

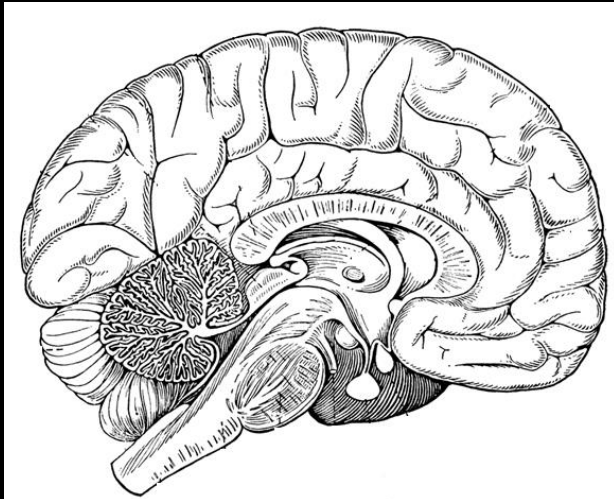
Brain Anatomy

HES 224 – Drugs, Behavior, and Society

Brain Anatomy

In this lecture we will...

- Identify and label various parts of the brain and their functions
- Apply this information to various video examples



Follow along and/or use for homework/review



Let's Take a Look Inside



3 lbs



Let's Take a Look Inside



73% Water



Let's Take a Look Inside



Consistency of Finger Jell-O

Let's Take a Look Inside



100,000,000,000 neurons

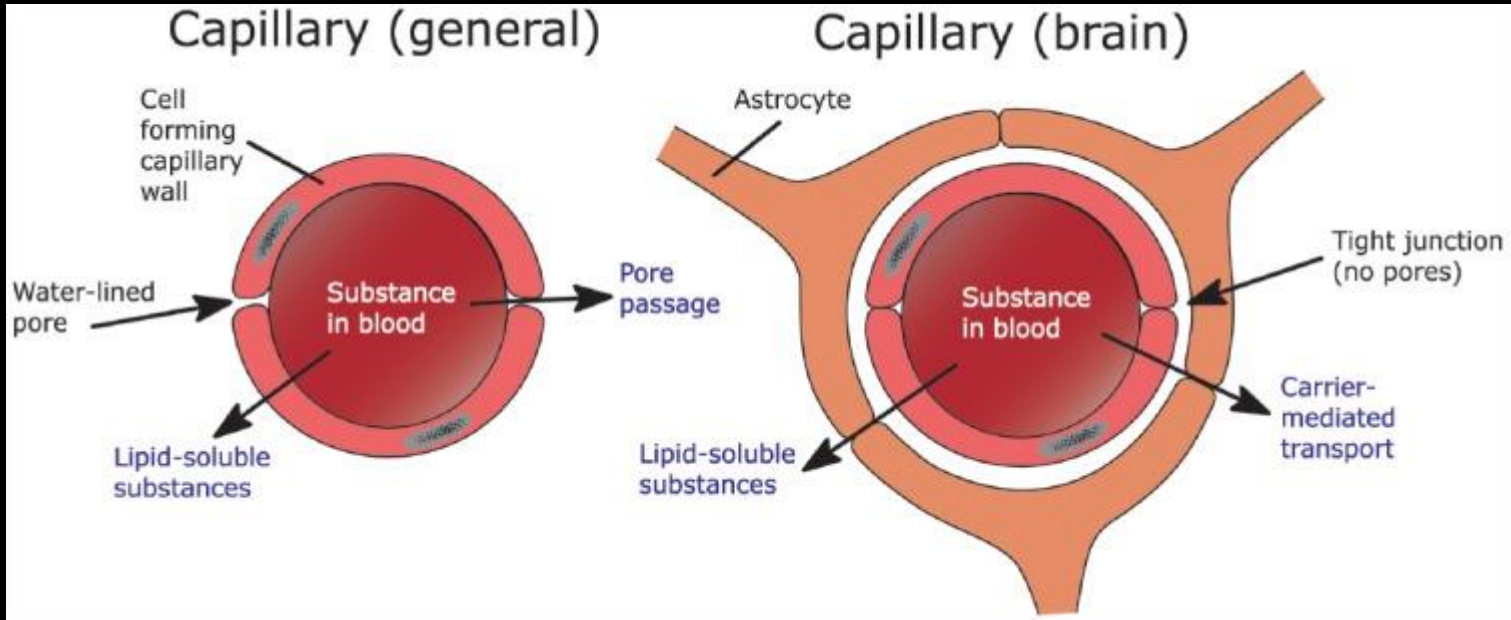
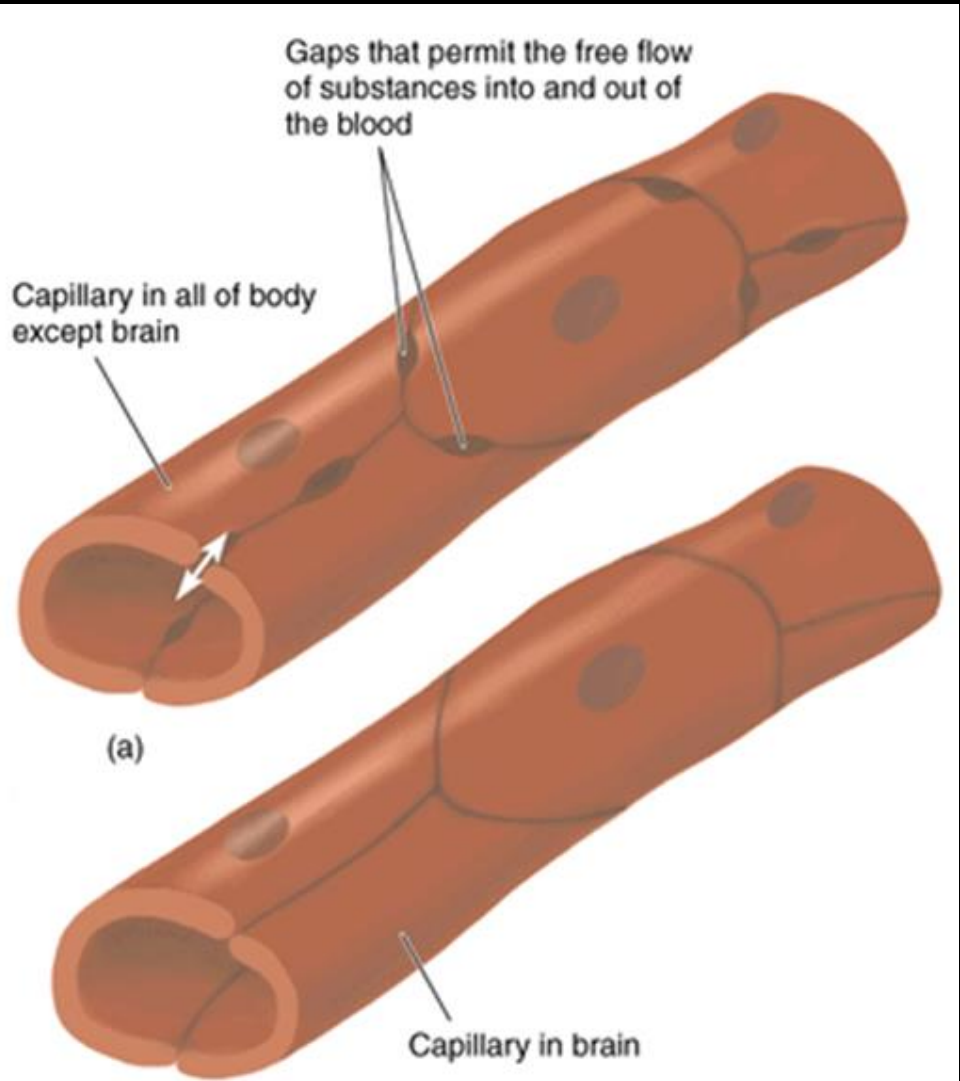


