

Cytoskeleton

Chapter 17a

I. Cytoskeleton

II. Intermediate filaments

- A. Background
- B. Location
 - 1. cytoplasm
 - 2. nucleus = nuclear lamina
- C. Structure
 - 1. monomer - protein domains
 - 2. dimer
 - 3. tetramer
 - 4. octamers
 - 5. filament formation
- D. Function
- E. Classes
 - 1. cytoplasmic
 - a. keratin
 - b. vimentin & vimentin related filaments
 - c. neurofilaments
 - 2. nuclear = nuclear lamina
 - a. lamin
 - b. progeria
- F. Additional proteins
 - 1. plectin

III. Microtubules

- A. Background
- B. Structure
 - 1. tubulin
 - a. heterodimer
 - 1) α -tubulin
 - 2) β -tubulin
 - 2. polarized
- C. Tubule formation
 - 1. centrosome
 - 2. contents
 - a. centrioles
 - b. centrosome matrix
 - 1) γ -tubulin
 - a) nucleation site
 - 3. basal bodies
- D. Tubule growth
 - 1. half-life of tubule
 - 2. dynamic instability
 - 3. observational
 - 1) catastrophe
 - 2) rescue
 - 4. molecularly
 - 1) GTP cap
 - 5. overview
 - 6. drugs
 - a. lab
 - 1) colchicine & nocodazole
 - 2) nivblastine & vincristine
 - 3) taxol

E. Microtubule-associated proteins

F. Cilia & Flagella

1. background
2. structure
 - a. basal body
 - b. transition zone
 - c. axonome
 - 1) $9 + 2$
3. movement
 - a. dynein
4. Kartagener's syndrome

IV. Actin Filaments

A. Overview

B. Protein structure

1. actin
 - a. G-actin
 - b. F-actin

C. Filament structure

1. polarity

D. Cellular functions

E. Growth

F. in vitro Polymerization

1. nucleation phase
2. elongation phase
3. steady-state phase
4. treadmilling

G. Actin binding proteins

1. thymosin & profilin
2. formins