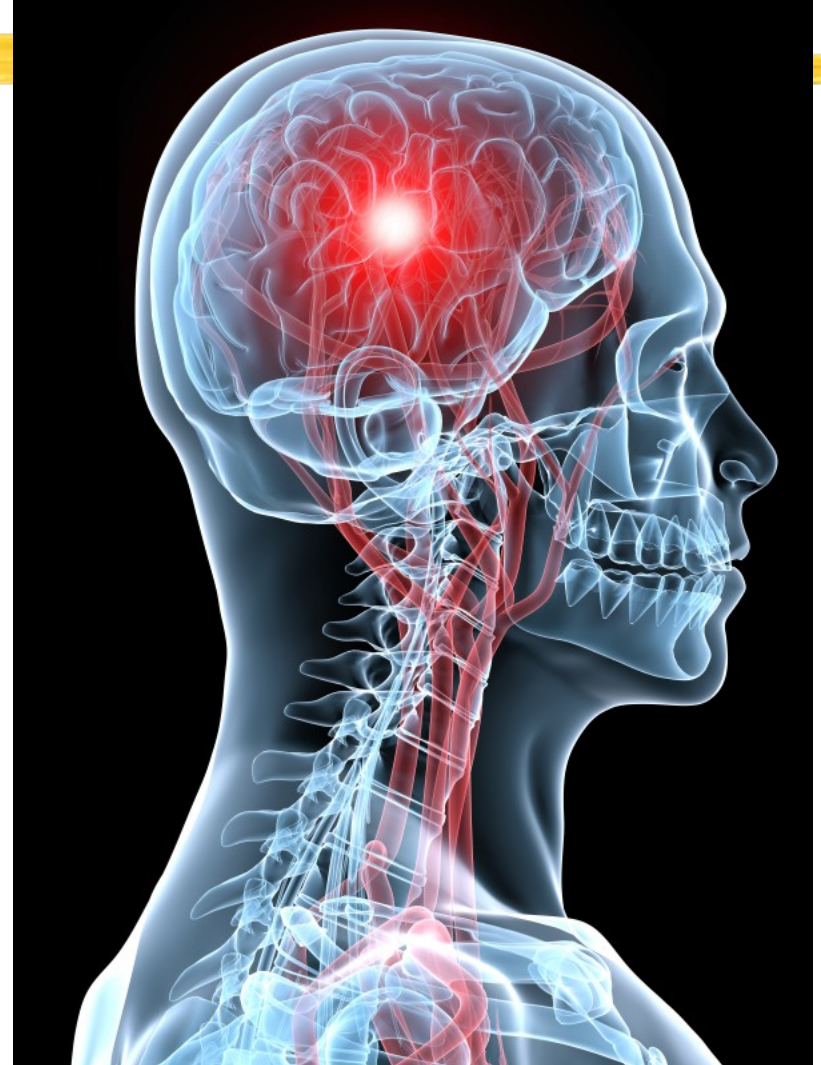


Neuroscience and Behavior



Two Ways to “come at” the Brain



■ Neuronally (elements of the brain)

