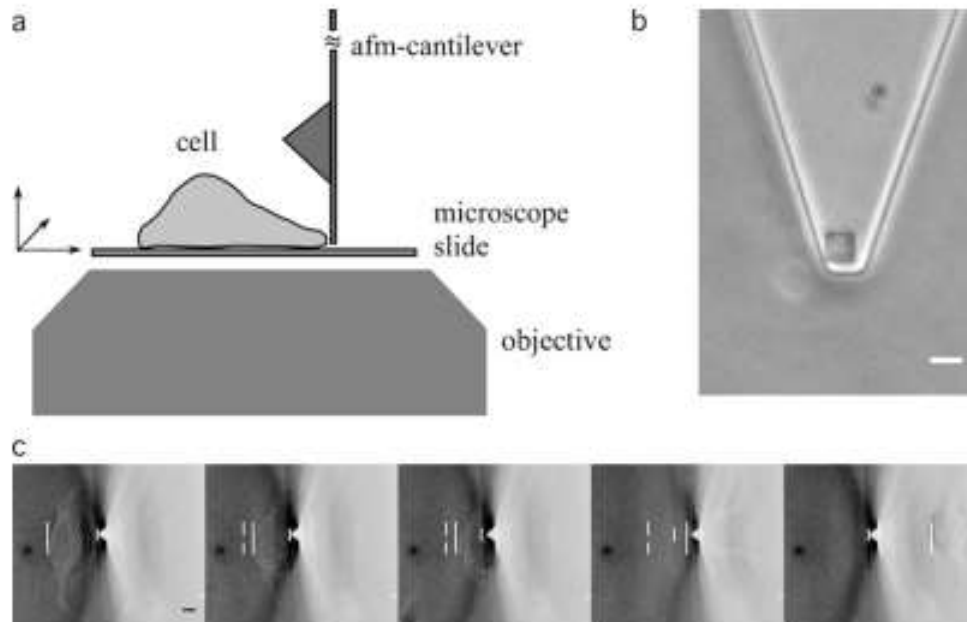
A fish keratocyte crawls rapidly using actin-based motility. Speeded up 30x.



Physical Biology of the Cell, Garland Science 2013

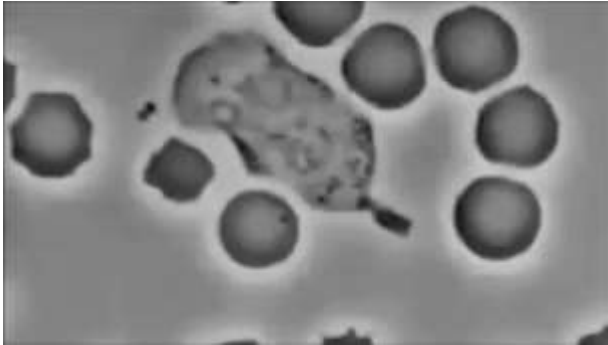
Actin-Based Cell Motility

AFM Measurement of Cell's Protrusive Migration Force



Prass *et al.* J. Cell Biol. **174** (2006)

