

GEK I064 Psychology in Everyday Life

Lecture I



Plotnik, R., & Kouyoumdjian, H. (2014). Introduction to Psychology (10th edition). Wadsworth, Cengage Learning.



About this module

- This module will have 10 lectures, and 5 tutorials.
 - Tutorial: Fortnight, 2-hourly sessions
- Common Assessment (50%) components :
 - Mid-term (30%)
 - Wk 9: 20th March (mcq...)
 - Journal report (10%)
 - See uploaded slides for details
 - Tutorial Participation (10%)
 - RP Requirement

Exams and mid-term

- Closed-book
- Format: MCQs and fill-in-the-blanks
- Tested materials:
 - Anything covered during lecture and tutorials
 - Relevant chapters in the textbook
 - Assigned supplementary readings



Important note for students taking this module

- This is a module meant for students who have **NO** intention to major or minor in psychology.
- This module is not recognized as a foundation module for majoring or minoring in psychology.
- So why this module?



Lecture 1. Brain's Building Blocks

- Overview of our nervous system
- Structure and working of neurons
- How the working of neurons influence behavior
 - Biological basis of Schizophrenia, Parkinson's disease, and Alzheimer's disease.

The Nervous System

- Central Nervous System (CNS)
 - Receives, processes, interprets and stores incoming sensory information; then sends out messages to muscles, glands, internal organs.
- Peripheral Nervous System (PNS)
 - handles CNS's input and output.
 - contains all portions of the nervous system outside the brain and spinal cord.

