

Neuroanatomy Tutorial.

ICDL

October 20th, 2004

Irene Merzlyak

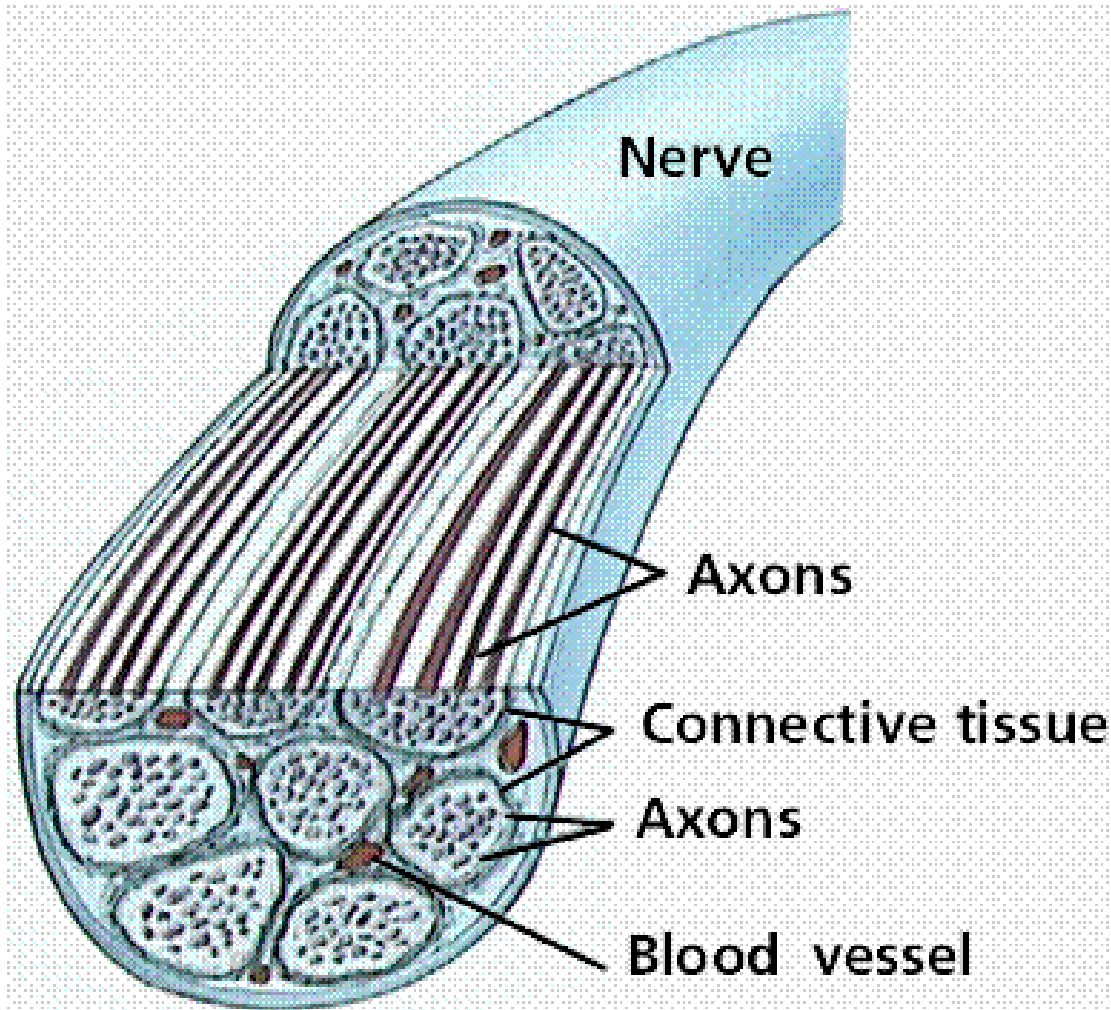
This is your brain..... (no, really)



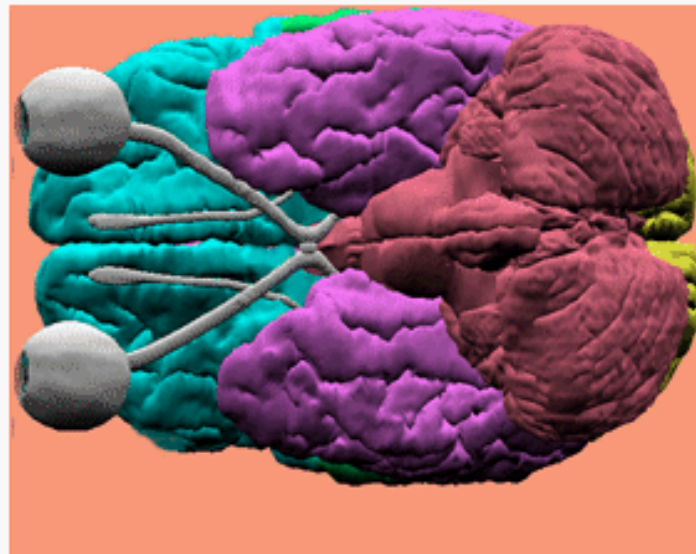
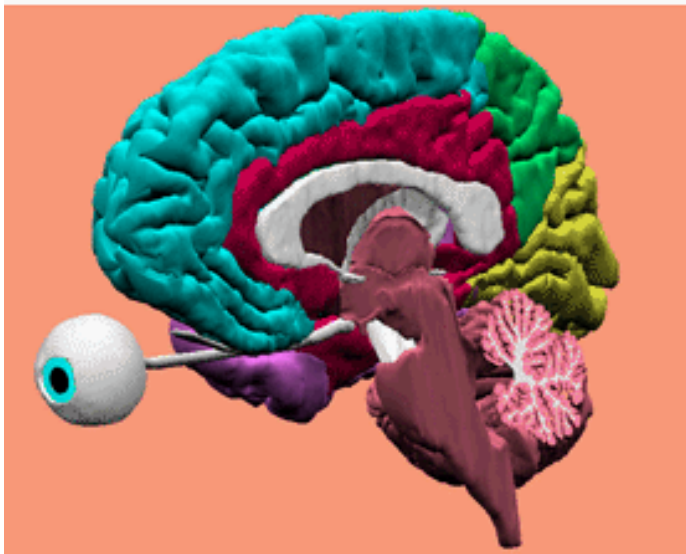
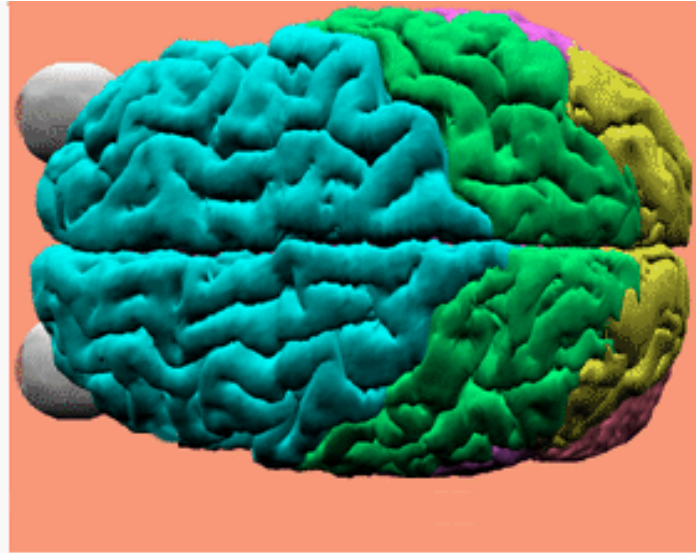
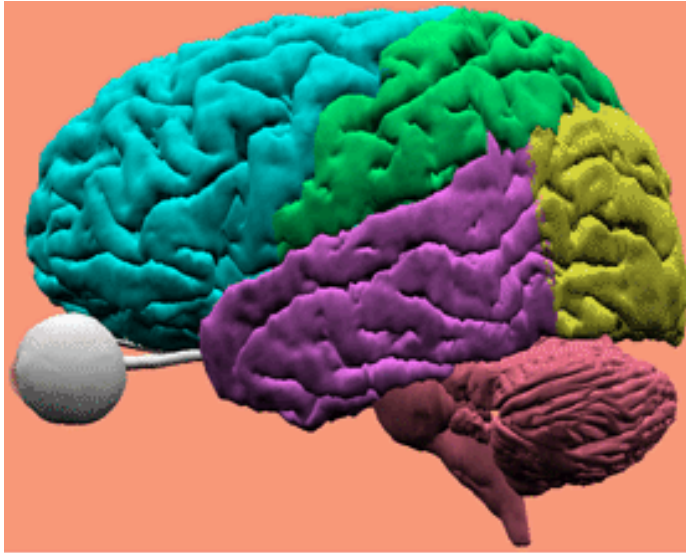
Central Nervous System



Structure of the nerve: a bundle of axons.



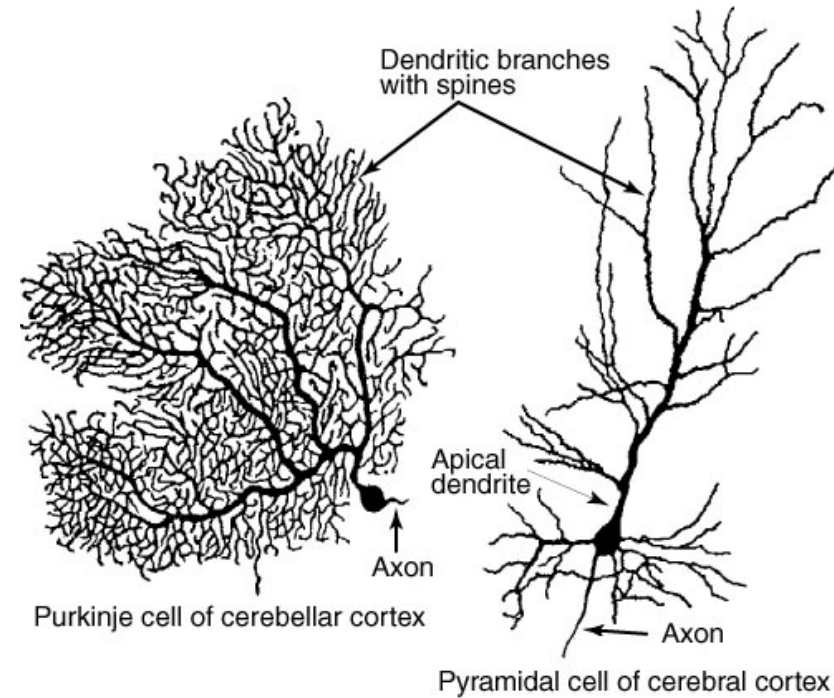
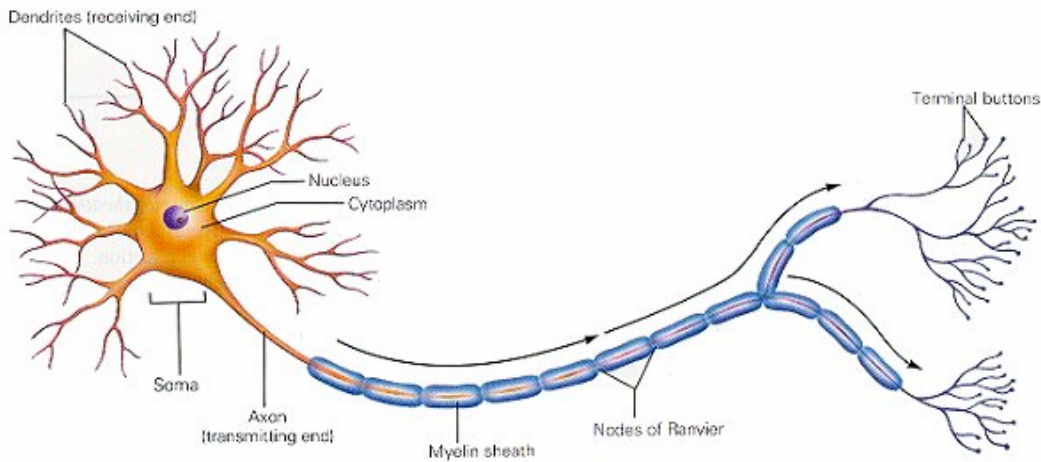
Different Views of the Brain:



Neurons!

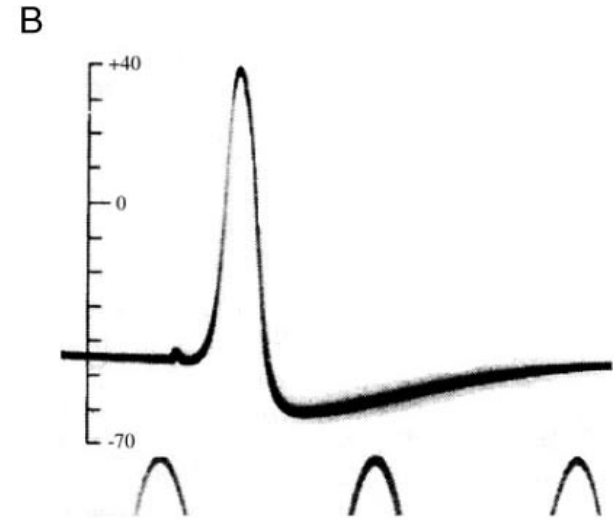
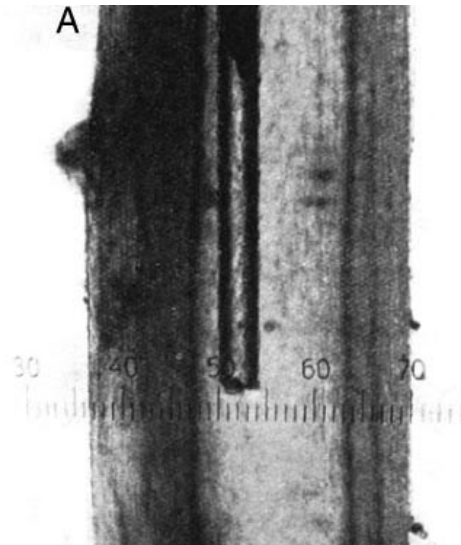
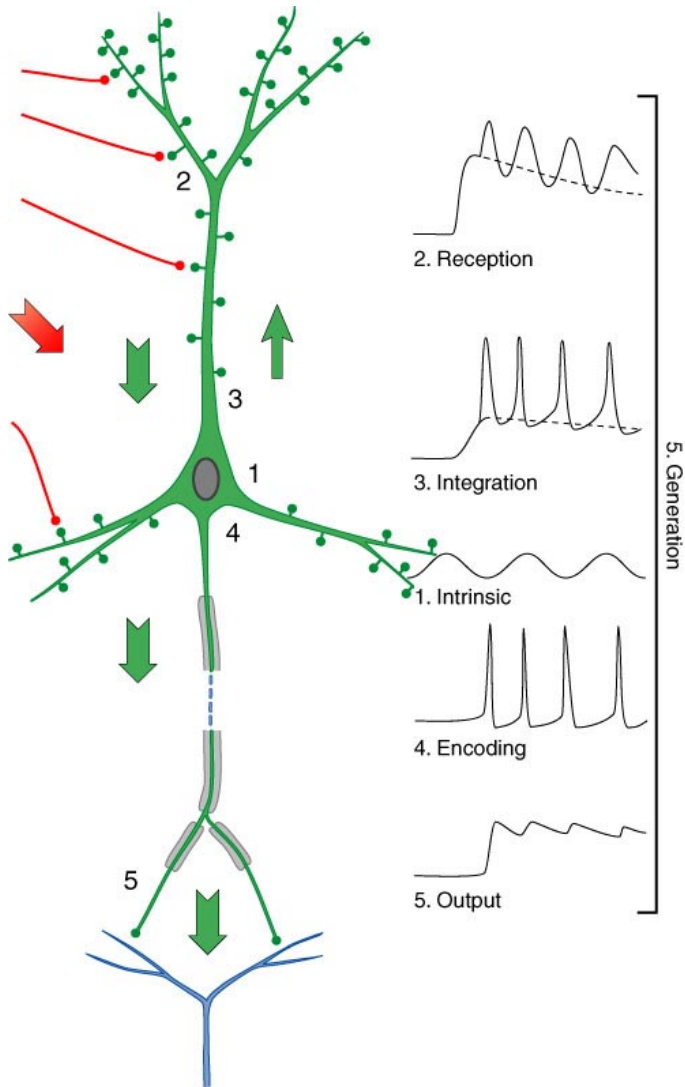
THE MAJOR STRUCTURES OF THE NEURON

The neuron receives nerve impulses through its dendrites. It then sends the nerve impulses through its axon to the terminal buttons where neurotransmitters are released to stimulate other neurons.



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Electricity in the brain: Action Potentials.



