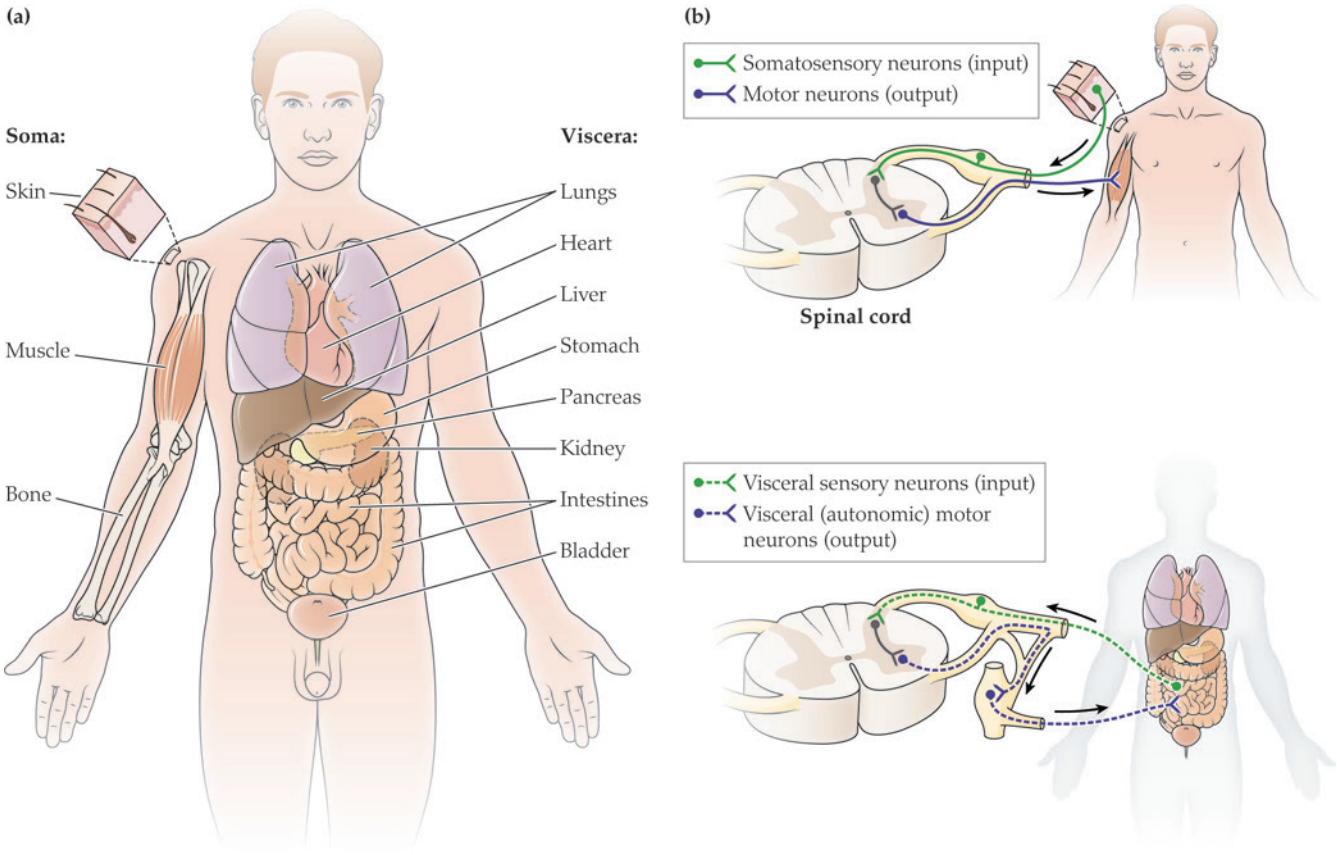
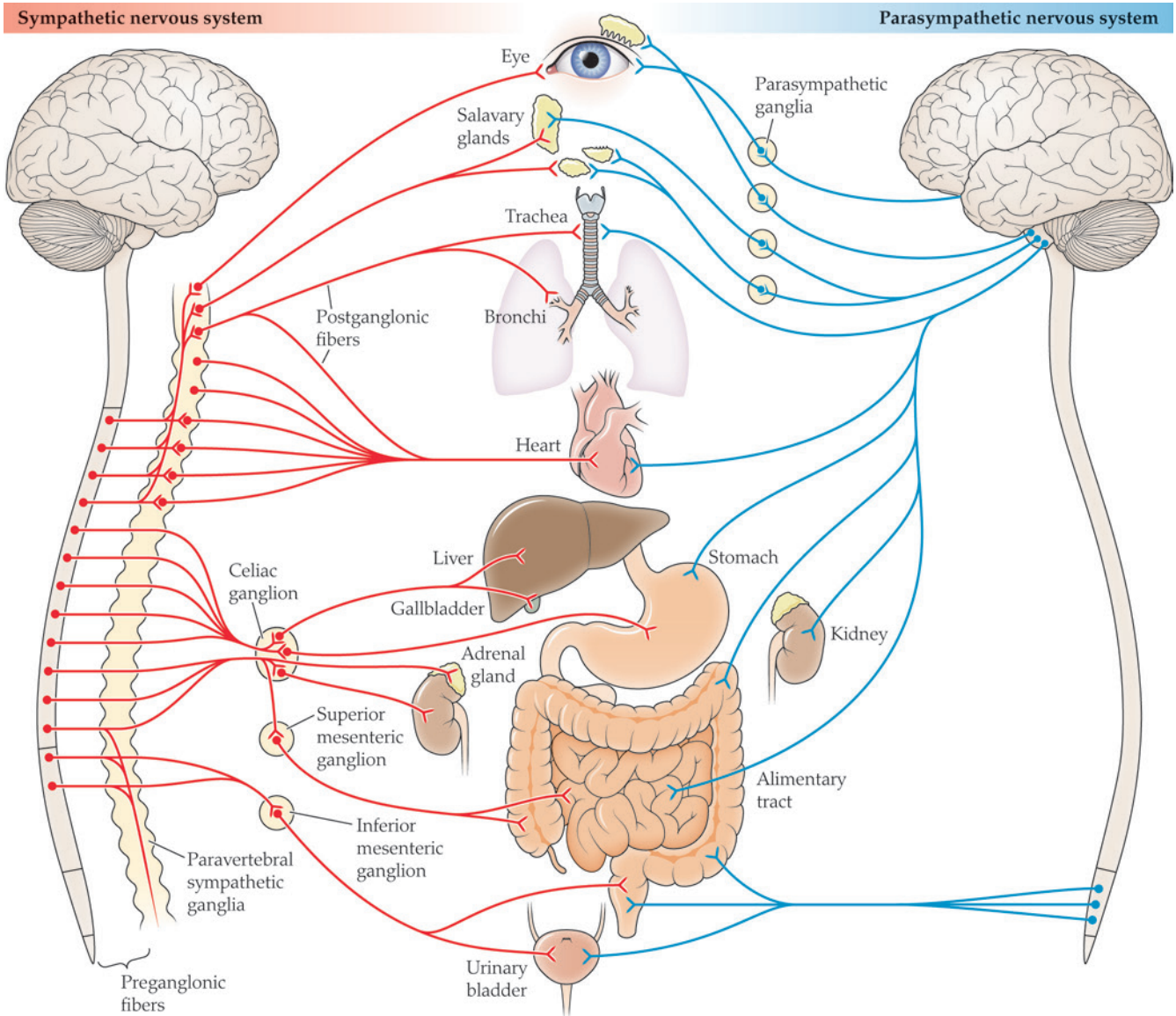
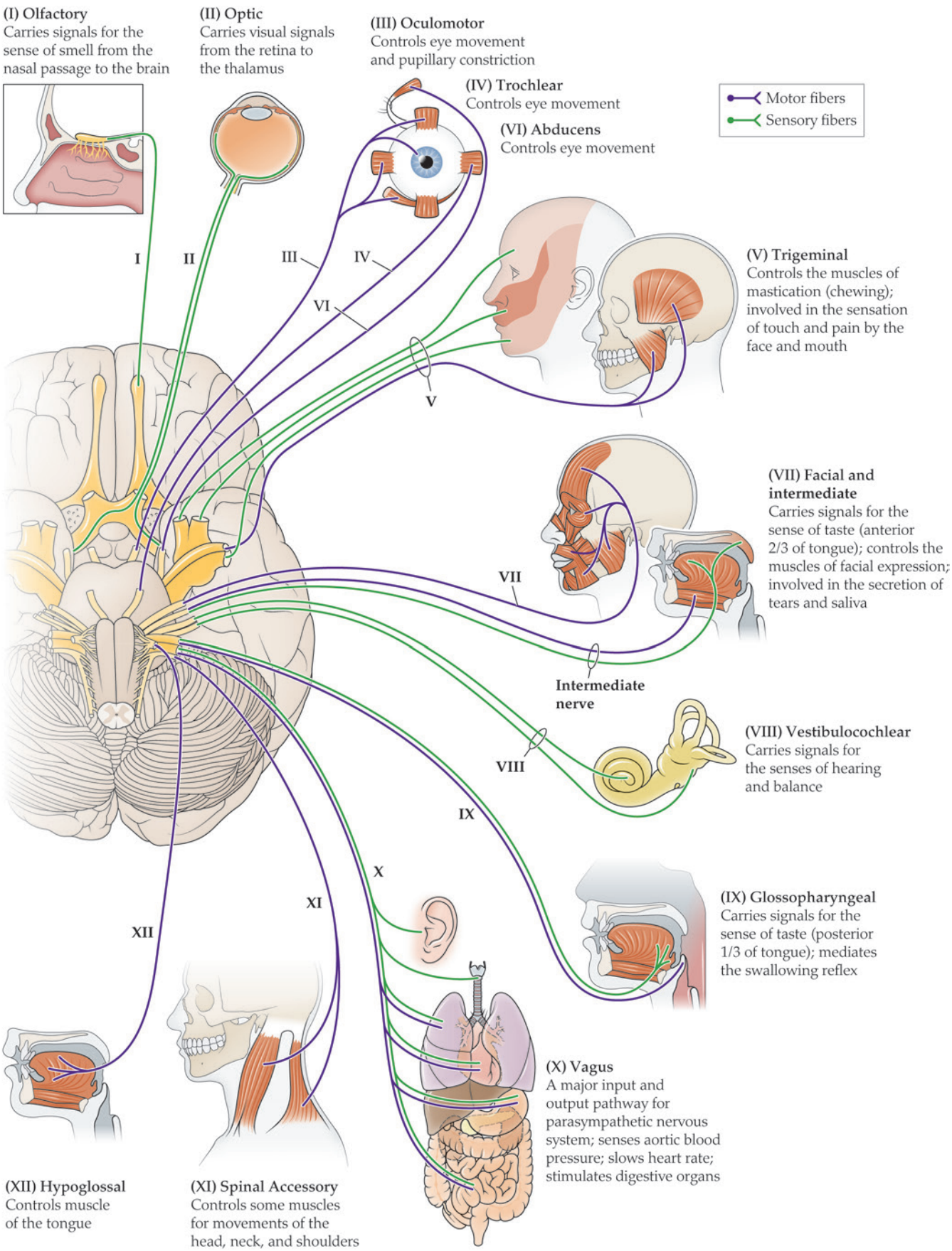