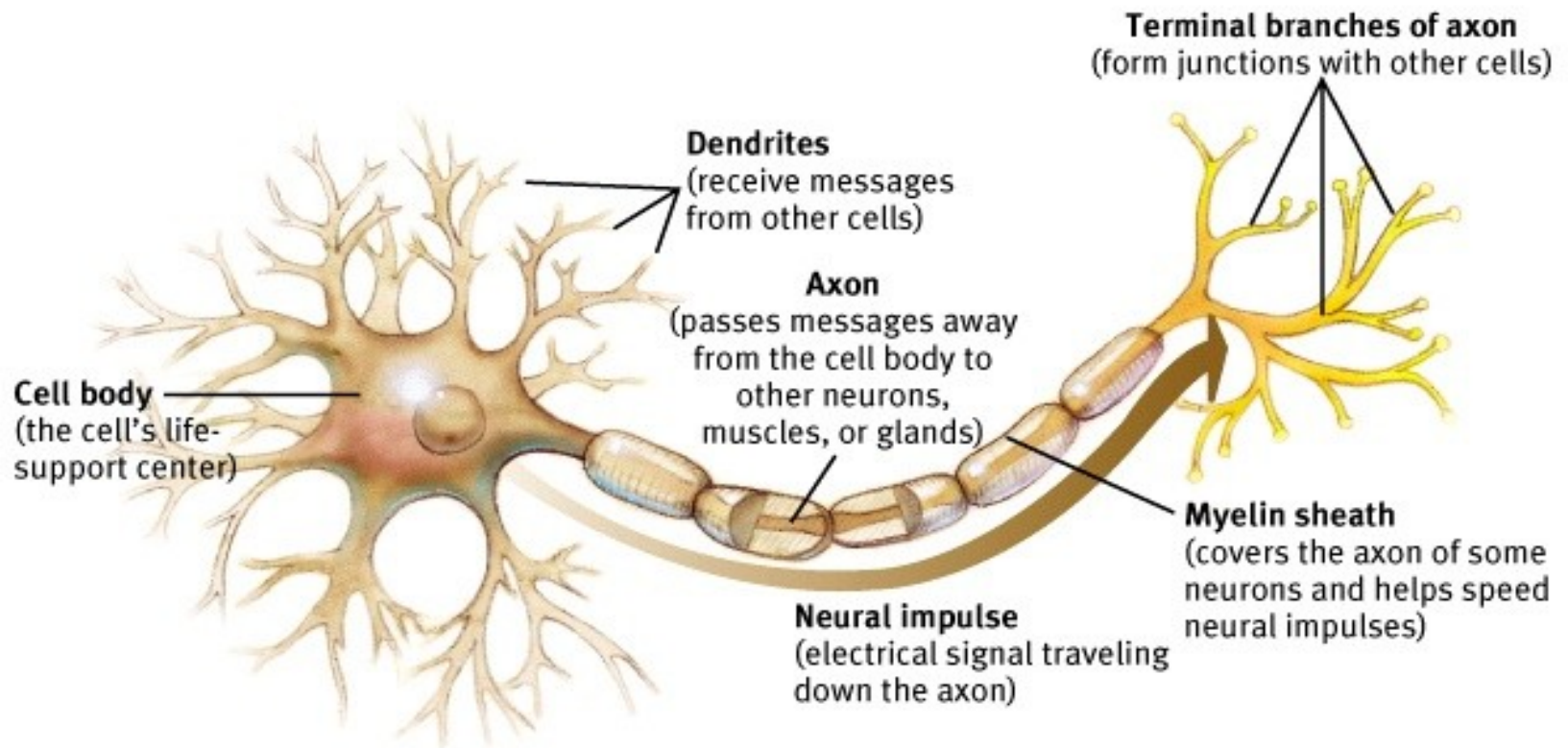
- a nerve cell
- the basic building block of the nervous system

■ Systematically (systems of the brain)

