

9.14

Class #30: Hippocampal formation

Monday April 25, 2005

Readings:

Striedter ch 5 pp 171-176; ch 8 pp 290-294.

Brodal, Per (2004) *The Central Nervous System. Structure and function*, 3rd edition. Oxford Univ. Press. Chapter 20, The limbic structures, pp. 415 - 434.

Butler, A.B. and Hodos, W. (1996) *Comparative Vertebrate Neuroanatomy: Evolution and Adaptation*. New York, Wiley-Liss. Ch. 30, "Limbic Telencephalon": read one small section, "Evolutionary perspective", to get a flavor of the comparative work (pp. 455-457. (Note: "pallium" means the dorsal structures of the endbrain; the medial pallium includes the hippocampus.)

Recommended:

Mesulam, M.-Marsel . (2001) Behavioral neuroanatomy: Large-scale networks, association cortex, frontal syndromes, the limbic system, and hemispheric specializations. Ch. 1 (pp. 1-120) in Mesulam, M.-M. (ed.), *Principles of Behavioral Neurology*. Philadelphia, F.A. Davis Company. Pp. 49-64, Paralimbic (Mesocortical) Areas; Limbic structures of the septal area, nucleus basalis, and piriform cortex; The amygdala, emotion, and affiliative behaviors: gateway into the neurology of value; The hippocampus and the binding of distributed information into explicit memory: gateway into the neurology of recollection. [This is not easy reading. Focus on the hippocampus section for this session.]

Questions on readings: Brodal

1. Identify the major subregions of the hippocampus and adjacent structures.
2. What pattern of interconnectivity distinguishes area CA1 from area CA3 ?
3. What types of memory are dependent on the hippocampus? What types are not dependent on the hippocampus?
4. What is the name of the major input pathway to the hippocampus and where does it originate?
5. What is the pathway for subcortical projections to and from the hippocampus?
6. Identify a major neuromodulatory system which regulates hippocampal activity and locate the nucleus that provides this input.

Questions on readings: Striedter

1. What are the major kinds of evidence that has shown that the hippocampal formation of mammals is the homologue of the medial pallium of non-mammalian vertebrates?
2. In what sense are evolutionary changes in hippocampal connections like the evolutionary changes in striatal connections? (p. 291)
3. In Georg Striedter's opinion, which is conserved more in evolution, specific connections or embryonic origins?

Questions on readings: Butler & Hodos

4. What is the "triune brain"? How has this idea been shown to be invalid?
5. What difference in medial pallial afferents is characteristic of amniotes as opposed to anamniotes?