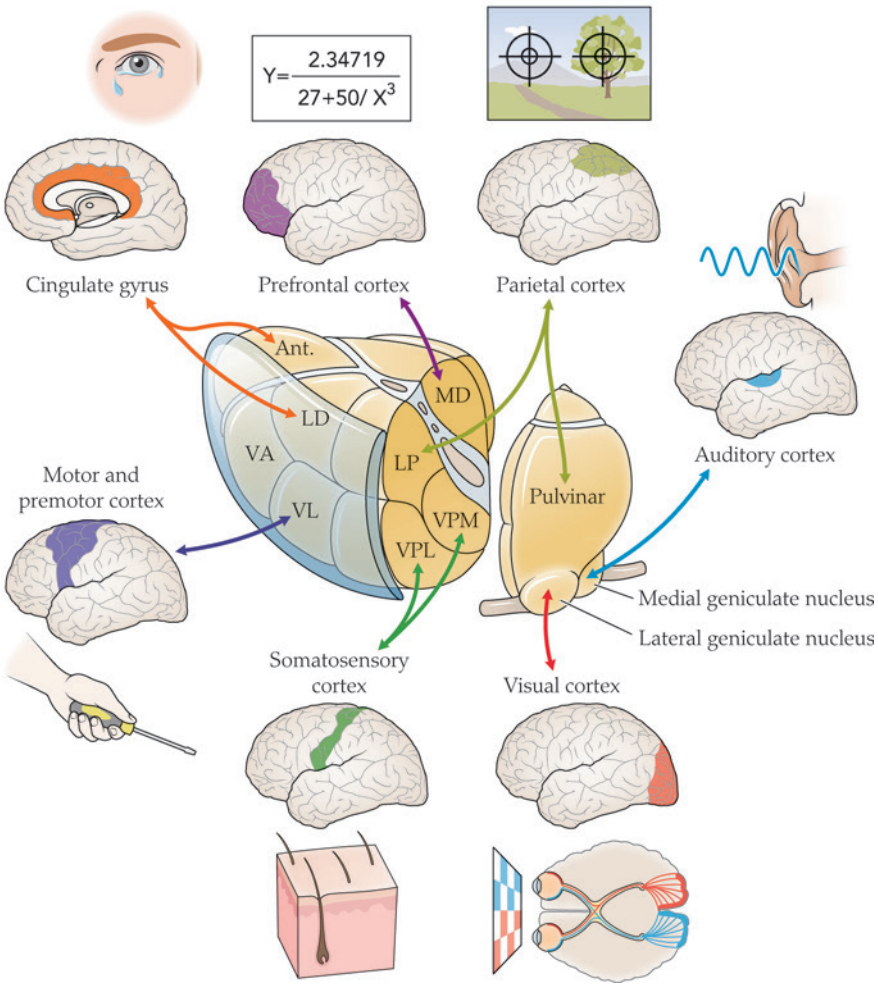
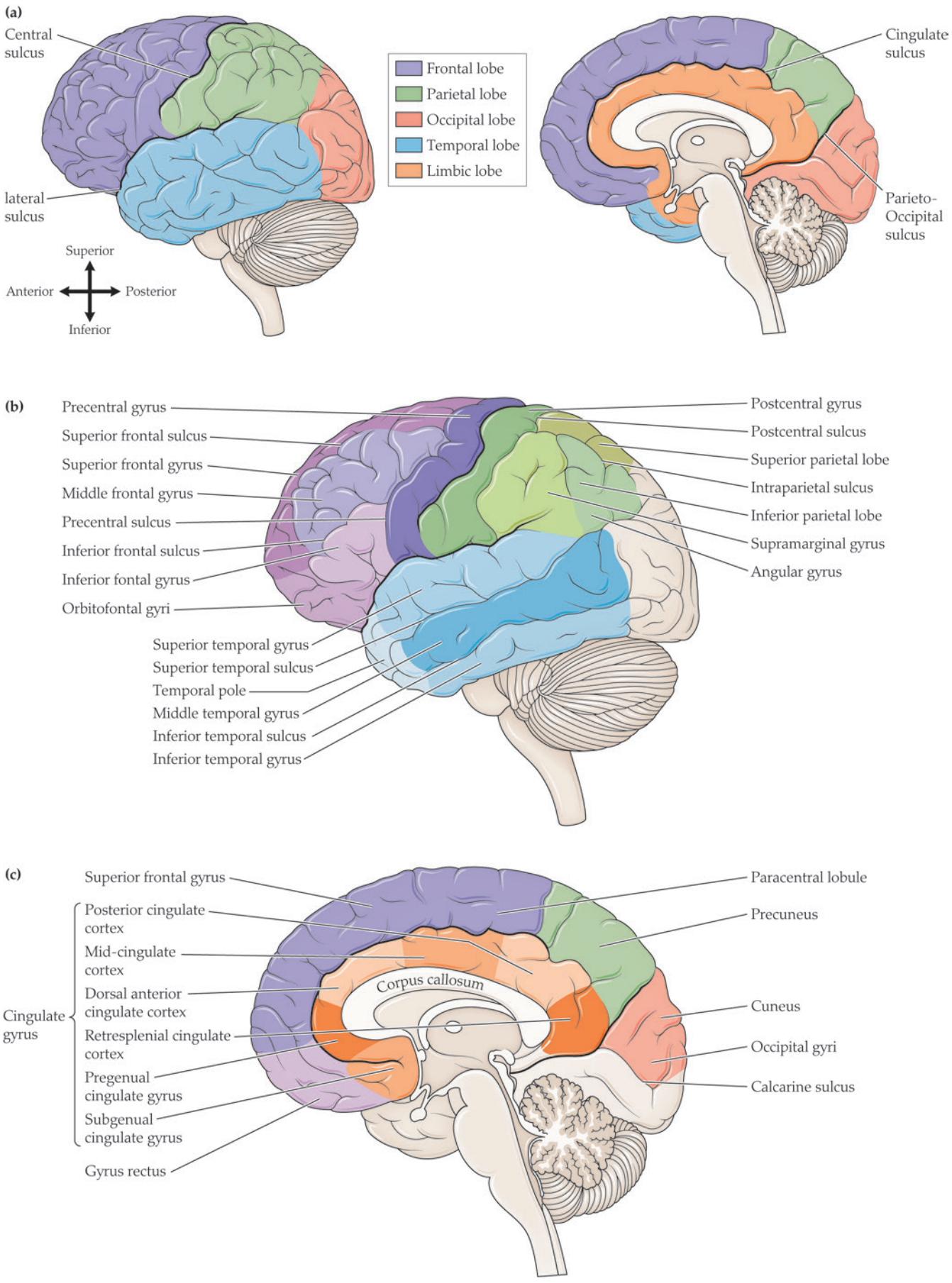
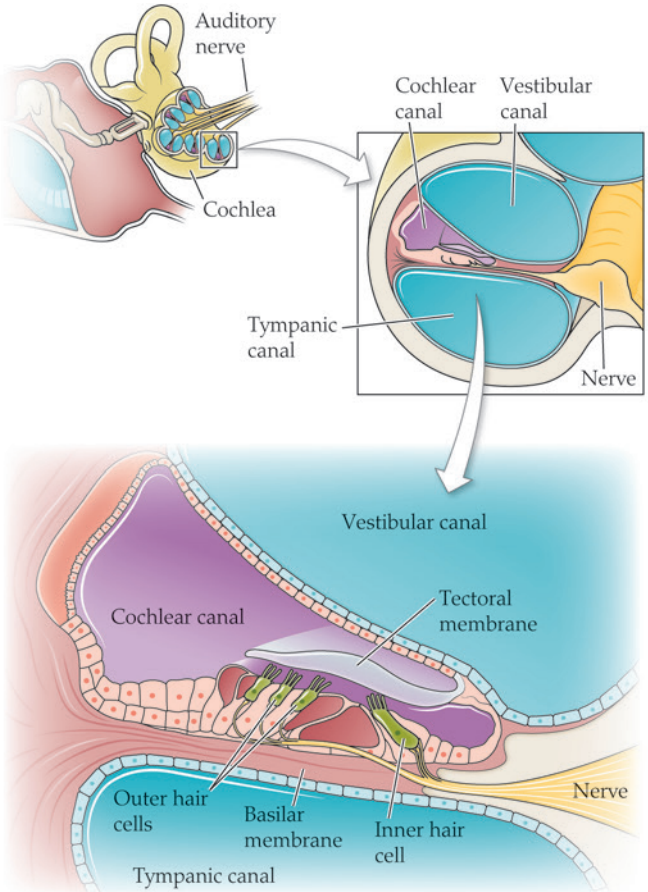