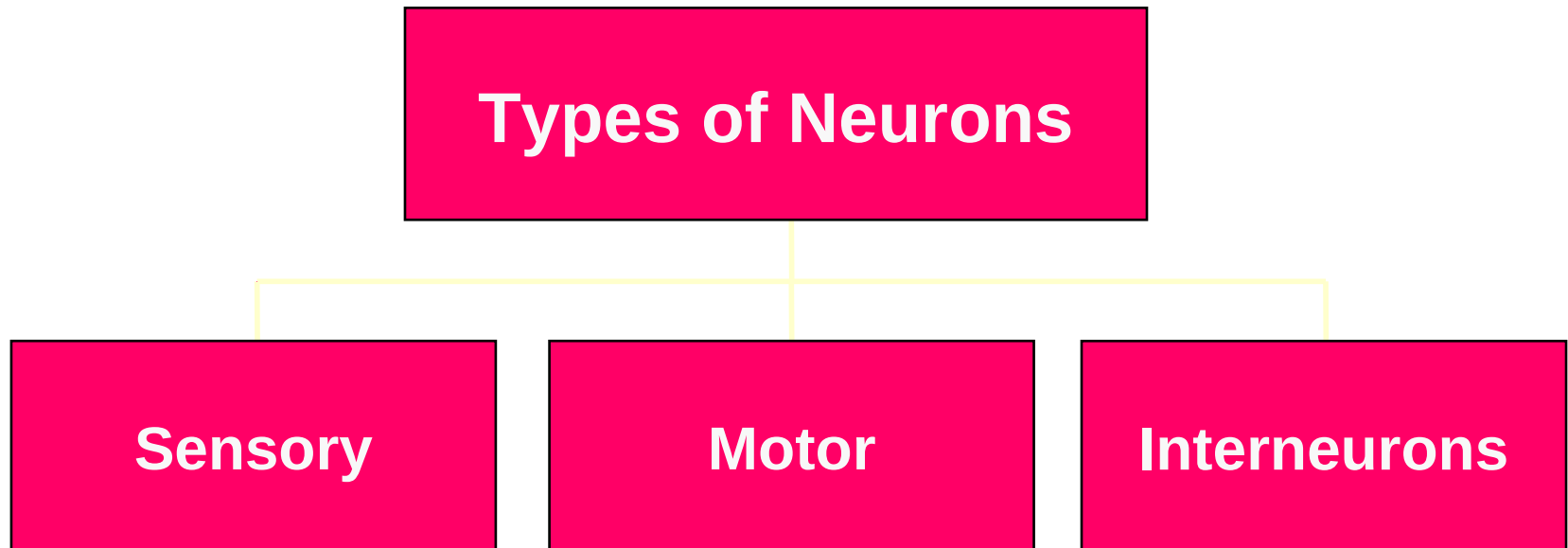
- Ex.: Limbic system
- Ex.: Endocrine system
- Ex.: Four lobes of the brain
- Ex.: 2 hemispheres of the brain

Neurons

86,000,000,000 neurons exist in your brain



Neurons and Synapses



Types of Neurons

■ Sensory Neurons

- neurons that carry incoming information from the sense receptors to the central nervous system