The Nervous System

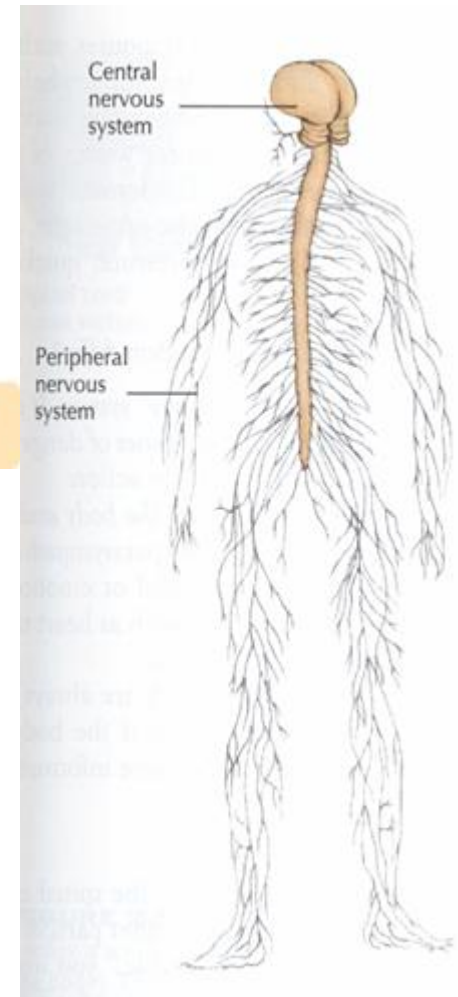