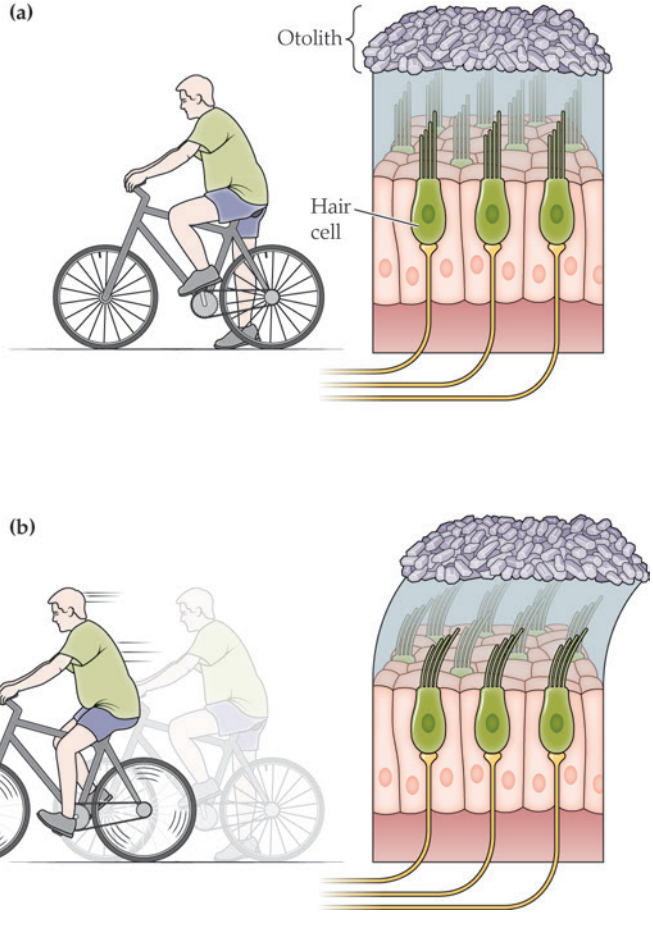


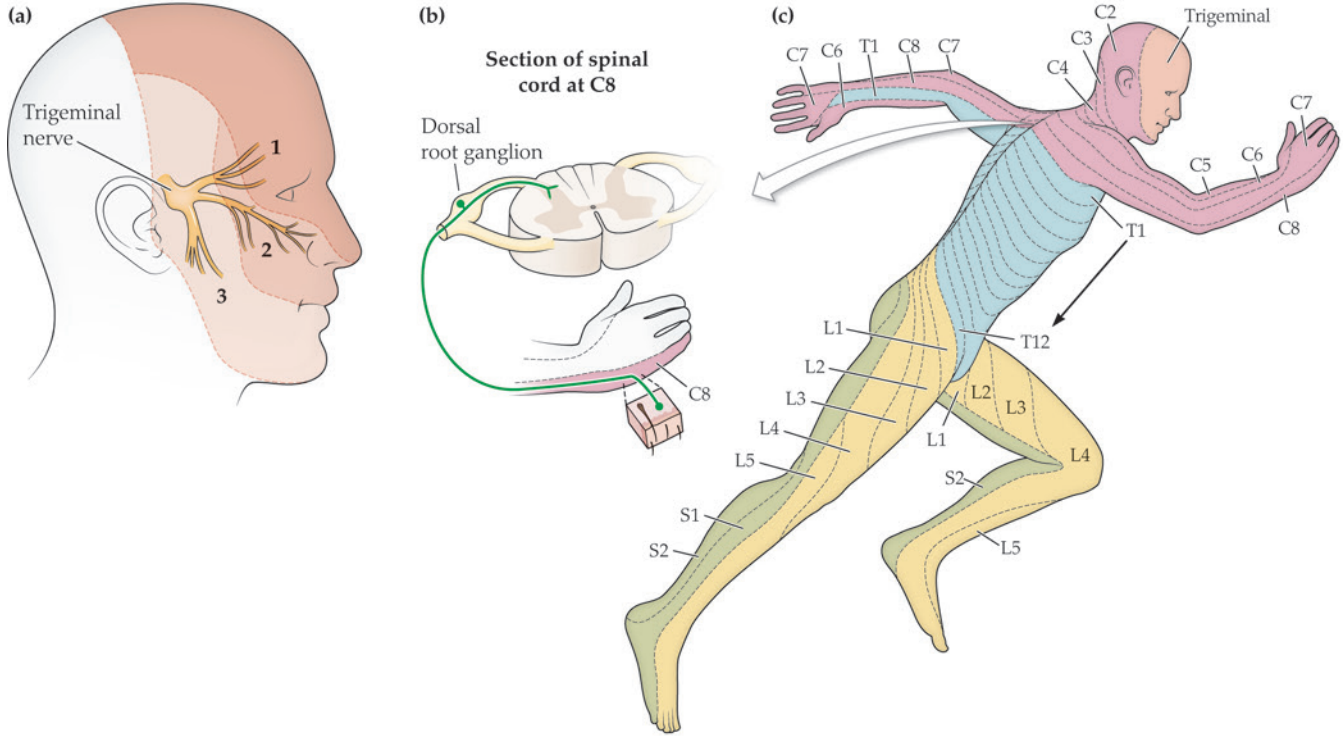


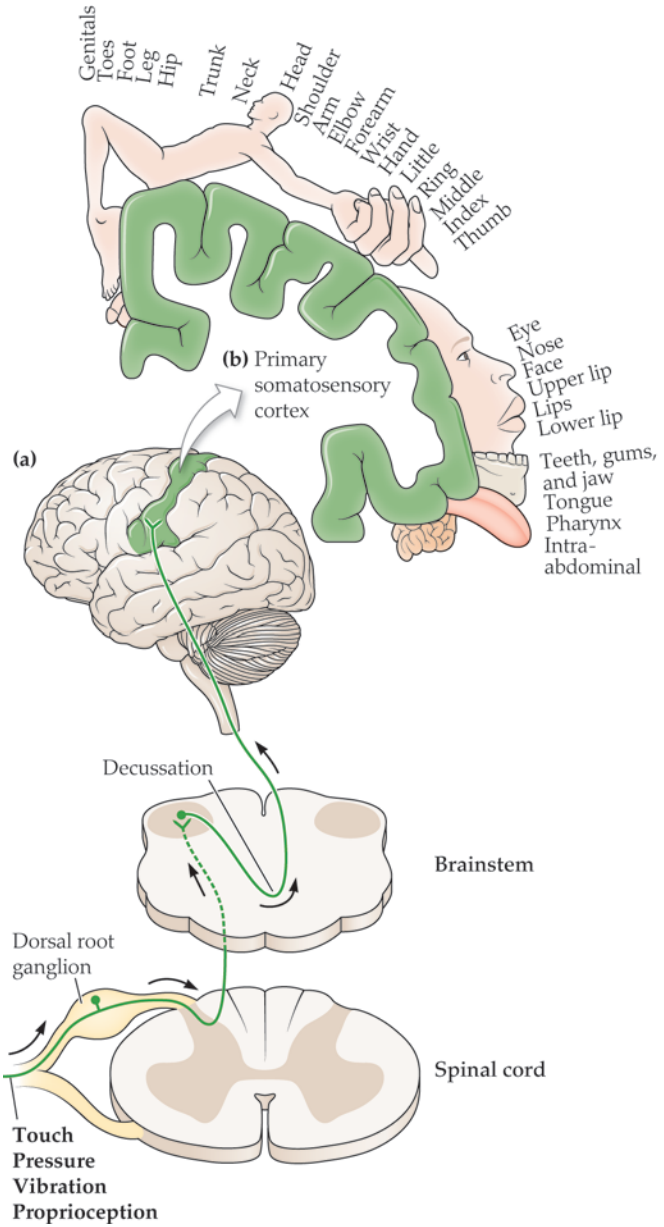


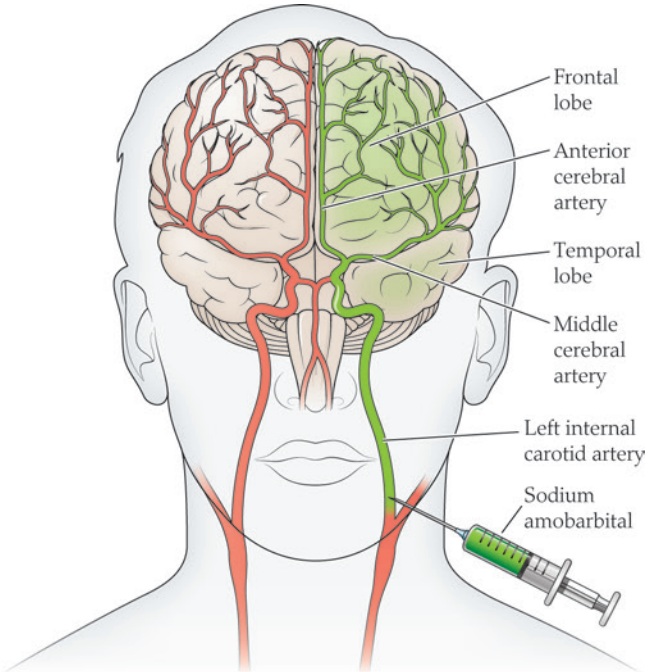


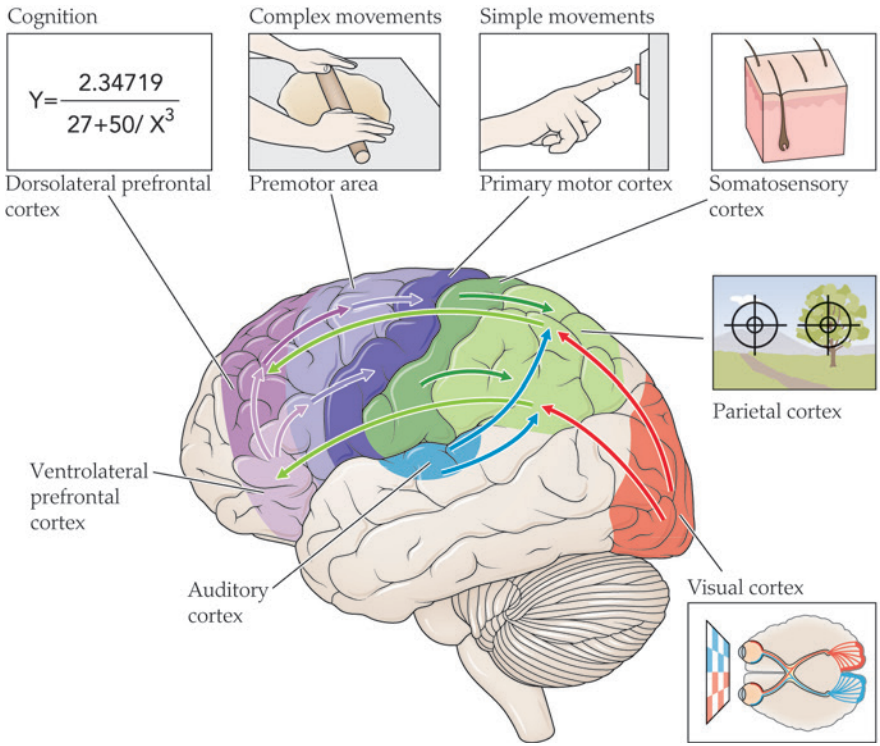


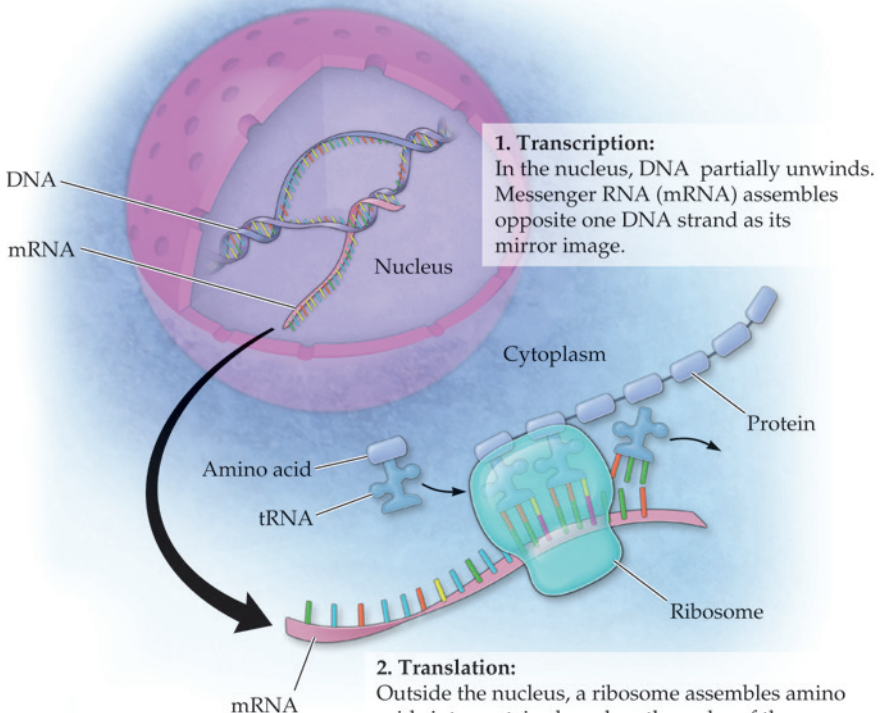






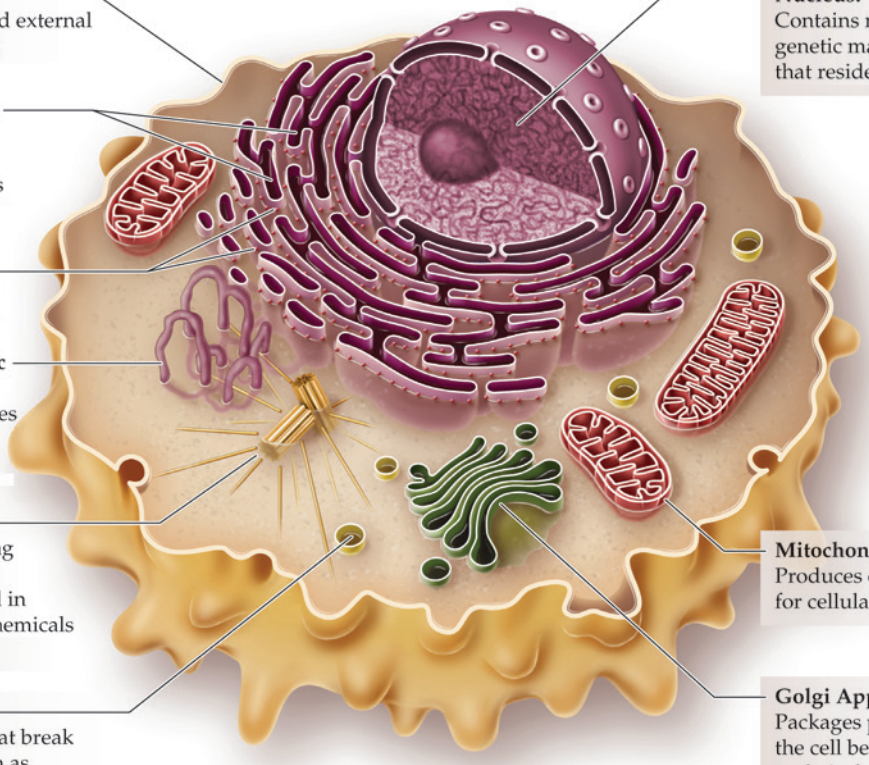






1. Transcription:
In the nucleus, DNA partially unwinds. Messenger RNA (mRNA) assembles opposite one DNA strand as its mirror image.

2. Translation:
Outside the nucleus, a ribosome assembles amino acids into proteins based on the order of the nucleotide bases in the mRNA. Transfer RNA (tRNA) brings amino acids to the ribosome and organizes them based on the order of mRNA base pairs.