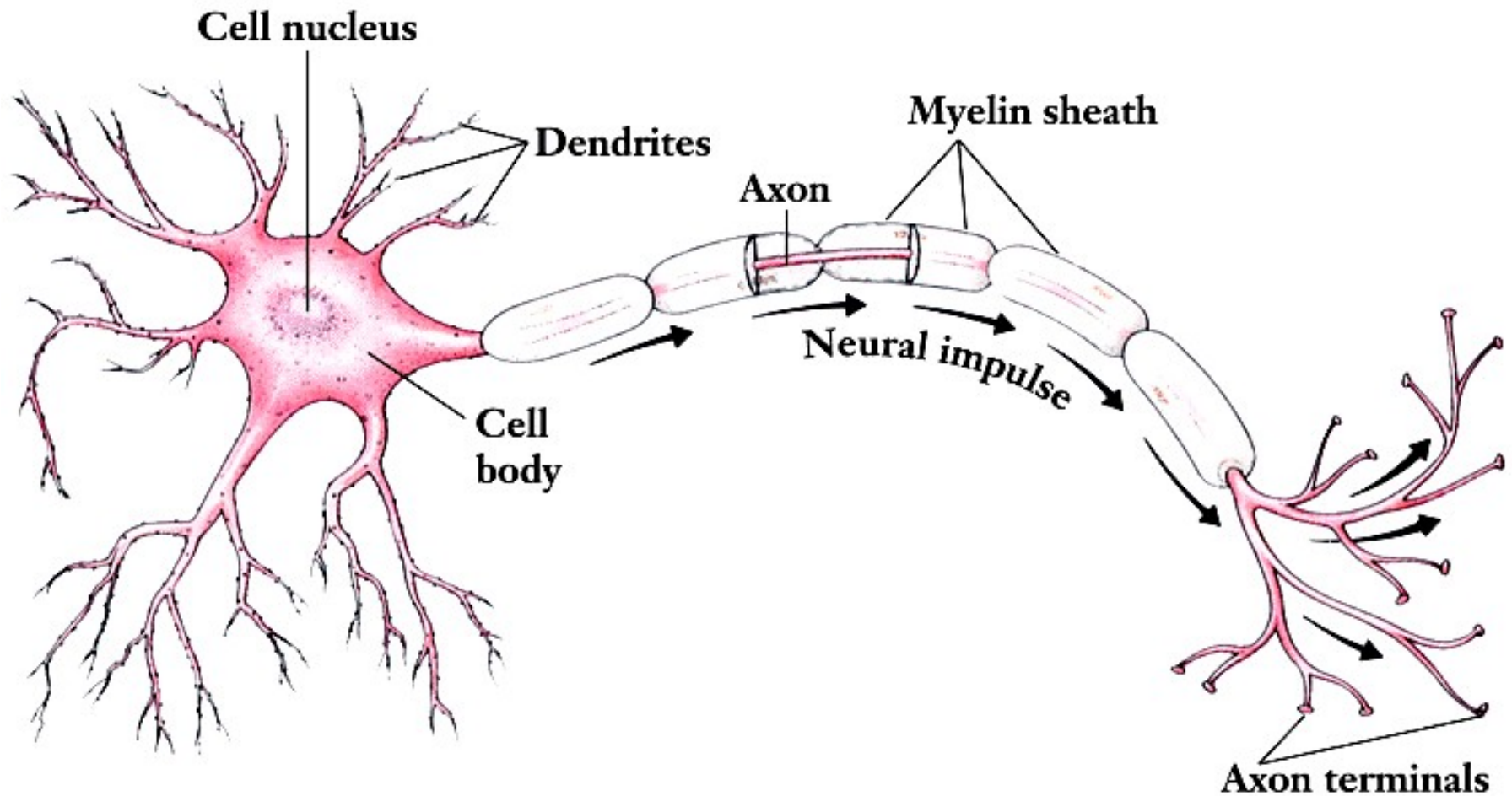
■ Motor Neurons

- carry outgoing information from the CNS to muscles and glands

■ Interneurons

- CNS neurons that internally communicate and intervene between the sensory inputs and motor outputs

Neural Communication



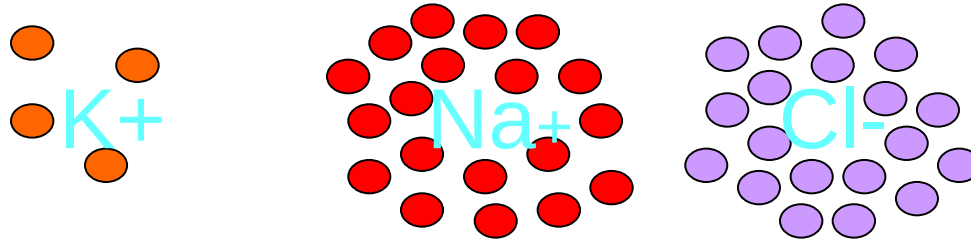
Two ways neurons communicate



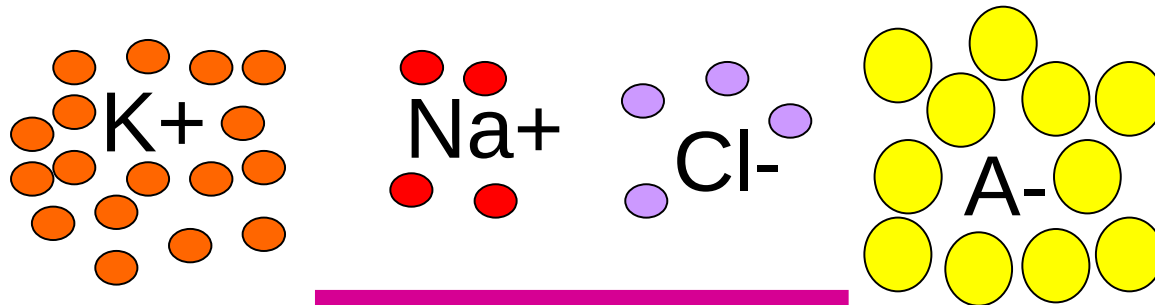
- ELECTRONICALLY
- CHEMICALLY (HORMONALLY)
- RESULT: an ELECTROCHEMICAL means of communication

