

9.14

Class 6: Neurogenesis II

Readings:

Purves & Lichtman, "Chapter 2a", (pp. 25-42);

Wolpert, "Chapter 3", (pp. 31-58);

Solomon, F., Specification of cell morphology by endogenous determinants. *J.Cell Biol.* 1981,90: 547-553.

Also recommended:

Tanabe, Y. and Jessell, T.M., "Diversity and pattern in the developing spinal cord", *Science*, 1996, 274: 1115-1123.

Weiss, S., Reynolds, B.A., Vescori, A.L., Morshead, C., Craig, C.G., and van der Kooy, D., "Is there a neural stem cell in the mammalian forebrain?", *TINS*, 1996, 19: 387-393.

Svendsen, C.N. and Rosser, A.E., "Neurons from stem cells?", *TINS*, 1995, 18: 465-467.

Temple, S. and Qian, X., "Vertebrate neural progenitor cells: subtypes and regulation", *Current Opinion in Neurobiology*, 1996, 6: 11-17.

Solomon, F., "Detailed neurite morphologies of sister neuroblastoma cells are related", *Cell*, 1979, 16: 165-169.

Questions:

Purves & Lichtman:

1. How can one, experimentally, distinguish between two possible mechanisms of cellular differentiation, namely, progressive loss of DNA (genes) from the cell vs. selective expression of genes?
2. Describe one experiment in which the phenomenon of **induction** is evident (see also Wolpert).
3. Describe a "fate mapping" experiment (see also Wolpert).
4. "Consistent with rapid differentiation is the obvious mosaicism of invertebrate eggs": explain "mosaicism"

Wolpert:

5. Define "regulation". How might it involve a cell's ability to detect its position?
6. "All signals are thus essentially selective rather than instructive...": explain.

Solomon:

7. Describe the problem investigated by Frank Solomon at M.I.T. (in his earlier work): What does it imply about, say, cell types in the spinal cord or in the neocortex?