Cell membrane:
Separates internal and external cellular environment

Rough endoplasmic reticulum:
Has ribosomes that manufacture proteins

Ribosome:
Primary site of protein synthesis

Smooth endoplasmic reticulum:
Synthesizes substances such as lipids and steroids

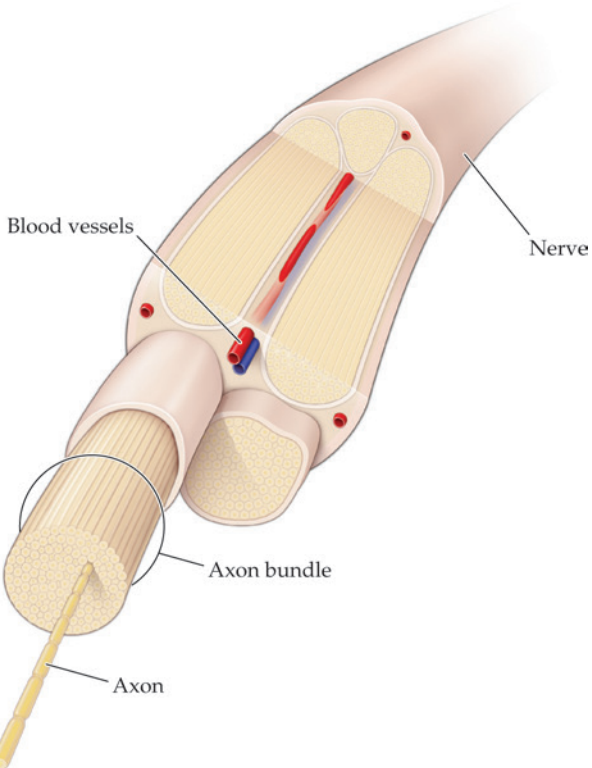
Cytoskeleton:
Consists of scaffolding by structures such as microtubules that aid in the transport of biochemicals within the cell

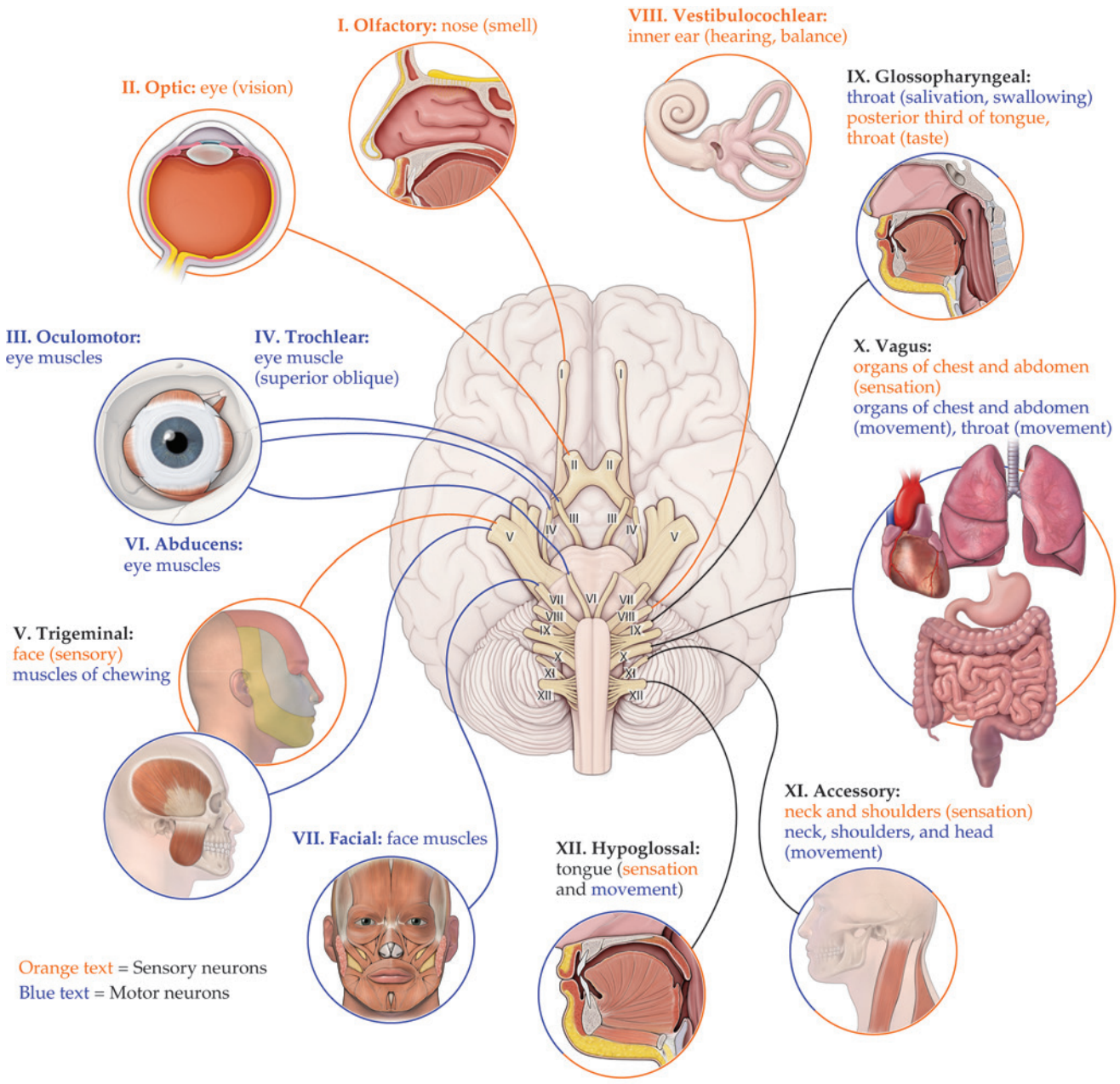
Lysosome:
Contains enzymes that break down molecules such as proteins and lipids

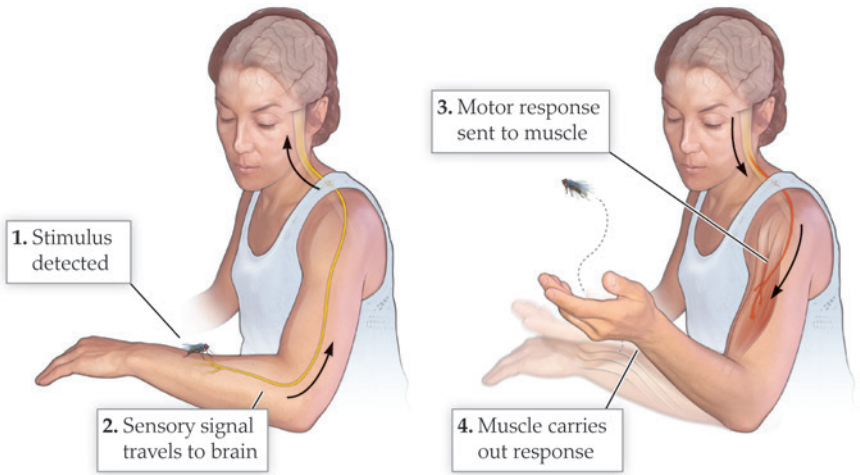
Nucleus:
Contains most of the cell's genetic material such as the genes that reside on the chromosomes

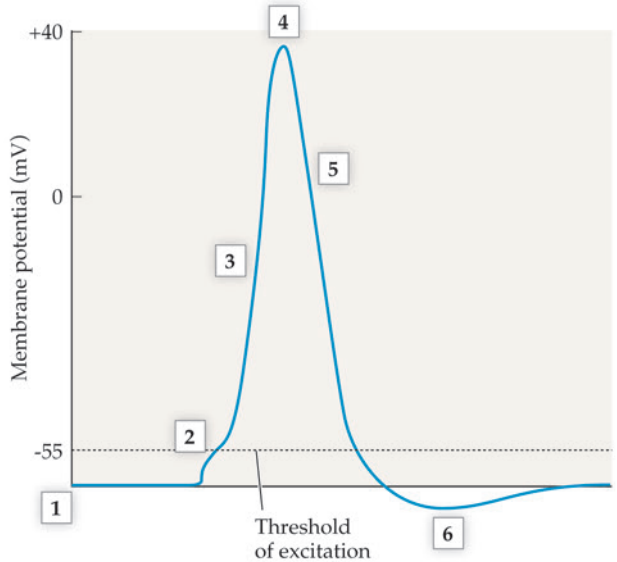
Mitochondria:
Produces energy necessary for cellular functions

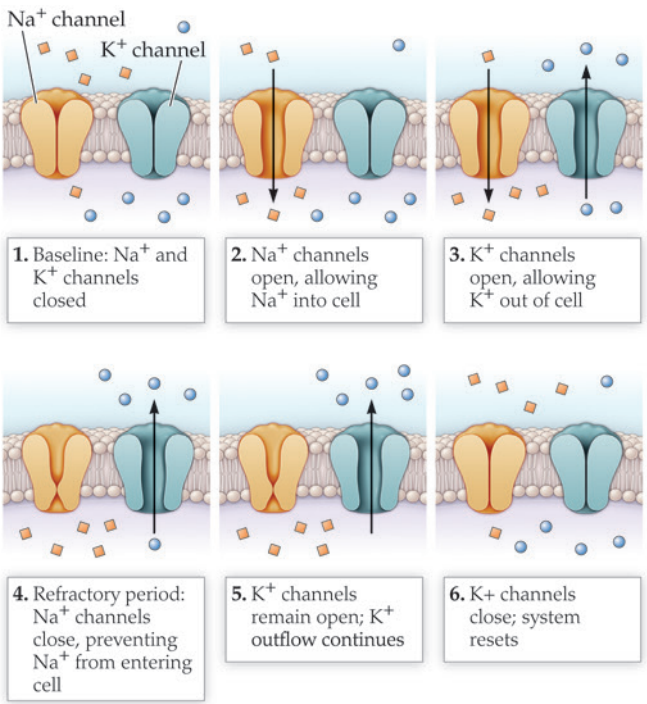
Golgi Apparatus:
Packages proteins within the cell before they are sent to their destination

