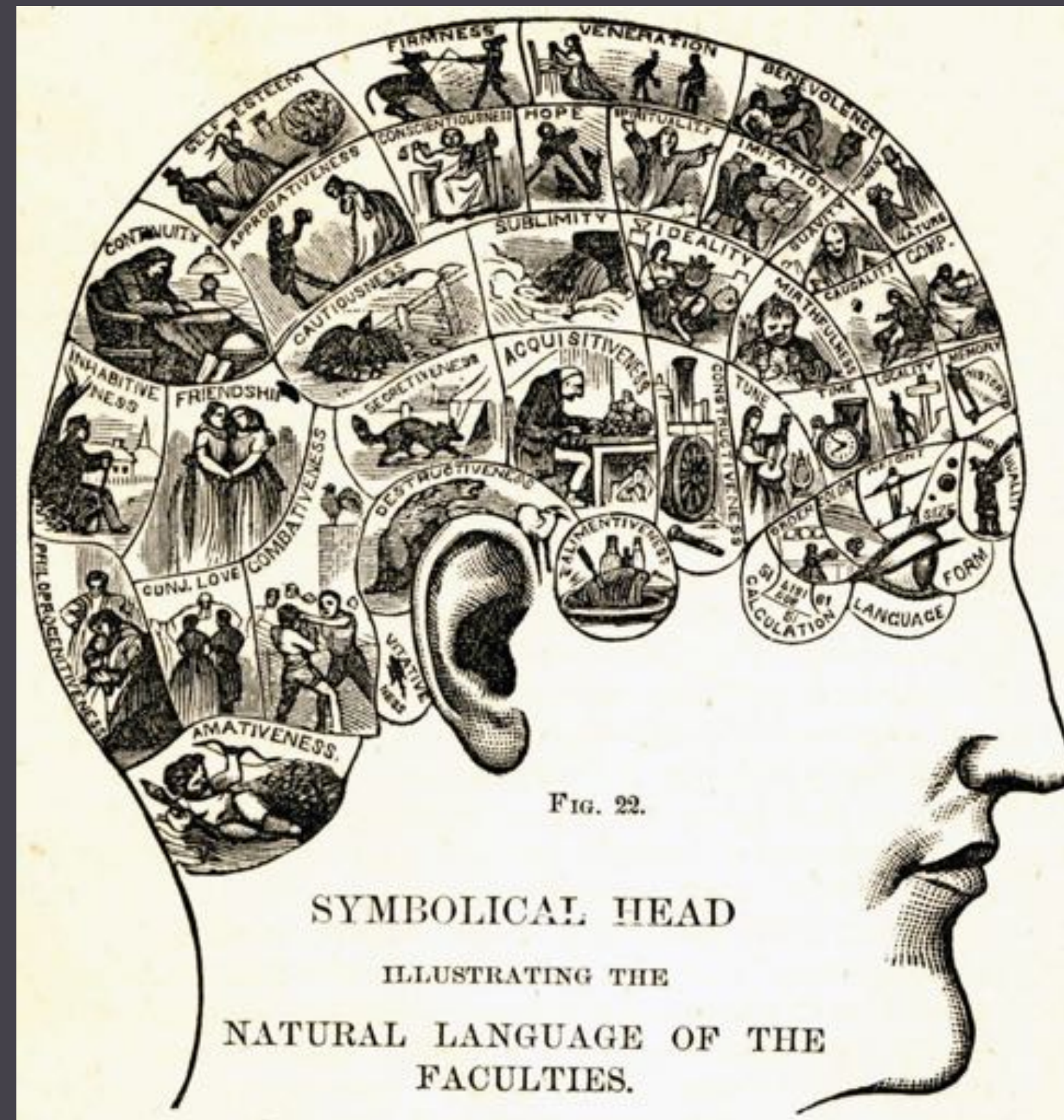


# The Brain (Part 3): Structure And Function

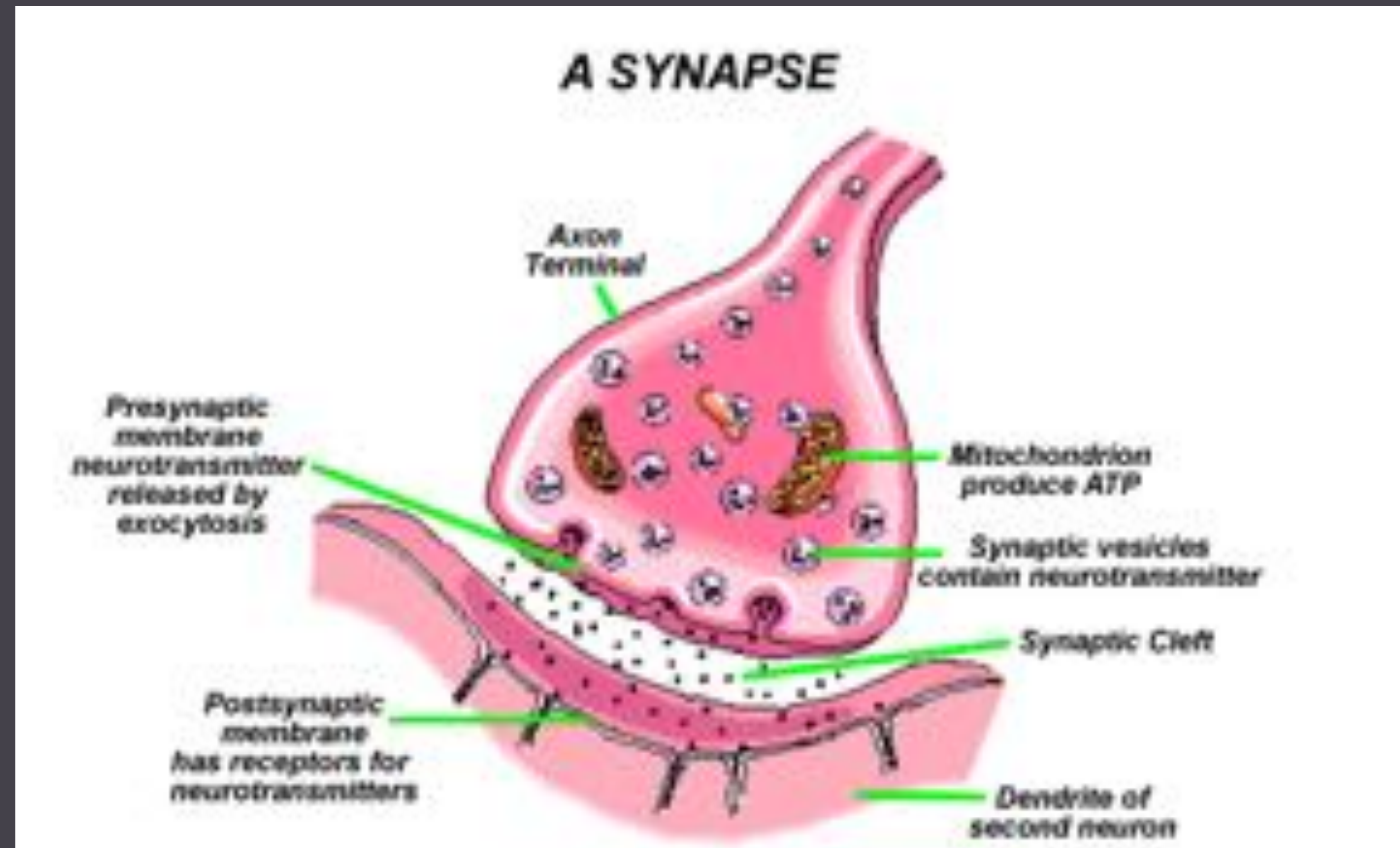


PSYCH 1101

PROF. DAVID PIZARRO  
DAY 7

# Neurotransmitters

- Chemical messengers that send signals across neurons
- Chemicals made in cell body, and when transmitted to a second neuron...
  - makes it more likely for next neuron to fire (excitatory)
  - or less likely (inhibitory)



# A Few Kinds Of Neurotransmitters

- **Acetylcholine**
  - stimulates muscle movement, memory, arousal, attention, mood
- **Dopamine**
  - one of four neurotransmitters called monoamines, produces both excitatory and inhibitory effects and is involved in several functions, including **learning, attention, and movement,**
  - important for reinforcement learning--gives you the **feeling of reward**
  - implicated in **pleasure and addiction**

# Motivated Rats



# A Few Kinds Of Neurotransmitters

- **Serotonin**

- plays an important role in regulating mood, sleep, impulsivity, aggression, and appetite

- **Norepinephrine**

- affects eating habits (it stimulates the intake of carbohydrates) and plays a major role in alertness and wakefulness.