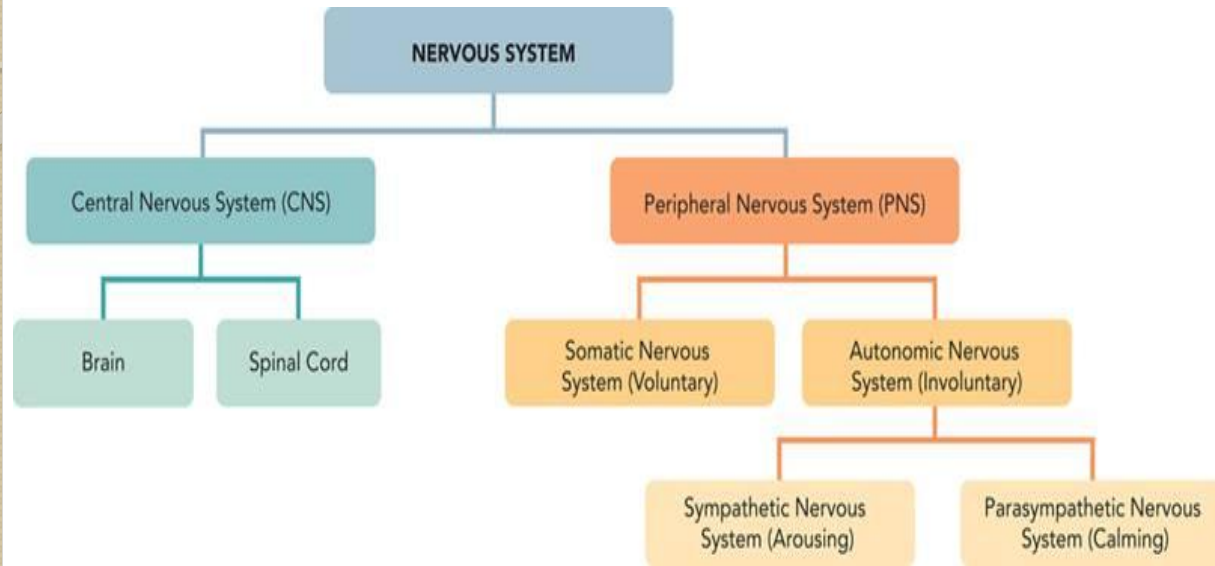
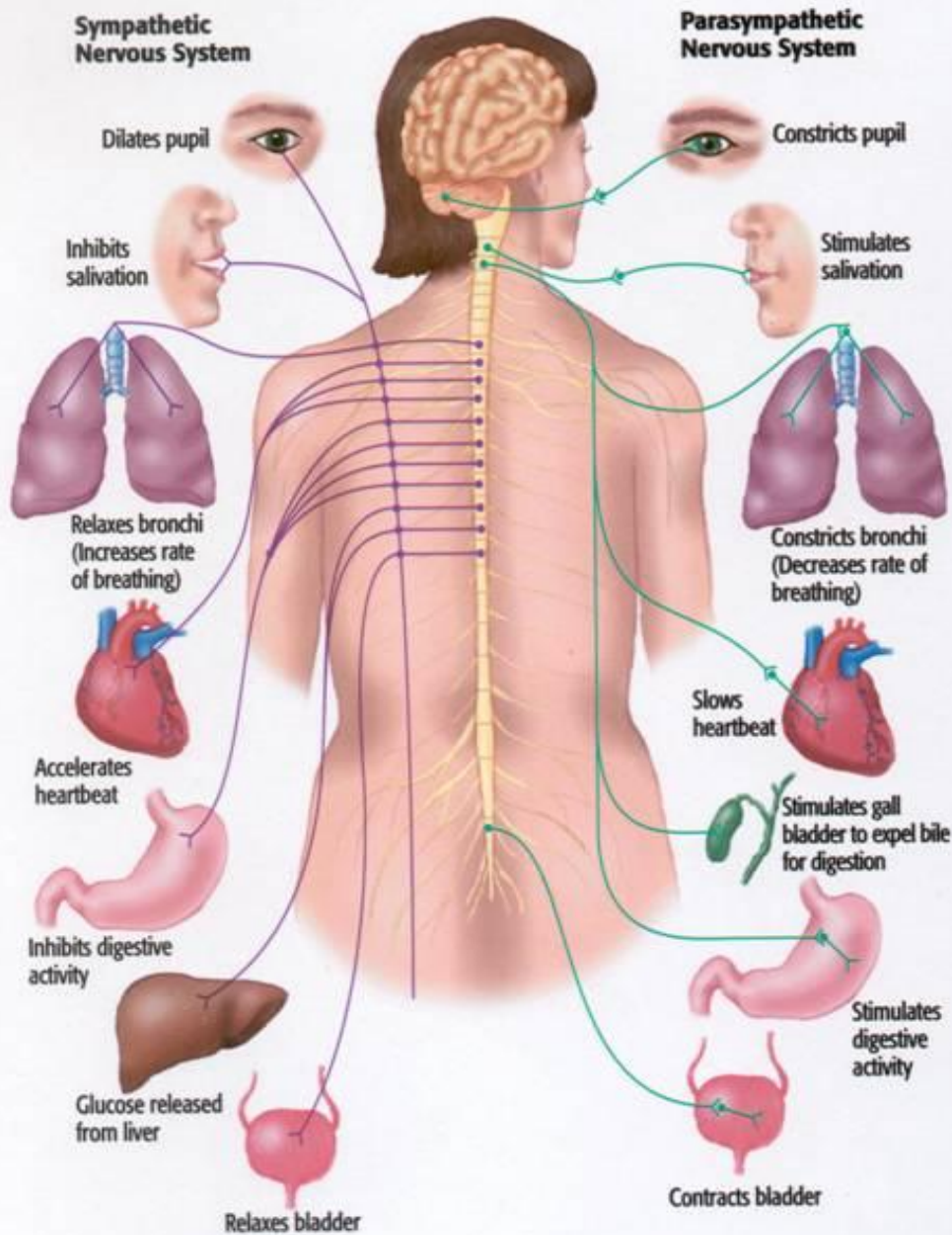