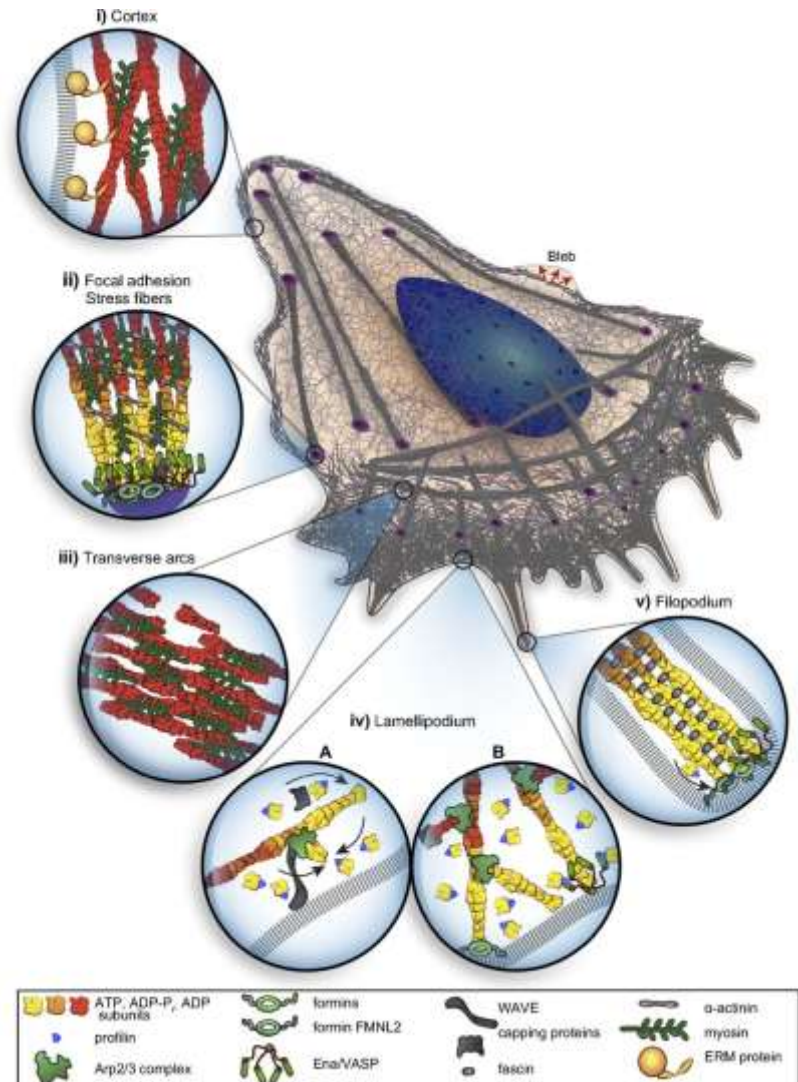
Actin-Based Cell Motility



Vanderbilt University
<https://www.youtube