Bio121
K. Mulligan

Review Questions
Lectures 21

1. What are the different strategies cells use to move and what are the mechanisms of each strategy?

2. What are the similarities and differences between flagella and cilia?

3. What are the structural and mechanistic differences between prokaryotic and eukaryotic flagella?

4. What cell types/organisms are cilia and flagella found in?

5. What are the different types of flagellar swimming and how are they different?

6. Describe the molecular mechanism that determines the type of swimming. (Describe the signaling pathway.)

7. What is the basal body? Compare and contrast with the MTOC.

8. What is the axoneme? Describe the proteins and how they are connected to form this structure.

9. How do ciliar and flagellar axonemes bend? What would happen if the adjacent microtubule pairs were not connected by nexin? Why?

10. Describe the steps involved in cell migration (“crawling”).

11. What directs cell migration?

12. What are the molecular mechanisms of chemotaxis during cell migration? (Hint: your answer should involve Rac and Rho)

13. A cell begins to migrate toward a chemotactic signal. What would happen if a GAP prematurely targeted the Rac-GTPase as the cell was starting to migrate? Explain your answer (be sure to discuss specific pathway targets and effector responses)

14. A cell begins to migrate toward a chemotactic signal. What would happen if a GAP prematurely targeted Rho-GTPase as the cell was starting to migrate? Would stress fibers form? Explain your answer (be sure to discuss specific pathway targets and effector responses; be sure to understand what a stress fiber is).

15. Describe actin treadmilling in the lamellipodia (include necessary associated proteins).

16. What happens to the length of f-actin as a cell is migrating? Does it get longer? Why or why not?

17. What is the importance of cellular attachment during migration and what molecules are involved?

18. How is the cell body moved forward during migration? (Be sure to describe the molecules involved.)

19. How can the type of ECM components and integrins expressed on a cell affect the direction of cell migration?

20. Describe the complete molecular mechanism of contraction. (Include the actions of Ach, Ca2+, tropomyosin, troponin, myosin and actin in your answer.)