The Cytoskeleton

What the cytoskeleton does

Three types of protein filaments

The cytoskeleton and cell-cell junctions
Intermediate filaments
Structure of intermediate filaments

Classes of intermediate filaments
Functions of intermediate filaments

Microtubules
Structure of microtubules
Microtubules assembly and disassembly
The centrosome: the major microtubule-organizing center in animal cells

(A) nucleating sites (rings of γ-tubulin)
(B) microtubules growing from γ-tubulin ring complexes of the centrosome

Dynamic instability

Growing

Shrinking

GTP tubulin molecules add to end of microtubule
addition proceeds faster than GTP hydrolysis

GTP cap

tubulin molecule with bound GTP

GTP tubulin are unstable and peel away from the microtubule wall

ODP tubulin is released to the cytosol

tubulin molecule with bound GDP
Functions of microtubules
Microtubule motor proteins
kinesins
dyneins

Organelles move along microtubules
Cilia and flagella:

Actin filaments
Structure of actin filaments
Actin and tubulin polymerize by similar mechanisms

The functions of proteins that bind to actin

The cell cortex

Cell crawling

Actin and myosin form contractile structures
Muscle contraction

How myosin "walks"