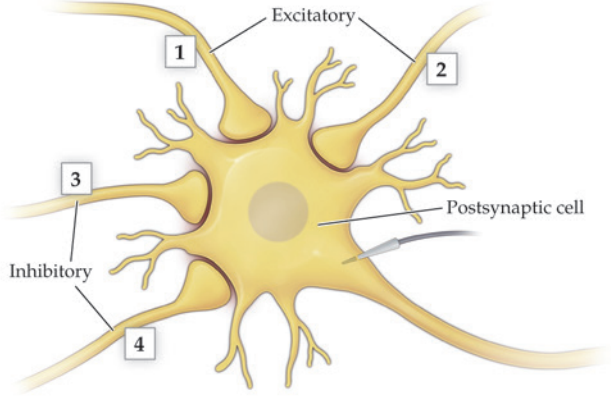


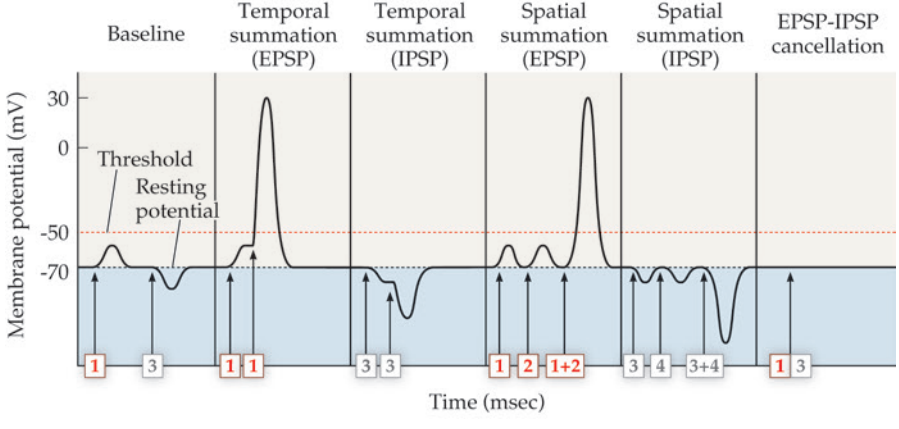


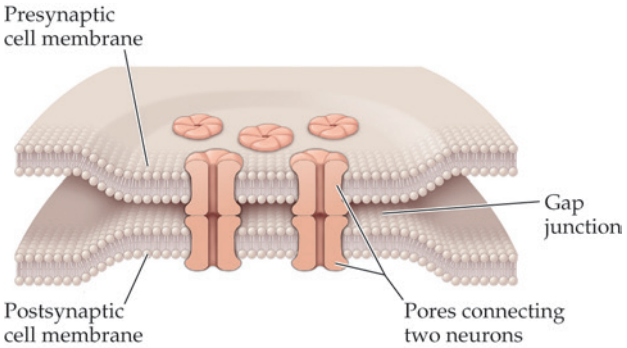


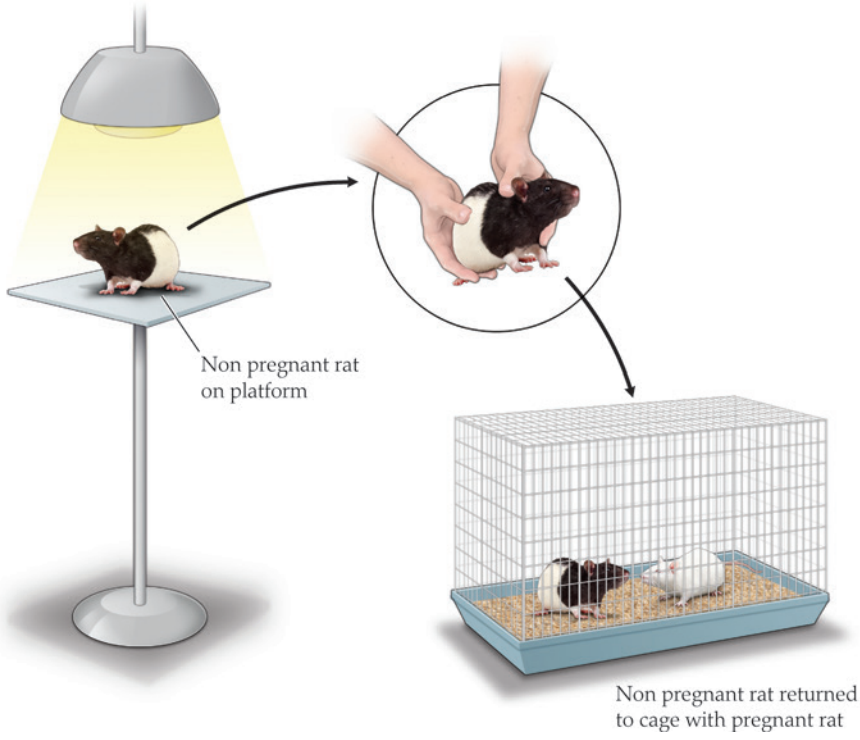


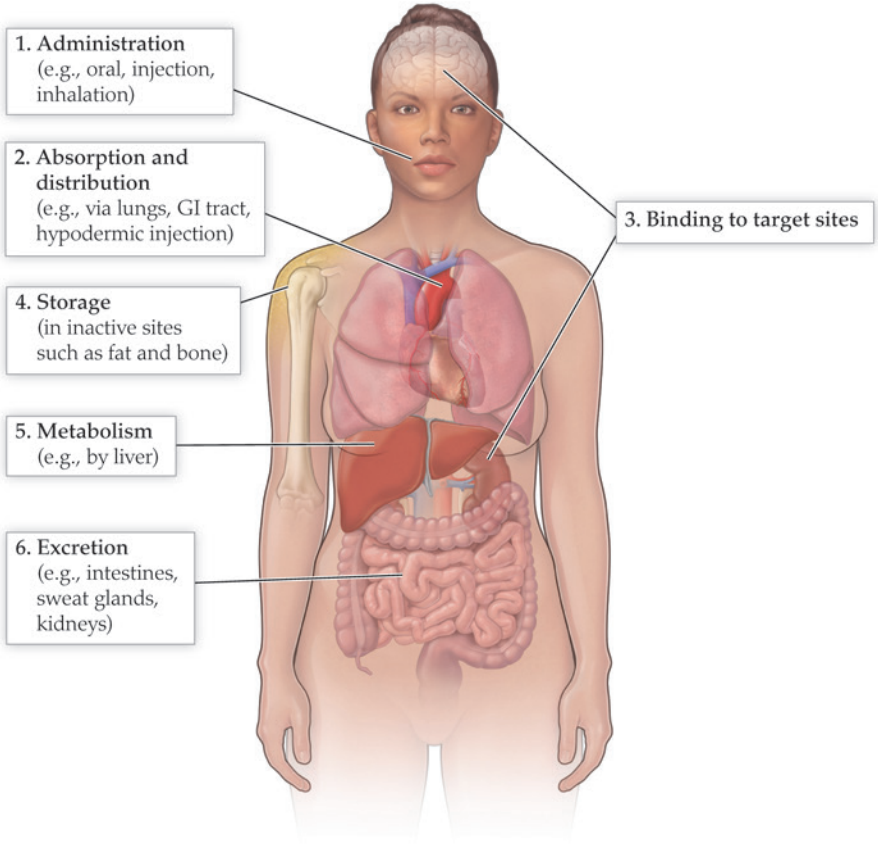


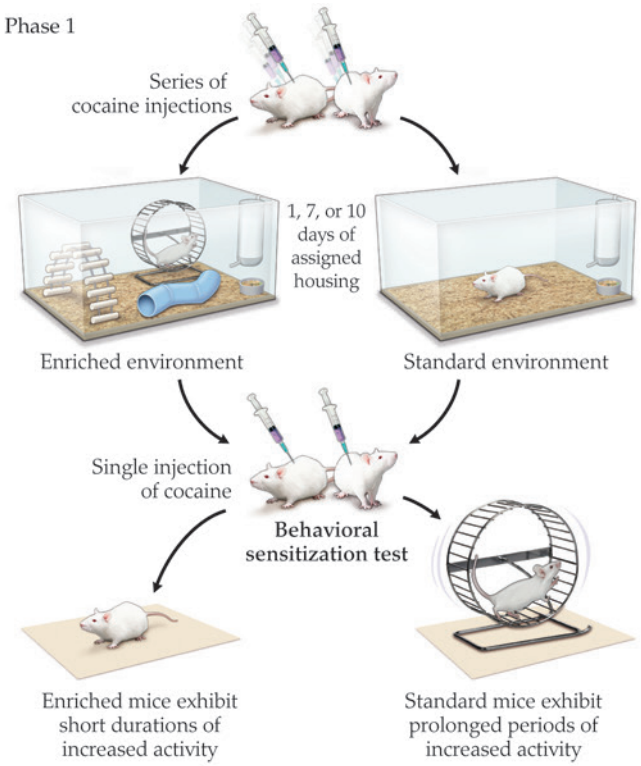


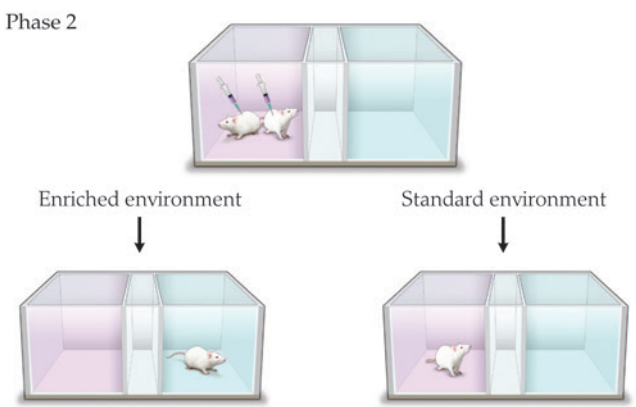




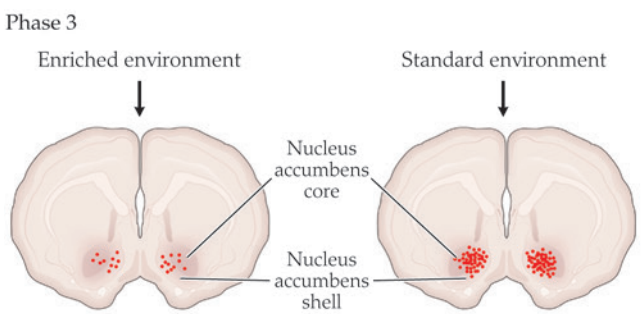




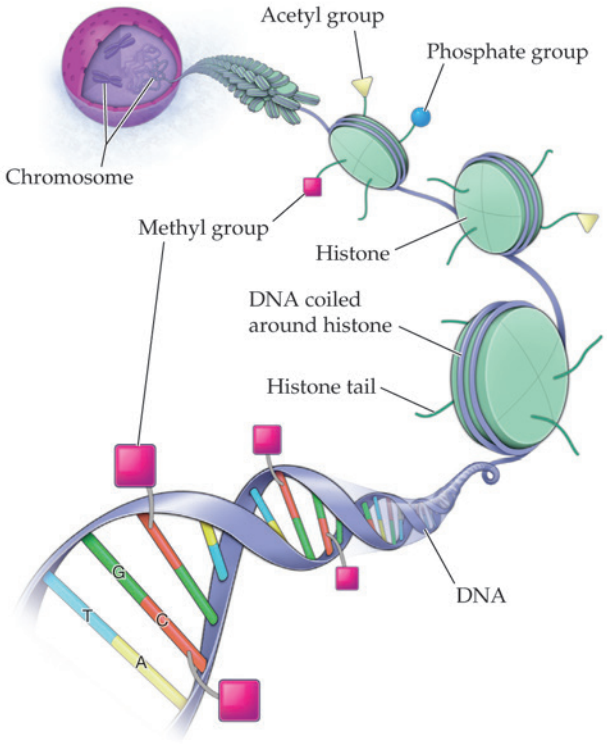




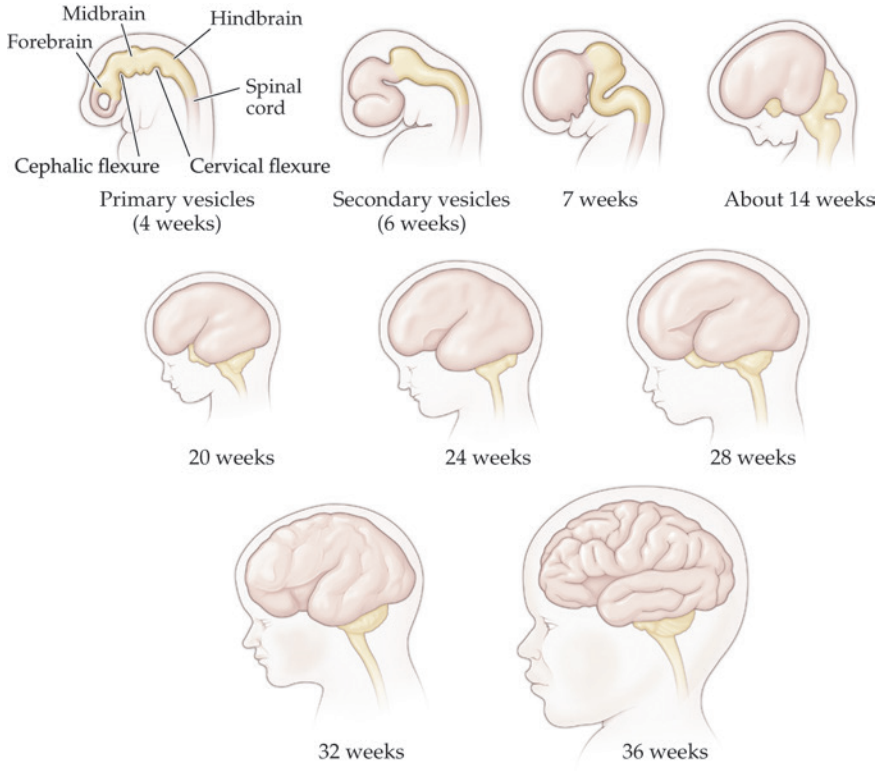
Thirty days after cocaine injections, standard-housed mice preferred the compartment where the injections took place, but mice housed in enriched environments did not.