- **GABA (gamma-aminobutyric acid)**

- is the main inhibitory neurotransmitter in the brain (

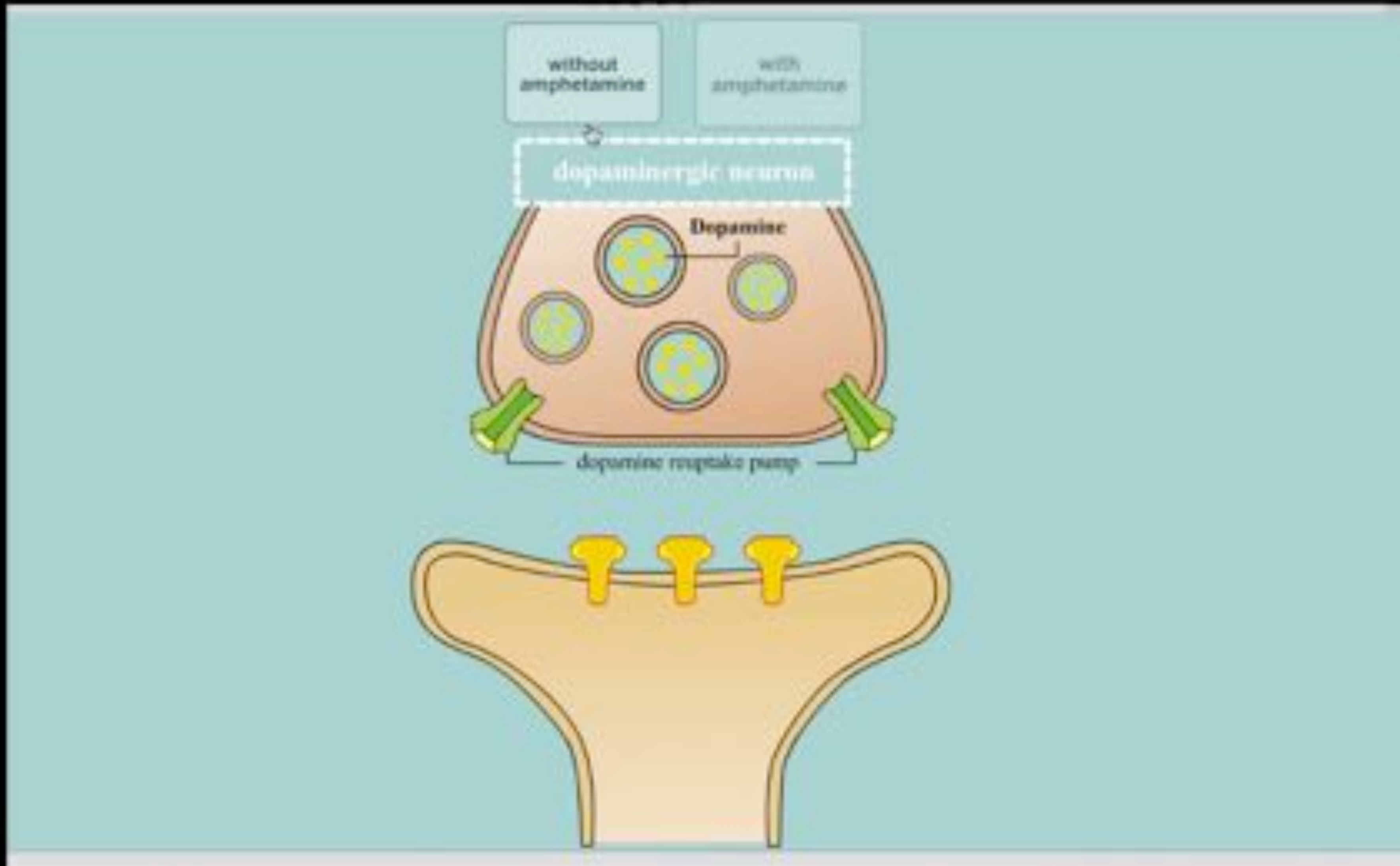
- **Endorphins**

- relief from pain or the stress of vigorous exercise and produce feelings of pleasure and well-being

# How Drugs Affect Neurotransmitters

- Many drugs act by influencing the action of neurotransmitters in a number of ways (as **agonists** and **antagonists**):
  - influence the chemical *precursors* of a transmitter substance
  - *prevent the storage* of the transmitter substance in vesicles
  - inhibit or stimulate the *release* of the transmitter substance
  - *block postsynaptic* receptors
  - *block reuptake* of free-floating transmitter substance

# How Amphetamines Work



# Example: Dopamine, Drugs, And Disease

- We know that **cocaine** and **amphetamines** act by boosting dopamine. Some hypothetical examples to illustrate their action...
  - Been doing crystal meth for a week straight? That much dopamine-boosting and you'll get **amphetamine psychosis** (delusions and hallucinations)
  - Didn't touch the crystal meth, but still having delusions and hallucinations? **Schizophrenia** can be improved by the use of drugs that *reduce* dopamine
  - But don't go too far... Not enough dopamine and you might get **tardive dyskinesia** (uncontrollable bodily movements-twitching and shaking).
  - Having uncontrollable bodily movement but you didn't take dopamine-reducing drugs? **Parkinson's Disease** can be treated by increasing the levels of dopamine in your brain, bringing your body to a temporary rest.



# Structure And Function Of The Brain