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Neuronal Communication:

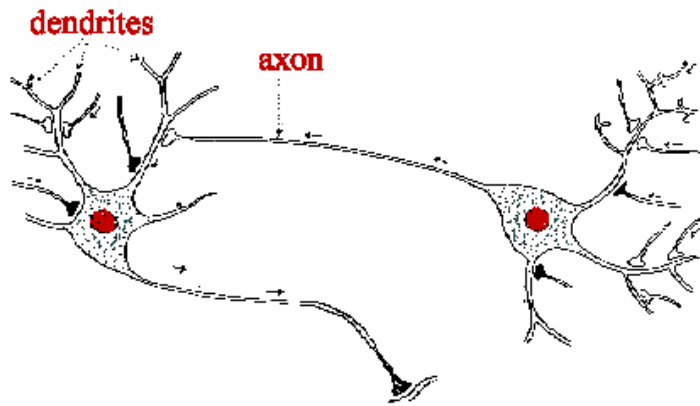
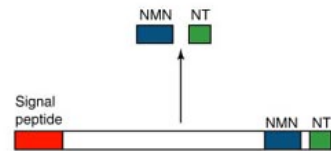
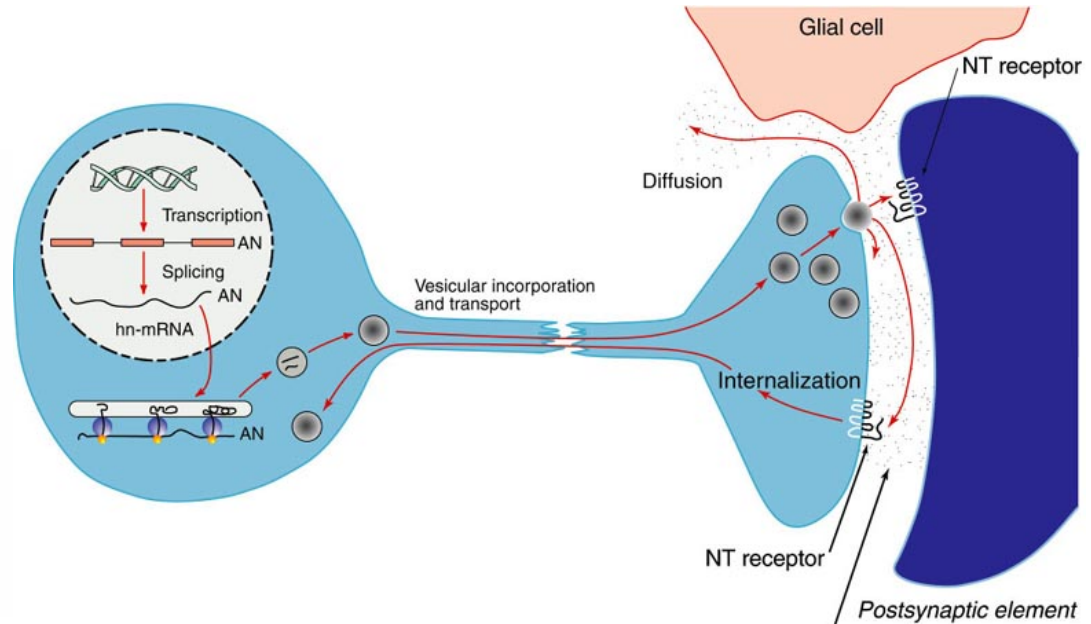
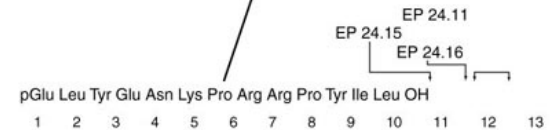


fig 1. Diagram of two neurons

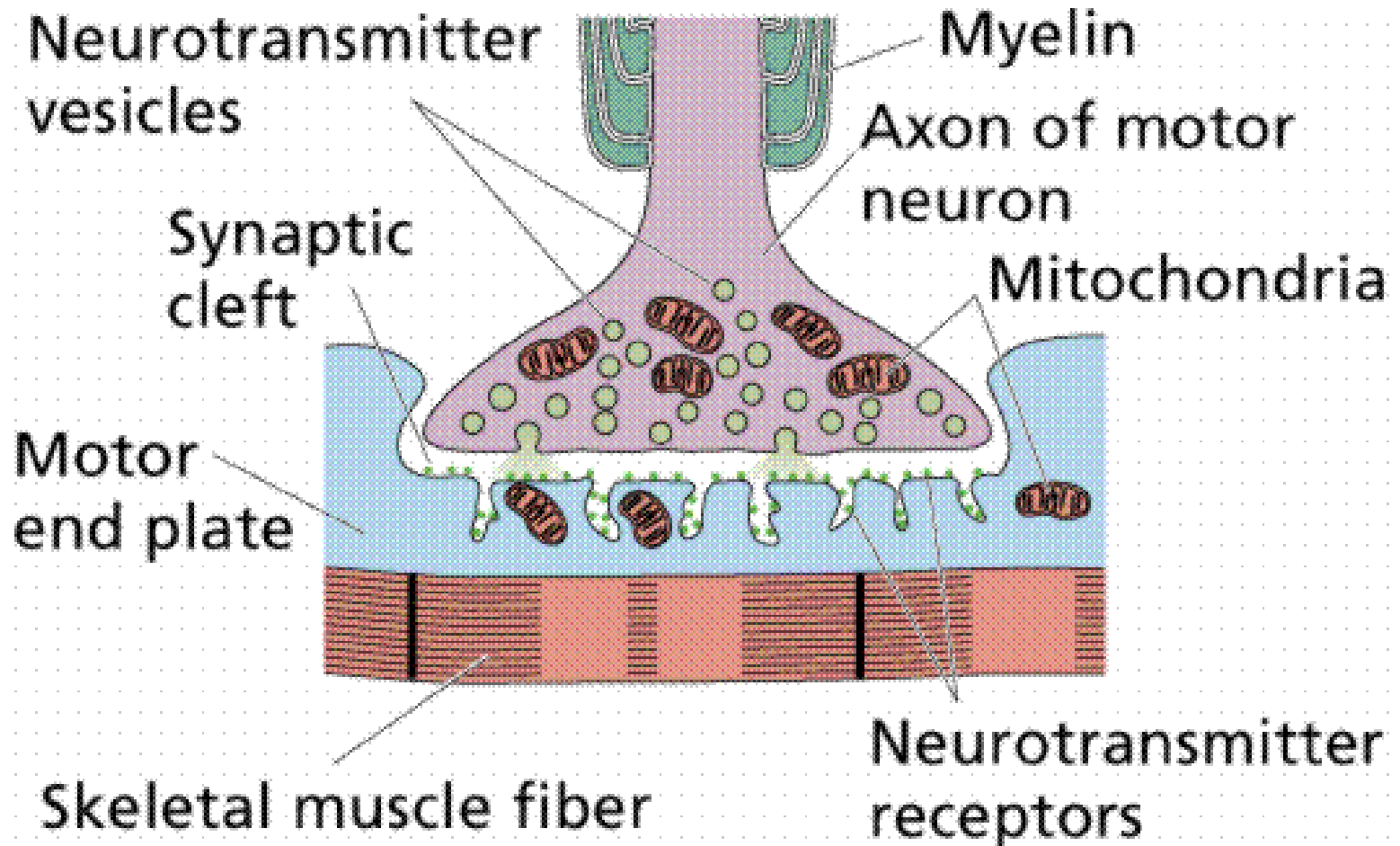


Prepro NT/NMN processing



Enzymatic inactivation of NT

Synapse

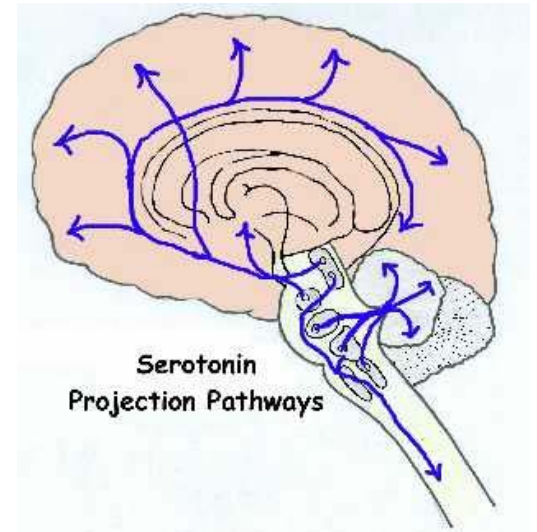
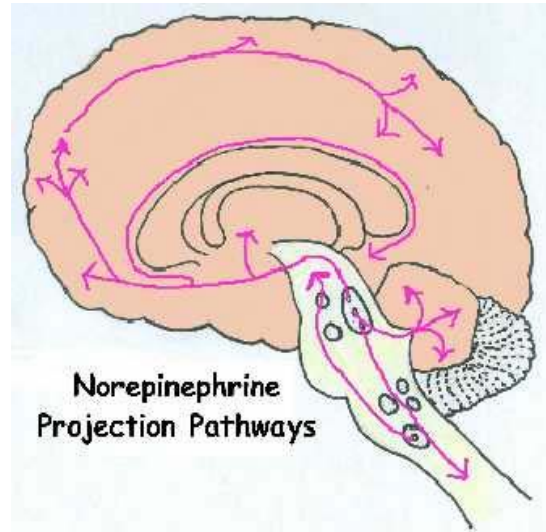
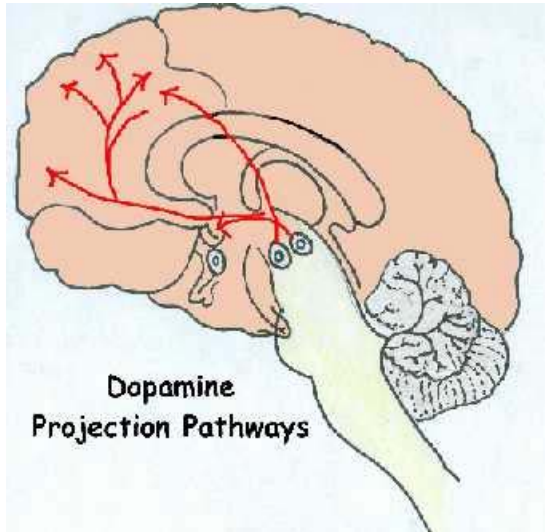


Neurotransmission

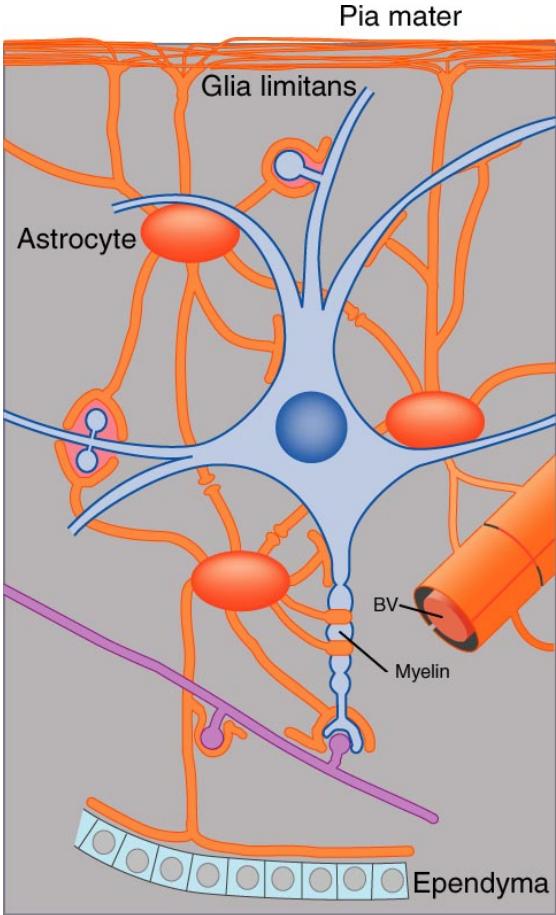
- Neurotransmitters:
 - Glutamate, GABA
 - Time scale: milliseconds (fast)

- Neuromodulators:
 - NE, DA, Serotonin
 - Ach – can act as either NM or NT
 - Time scale: minutes to hours

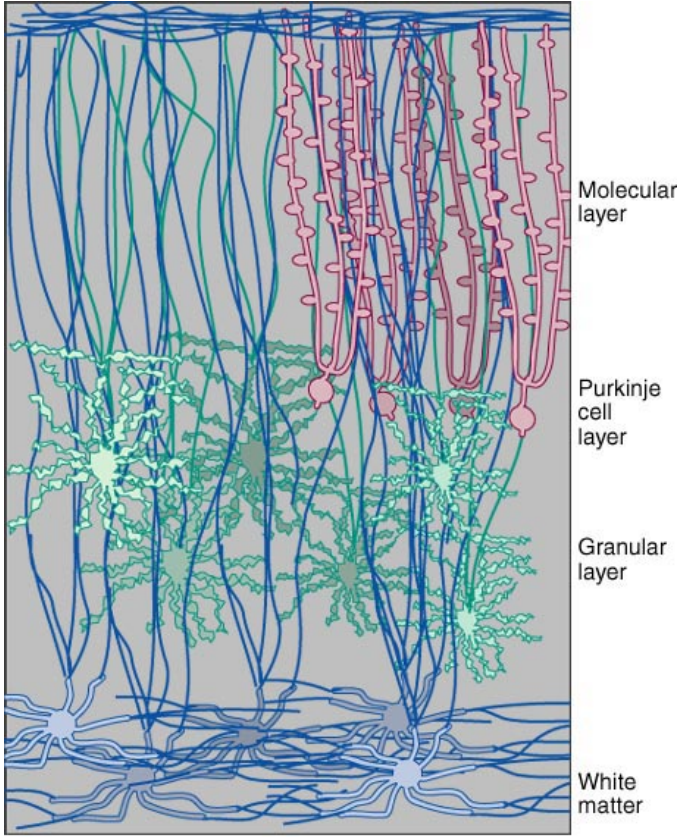
DA, NE, 5HT Pathways



Diverse functions of glial cells in the CNS.

