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 0.1 uM and the CC for actin (-) end is 0.6 uM, what would happen at 0.6 uM 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