Ion concentrations

Outside of Cell



Cell Membrane in resting state



Inside of Cell

Two factors influence communication

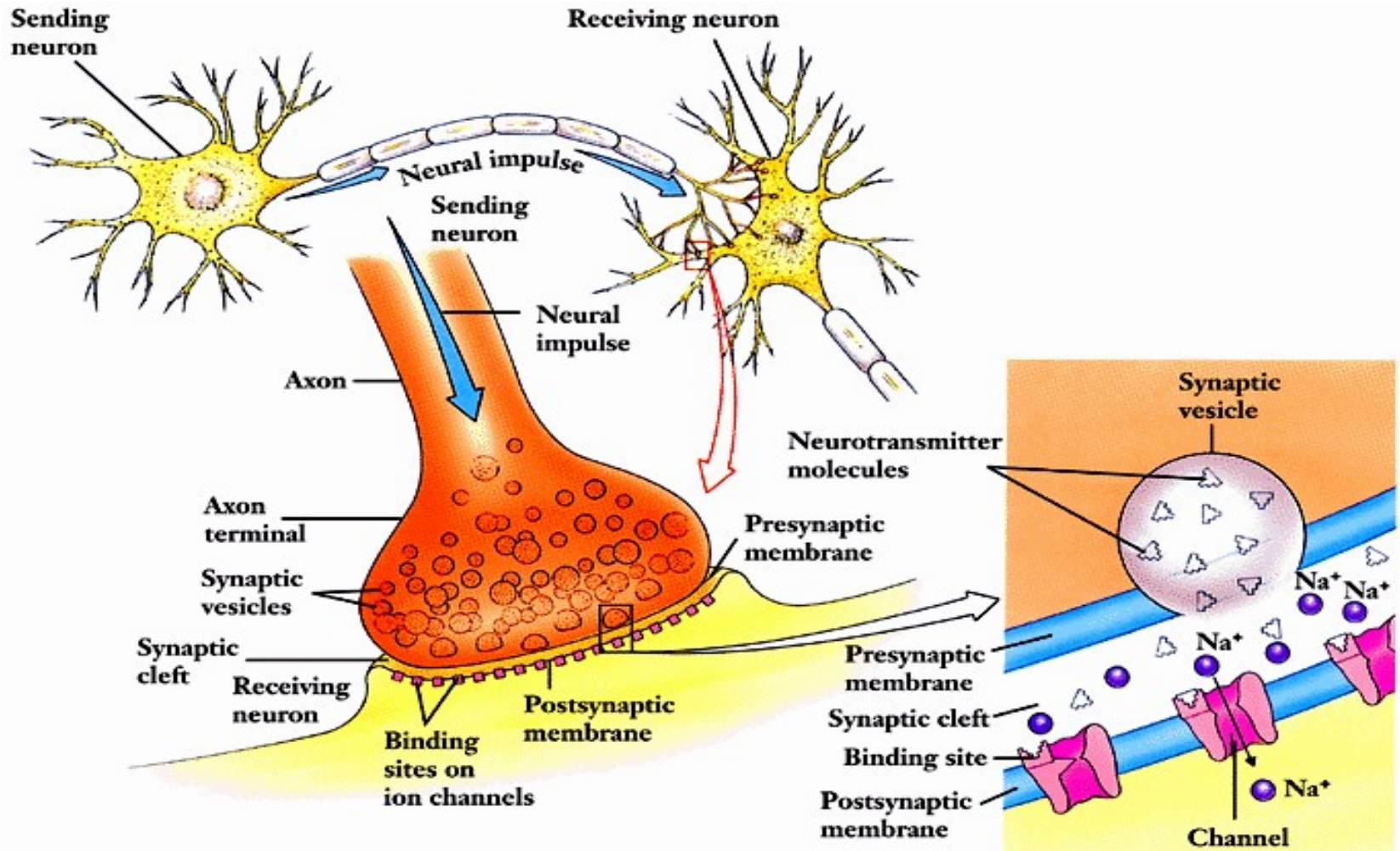
■ FAMILIARITY

- Practice and repetition

■ COMPLEXITY

- Simple: Today is Thursday
- Complex: “Self-consciousness exists in-itself and for-itself, in that, and by the fact that it exists for another self-consciousness.” (Hegel, *Phenomenology of Spirit*)

