Study guide 8

Lecture 12:

1. What are the three major types of cytoskeleton? What typical structures in cells are these cytoskeletons associated with? What are their basic units?
2. Be able to tell the differences for these cytoskeletons. (polarity, size, motorized, rigidity, elasticity, etc)
3. What is G-actin, what is F-actin? Be able to tell the different phases during F-actin assembly, what is the rate-limiting step?
4. How is F-actin assembled? How to define its polarity? (by a typical myosin S1 decoration experiment)
5. What is critical concentration in F-actin assembly? Tell the difference in *Cc* at the minus end and the plus end?
6. In cells, the G-actin concentration is in mM range, while *Cc* is in μM range, why?
7. What is actin tread milling?
8. In cells, G-actin associate with certain protein partners, e.g. profiling guides G-actin to polymerize, while thymosin inhibits it to polymerize.
9. In cells, actin nucleation is controlled by Formin (straight filament) and Arp2/3 complex (branched filament). How is this achieved? How does the Rho GTPase mediate cell surface signaling to the control of F-actin assembly.
10. How do Listeria bacteria ride around in the cells?
11. Actin assembly can be disrupted by certain drugs, what are they, how do they work? (such as phylloidin, latrunculin, etc)
12. What are typical actin crosslinking proteins? How do they work?
13. Be able to tell the general structure of myosin. Tell the structure of Myosin II, how does it assembled into bipolar structure in muscle contraction?
14. Be able to tell the process myosin moves along the F-actin.
15. Understand how muscle contracts and how is it regulated (by Ca2+ and by myosin light chain phosphorylation)
16. Be able to illustrate how a fibroblast moves along the matrix? How does a neutrophil chase a bacterium?

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