

9.14

classes #12 - 13: Axon growth

Monday February 28; Wednesday March 2, 2005

Readings

Purves & Lichtman ch 4b pp 94-103; ch 5 pp 105-129. (Re: growth cones and axon outgrowth)
Zigmond et al part III: (pp 417-517); pp 519-546, "Growth cones and axon pathfinding"; (pp 547-654).

Questions on readings:

1. Describe membrane incorporation in the growing axon.
2. What technical advances in neuroembryology can attributed to Ross G. Harrison ?
3. How did Speidel's method differ from Harrison's?
4. What is a filopodium (plural: filopodia)? What causes a filopodium to contract? What enables it to stick to a substrate?
5. What is the major result in Hibbard's experiment on transplanted amphibian Mauthner cells?
6. What are the four mechanisms of directed axon growth summarized by Purves & Lichtman?
7. Recent studies have distinguished four types of chemical guidance, adding new detail to the above. What are they? (See Zigmond et al., p. 530f.)
8. Describe Levi-Montalcini's bio-assay for NGF.
9. Contrast trophic and tropic effects of NGF.
10. Give an example of an extracellular matrix (ECM) molecule found in the CNS, and the role it may have.
11. Give an example of evidence that netrins or semaphorins can function as diffusible attractants or repellants for growing CNS axons.
12. How can a "stripe assay" using "membrane carpets" be used to study the basis for retinotectal map formation? (Zigmond et al., p. 541-543.)