

## 9.14

### Classes #21-23: Visual systems

Monday March 28; Wednesday March 30; Friday April 1, 2005

#### *Readings:*

Allman ch 6, pp 122-157.

Striedter ch 5 continued, pp 153-176.

Striedter ch 6, pp (177-185), 185-215.

Striedter, review figures 7.14, 7.15, 7.16.

Not assigned, for more advanced study: Butler and Hodos ch 18 (Optic tectum), ch 20 (Pretectum and posterior tuberculum), ch 22 (Dorsal thalamus); ch 25 (Dorsal pallium); ch 26 (Visual forebrain in amniotes).

#### *Questions on readings: Allman*

1. “The advantages and costs of front-facing eyes”: Give examples of both advantages and costs. How did a cost of front-facing eyes increase the adaptive advantages of social groups?
2. What data on the midbrain indicate that the large bats known as megachiropterans are not “flying primates”?
3. How do areas 17 (striate cortex) and MT stand out from other neocortical areas in stained sections of the brains of primates?
4. What is meant by “classical” and “non-classical” receptive fields of MT neurons? What does the existence of very large non-classical receptive fields imply about connectivity of the neurons?
5. What specialized neocortical areas concerned with vision, beyond the striate area, have been found in humans by functional magnetic resonance imaging? Give two examples.
6. Allman has found neurons unique to the brains of humans and great apes. Where are these neurons?

#### *Questions on readings: Striedter ch 5*

7. Describe an example of “mosaic evolution” in the dorsal midbrain of mammals.
8. Describe two examples of mosaic evolution in the hindbrain of fishes.
9. What is Harry Jerison’s principle of proper mass? When (in what circumstance) does this principle work best?
10. What is the functional correlate of relative size of the hippocampus in birds?

*Questions on readings: Striedter ch 6*

11. Give two examples of lamination in the brain's visual system or other systems. Why does Striedter use examples of lamination in his discussion of "phylogenetic conversion"? What is "perhaps the most spectacularly laminated brain region in vertebrates" found in certain fish?
12. What is meant by "proliferation by phylogenetic segregation" in the dorsal thalamus?
13. Describe how the primate visual cortex has provided a striking example of phylogenetic proliferation by addition.
14. Describe the relationship of neocortical size to number of visual neocortical areas in mammals.