.com/watch?v=2d1SFqJJeVY>

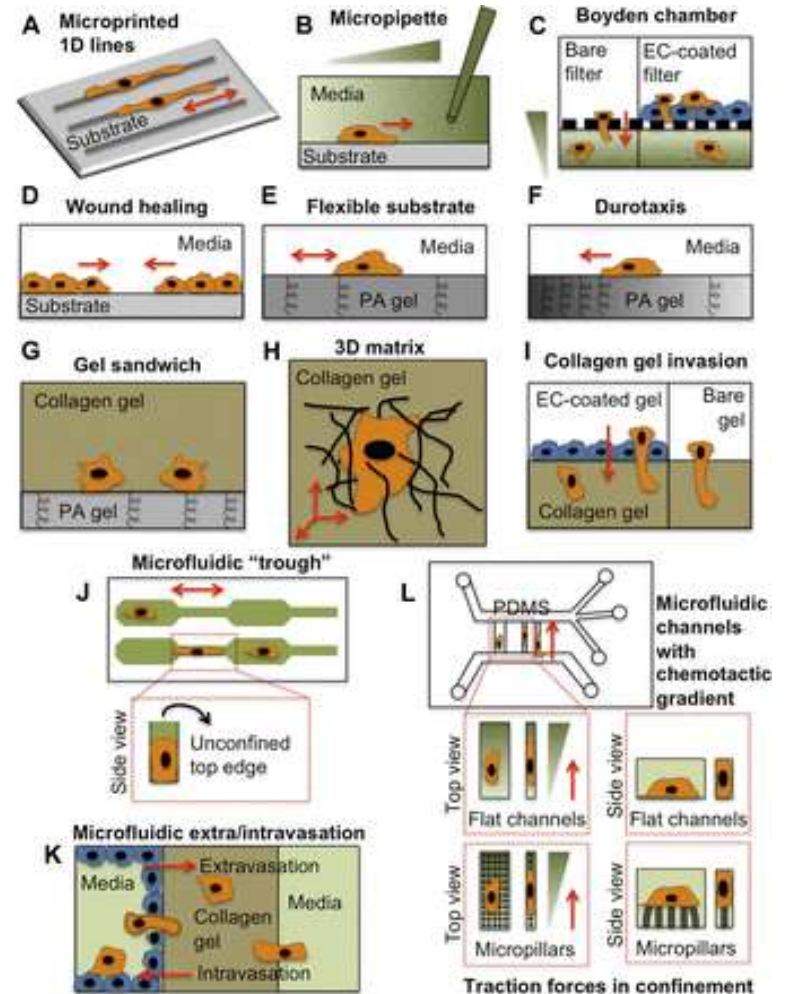
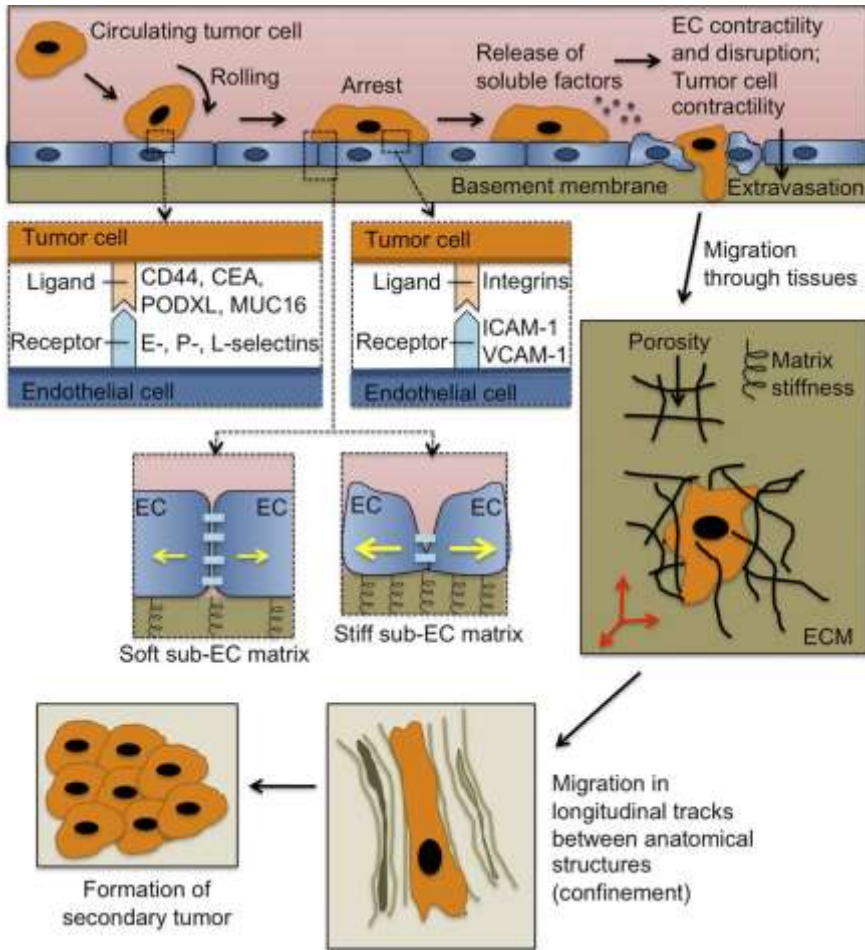