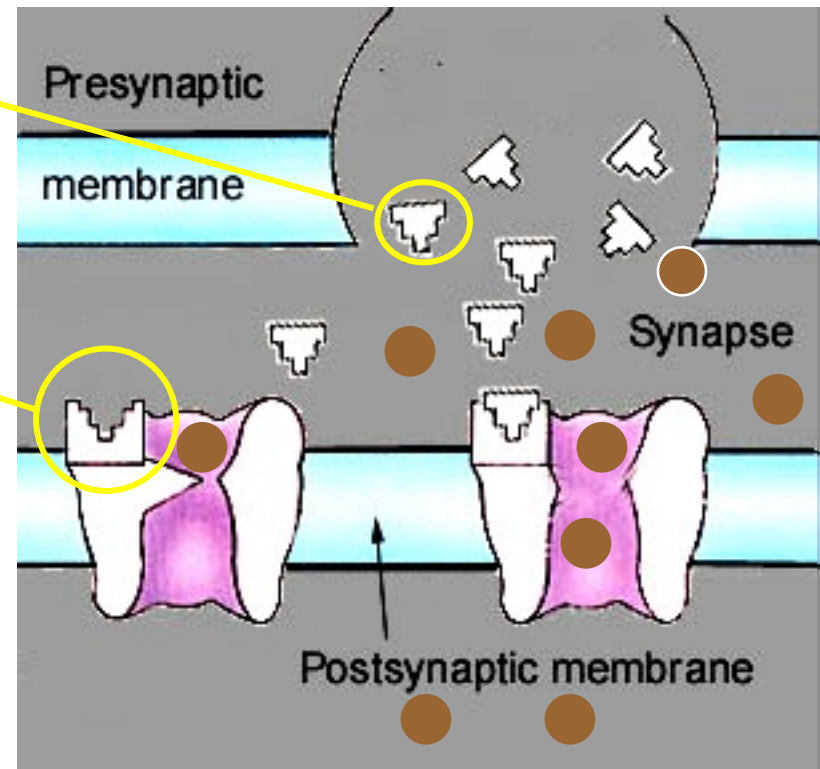
Neural Communication



Locks and Keys

Neurotransmitter molecules have specific shapes

Receptor molecules have binding sites



Types of Neurotransmitters



- Acetylcholine (excitatory)
- Norepinephrine (inhibitory)
- Epinephrine (excitatory)
- Dopamine (inhibitory)
- Oxytocin (the “cuddle chemical”)
- Serotonin