Parts of the Brain

- Upper Brain – Cerebrum or Cerebral Cortex
 - Right & Left Hemispheres
- Mid Brain
- Cerebellum
- Brain Stem



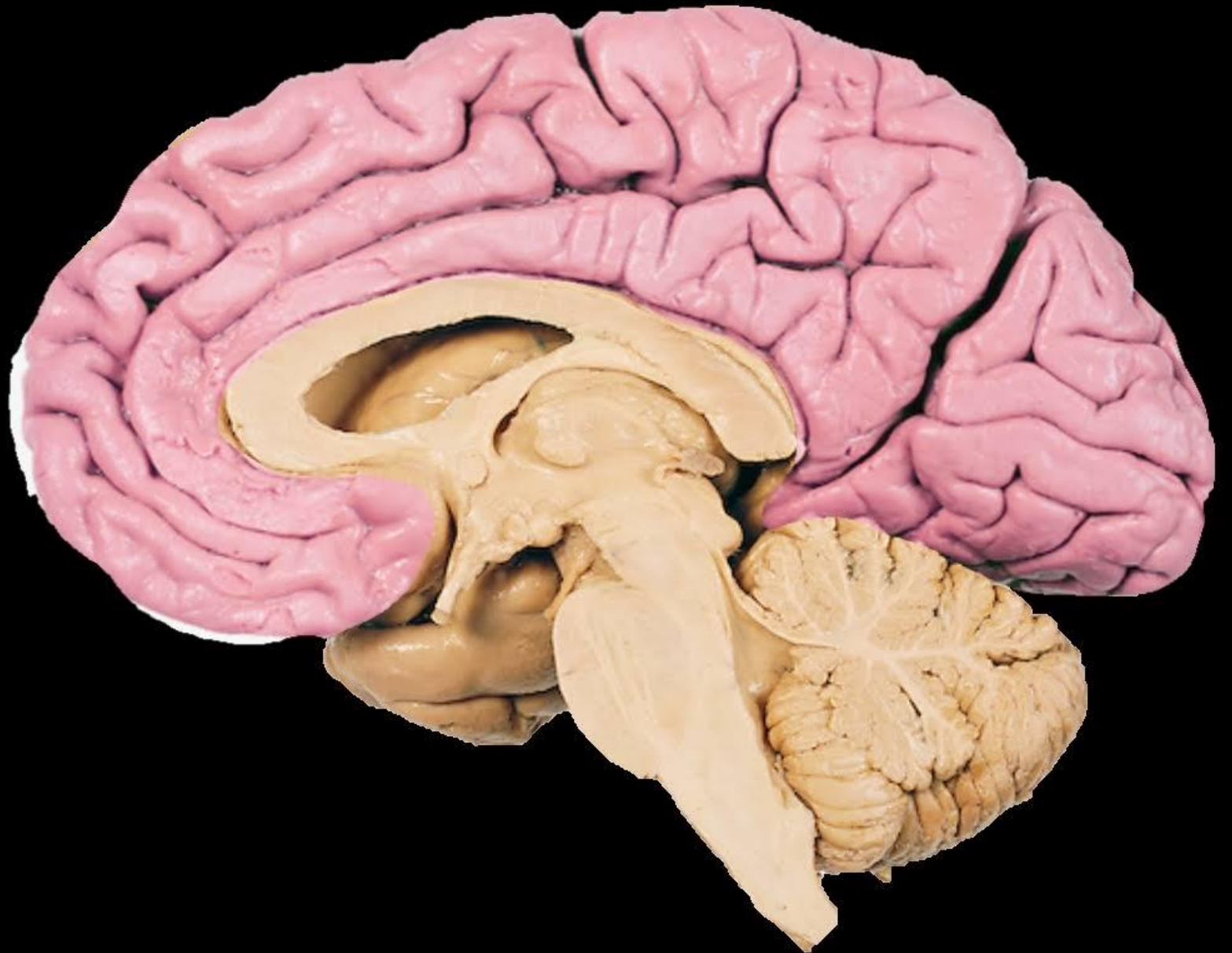
Blood Brain Barrier



Cerebrum

Higher Order Functions

- Sensory input
- Motor control
- Speech
- Hearing & Understanding
- Vision
- Reasoning
- Personality
- Emotions
- Learning