<http://www.youtube.com/watch?v=4bvskwAnlXU>

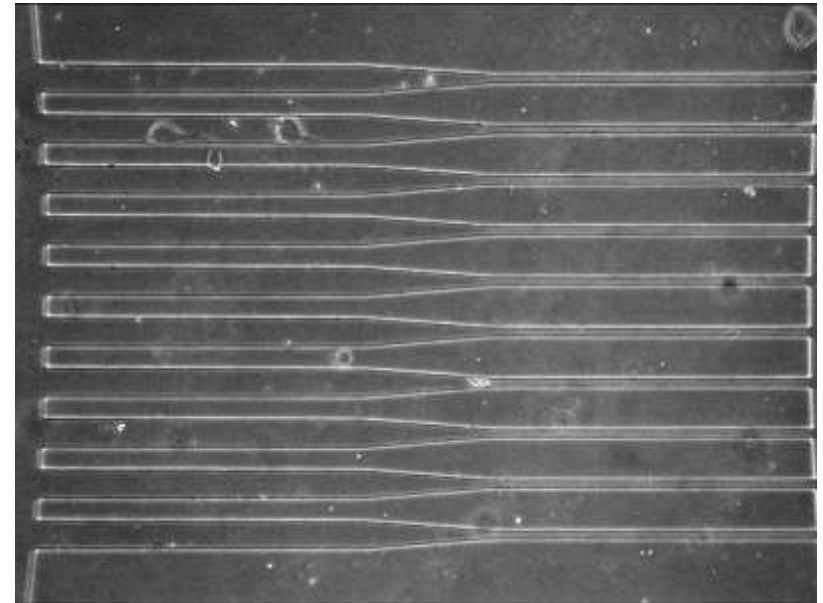
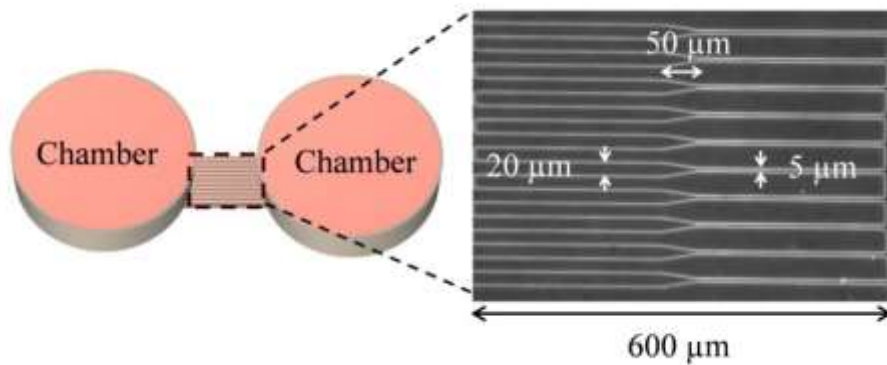


Blanchoin *et al.*
 Physiological Reviews (2014)

Cancer and Cell Motility

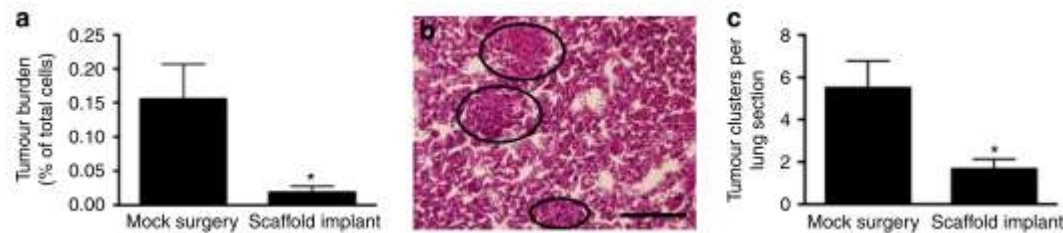


Cancer and Cell Motility



Rao *et al.* Micromachines 5 (2014), DOI: 10.3390/mi5010013

“Trapping” Cancer Cells



Azarin *et al.* Nature Communications 6 (2015), DOI: 10.1038/ncomms9094
 Comment in Nature 525 (2015), DOI: 10.1038/525292d



<http://www.bbc.com/news/health-34191325>

Topics

Introduction

Scaling effects (physics from micro to nano scale)

Micro- and nanomanipulation

Micro- and nanofluidics

Nano meets bio: Lab-on-a-chip technology

Entropic effects and free energy

Polymers physics

Mechanics of cells and tissues

Interface and membrane physics

Diffusion

Physics of the cytoskeleton

Cellular forces and motor proteins

Analytical and microscopy techniques → Seminar

Extra: Block practical / lab tour

Thank you for your participation!!!