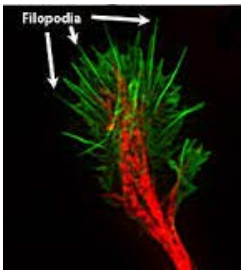
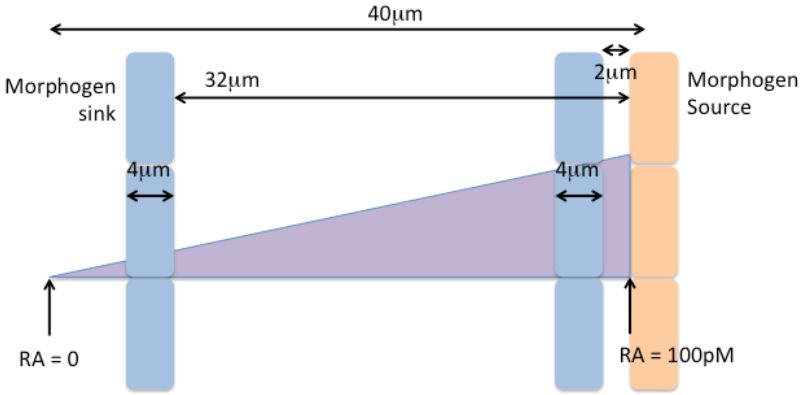
Assignment 5: Morphogenesis

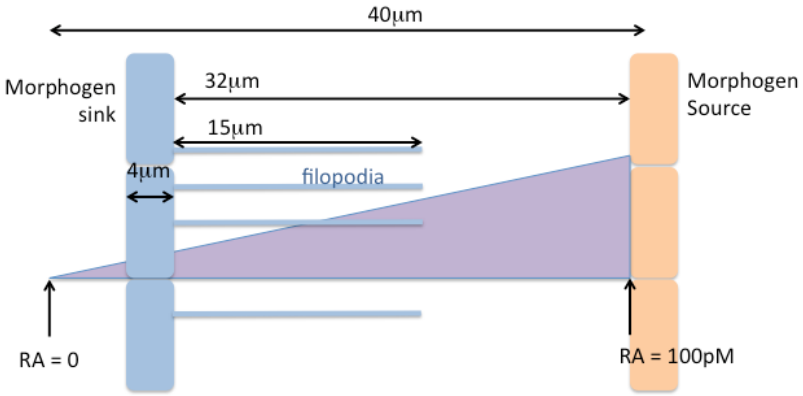
Cell and Tissue Engineering

1. Exercise 3.1 From *Tissue Engineering*, Saltzman
2. Explain why fingerprints can be used to tell identical twins apart.
3. Describe how semaphorins and slits function similarly in directed migration.
4. Gradient calculations.
    a. Gradients of soluble morphogen are used to direct both cell specification and cell migration in the embryo. Given the diagram ***quantitatively*** determine the location (2μm or 32μm) at which the blue cells feel the steepest gradient.





    b. Cells use special structures called filopodia to sense their local environment. These thin projections of the actin cytoskeleton reach out and survey both the chemical and mechanical composition of the environment as the cell decides what direction to migrate in. ***Quantitatively*** determine how filopodia change the gradient sensed by the cell in the diagram below.



References:
Filopodia Image: en.wikipedia.org.

Assignment Rubric

Question	Component	Total Point Value
1	A (1pt each)	12
	B	4
2	Short answer	3
3	Short answer	3
2	A	4
	B	14

Total Point Value = 30