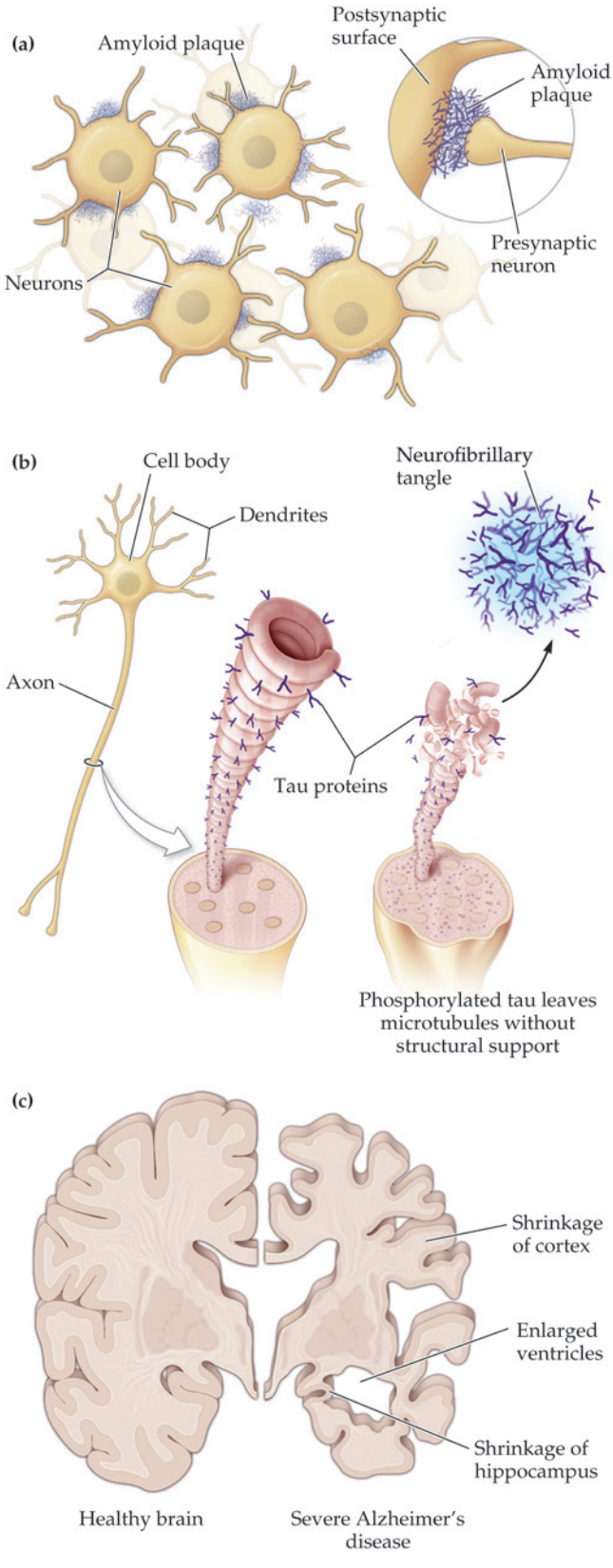


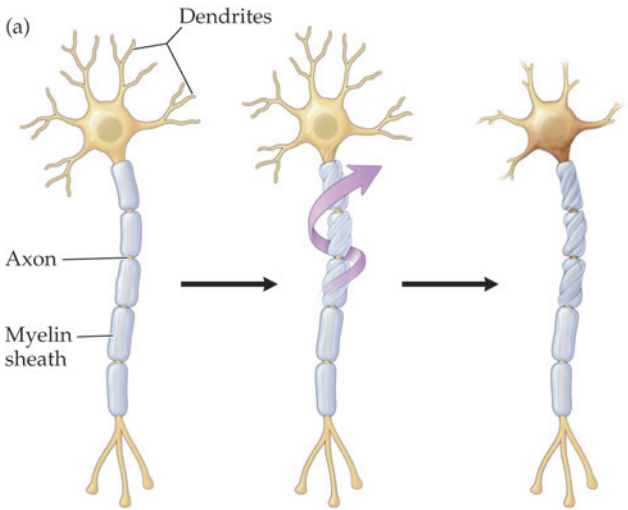
When all the mice were reexposed to cocaine, the enriched-environment mice showed less nucleus accumbens activation than did standard-environment mice.



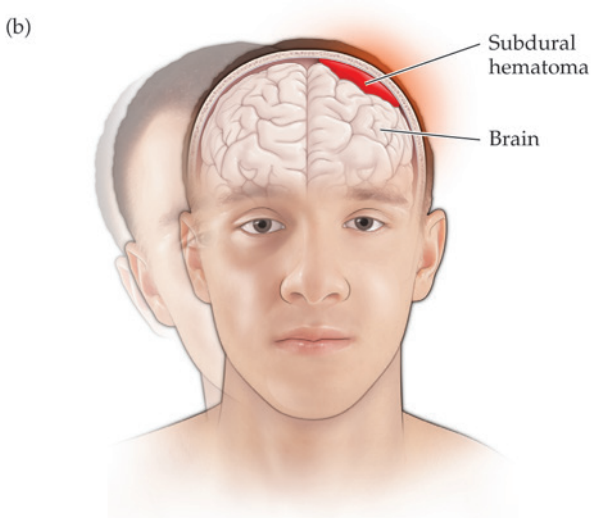
Chemical markers on DNA can affect gene expression. Histone modification occurs throughout an organism's life. Removal of methyl groups occurs at fertilization, during fetal development, and immediately after birth.

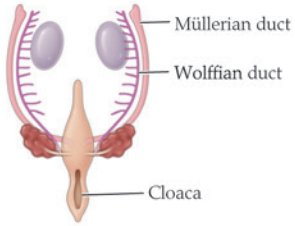






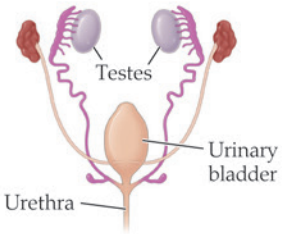
Axon rips, leading to cell death



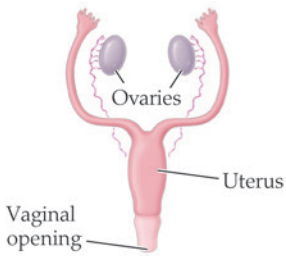


Six weeks following conception, males and females have the same internal anatomy.

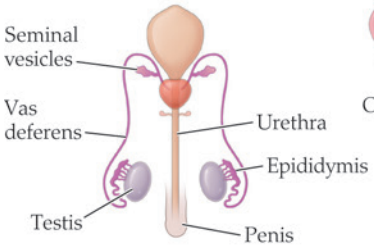
XY → male

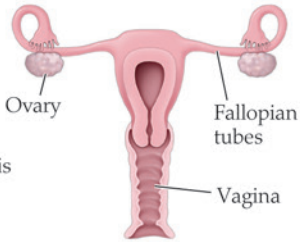


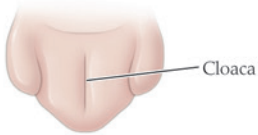
XX → female



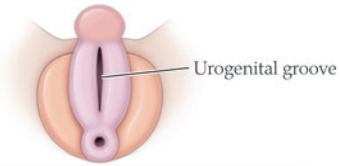
Fourteen weeks following conception, in males the Wolffian ducts have begun to develop into the male internal reproductive organs. In females, the Müllerian ducts have begun to develop into the female internal reproductive organs.



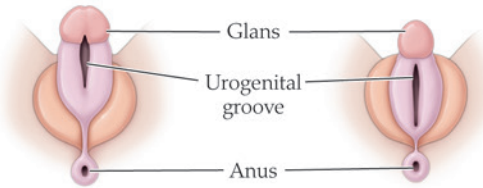




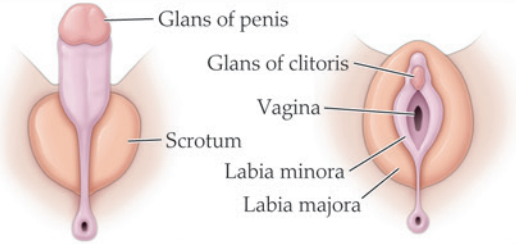
4 weeks



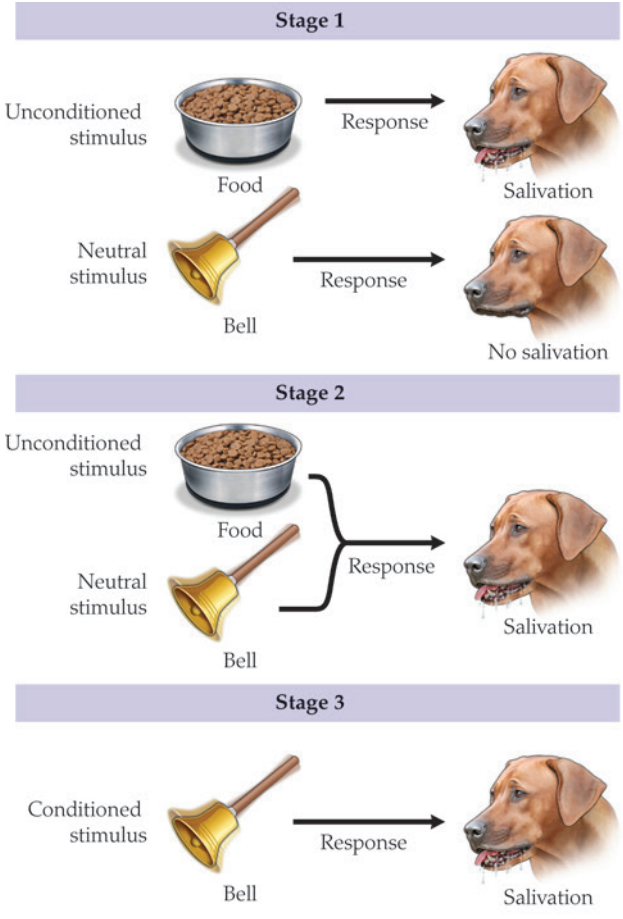
Six weeks following conception, males and females have the same external anatomy.

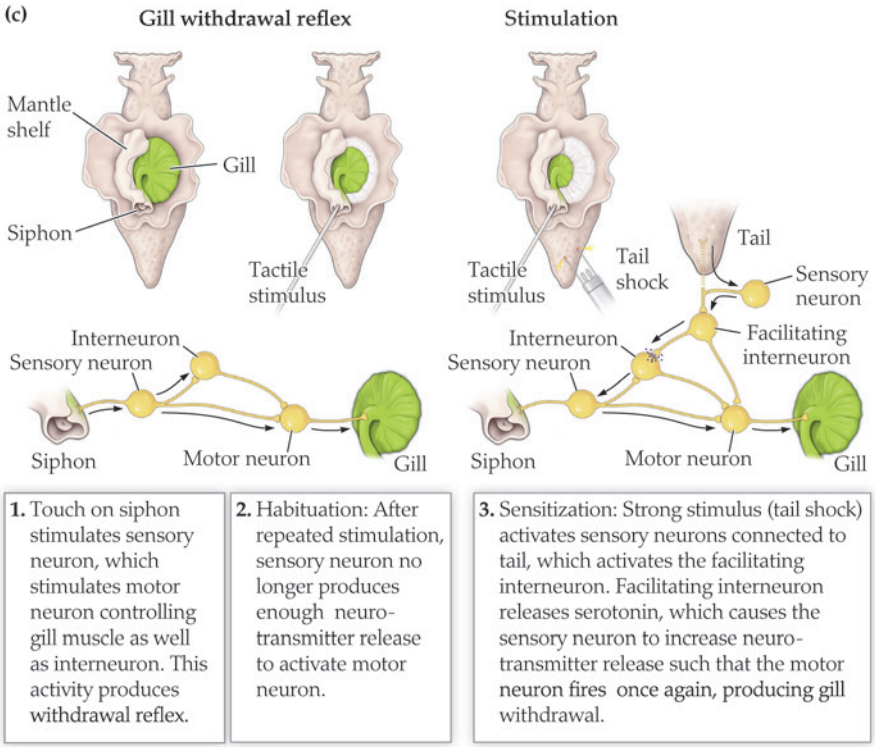


Nine weeks following conception, the male and female external genitalia have begun to differentiate.



Fourteen weeks following conception, male and female external genitalia have fully differentiated.