Cerebellum

- Posture
- Balance
- Equilibrium
- Coordination
- Fine motor control

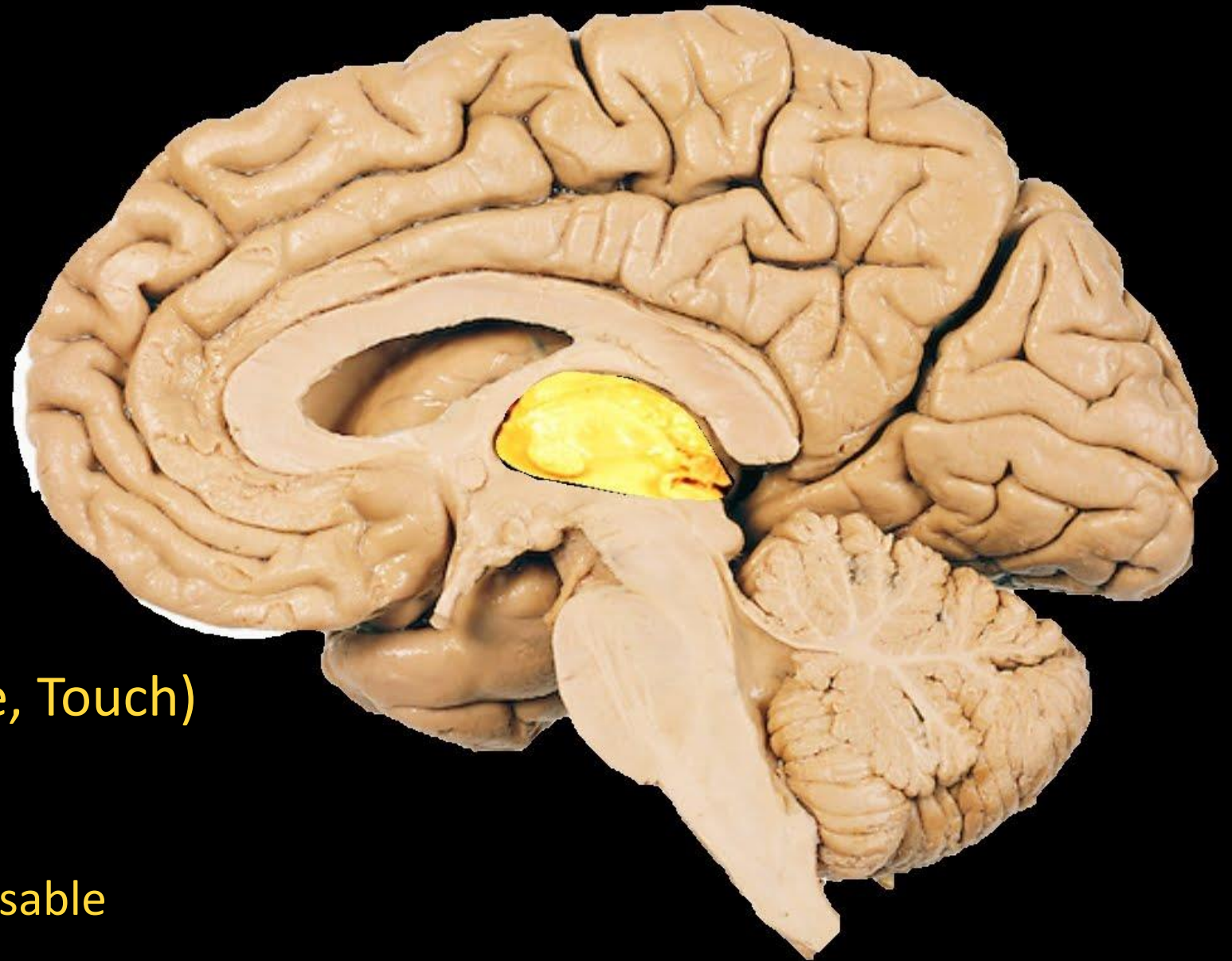


Corpus Callosum

- Integrates motor activity
- Integrates sensory perceptions
- Coordinates brain functions
 - Ex: face or voice recognition



Thalamus



- Sensory Receptor
- (Vision, Hearing, Taste, Touch)
 - Pressure
 - Temperature
 - Pleasurable or unpleasable

Which areas of the brain are impacted by alcohol?



