

Golgi are located near the MTOC while the ER is spread throughout the cytoplasm, so which of the following is probably true?

- A. COPII and COPI vesicles are transported with dynein.
- B. COPII and COPI vesicles are transported with kinesin1.
- C. COPII is transported with dynein and COPI is transported with kinesin 1.**
- D. COPII is transported with kinesin 1 and COPI is transported with dynein.

Which statement about actin is false?

- A. They are shorter and skinnier than microtubules
- B. Monomeric actin binds ATP.
- C. The plus end is faster growing than the minus end
- D. ATP hydrolysis is not required for actin polymerization, but ATP is hydrolyzed as the filament lengthens.
- E. None of the above**

If the Critical Concentration (CC) for the actin (+) end is .1 μM and the CC for actin (-) end is .6 μM , what would happen at .6 μM free actin?

- a) **The plus end of the filament will grow.**
- b) Both ends will grow.
- c) The plus end will shorten and the minus end will grow.
- d) The minus end will shorten.

Which statement is the most accurate?

- A. A round mammalian cell is 2000X wider than a microtubule.
- B. A round mammalian cell is 100X wider than a microtubule.
- C. A round mammalian cell is 10X longer than a microtubule.
- D. Axons and dendrites are skinny because they have no microtubules.

How would you test if mitochondria traffic on microtubules?

- A. Make a movie of fluorescent mitochondria and add taxol during the movie.
- B. Make a movie of fluorescent mitochondria and add nocodazole during the middle.**
- C. Make a movie of fluorescent mitochondria in a tubulin knockout mice.
- D. Two of the above.

In a round cell, the (+) end of a microtubule is...

- A. Closer to the nucleus than the (-) end
- A. More positively charged
- C. Bound to the MTOC
- D. More dynamic than the (-) end**

Which of the following is true?

- A. The MTOC is at the (-) end of the MT.
- B. In solution, “Tubulin” is a hetero-dimer.
- C. A microtubule is formed from 13 filaments.
- D. A microtubule gains strength from lateral bonds between filaments.
- E. Answers C and D.
- F. All of the above.**

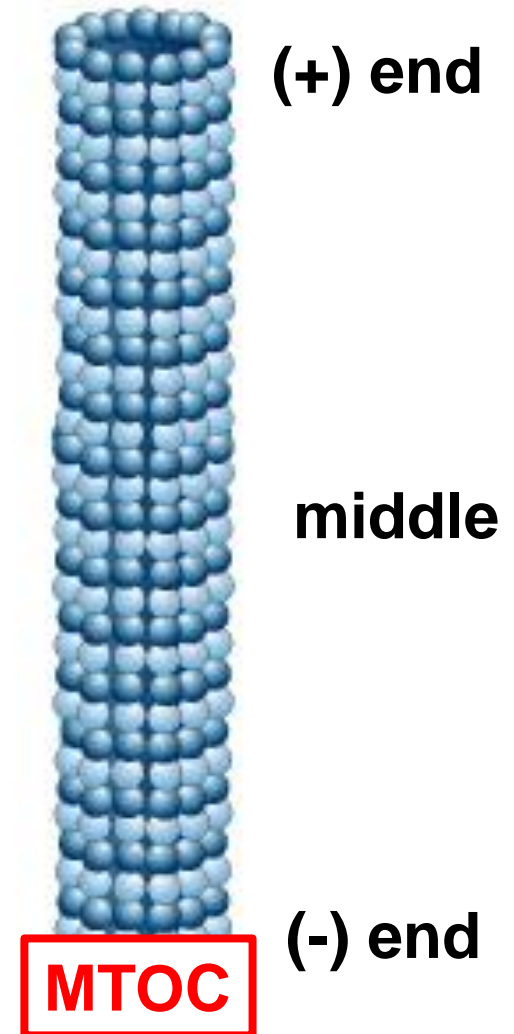
Which region of this MT would have the most GDP-tubulin in it?

A. The newest section

B. The minus end

C. The plus end

D. The middle



Which of the following would stabilize the plus end of microtubules

- A. A GAP that converts GTP-tubulin to GDP-tubulin
- B. A protein that stabilizes straight protofilaments.**
- C. A GTPase activating protein.
- D. An increase in the number of gamma-tubulin ring complexes.
- E. A drug that binds tubulin and prevents its polymerization

Which of the following would stop transport by
Kinesin-1?

- A. Taxol treatment.
- B. XMAP215 overexpression
- C. MCAK depletion.
- D. Katanin overexpression.**

Which best describes microtubules?

- A. They are polymers of self assembling subunits, yet they have polarity.**
- B. They have a positive and negatively charged end.
- C. A homo-dimer of alpha-tubulin forms the building block of MTs.
- D. In their polymerized state all of their tubulin is GDP-bound

Which of the following is a feature shared by all cytoskeletal fibers?

- A. They all have polarity.
- B. They are all self polymerizing.**
- C. They are all used for trafficking by motors.
- D. They are all only found in the cytoplasm.

Microtubules are *not* equilibrium polymers because:

- A. Both ends can grow and shrink
- B. The (-) end is stabilized by the MTOC
- C. GTP hydrolysis weakens the tubule**
- D. It is an equilibrium polymer

**What kind of (+) tip binding protein would
decrease the stability of the (+) end?**

A. a GEF (guanine exchange factor)
note: cytoplasmic GTP >> GDP

B. a GAP (GTPase activating protein)

C. A protein that recruits free tubulin

D. A protein that links MT filaments together

Katanin cuts microtubules in the middle –How do you think it works?

A. It binds in a circle around microtubules and weakens longitudinal and lateral bonds

B. It recruits GDP-bound tubulin to the middle of the microtubule to cause “fraying”

C. It stimulates GTP hydrolysis in the middle of the MT.

D. It is a protease

Which of the following do NOT have analagous mechanism for regulating polymer formation?

A. Katanin AND Cofilin

B. Arp2/3 and gamma tubulin ring complex

C. Thymosin B4 and nocodazole

D. Profilin and MCAK