

BIOLOGICAL FRAMEWORKS FOR ENGINEERS

Session #17 [Cell Movements]

General Objectives:

- ✓ Discuss the importance of cell motion in normal physiology and pathophysiology
- ✓ Discuss the mechanics of cytokinesis, cell migration, and cell contraction

Central Framework:

- ✓ Cell movement is central to the form and function of tissues in an organism and is accomplished using motor proteins.

Interactive Activity:

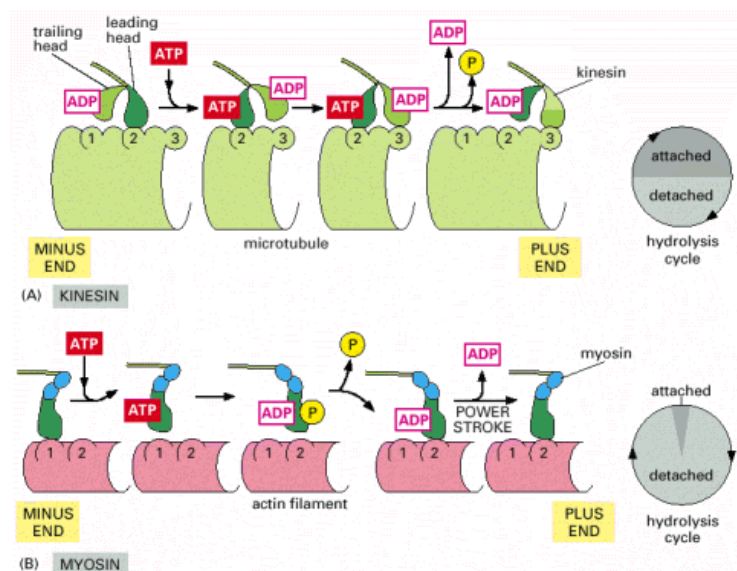
- ✓ Videos

Session Outline:

A. Molecular Motors

Kinesin & Dynein

Myosin



B. Cytokinesis

Prophase

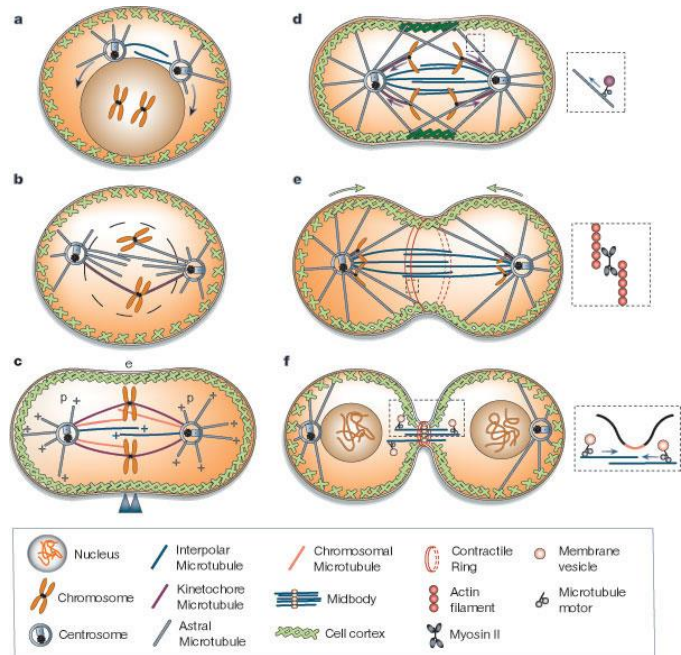
Prometaphase

Metaphase

Anaphase A

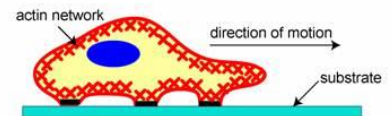
Anaphase B

Telophase

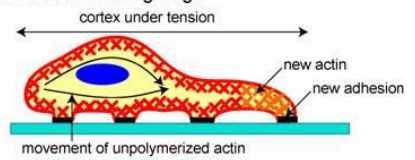


C. Cell Migration

1) Protrusion of the Leading Edge



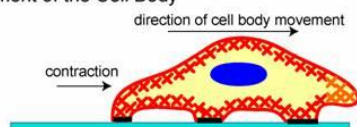
2) Adhesion at the Leading Edge



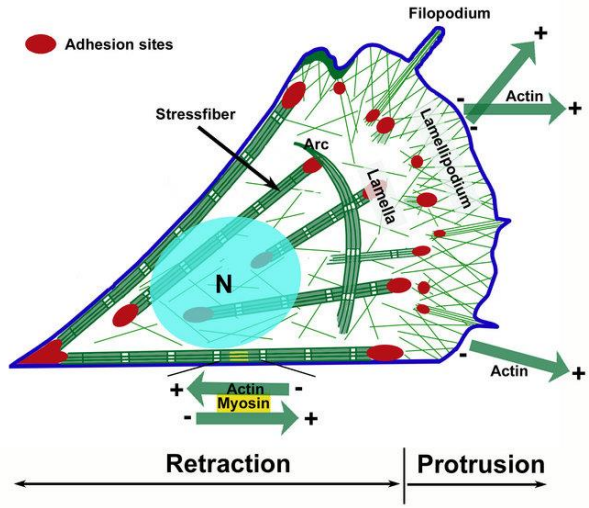
Deadhesion at the Trailing Edge



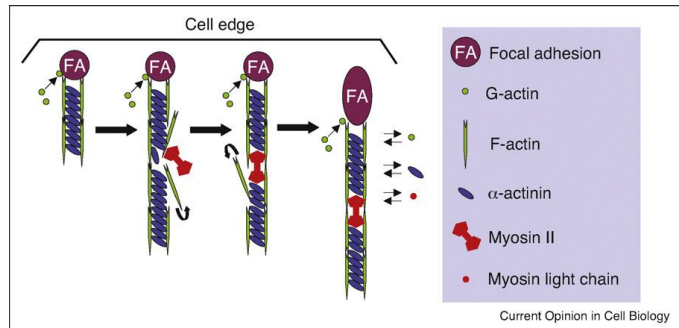
3) Movement of the Cell Body



Lamellipodium & Filopodia



Stress Fibers



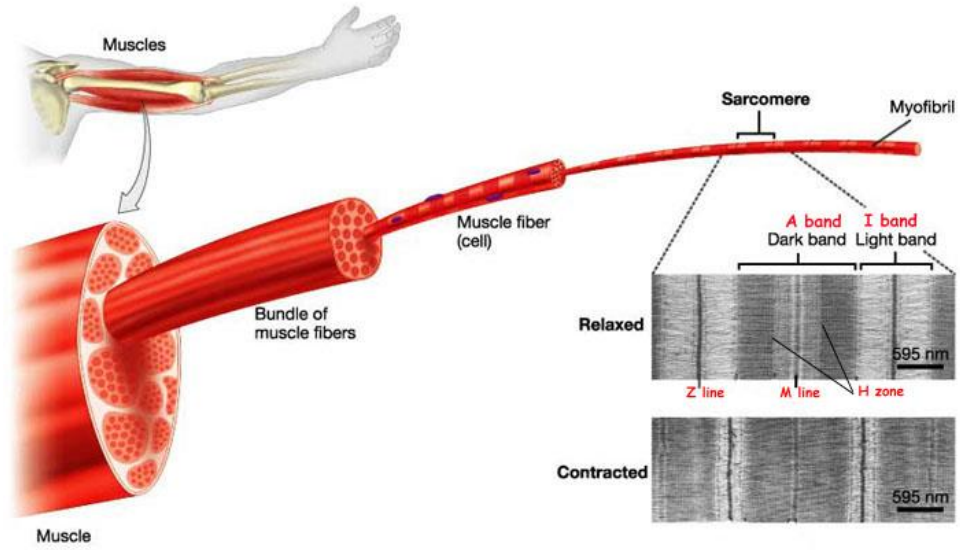
Multicellular Migration

D. Cell Contraction

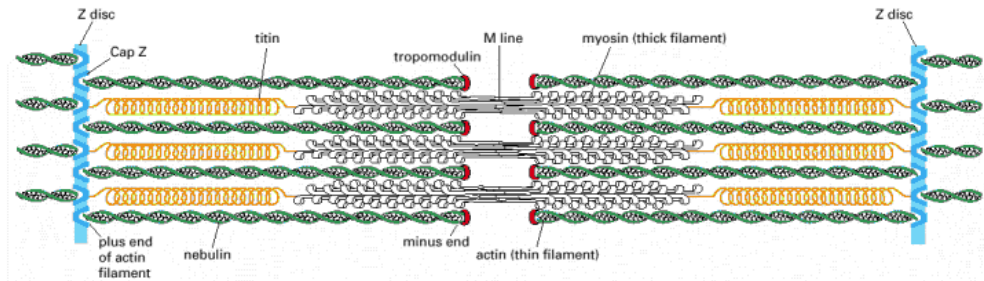
Wrinkling Membranes

Micropost arrays

Muscle Cells



Sarcomeres



Cardiac Contraction