Hypothalamus

- Body temperature
- Circadian rhythms
- Hormonal regulation
- Hunger
- Thirst
- Emotion



Nucleus Accumbens

- Reward Center
- Satiating
- Memory Formation



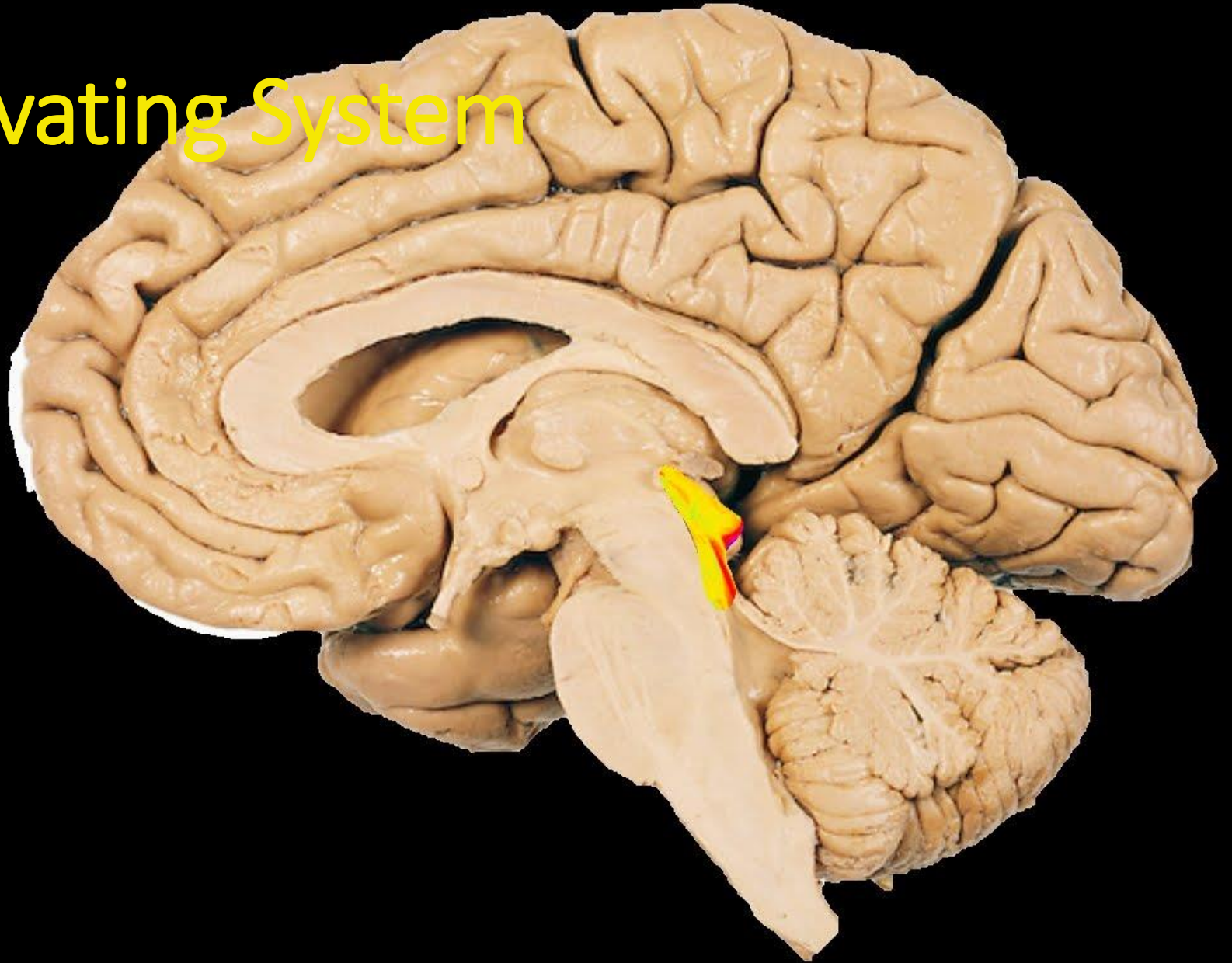
Amygdala

- Emotions
 - Fear
 - Anger
 - Aggression
- Survival Response
 - Hunger
 - Sex
 - Protection
- Memory



