

9.14 class #35: Limbic system 4: Hippocampal formation.*Readings:*

Brodal, Per, "Chapter 19, Limbic structures", *The Central Nervous System. Structure and function.*, Oxford Univ. Press, 1992, pp. 555 - 581.

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

Recommended: Mesulam, M.-Marsel, "Chapter 1, Behavioral neuroanatomy: Large-scale networks, association cortex, frontal syndromes, the limbic system, and hemispheric specializations", *Principles of Behavioral Neurology* Mesulam, M.-M. (ed.). Philadelphia, F.A. Davis Company. 2001, pp. 1-120 "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 very difficult reading. Focus on the hippocampus section for this session.] Pp. 49-64,

Read at least the summaries of the two readings listed below.

Hasselmo, M.E. and Bower, J.M., "Acetylcholine and memory", *Trends in Neuroscience*, 1993, 16: 218 - 222.

McNaughton, B.L. and Morris, R.G.M., "Hippocampal synaptic enhancement and information storage within a distributed memory system", *Trends in Neuroscience*, 1987, 10: 408 - 415.

Questions:

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 afferent 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.
7. What is an associative memory?
8. What is the "triune brain" and what has been claimed about its evolution?