Types of Neurotransmitters

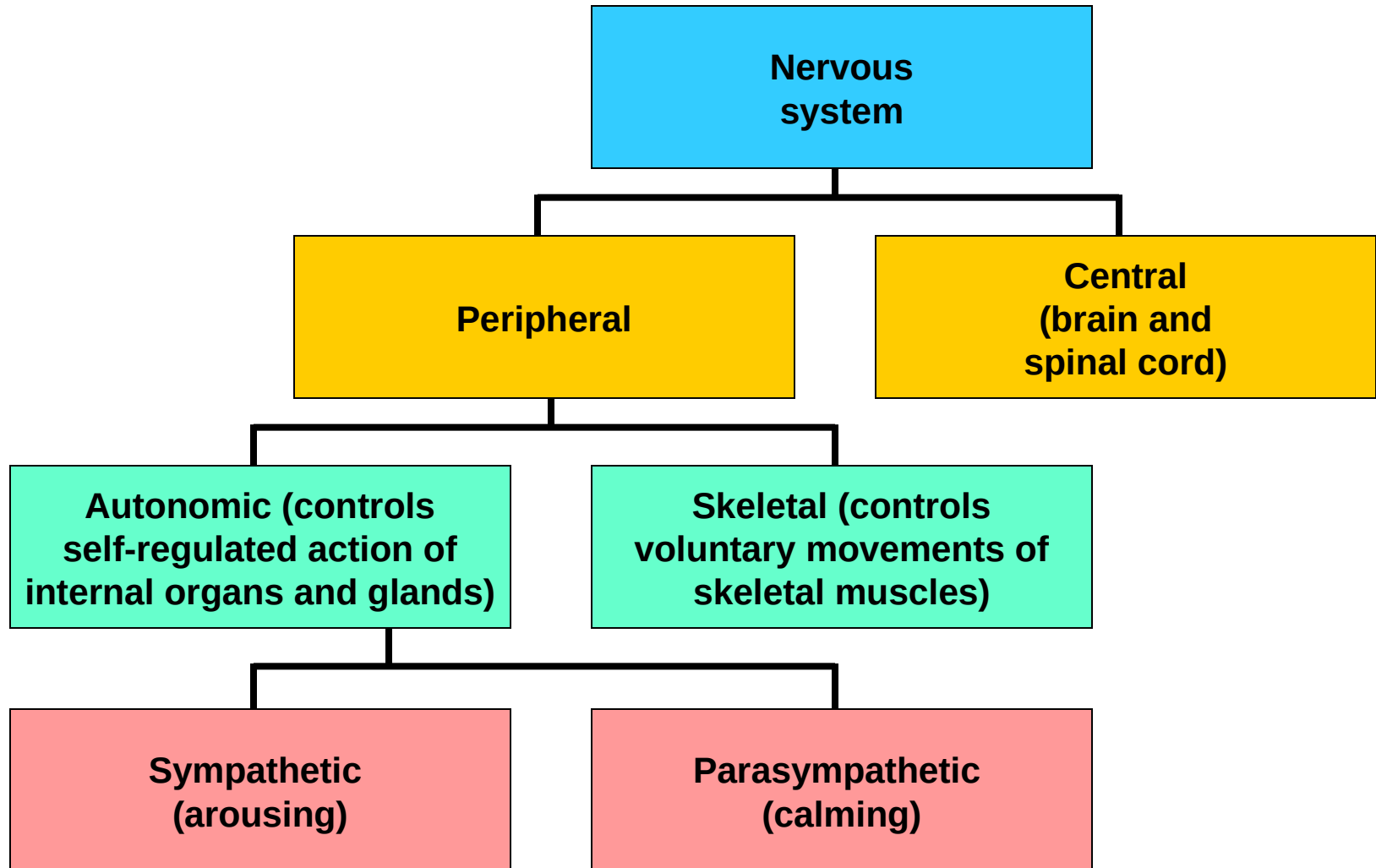
■ Peptides

- Proteins: long sequence of amino acids
- Polypeptides: short sequence of amino acids

■ Example: Endorphins

- “morphine within”
- natural, opiate-like neurotransmitters
- linked to pain control and to pleasure

Systems of the Brain



Brain has 2 Hemispheres

- Left & Right sides are separate
- Corpus Callosum : major pathway between hemispheres
- Some functions are 'lateralized'
 - language on left
 - math, music on right
- Lateralization is never 100%