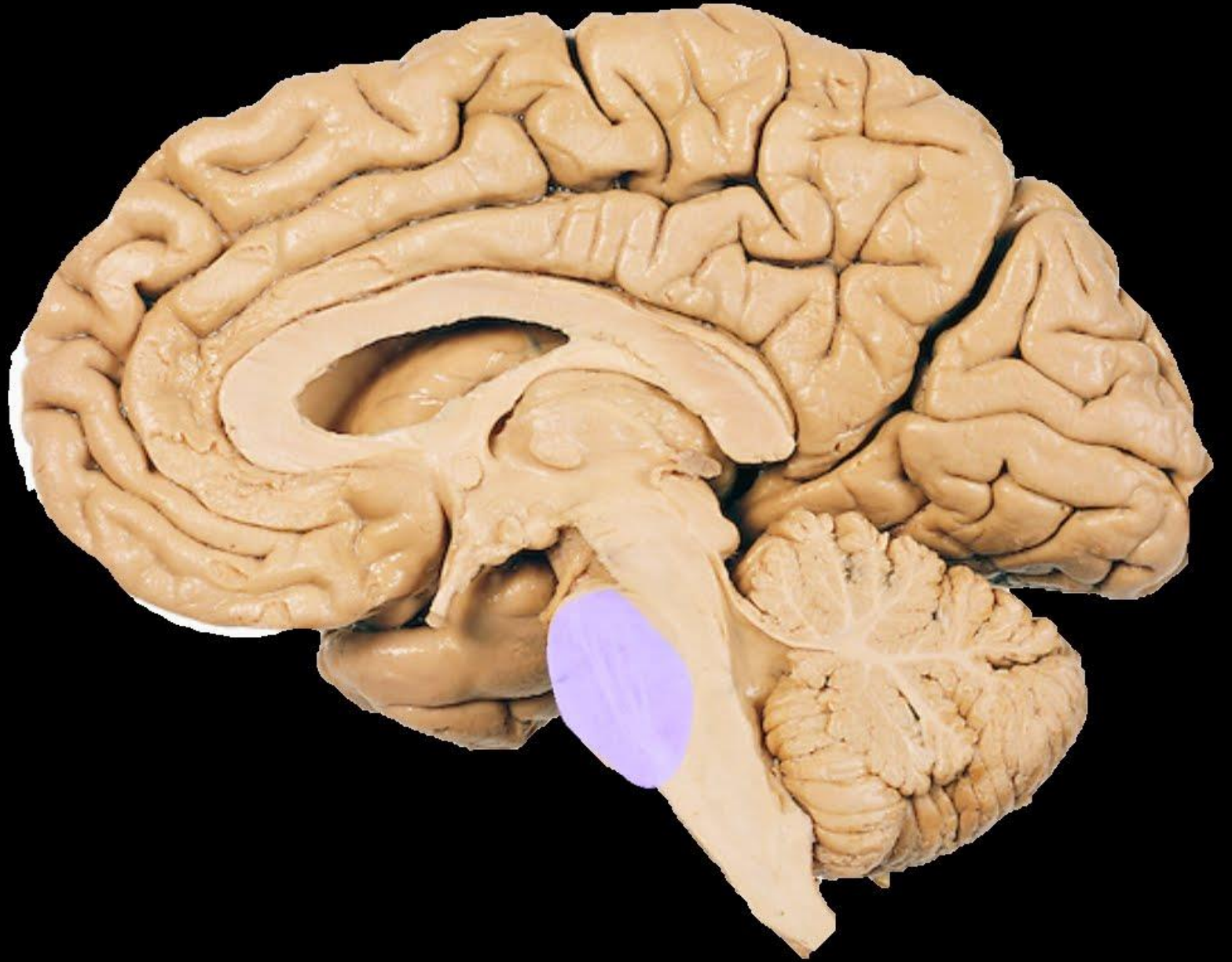
Reticular Activating System

- Sleep-Wake Cycle
- Sensory Regulation



Ponds

- Sleep
- Respiration
- Taste
- Swallowing
- Bladder control
- Facial expressions
- Eye movement



Medulla Oblongata

- Respiration control
- Sneezing
- Circulation control
 - Heart Rate
 - Blood Vessel Function



Which parts of the brain are impacted?



Work Groups

- 10 minutes to dialogue
- Each group share for 5 minutes

Work Groups

- BRN - Chargers
 - Describe how neurons communicate. How do they send and receive signals?
- FOX - Cyclones
 - What are neurotransmitters? What role do they have in the body?
- MAN - Blue Devils
 - Explain the autonomic nervous system.
- MNT - Buccaneers
 - What is the cannabinoid system? How does it work?
- BRN - Bluegolds
 - What are opiate receptors? How do they work?
- FOX – Titans
 - Describe drug metabolism. Agonistic & antagonistic effects of metabolism.
- MAN – Phoenix
 - Explain the endocrine system and how it works.
- MNT - Phoenix
 - How do steroids work? How and why are they abused? What are the positive and negative side effects of use?