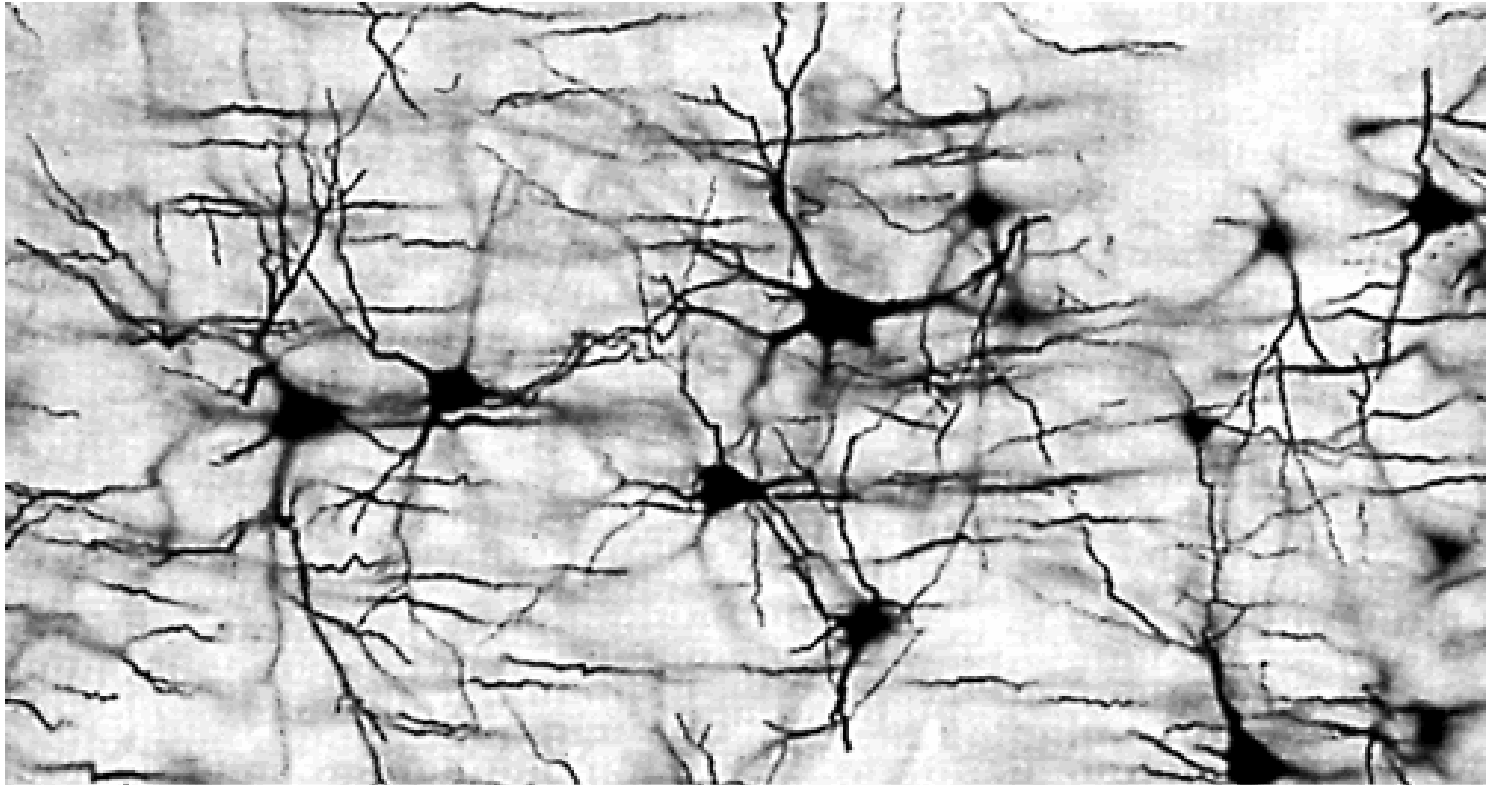


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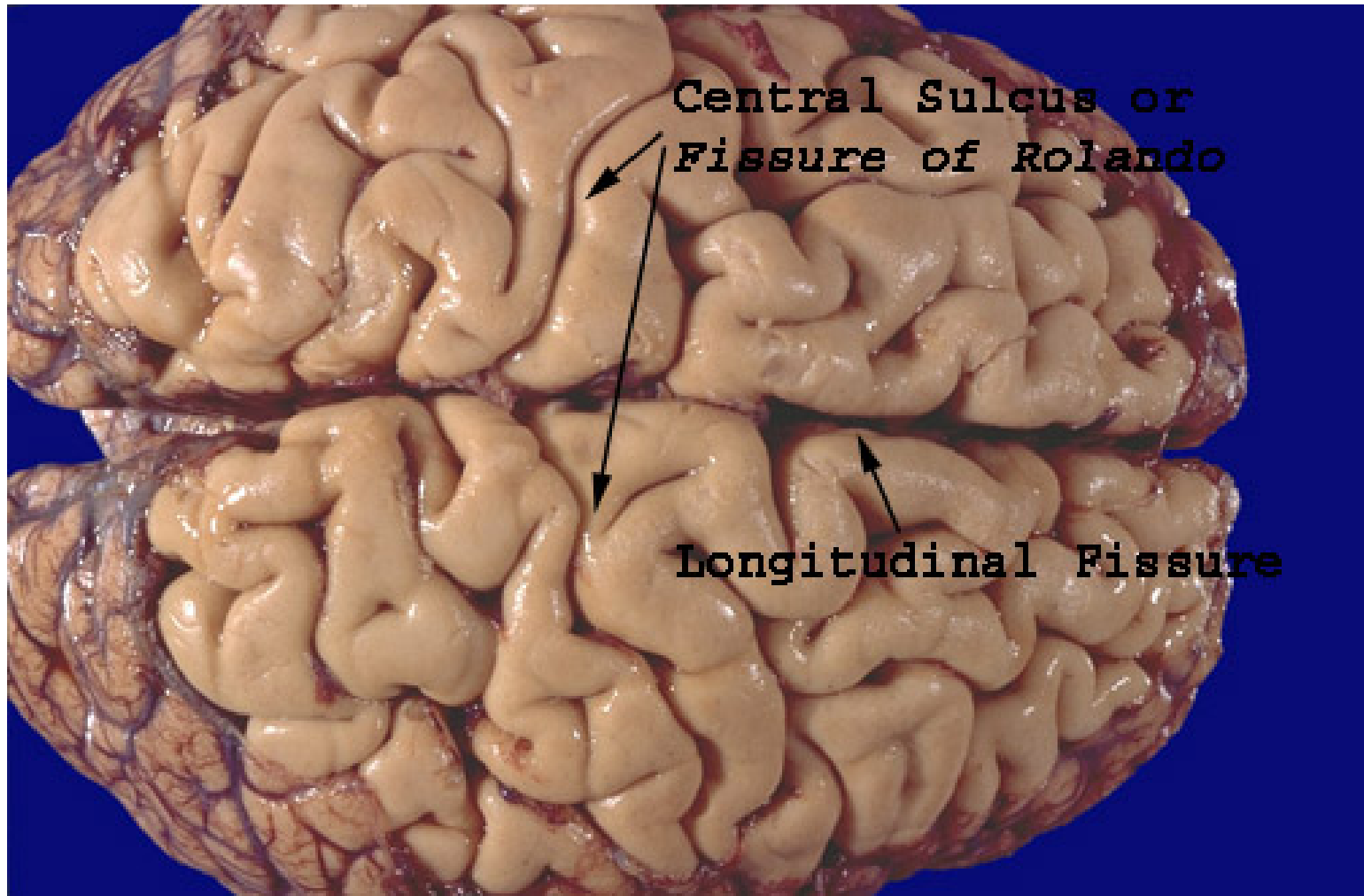


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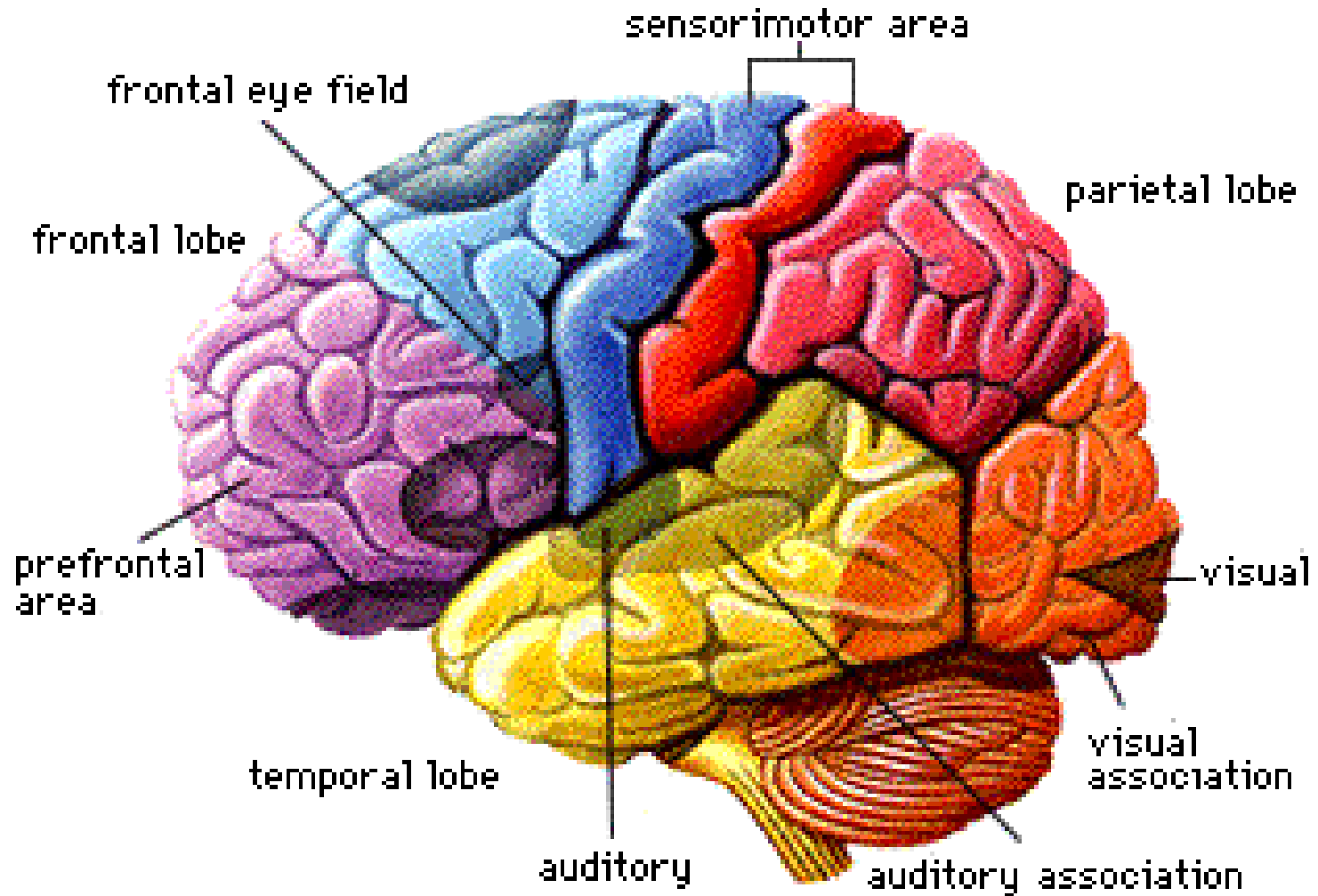
Real neural nets:



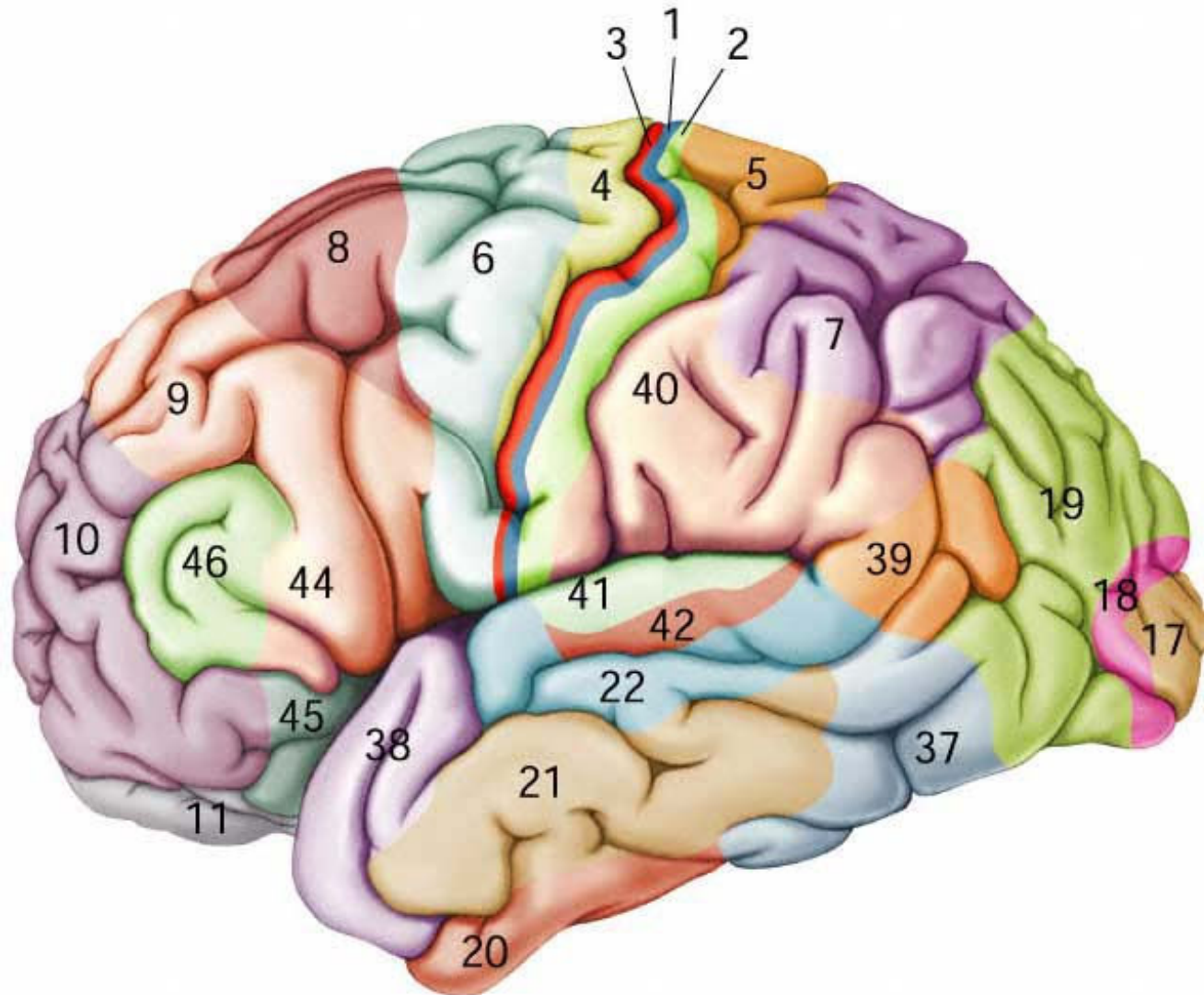
Sulci and Fissures

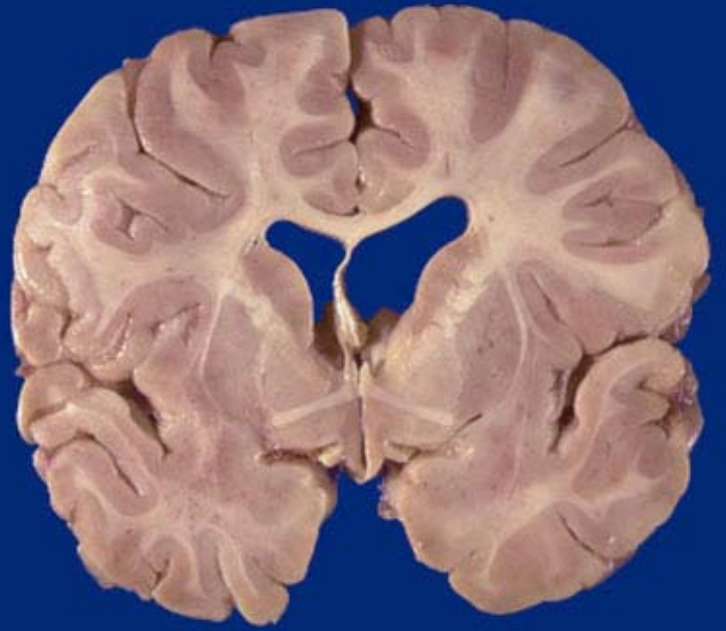
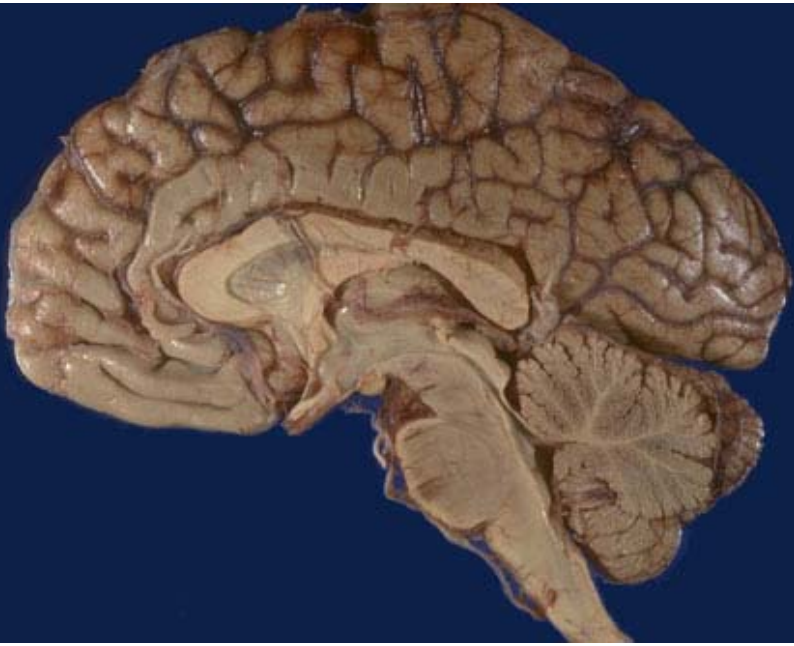


Some of the Functions:

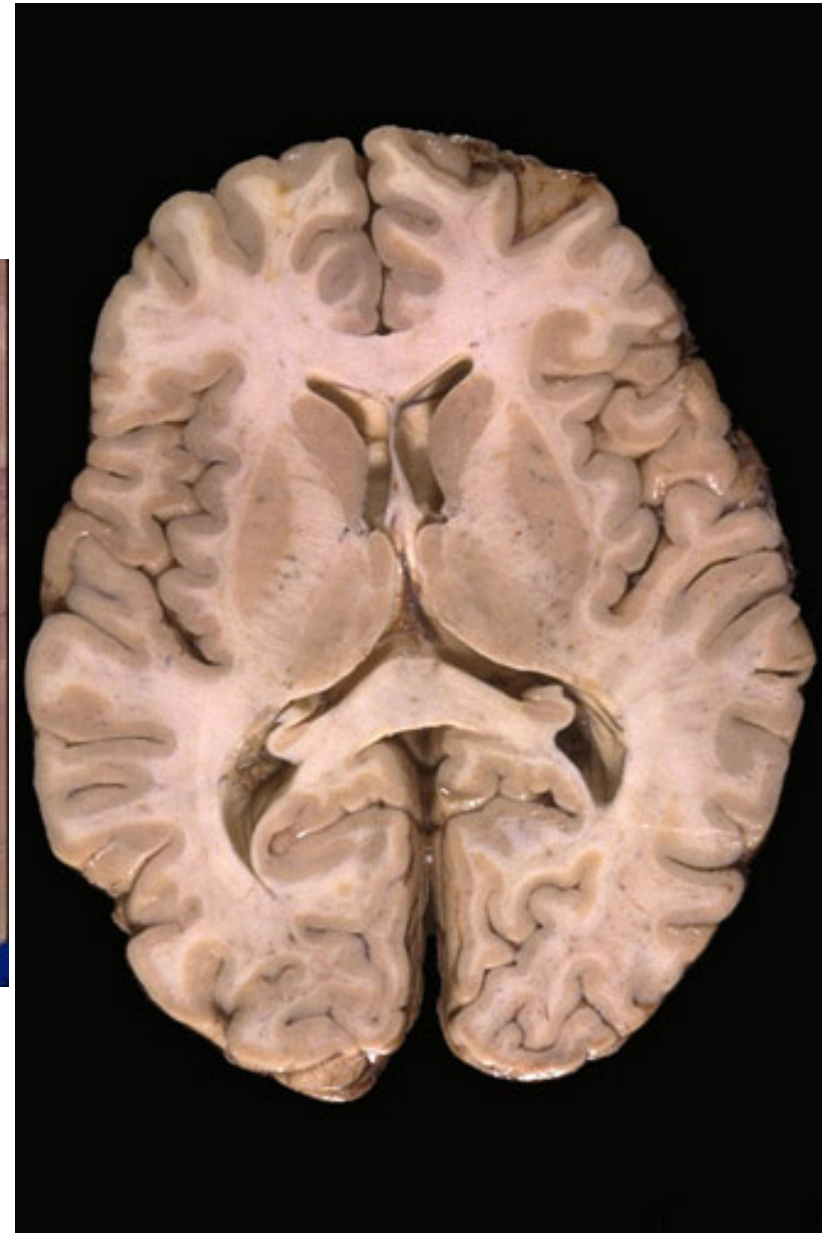
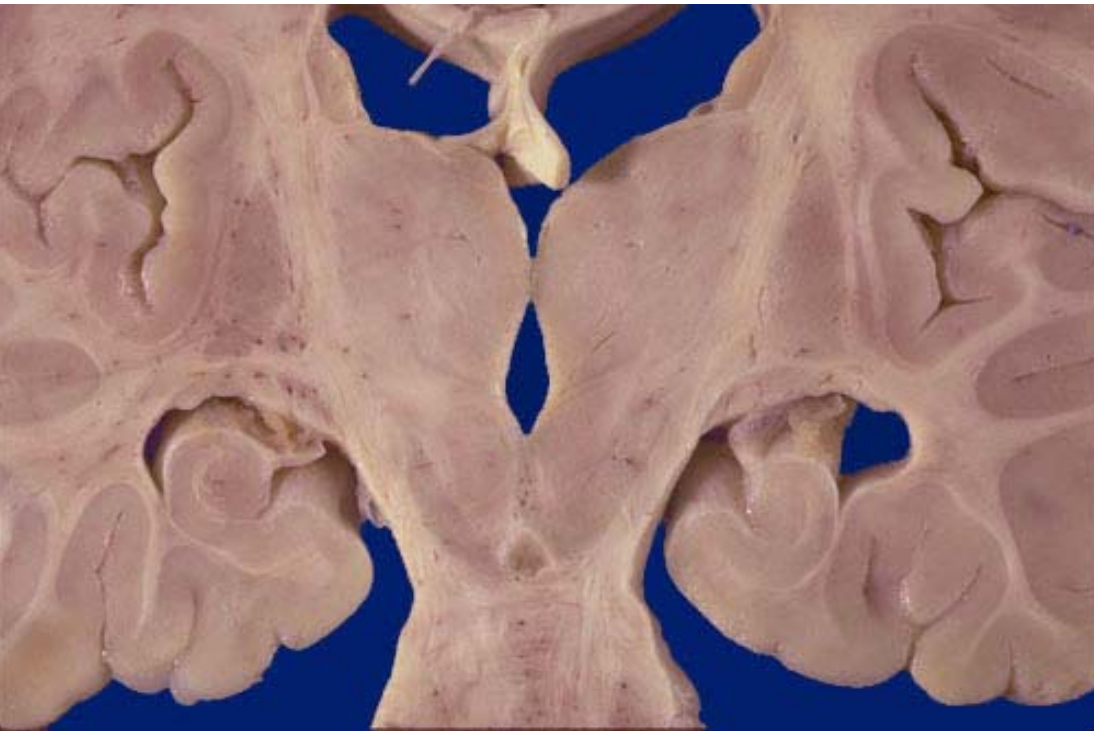


Brodmann Areas: cytoarchitectonics.