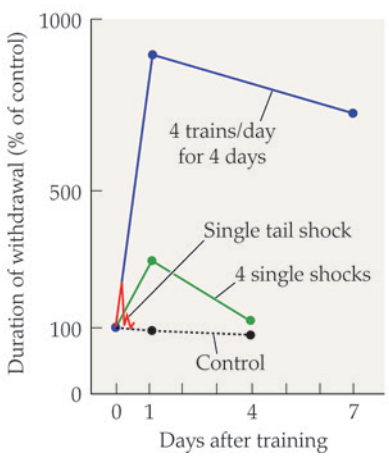


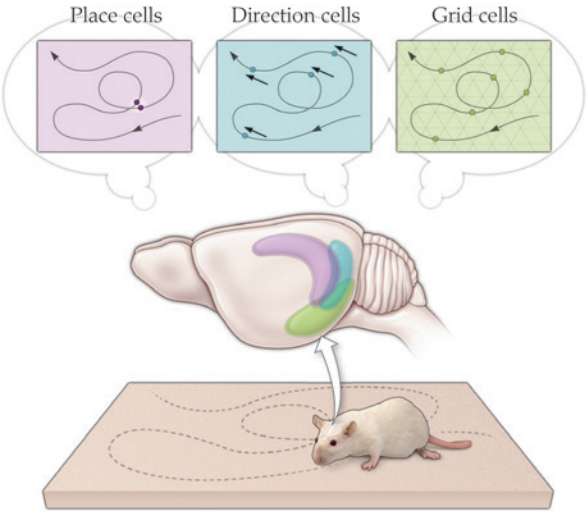


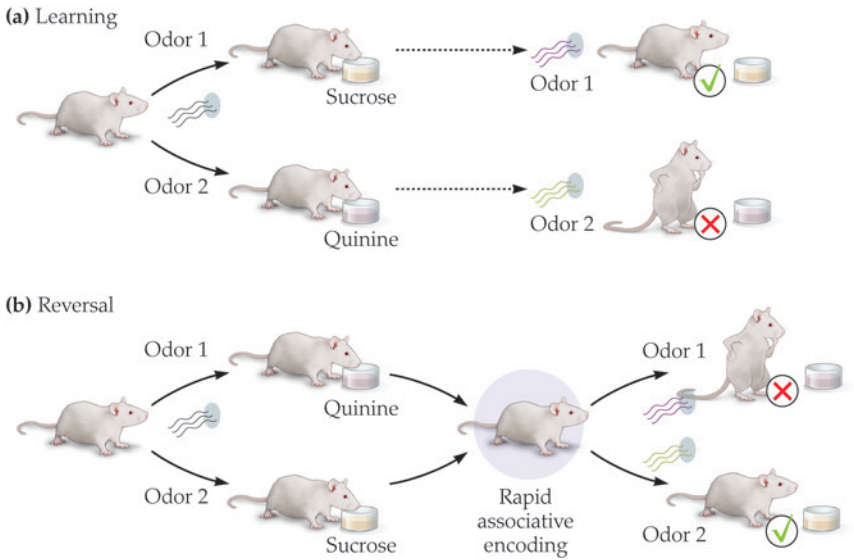
1. Touch on siphon stimulates sensory neuron, which stimulates motor neuron controlling gill muscle as well as interneuron. This activity produces withdrawal reflex.

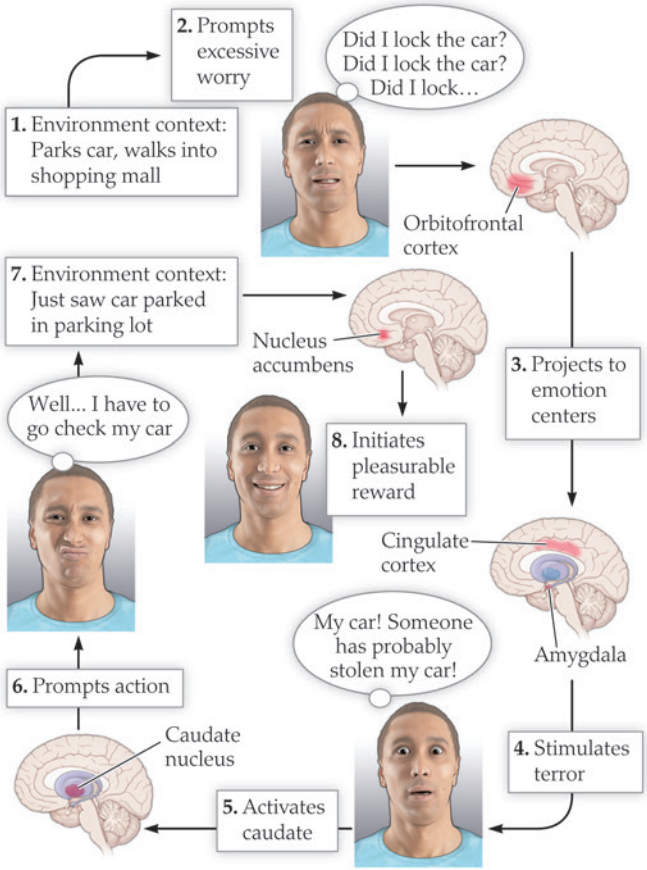
2. Habituation: After repeated stimulation, sensory neuron no longer produces enough neurotransmitter release to activate motor neuron.

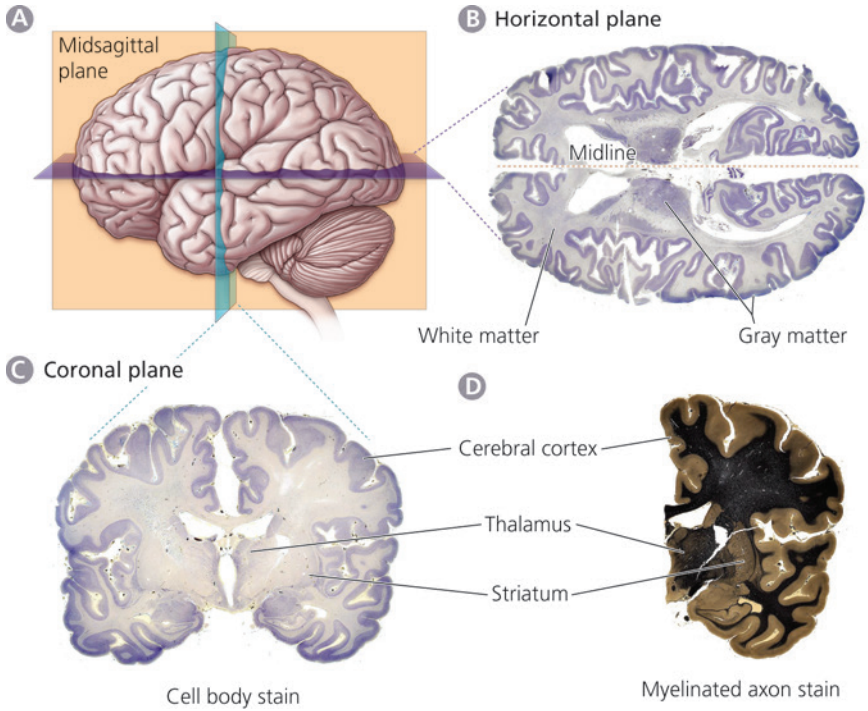
3. Sensitization: Strong stimulus (tail shock) activates sensory neurons connected to tail, which activates the facilitating interneuron. Facilitating interneuron releases serotonin, which causes the sensory neuron to increase neurotransmitter release such that the motor neuron fires once again, producing gill withdrawal.