Figure 2.5 Opposing Effects of Sympathetic and Parasympathetic Nervous System



Please also read p.484-485 of your textbook...

- Sympathetic nervous system: the body's alarm system that heightens the arousal and releases stored energy to deal with emergency (**fight-or-flight response**):
 - Accelerate heart-rate: more blood can pump to the muscles
 - Dilates pupil: allow more light to enter eyes to improve vision.
 - Increases breathing: body can get more oxygen.
 - Glucose released from liver: provide more fuel for cells
 - Inhibit digestive activity: so that blood can be pumped to muscles

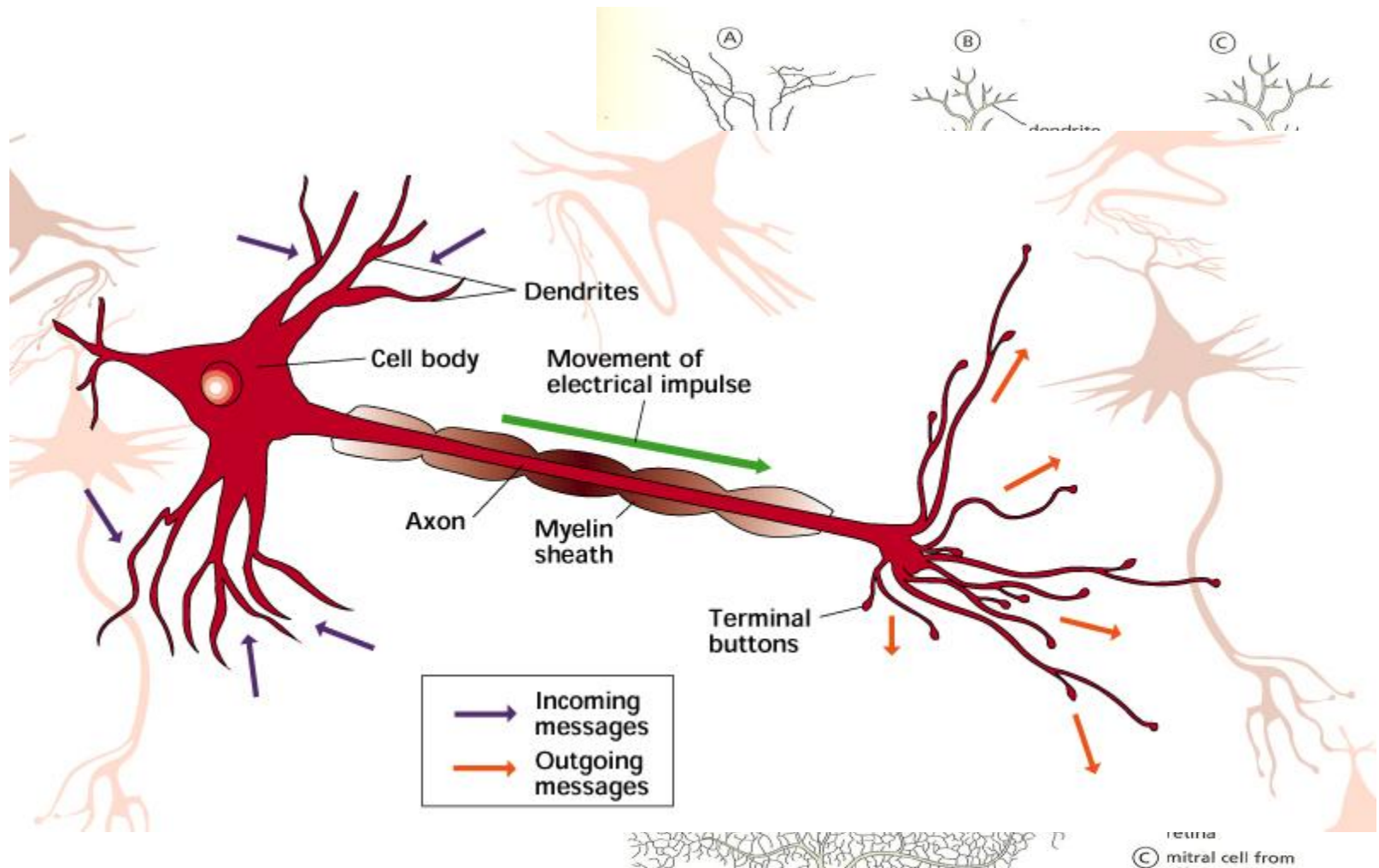
Neurons (nerve cells): Building blocks of the nervous system

- specialized cells responsible for receiving, processing and transmitting information.



Neurons in the brain of a monkey...

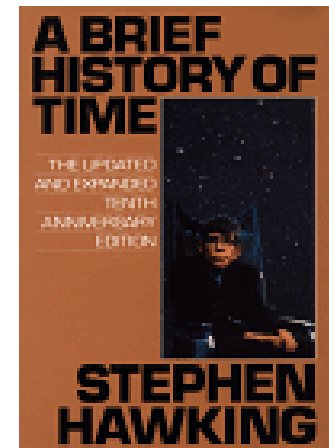
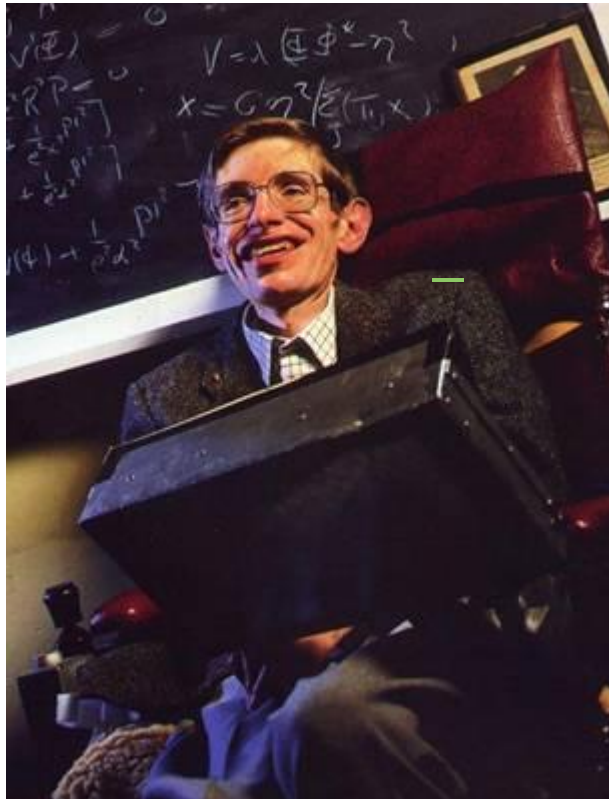
Neurons: The Elements of Behavior



No two neurons are alike but they have the same structure...

