Questions based on lectures and Schneider text:

1. Describe three roles of neurotrophins in the brain.

2. Describe or name two effects of hormones on brain development.

3. Contrast two major possible purposes in naturally occurring neuronal death.

4. Give an example of innervation-dependent neuronal death/survival.

Some of the following questions may require some web searching, or questions for the professor in the classroom:

5. Contrast apoptosis and necrosis.

6. What are trk receptors? (What binds to them, and what is the result?)

7. How is the intracellular protein bcl-2 involved in regulating the above processes?

8. Describe the effects of overexpressing bcl-2 *in vivo* in mice by generating mice in which a bcl-2 transgene is placed under the control of an exogenous promoter (i.e., a promoter which comes from a different gene) and which, for example, triggers the expression of the bcl-2 transgene specifically in neurons.

Questions on other readings; also, Schneider lectures and text:

9. Describe membrane incorporation in the growing axon.

10. What technical advances in neuroembryology can attributed to Ross G. Harrison ?

11. How did Speidel's method differ from Harrison's?

12. What is a filopodium (plural: filopodia)? What causes a filopodium to contract? What enables it to stick to a substrate?

13. What is the major result in Hibbard's experiment on transplanted amphibian Mauthner cells?

14. What are the four mechanisms of directed axon growth summarized by Purves & Lichtman?

15. Recent studies have distinguished four types of chemical guidance, adding new detail to the above. What are they? (Schneider text and lectures; see Zigmond et al., p. 530f.)

16. Describe Levi-Montalcini's bio-assay for NGF.

17. Contrast trophic and tropic effects of NGF.

18. Give an example of an extracellular matrix (ECM) molecule found in the CNS, and the role it may have.

19. Give an example of evidence that netrins or semaphorins can function as diffusible attractants or repellants for growing CNS axons.

20. How can a "stripe assay" using "membrane carpets" be used to study the basis for retinotectal map formation? (Zigmond et al., p. 541-543.)

9.14 Brain Structure and Its Origins
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