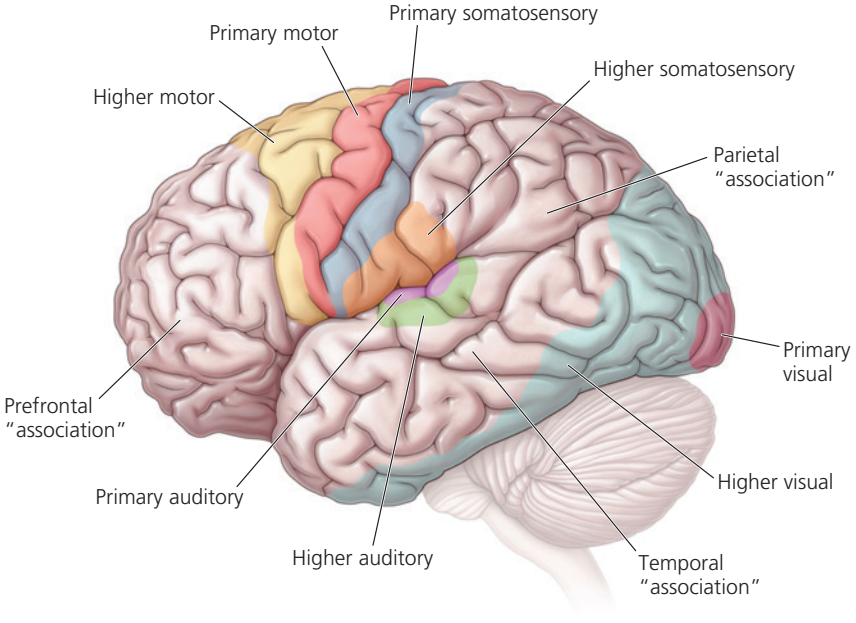


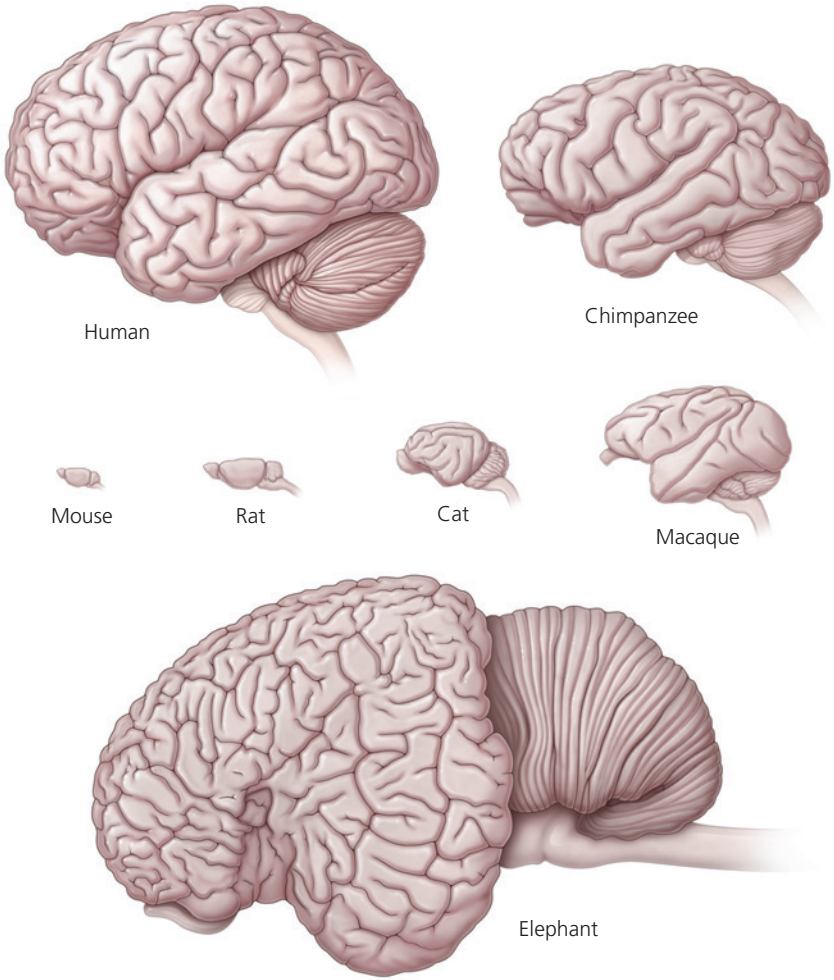


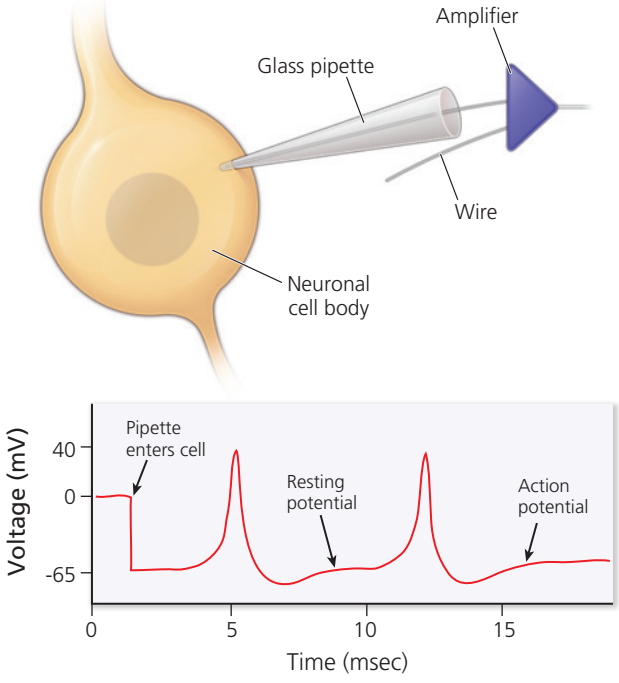


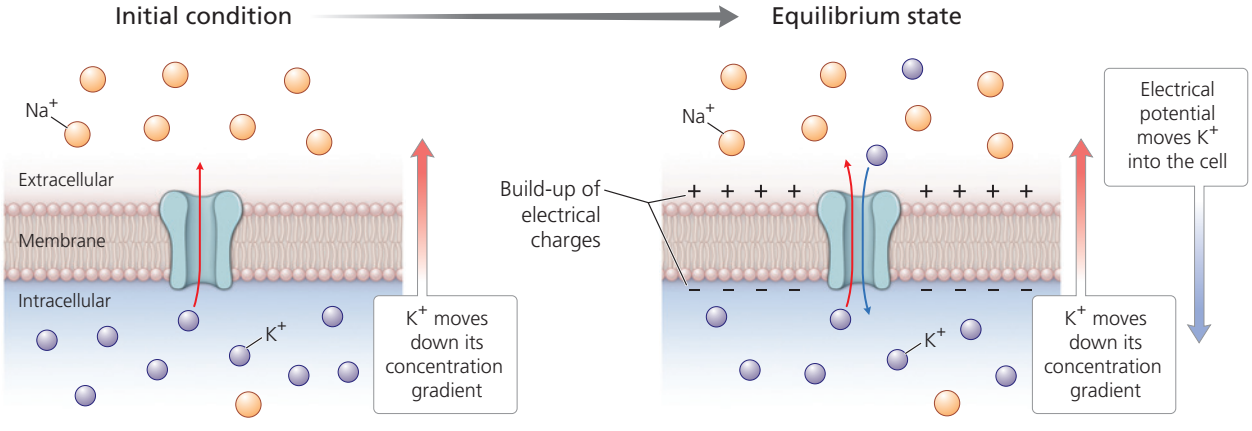


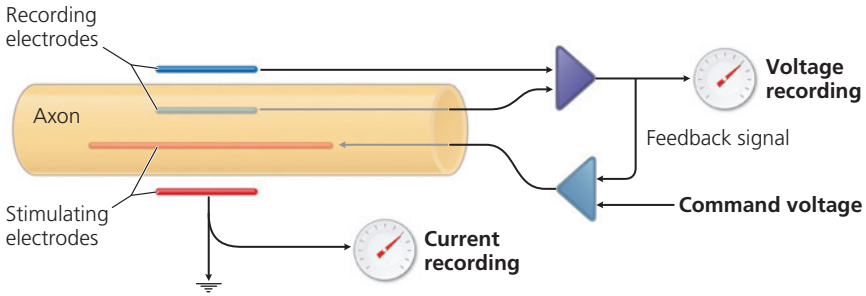


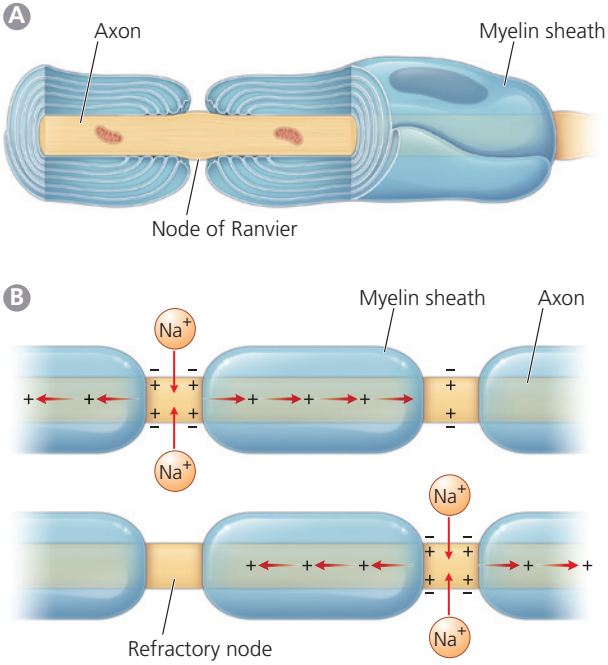




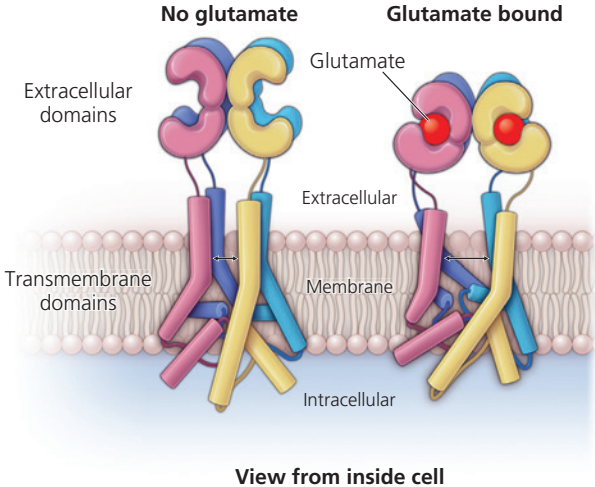




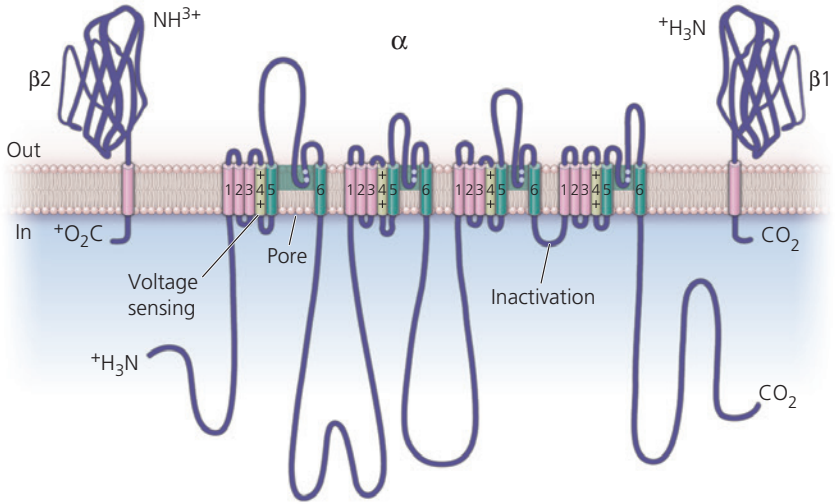




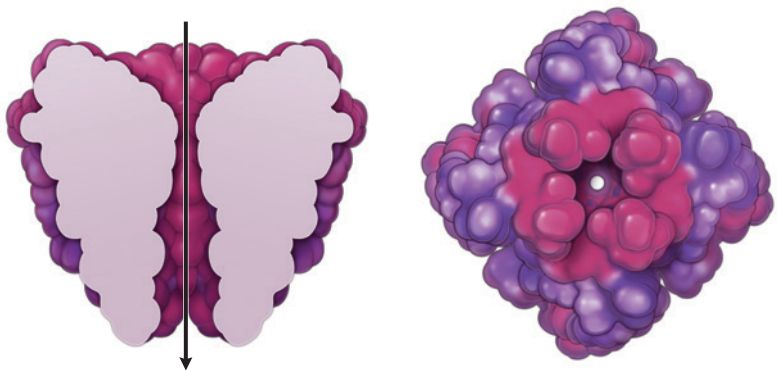
NMDA Receptor

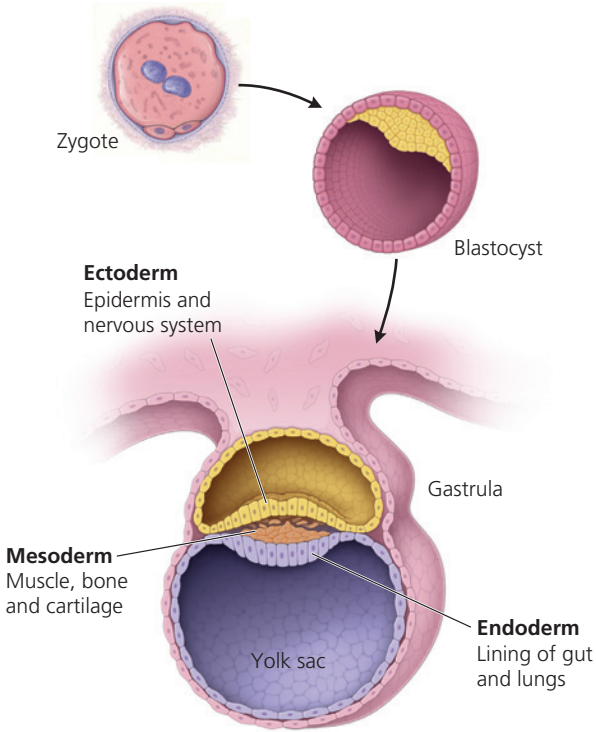


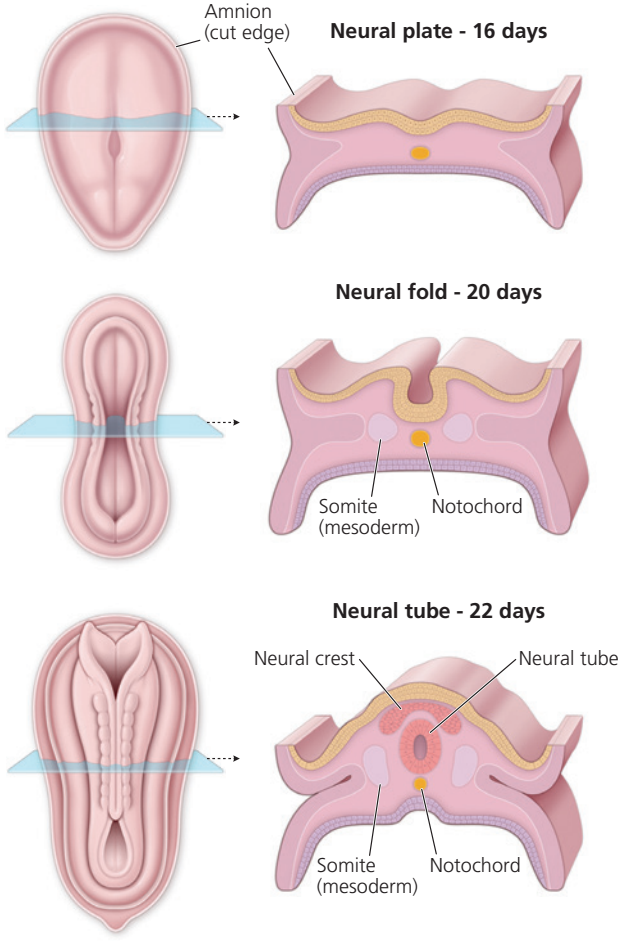
A 2D structure of a V-gated Na^+ channel



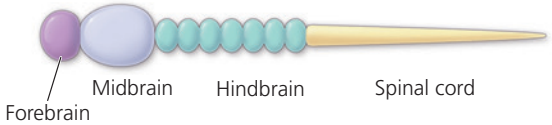
B 3D structure of an open Na^+ channel pore



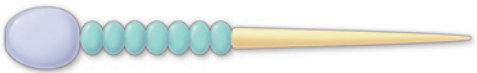




A **Normal RA concentration**



B **Increased RA concentration**



C **A model of RA effects**