Fig 2.8 Varieties of neurons.

Amyotrophic Lateral Sclerosis (ALS):



What was not mentioned in the video

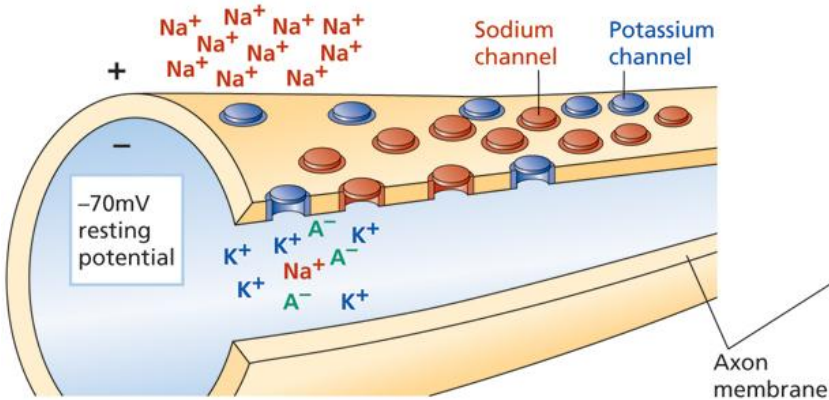
- Myelin Sheath

- Fatty insulating sheath wrapped around the axon.
- Two functions:
 - Speed up the conduction of neural impulses.
 - Prevent signals from adjacent cells from interfering with each other (short circuits otherwise)

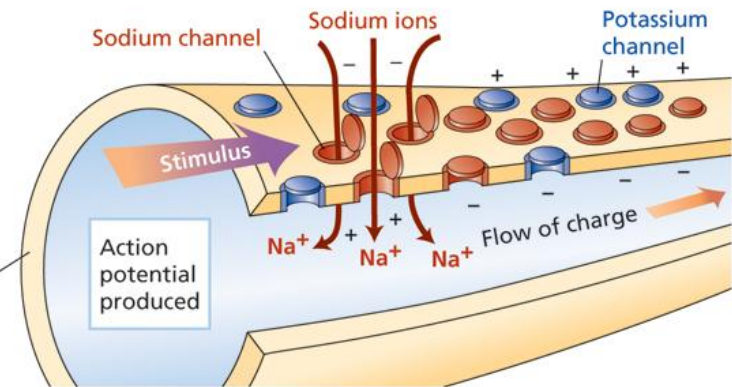
Points to highlight from the video

- Information travels in the nervous system is **electrochemical** in nature:
 - Impulse flowing along the neurons: electrical signal
 - Messages from one neuron to another: chemical process (in the form of neurotransmitter)
- The electric impulse traveling through the neuron is known as an **action potential**, which changes the cell's charge from negative to positive