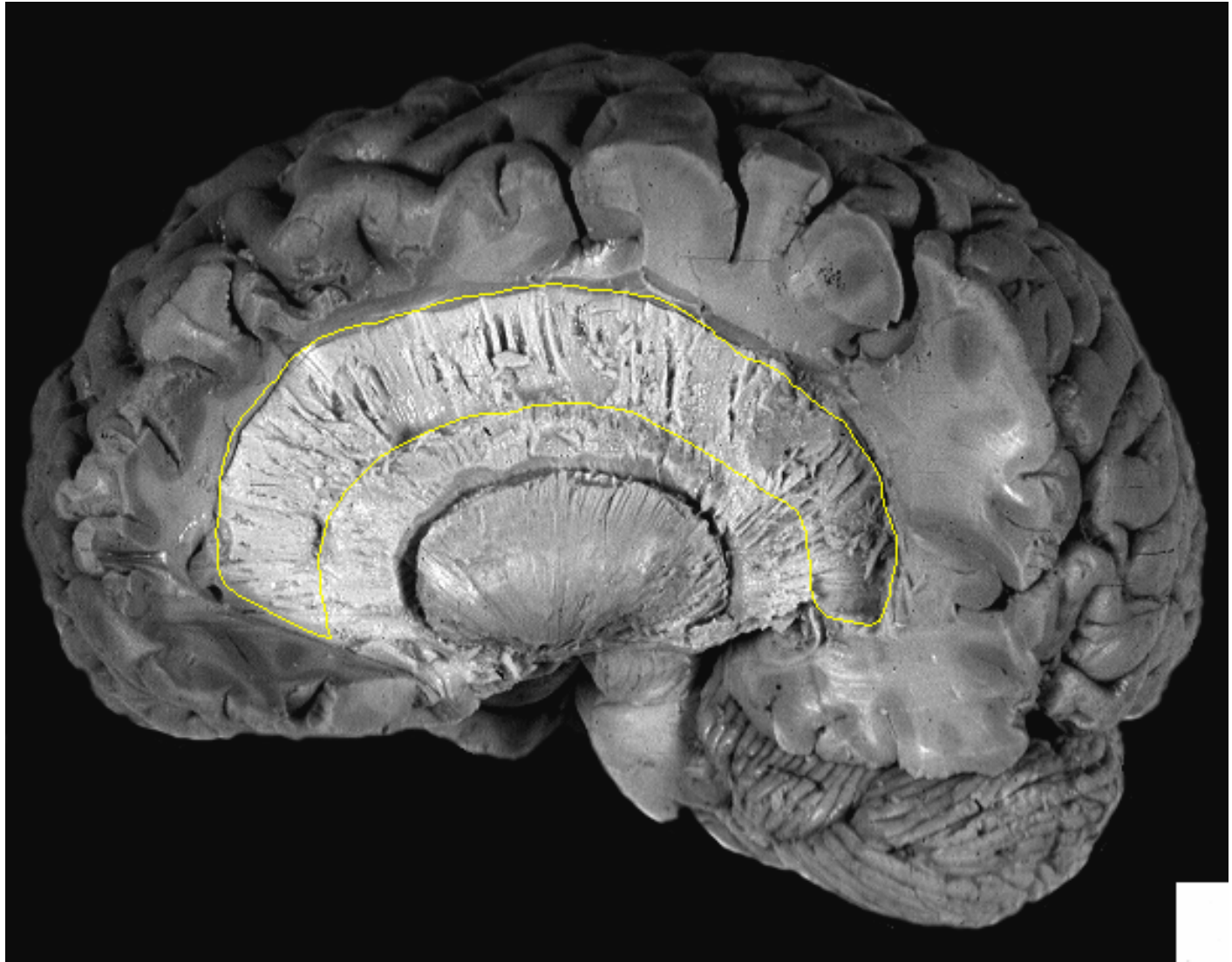




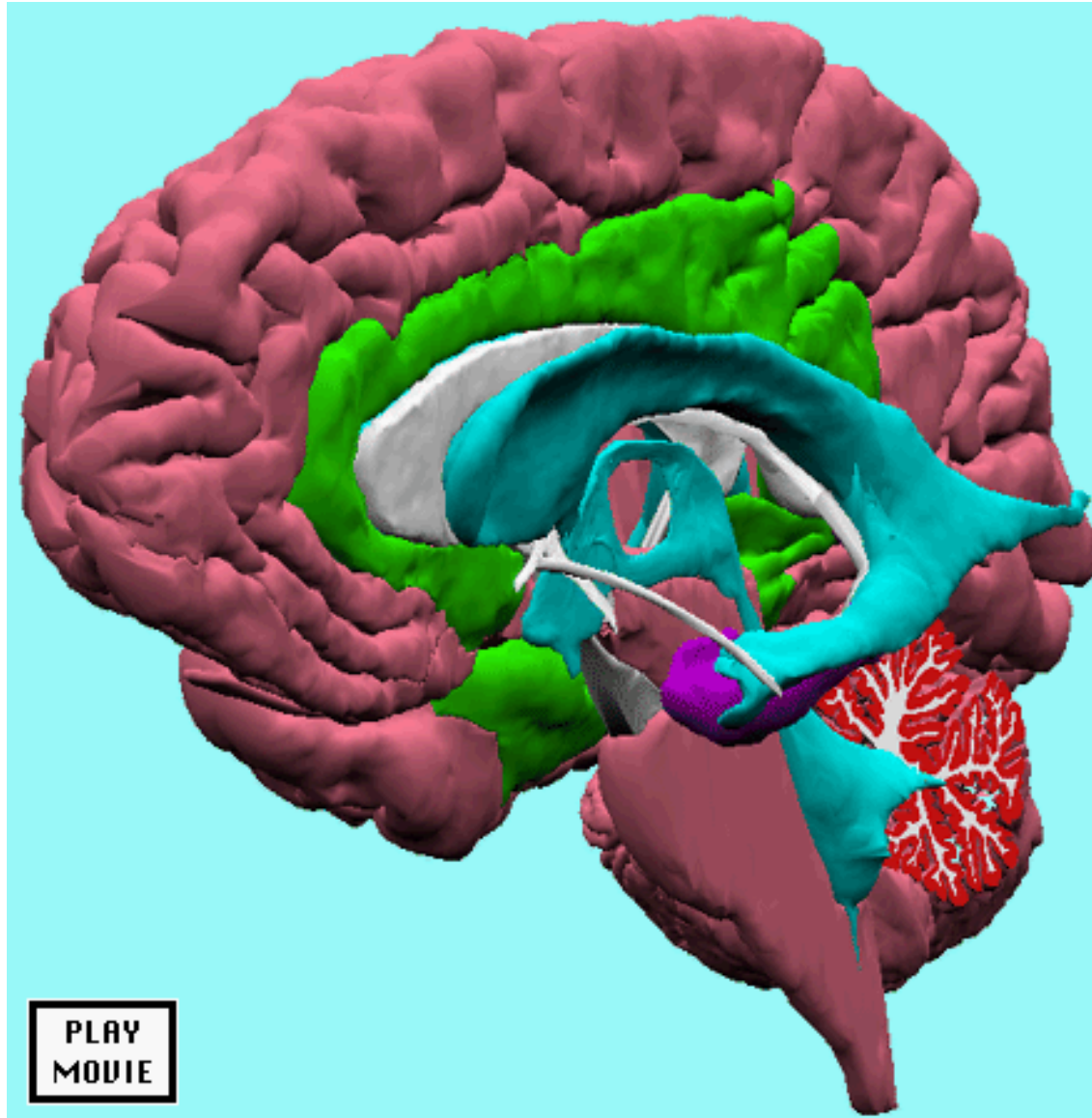
Thalamus



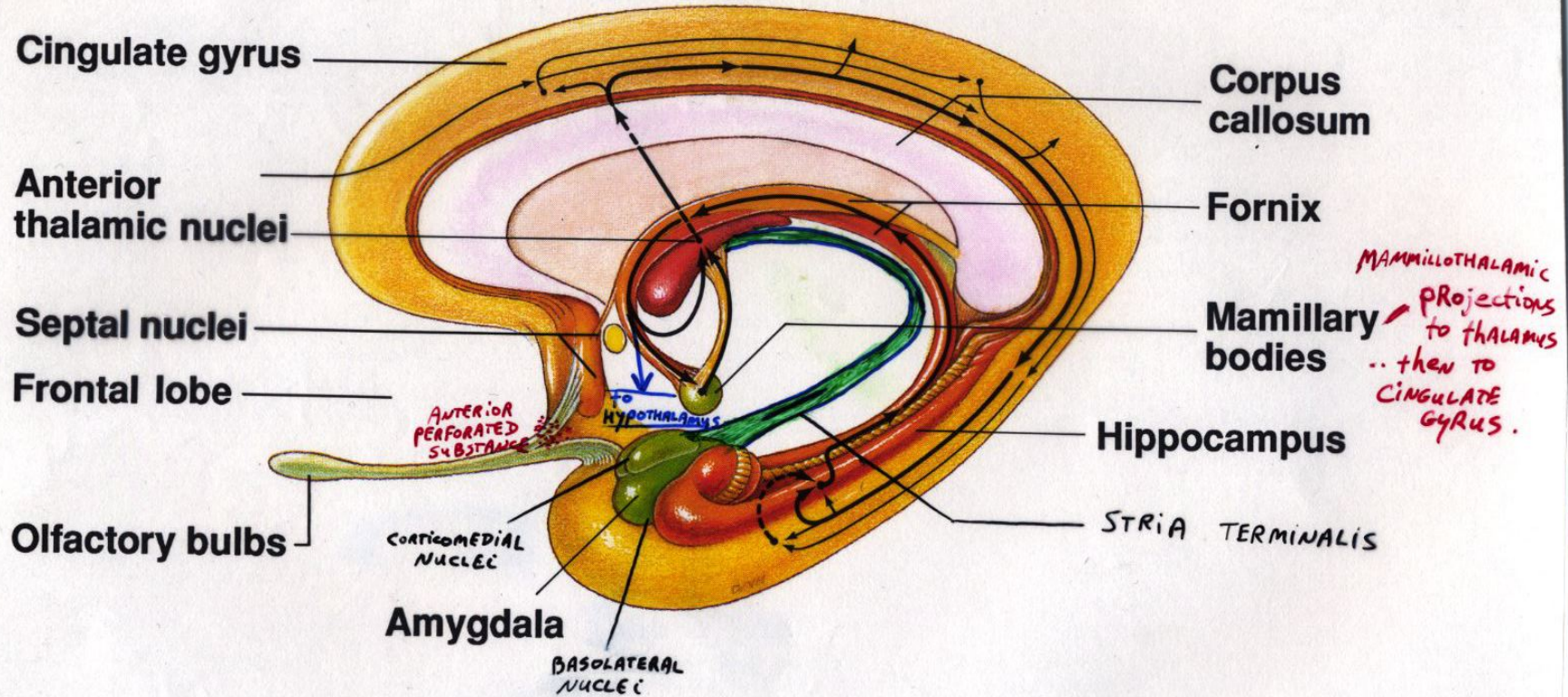
Corona Radiata –Thalamic Pathways



Limbic System



Papez Circuit

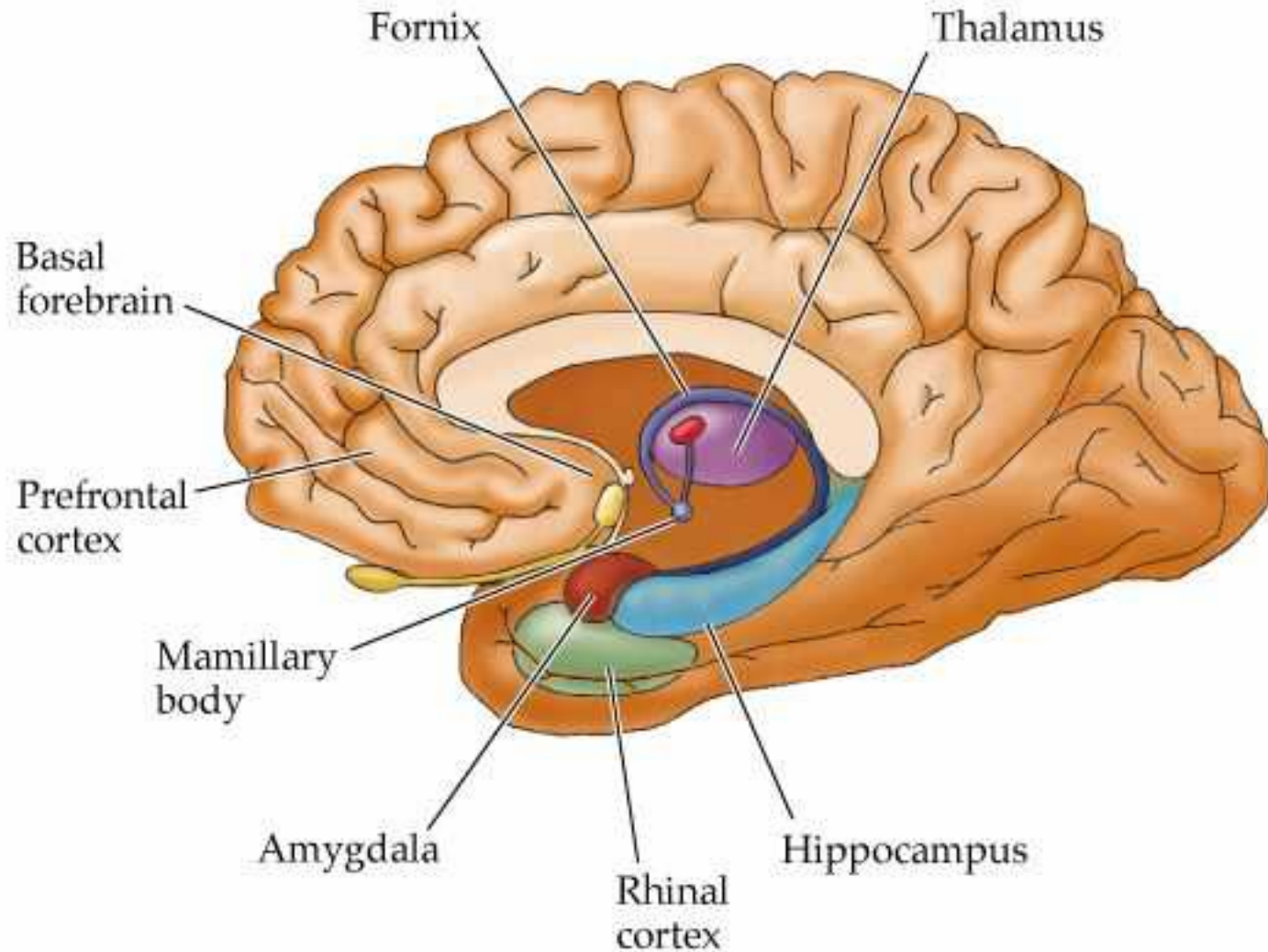


Limbic system

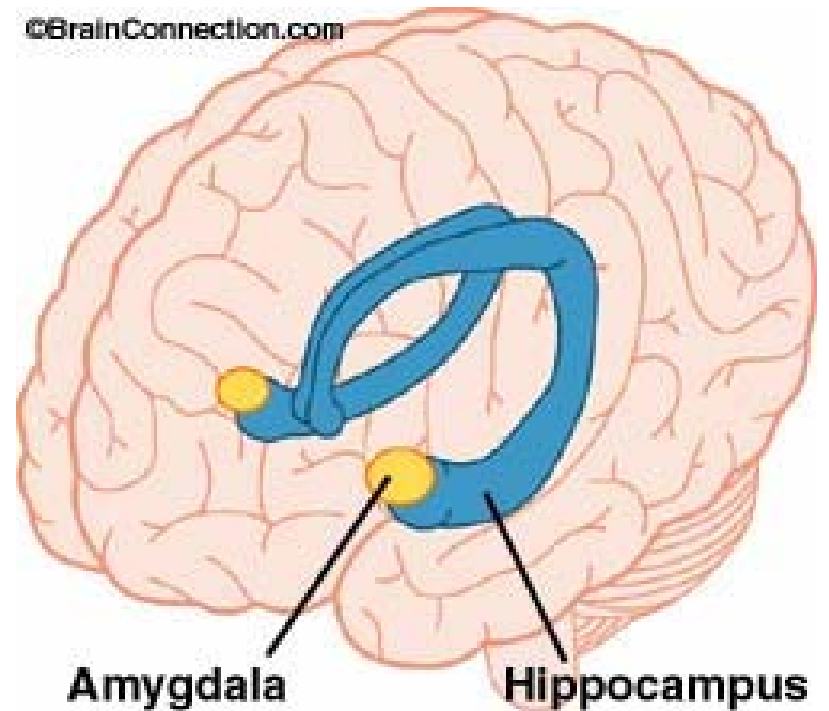
Based on McLean, 1949

© 1992 Wadsworth, Inc.

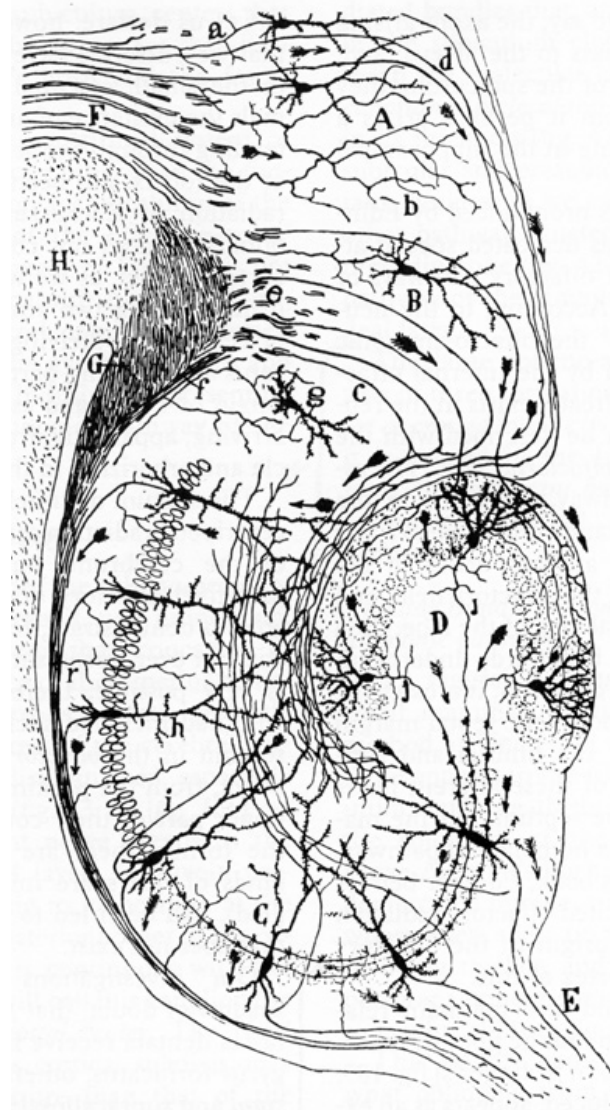
Neural Structures important in Emotion:



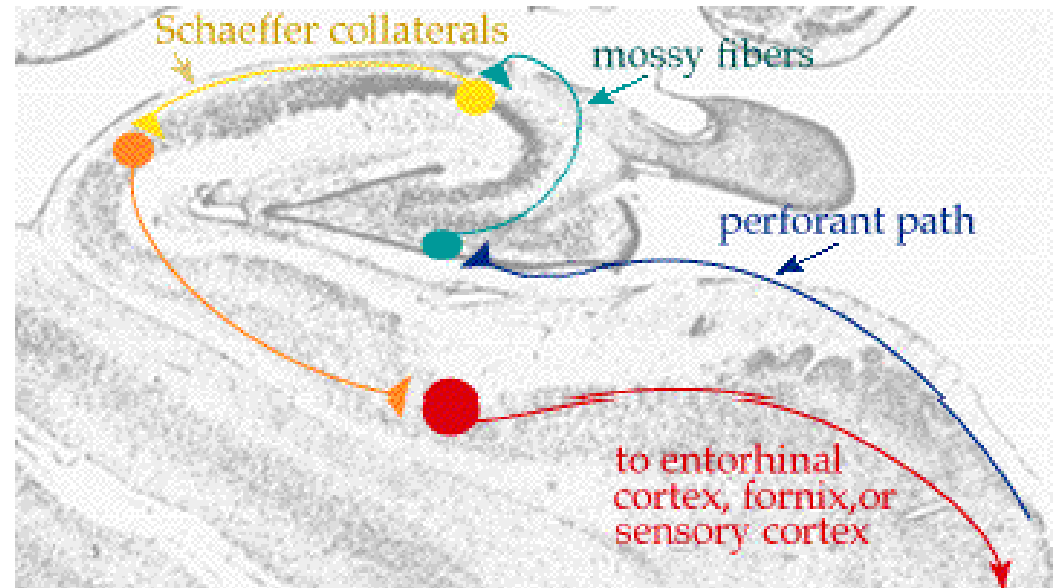
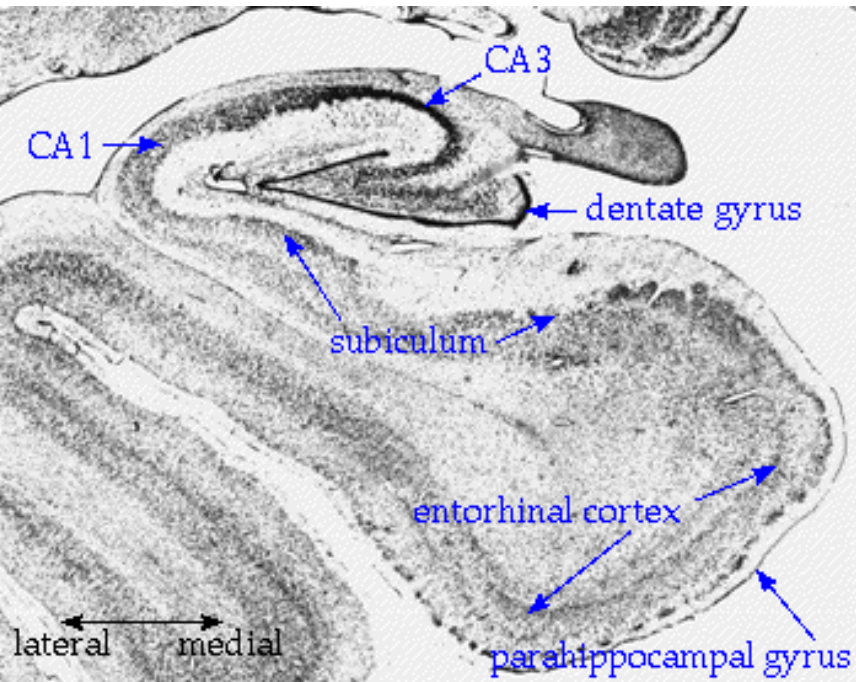
Amygdala



