

9.01 Study Questions

Lecture 18 (Axonal growth, sprouting and regeneration)

1. Where are cells that secrete netrin molecules? Describe a role of these molecules in axonal growth in the developing spinal cord.
2. Describe experimental evidence of a specific barrier to axon growth, in the midbrain tectal midline.
3. Describe an inhibitory effect of glial cells on growth of axons. (Two examples were given in recent classes.) Describe an axon growth-promoting effect of glial cells.
4. What is meant by a “very supportive environment” for regenerative growth of axons?
5. Define collateral sprouting. What appears to be its cause? How does it differ from true regeneration of axons?
6. What are the two major types of chemical influences on axonal growth? Each of these has two subtypes. What are they? Describe a clear example of chemical influences on axonal growth.
7. Describe one phenomenon which demonstrates competition among axons during development.
8. Describe a lesion in the CNS that may cause collateral sprouting to occur in the thalamus.
9. From what was said in class, and what is described in the slides, try to distinguish two separate factors that cause sprouting of axonal arbors in the CNS. What is the “pruning effect” of some brain lesions?

Terminology: cell adhesion molecules, cell migration, corticofugal, differentiation, ectoderm, filopodia, genotype, growth cone, *in vitro*, induction, mitosis, myelination, nerve growth factor, neural groove, neural tube, neurogenesis, notochord, oligodendrocyte, radial glial cells, retrograde degeneration, Schwann cell, synaptogenesis, transneuronal degeneration (or atrophy), ventricular layer, Wallerian degeneration (=anterograde degeneration).