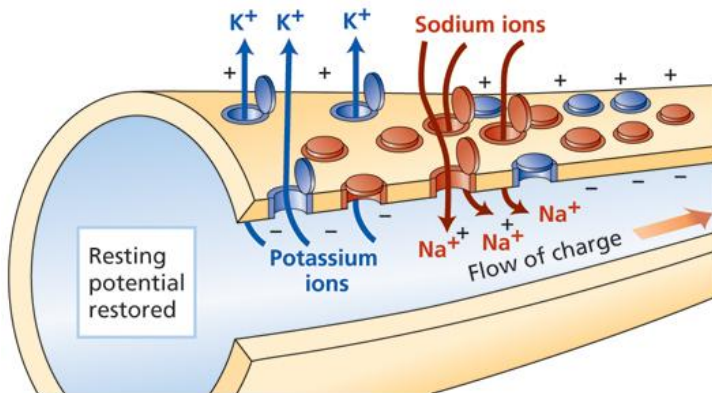
The Electrical Impulse



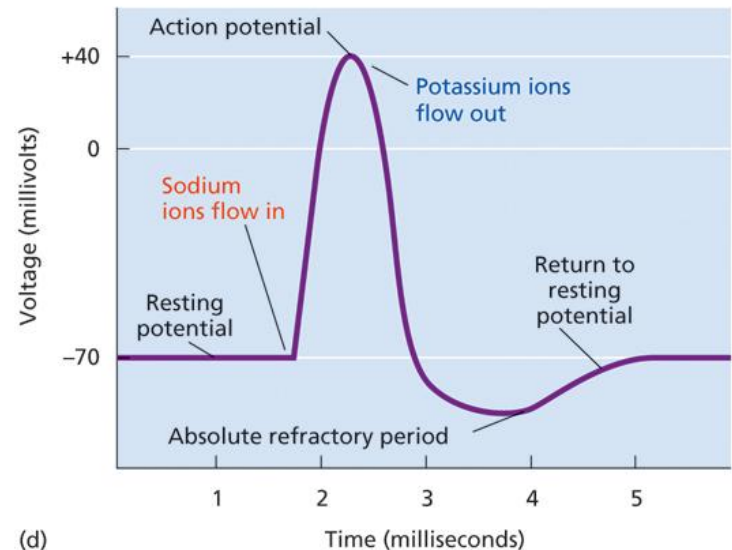
(a) The 10:1 concentration of sodium (Na^+) ions outside the neuron and the negative protein (A^-) ions inside contribute to a resting potential of -70mV.



(b) If the neuron is sufficiently stimulated, sodium channels open and sodium ions flood into the axon. Note that the potassium channels are still closed.



(c) Sodium channels that were open in (b) have now closed and potassium channels behind them are open, allowing potassium ions to exit and restoring the resting potential at that point. Sodium channels are opening at the next point as the action potential moves down the axon.