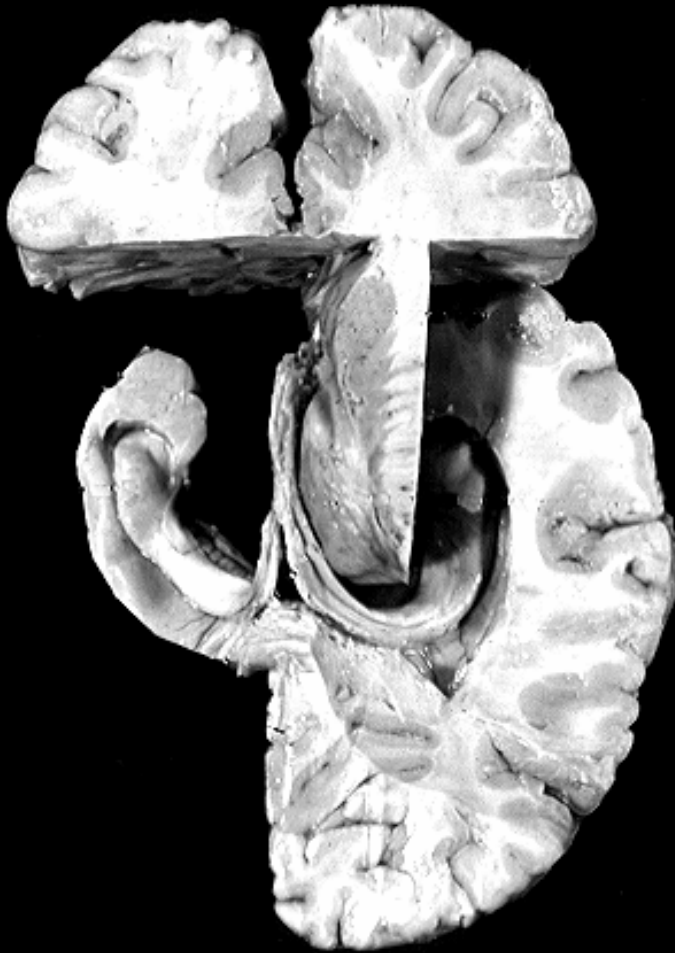
Hippocampus



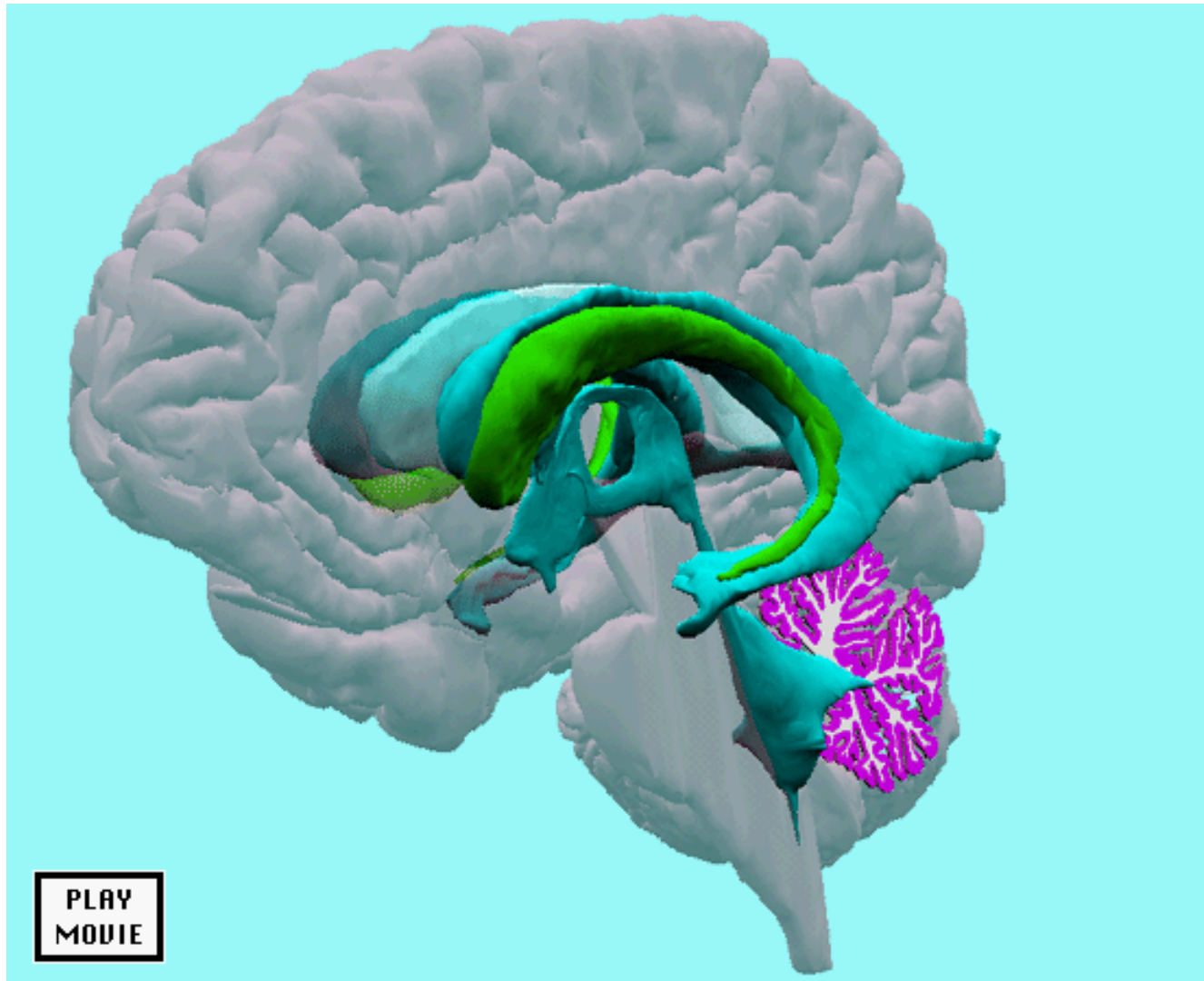
Hippocampal Connectivity



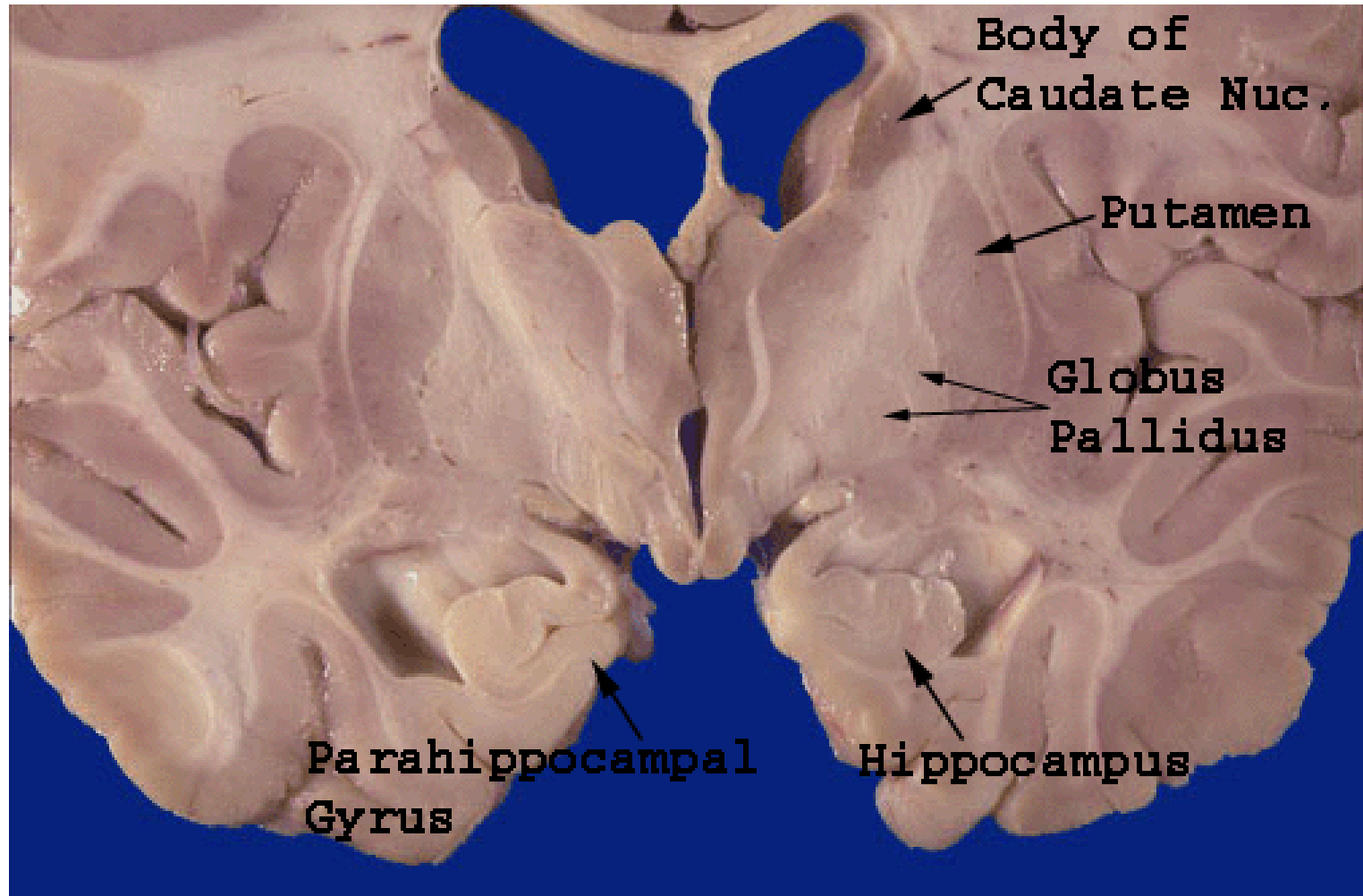
Hippocampal Dissections



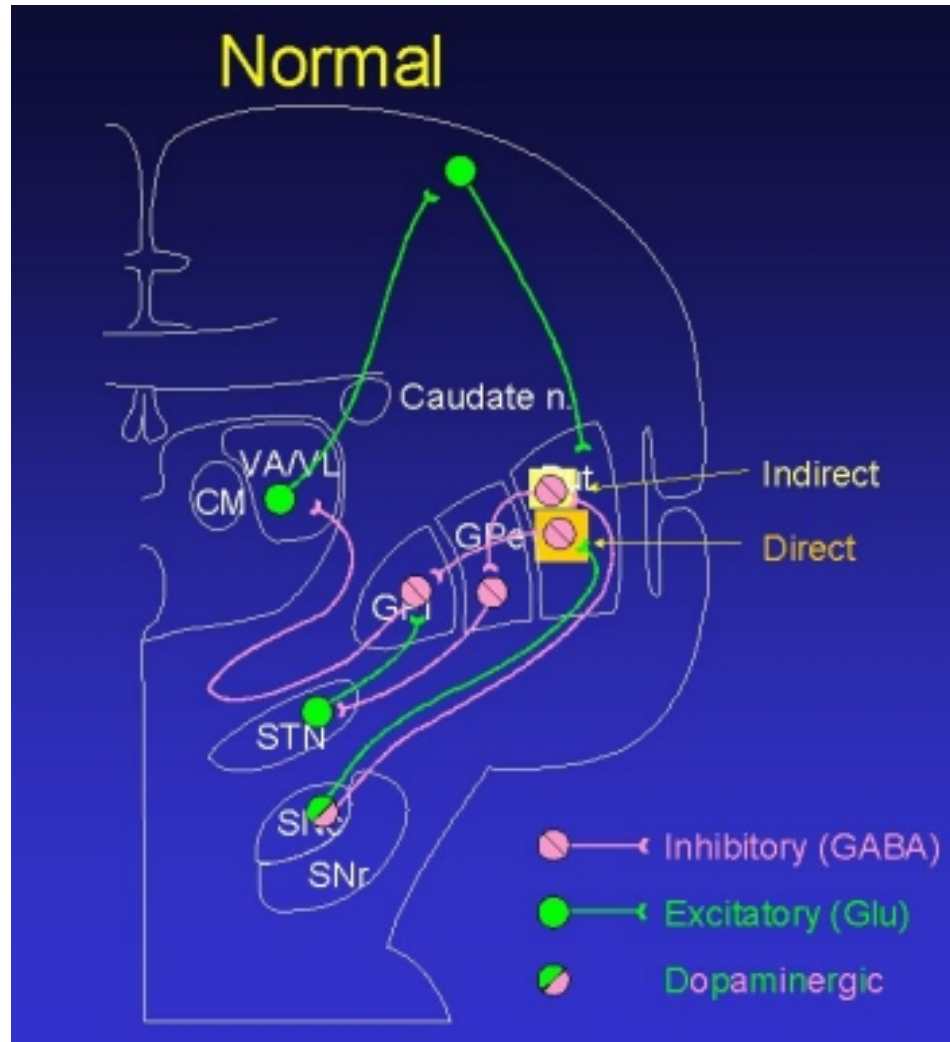
Caudate Nucleus

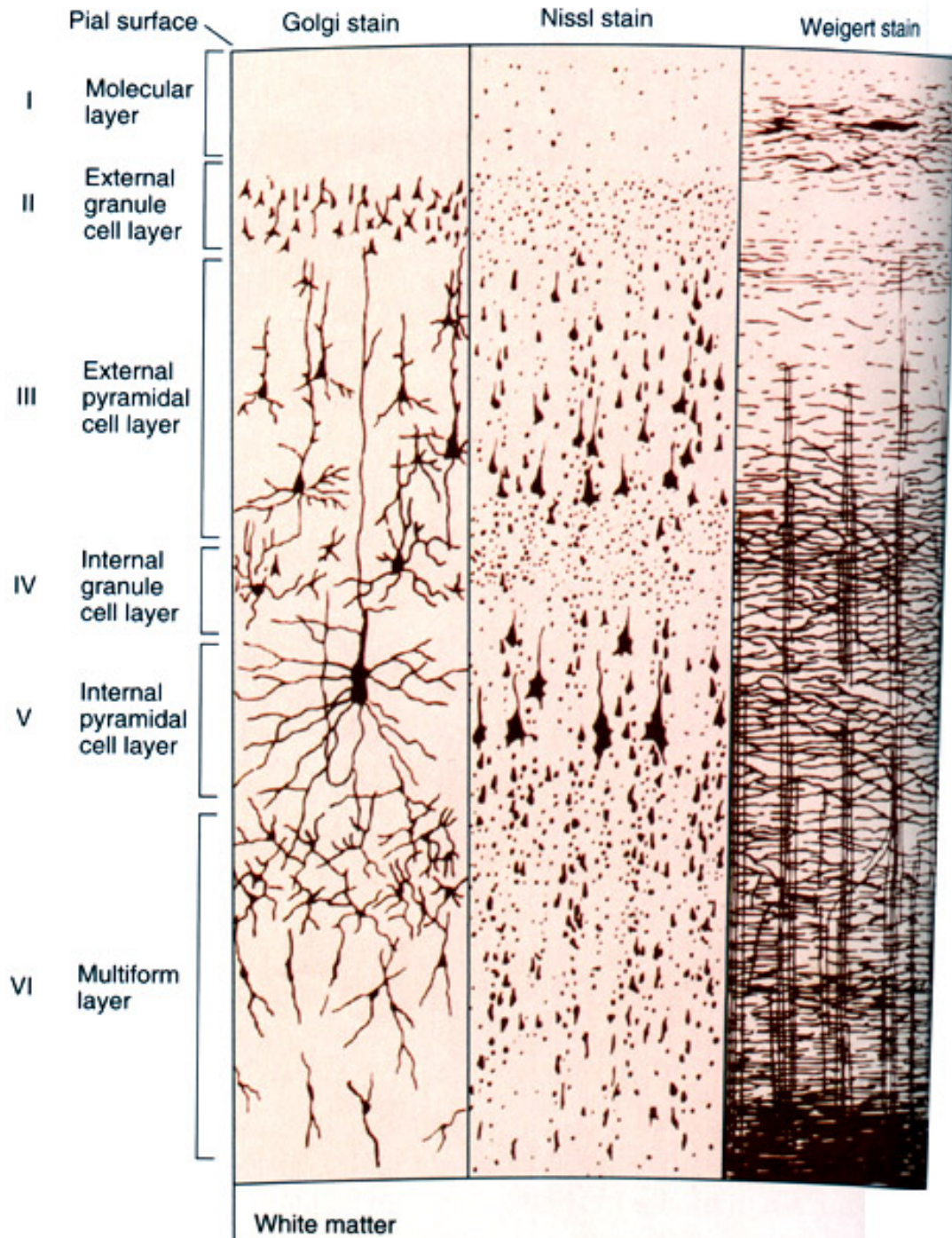


Basal Ganglia Structures

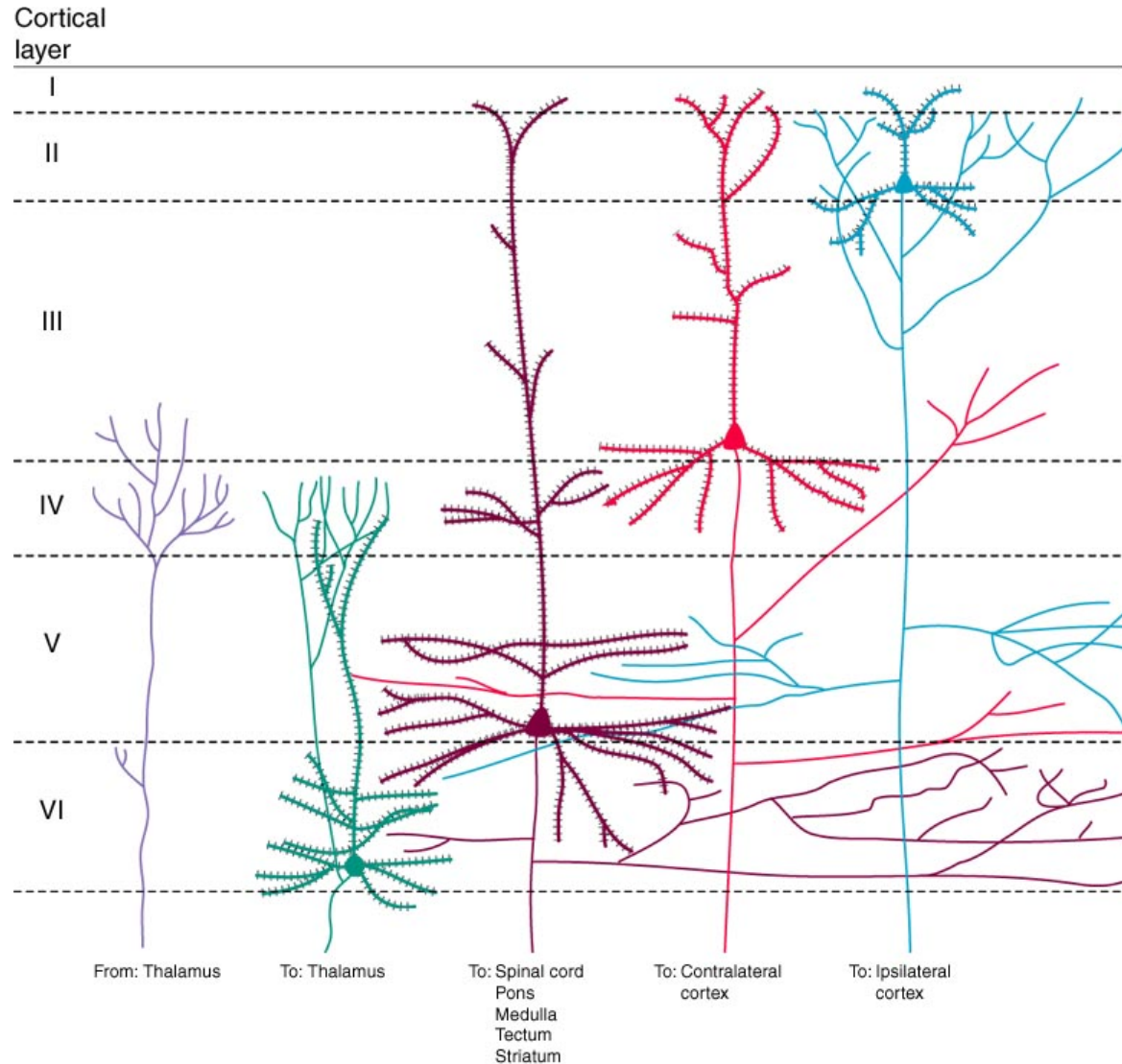


