

Questions on Schneider chapter 33 and classes: Neocortex 2

“Basic Neocortical Organization: Cells, Modules, and Connections”

1. Contrast some of the major neuronal cell types of the neocortex: first the spiny excitatory neurons, and second the non-spiny inhibitory neurons. What are the main neurotransmitters? What other characteristics can be used to differentiate them?
2. How have neuroscientists defined cortical layers and cortical columns? Name the most common methods.
3. Describe different methods for differentiating different areas of the mammalian neocortex. How did Brodmann do it?
4. What methods have been used, and are being used, to find functional differences between different cortical areas?
5. Following axons from the somatosensory and motor areas of the neocortex to the spinal cord, the name of the group of axons that includes them changes. Give the names of the axon groups in succession, beginning with the neocortical white matter.
6. Secondary sensory neurons of the olfactory system, the mitral cells of the olfactory bulb, terminate in the olfactory cortex, or paleocortex. How does olfactory information go from this cortex to the neocortex? Which region of the neocortex receives such information?
7. What thalamic cell groups project to the major territories of the human neocortex, namely, the central cortical regions, the prefrontal regions, and the posterior association cortex?
8. What is the nature of Mesulam's idiosyncratic cortex, two types of homotypic cortex, and paralimbic and limbic areas? Answer by describing major functional characteristics. Also, describe the nature of transcortical connections connected to these areas.
9. What are the “association layers” of the neocortex? What is implied by the presence of the growth-associated protein GAP-43 in these layers of the adult human brain?
10. How can long transcortical projections found in experimental studies of monkeys be verified for the human brain, other than the use of postmortem dissection? What are some of the limitations of the method?
11. What are the two major ideas concerning the evolution of the thalamus summarized at the end of the chapter?

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9.14 Brain Structure and Its Origins

Spring 2014

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