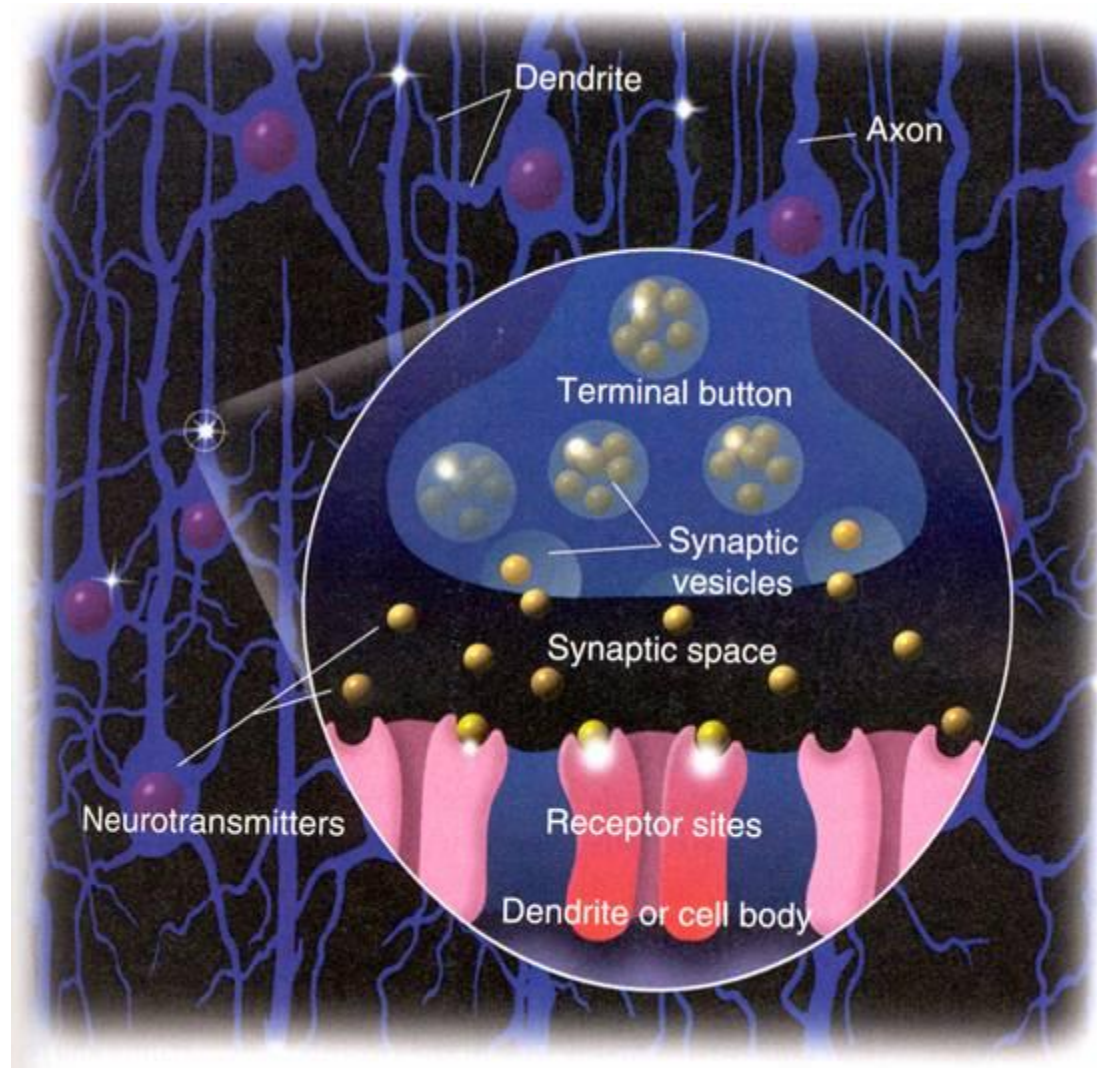


(d)

Points to highlight from the video: How neurons communicate

- Chemical process involving *neurotransmitters* traveling across *synaptic cleft*.
- It binds briefly on the receptor site of the receiving neuron, like a key fits into a lock.
- Neurotransmitters deliver either excitatory or inhibitory messages that determine whether the receiving neuron fires or not fires.
- Neurotransmitters fundamental to behaviors.

Synaptic transmission



Neurotransmitters

TABLE 2.1

Neurotransmitters: An Overview

Neurons communicate with one another across the synapse through neurotransmitters. Several of these are listed and described here.

Neurotransmitter	Location	Effects
Acetylcholine	Found throughout the central nervous system, in the autonomic nervous system, and at all neuromuscular junctions.	Involved in muscle action, learning, and memory.
Norepinephrine	Found in neurons in the autonomic nervous system.	Primarily involved in control or alertness and wakefulness.
Dopamine	Produced by neurons located in a region of the brain called the substantia nigra.	Involved in movement, attention, and learning. Degeneration of dopamine-producing neurons has been linked to Parkinson's disease. Too much dopamine has been linked to schizophrenia.
Serotonin	Found in neurons in the brain and spinal cord.	Plays a role in the regulation of mood and in the control of eating, sleep, and arousal. Has also been implicated in the regulation of pain and in dreaming.
GABA (gamma-amino-butyric acid)	Found throughout the brain and spinal cord.	GABA is the major inhibitory neurotransmitter in the brain. Abnormal levels of GABA have been implicated in sleep and eating disorders.

Parkinson's disease: A deficiency in dopamine



The black cells of the substantia nigra die and thus no longer able to produce dopamine. See that the midbrain on the left does not have a visible dark band due to the death of the pigmental neurons.



End of Lecture