9.14

Class #11: Growth factors and cell survival I

Readings:

Purves & Lichtman, "Chapter 7", pp. 155-178.

Johnson, James E., Zigmond, "Chapter. 21Neurotrophic factors.", *Fundamental Neuroscience*, Academic Press,1999,(p. 611-635) .

Questions:

[Purves]

1. How did implants of tumors in the developing chick lead to the discovery of NGF? (fig. 1)

2. Describe Levi-Montalcini's bio-assay for NGF. (fig. 2)

3. Describe immunosympathectomy.

4. Contrast trophic and tropic effects of NGF.

5. Describe the Campenot (1981) chamber and how it was used to show local effects of NGF on neurite endings.

[Johnson]

6. Diagram the binding of the various neurotrophins to the various trk receptors, i.e., which binds to which?

7. What sensory defect occurs in mutant mice lacking NGF or trkA, and what is the correlated anatomical defect? See fig. 21.8.

8. Similarly, for mutants lacking NT-3 or trkC, in spinal innervation patterns.

9. What are two major differences between trk A and p75 receptors for NGF? (re: affinity; intracellular domain properties) See p. 616-617.

10. What are three effects of trk signalling pathways triggered by NGF binding to trk A receptors? (See fig. 21.7)

11. What are “caretaker” neurotrophins? (fig. 21.9 and text) Are they always necessary?

12. Fig. 21.10 is screwed up (anatomy of left-side “PNS” neuron, vs. legend). What should it look like?