

9.14

Classes #1-2: Introduction; anatomical techniques Wednesday, February 2; Friday, February 4.

Readings:

Allman (2000), ch. 1 pp 1-13.

Nauta (1986), ch 1 pp 1-11.

Swanson (2003), [ch 1 pp 1-8], ch 2 pp 9-28. [Note: bracketed items are recommended but not assigned.]

Questions on readings:

- 1) Explain what is meant by “brainlike functions in unicellular organisms”. Give examples (see Allman and Swanson).
- 2) According to Allman, what are the simplest organisms to possess nervous systems, with action potentials based on voltage gated sodium channels?
- 3) George Parker’s work at Yale (Swanson says he was at Harvard) is described by Nauta. Parker, using the Golgi technique, found a kind of nervous system in certain sea anemones, an even simpler organism. What kind of nervous system was it?
- 4) “...a sponge has no neurons—or else all its cells are neurons” (Nauta). What two types of intercellular junctions in the sponge was Nauta discussing? How are they recognized?
- 5) “Animals with large brains are rare—there are tremendous costs associated with large brains” (Allman). What costs?
- 6) Swanson describes the nerve net of hydra, including two-way connections made by motor neurons with each other. What structure makes such two-way conduction in single fibers possible? Ramon y Cajal called such fibers “amacrine processes”, distinguishing them from dendrites and axons.
- 7) How are interneurons defined? What neurons are not interneurons?

General question to be answered over the entire term:

- 8) How did the brain become the way it is? (studies of evolution; descriptive and experimental studies of development and plasticity)