

## 9.14

### Class #5: Neurogenesis I

#### Readings:

Nauta and Feirtag, "chapter 10", pp.134-143

Wolpert, "chapter 2", *The Triumph of the Embryo* .1992, pp. 11-29.

Purves & Lichtman, "chapter 1", pp 3-23.

*Supplementary:* Brodal (2nd edition), pp 63-121, especially 63-87. Special attention to figures and legends.

#### Guiding questions:

##### Nauta:

1. Terms to be familiar with: ectoderm (vs. mesoderm and endoderm), ventricular layer, marginal layer, mantle layer, modes of migration, radial glia (radial astrocytes), ependyma, sulcus limitans, alar and basal plates, neural crest, dorsal and ventral roots and rootlets.

##### Wolpert:

2. From blastula to gastrula: What is the role of filopodia in gastrulation?
3. How does vertebrate neurulation resemble the development of the lens in the eye?
4. What is spinal bifida?
5. "The wave of somite formation...does not involve any propagation of a message." Explain.
6. How can CAMs provide a basis for self-assembly of tissues, or even of a developing organism? Give examples.
7. Moulding the basic form of the embryo: What are the major cellular activities?

##### Purves & Lichtman:

8. Explain why Wilhelm Roux is considered the founder of experimental embryology, even though his major experimental contribution was soon proved to be invalid.
9. "Ontogeny recapitulates phylogeny": How is this phrase both useful and misleading?
10. What is the fate of the three germ layers of the gastrulas (see also question 1)?
11. What is an epidermal placode or sensory placode?
12. Why is the wall of the neural tube described as a "pseudostratified epithelium"?

We will discuss descriptive studies, and some experimental studies, of embryogenesis, species differences, and think about possible strategies of evolution change; also, we will try to formulate questions and issues for the next series of classes.

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#### Terms you should learn:

Induction, organizer, activators.

Blastopore, dorsal blastopore lip.

Blastula, blastomeres, blastocoel.

Gastrula, gastrulation, invagination, evagination.

Germ layers, ectoderm, mesoderm, endoderm.

TGF-like PGFs (polypeptide growth factors), activin, BMPs (bone morphogenetic proteins), cadherins.

Phenotype, phenotypic differentiation.

Proliferation, neurogenesis, migration, cell birthdays.

Ventricular zone, mantle zone, intermediate zone, cortical plate.