

9.14

Class #26: Introduction to the forebrain

Friday April 8

Readings:

Striedter ch 8A, pp 255-287 (Some of this was assigned earlier. You should read it again.)

Remember also: Allman ch 5.

To be assigned later, but good to get an early start: Nauta & Feirtag ch 13, pp 220-238.

Additional reference, not assigned: Butler & Hodos ch 19 (“Overview of the forebrain”, pp 259-280)

Questions on readings: Striedter.

1. Can we link the evolution of neocortex and its expansion to the evolution of intelligent behavior? Why or why not?
2. What similarity in metabolism and autonomic control is shared by birds and mammals, and seems to be a precursor of enlarged brains?
3. Evidence indicates that early placental mammals lost some of the color vision present in ancestral pre-mammalian animals. Why? How did their vision probably change? (See discussion of Gordon Walls’ “bottleneck hypothesis”).
4. Besides the changes in the auditory system, what was the other likely change in sensory capacities of mammals, especially placental mammals?
5. Give a rough estimate of the relative size of telencephalic cortex in very early mammals. Were their brains small or large? How do we know this?
6. What are some major similarities and differences between reptilian (e.g., turtle) dorsal pallium and mammalian neocortex?
7. What major endbrain structure is found in reptiles and birds but not in mammals? What was the finding, surprising at the time, of Harvey Karten, working at MIT in the 1960s, about this structure?
8. Summarize the two major competing hypotheses concerning the mammalian homologue of this endbrain structure in sauropsids (reptiles and birds).
9. “The avian dorsal cortex is generally called the hyperpallium, or ‘Wulst’”. What is this structure in terms of function and connections, and in what species is it most developed?