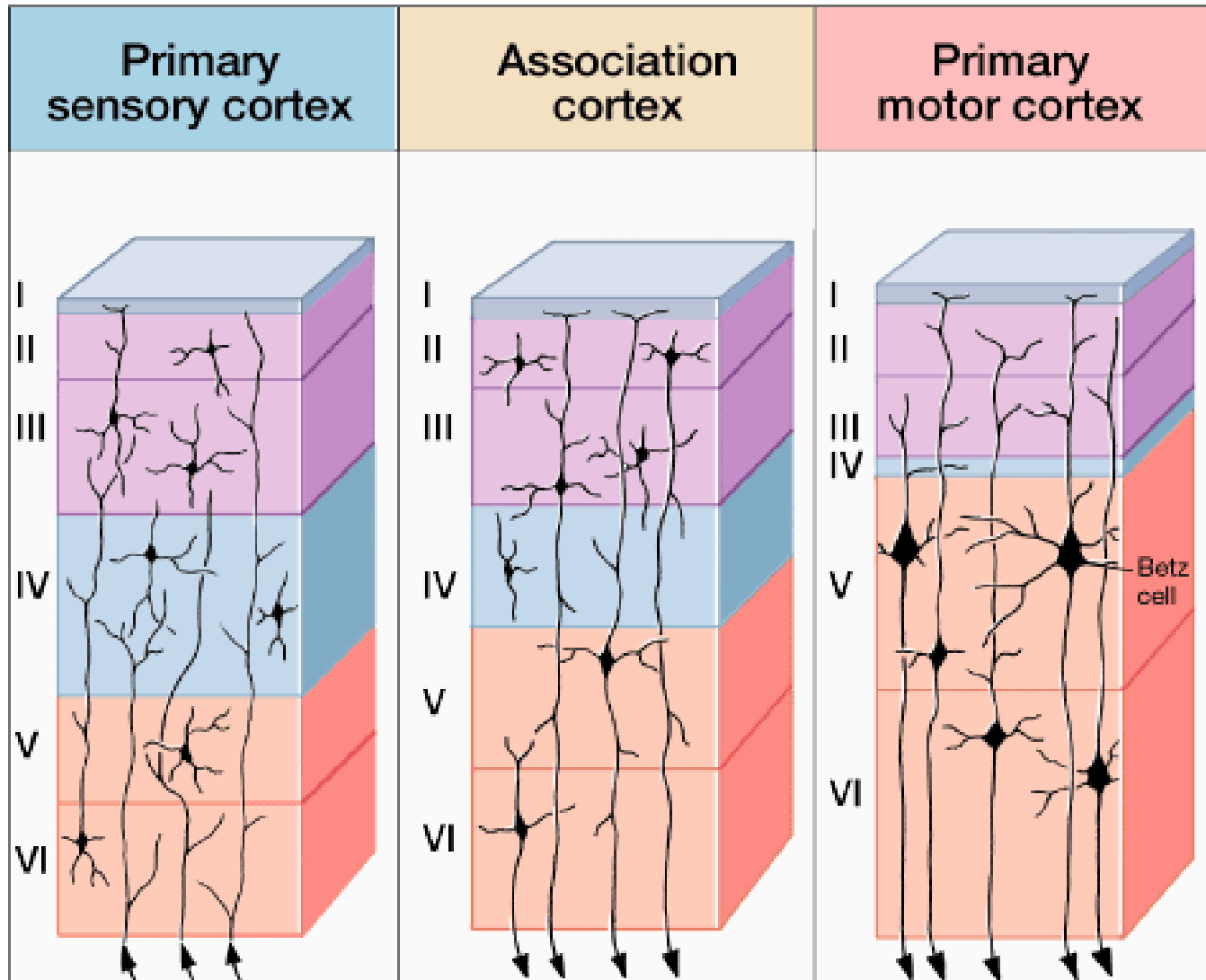
Basal Ganglia Pathways

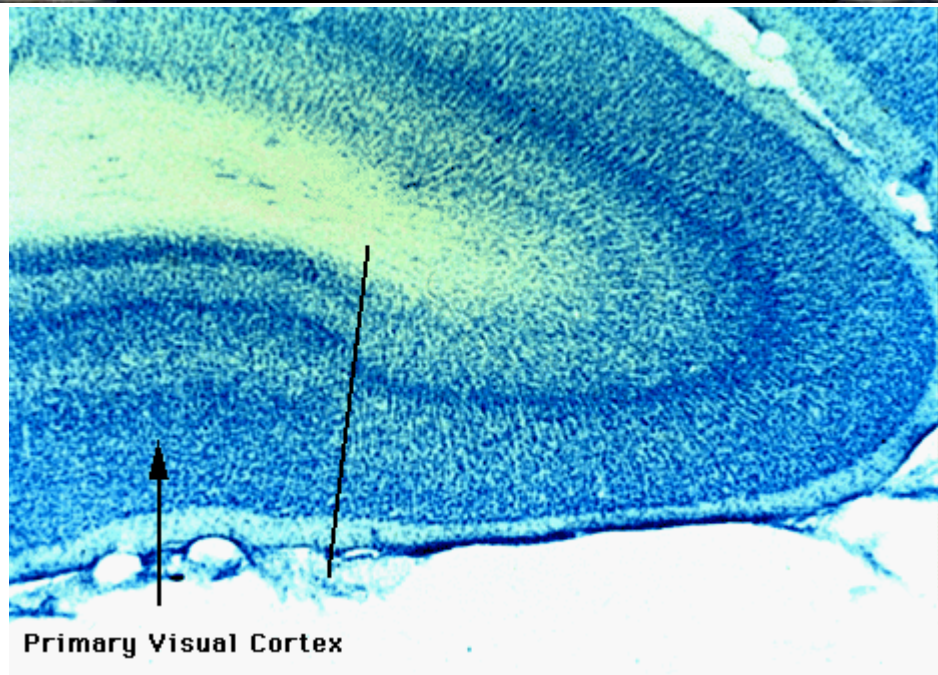
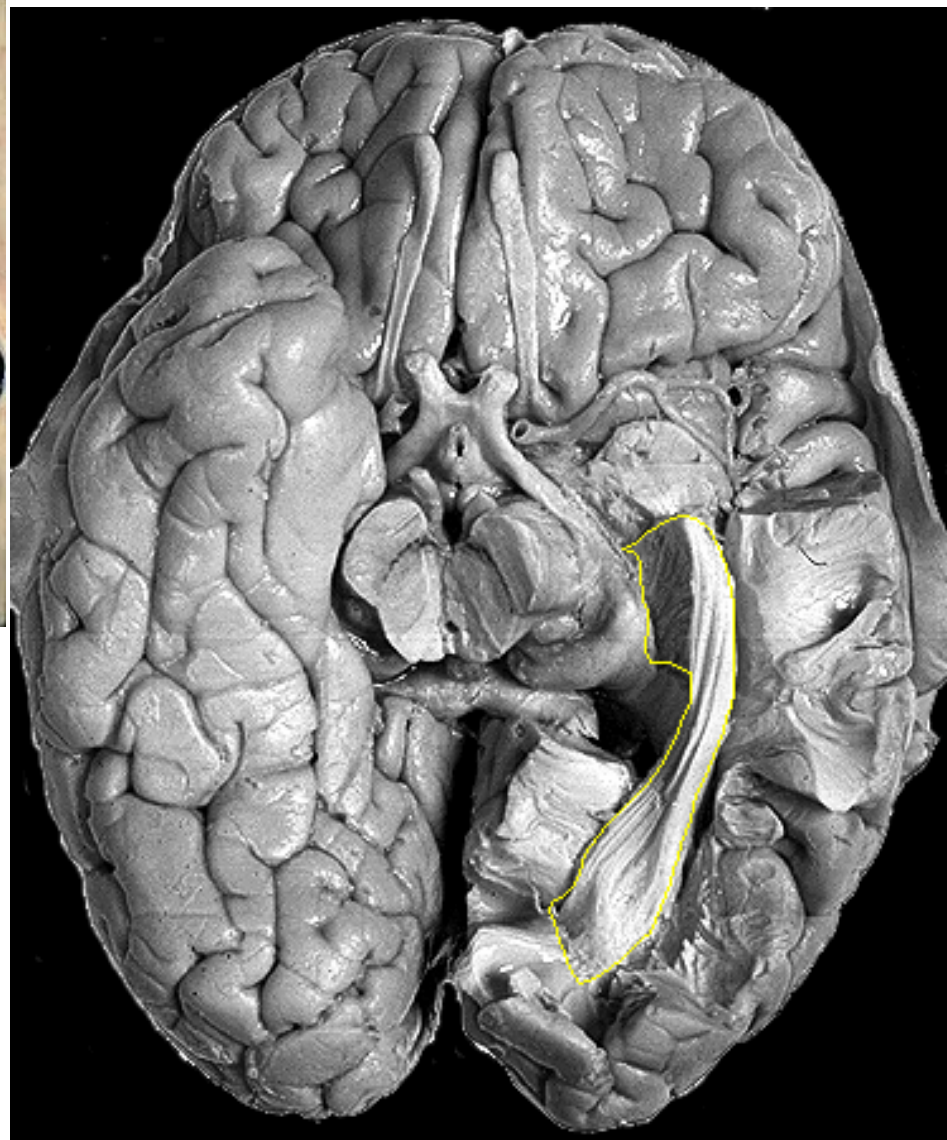
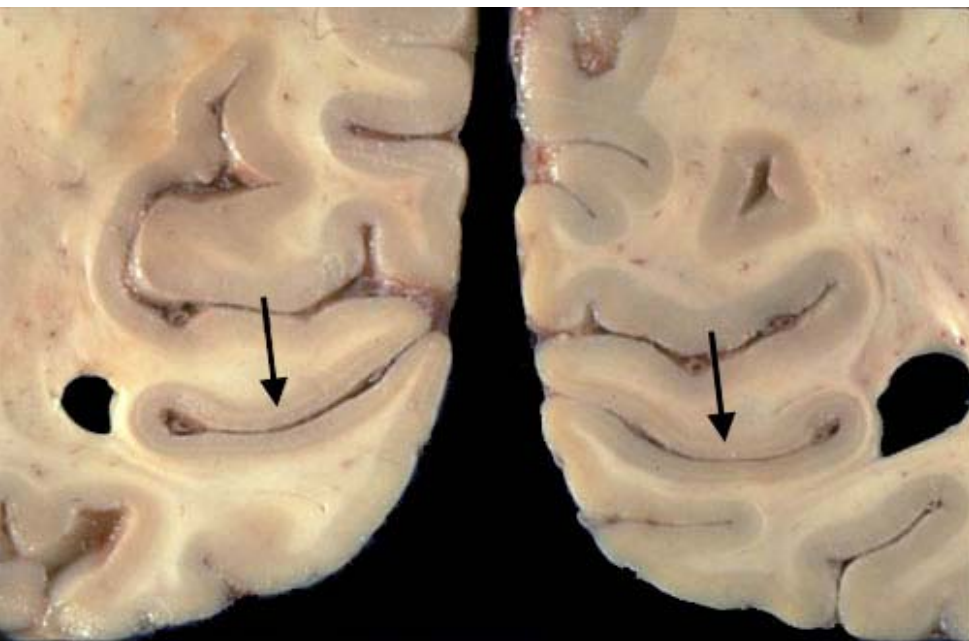




Projection and growth patterns of cortical neurons:

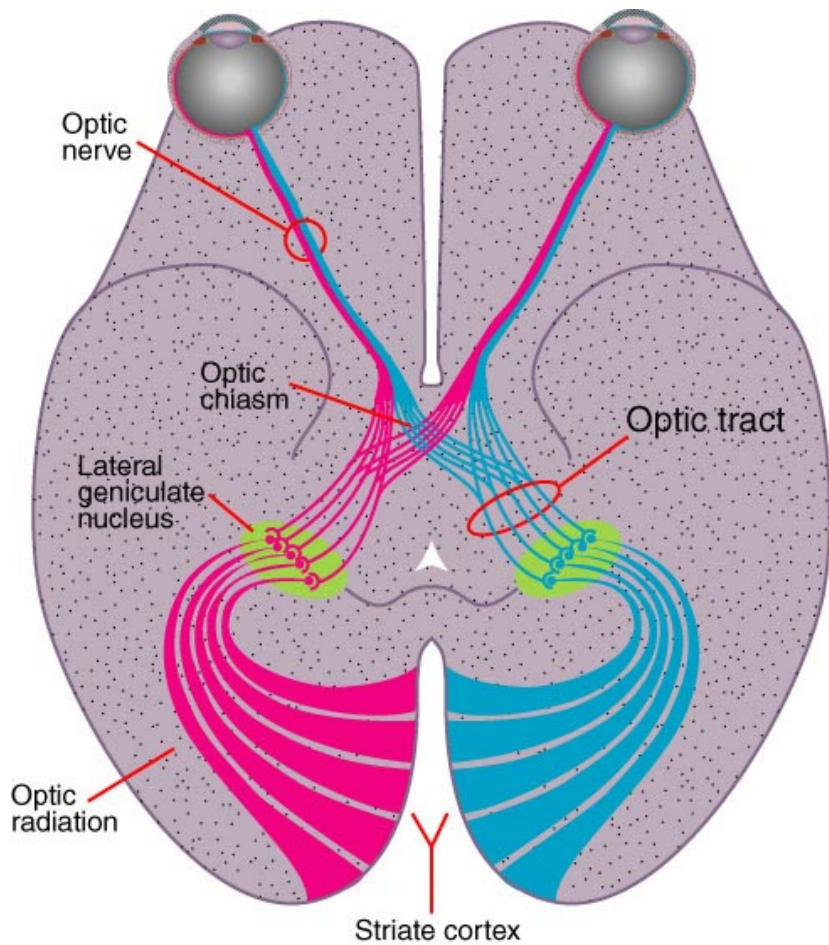






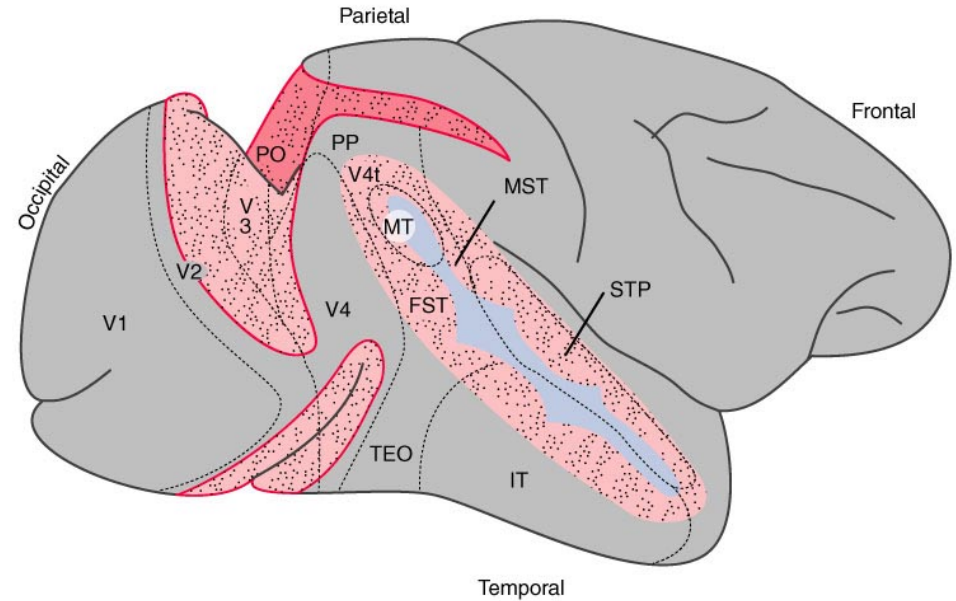
Primary Visual Cortex

Visual and Spatial Pathways:

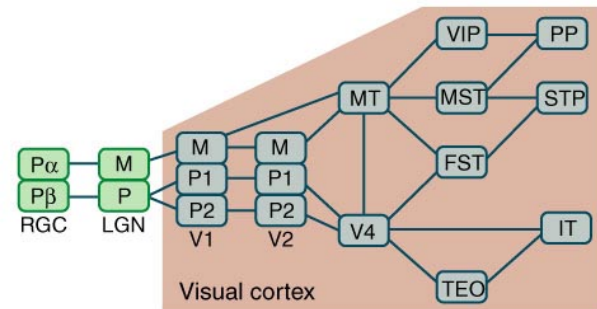


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A



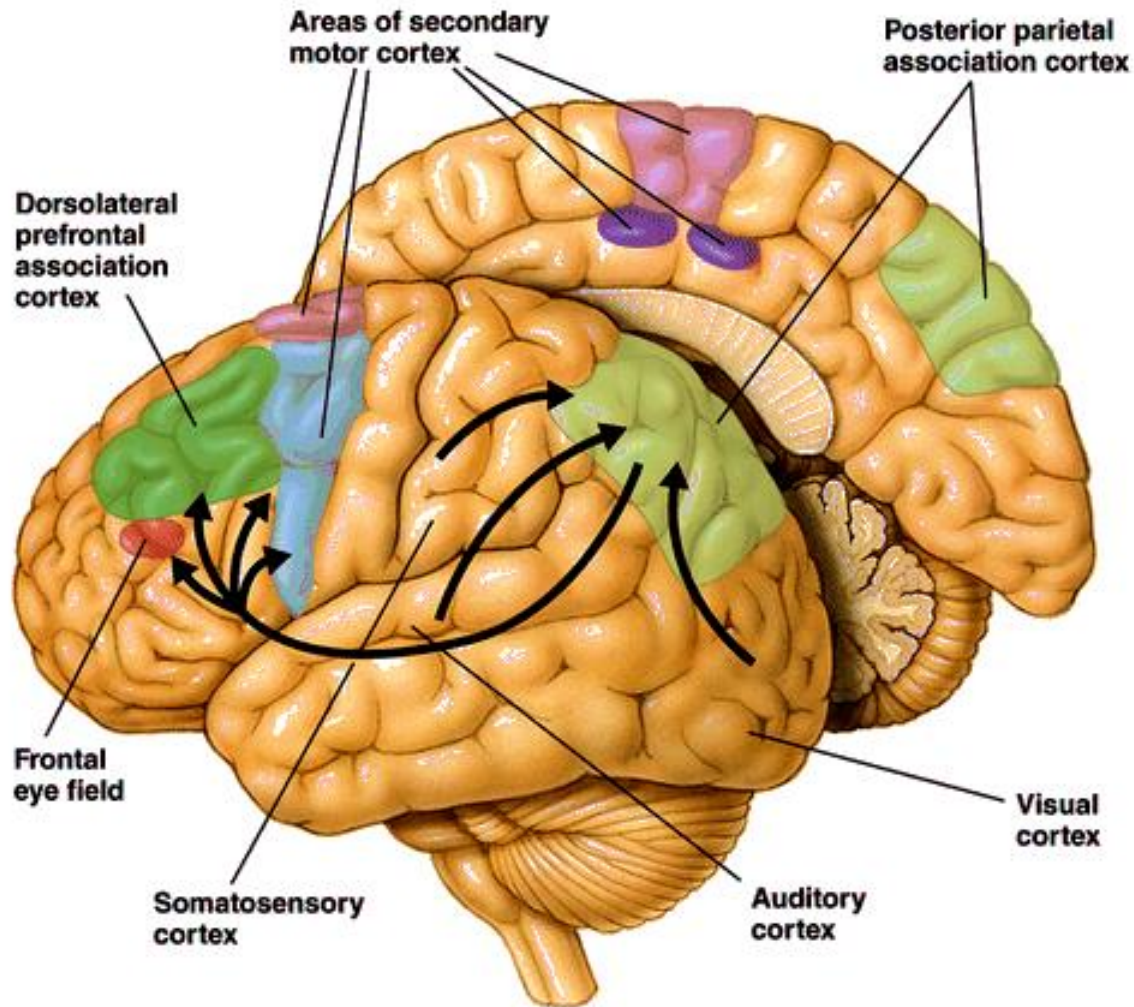
B



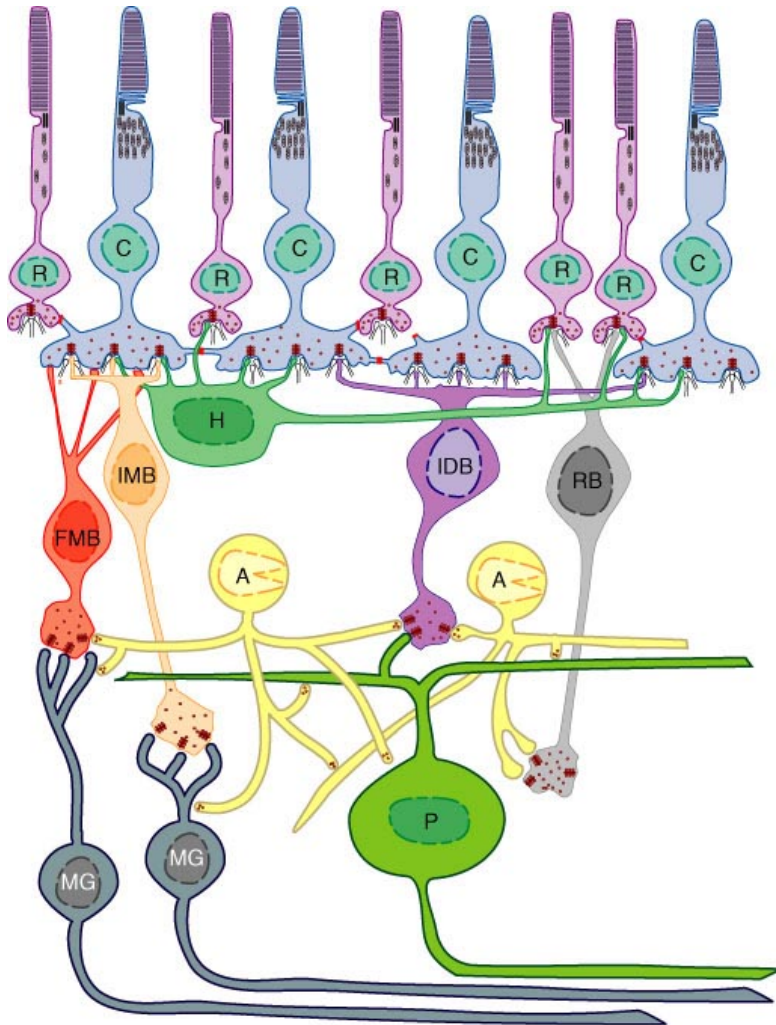
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Some of the Cortical Pathways:

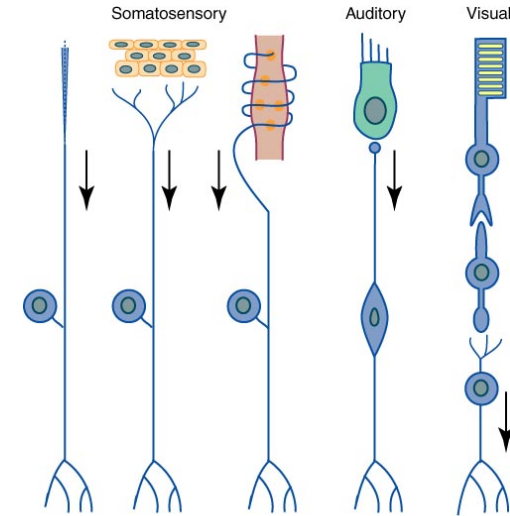
► Cortical Input and Output Pathways



Sensory Information in the Cortex:

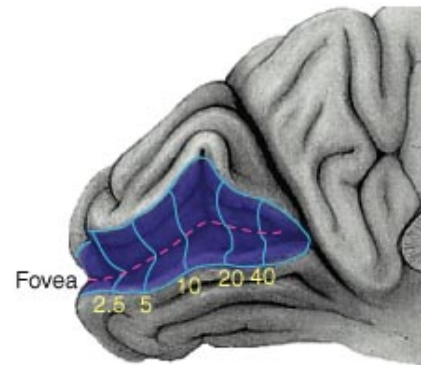


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A

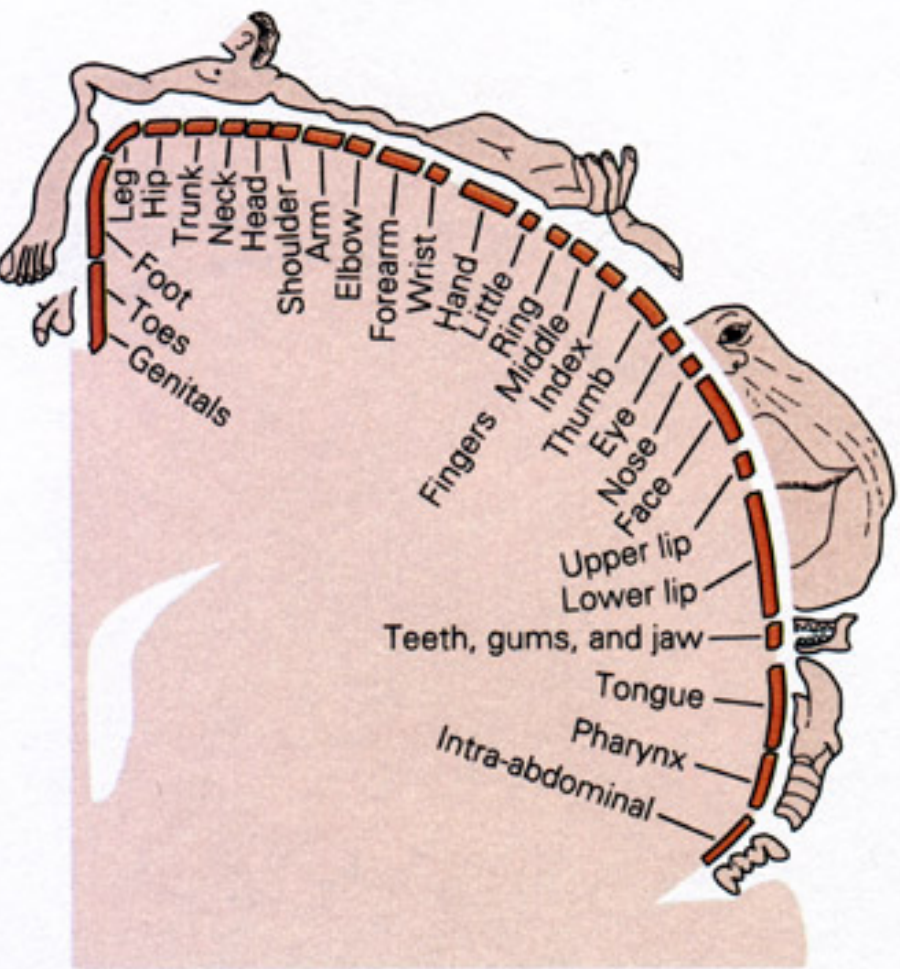


B



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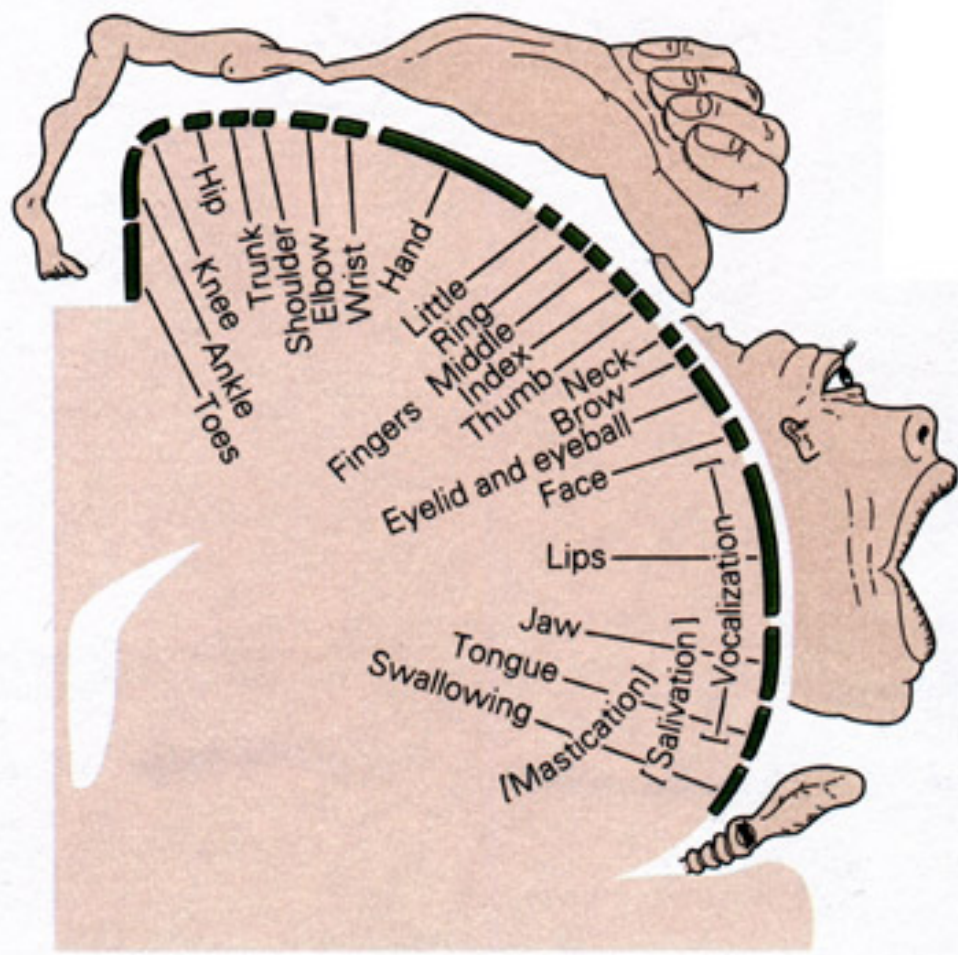
A Sensory homunculus



Medial

Lateral

B Motor homunculus



Medial

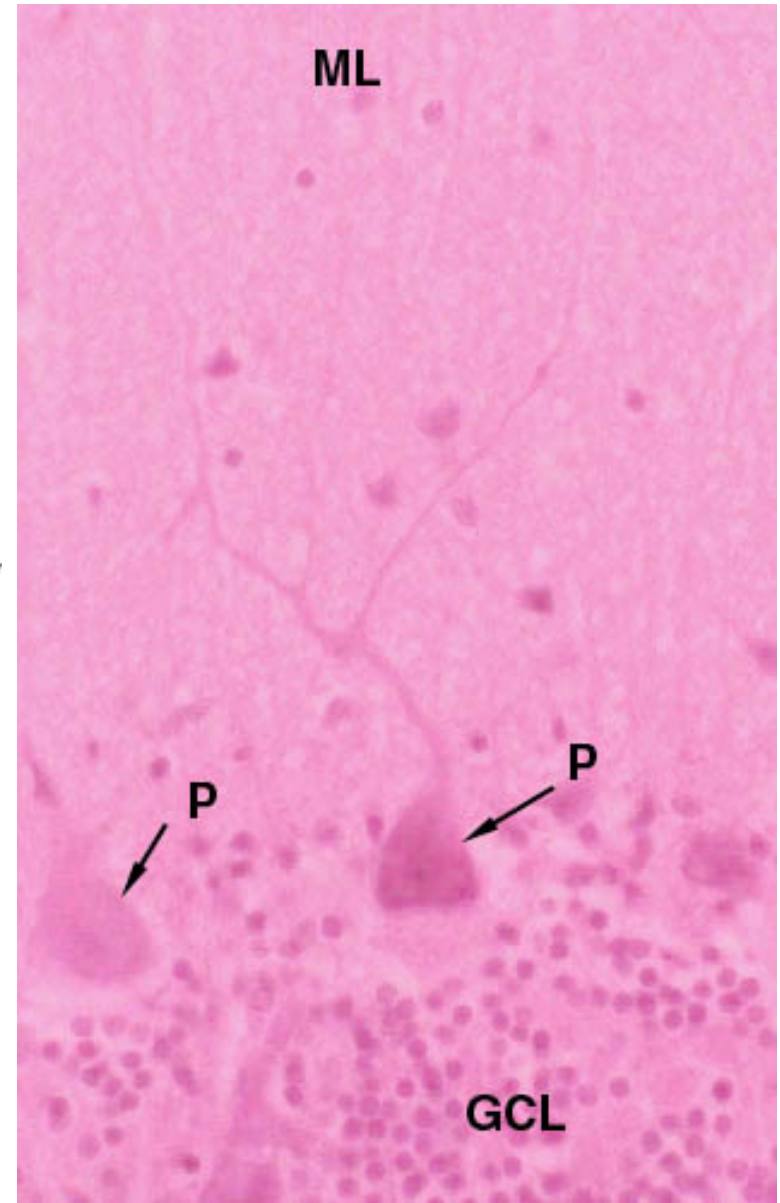
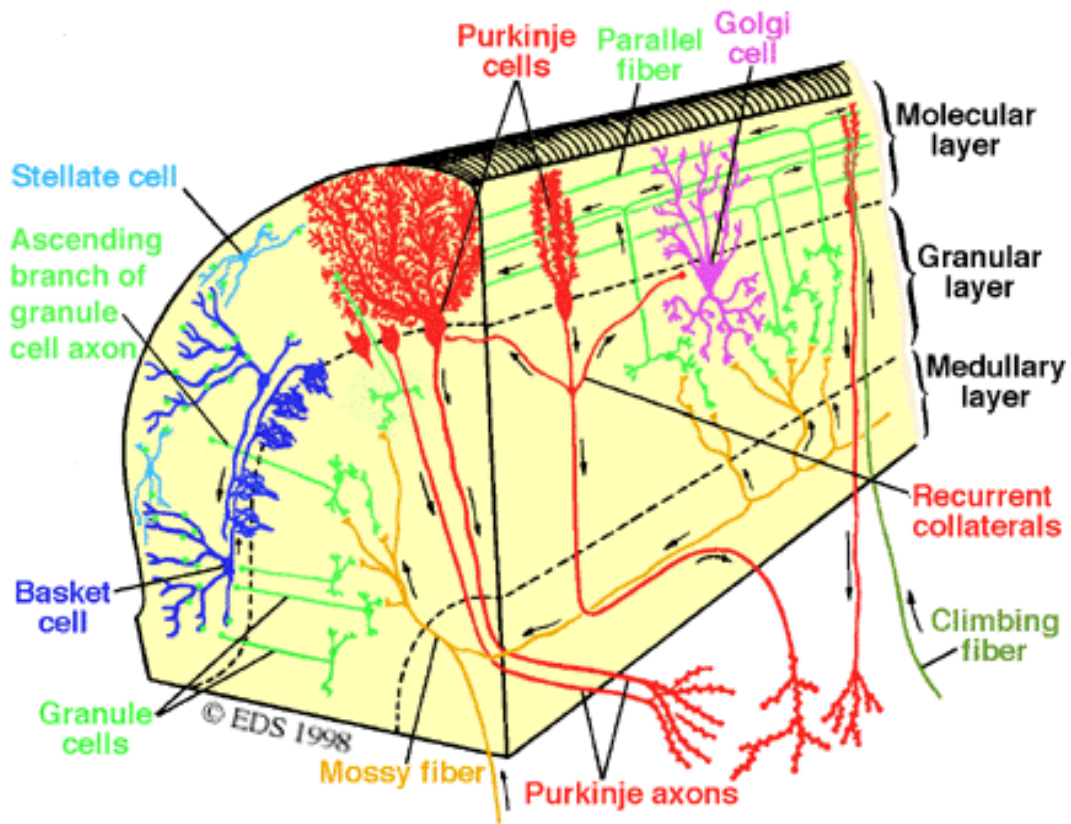
Lateral

Ventral View of the Cortex: OFC

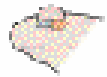


Cerebellum





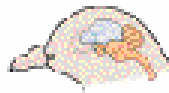
Cerebral Cortex in Various Animals



Leopard frog



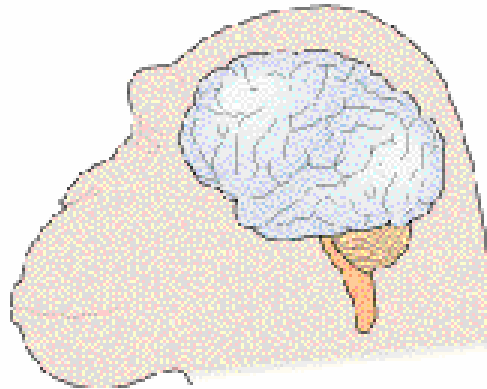
Grass snake



Pigeon



Cat



Chimpanzee



Human