BRN – Chargers = Neurons

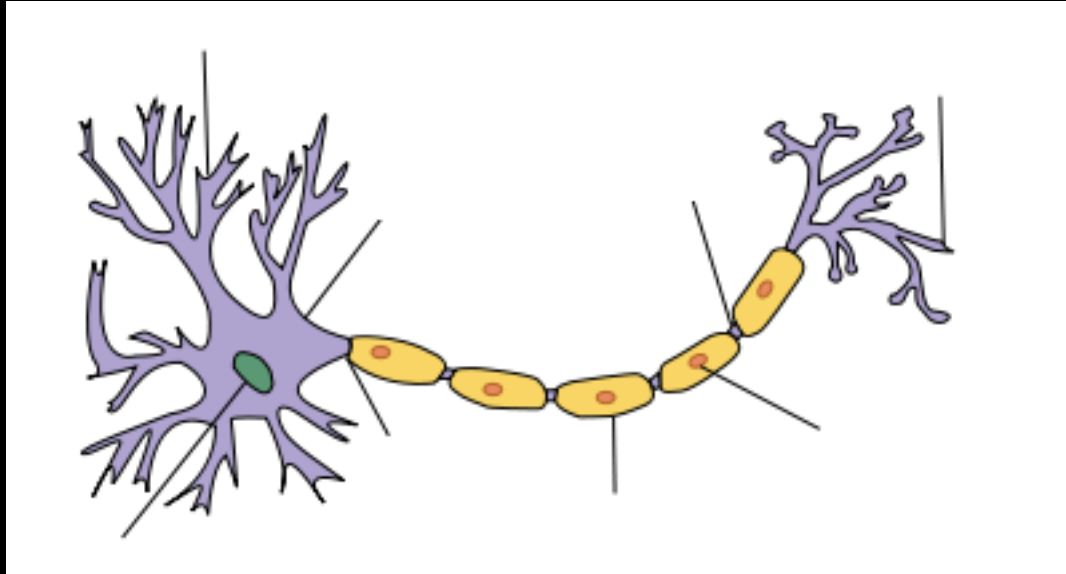


Image: Wikipedia

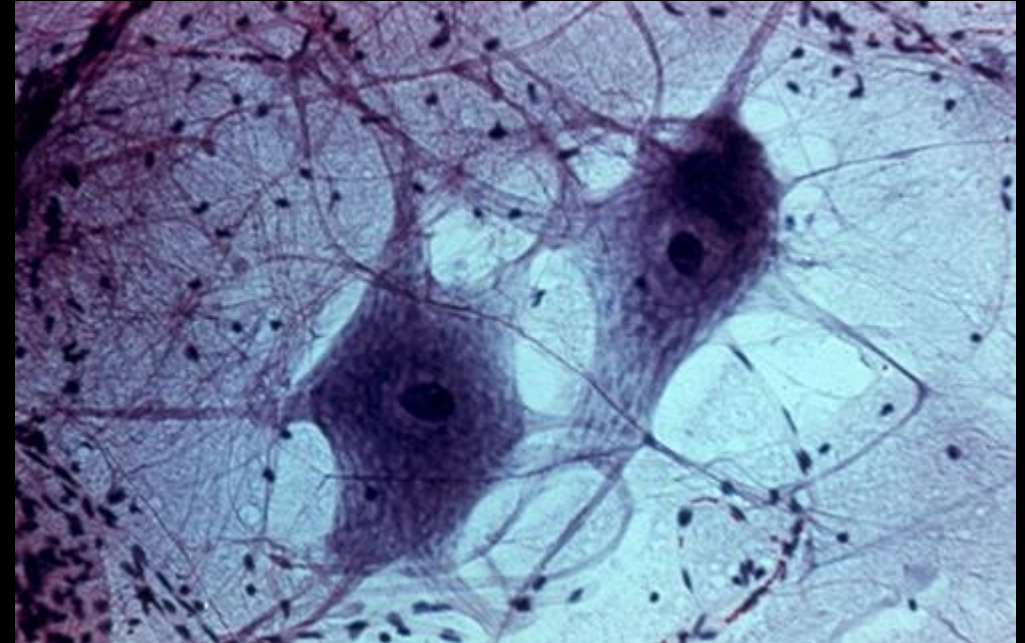


Image: Matthews, S. (n.d.) Tissue layers- depth! Tunnel books. TES Tech . Retrieved from <https://www.tes.com/lessons/xWDgXtKYr-Sgw/tissue-layers-depth-tunnel-books>

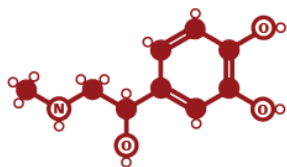
FOX – Cyclones = Neurotransmitters

THE STRUCTURES OF NEUROTRANSMITTERS

STRUCTURE KEY: ● Carbon atom ○ Hydrogen atom ○ Oxygen atom ○ Nitrogen atom ○ Rest of molecule

ADRENALINE

Fight or flight neurotransmitter



Produced in stressful or exciting situations. Increases heart rate & blood flow, leading to a physical boost & heightened awareness.

NORADRENALINE

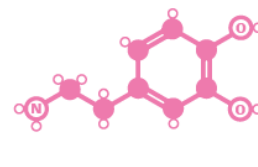
Concentration neurotransmitter



Affects attention & responding actions in the brain, & involved in fight or flight response. Contracts blood vessels, increasing blood flow.

DOPAMINE

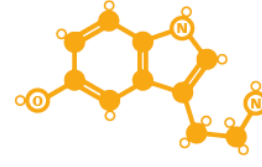
Pleasure neurotransmitter



Feelings of pleasure, and also addiction, movement, and motivation. People repeat behaviours that lead to dopamine release.

SEROTONIN

Mood neurotransmitter



Contributes to well-being & happiness; helps sleep cycle & digestive system regulation. Affected by exercise & light exposure.

GABA

Calming neurotransmitter



Calms firing nerves in CNS. High levels improve focus; low levels cause anxiety. Also contributes to motor control & vision.

ACETYLCHOLINE

Learning neurotransmitter



Involved in thought, learning, & memory. Activates muscle action in the body. Also associated with attention and awakening.

GLUTAMATE

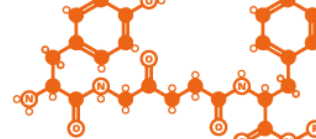
Memory neurotransmitter



Most common brain neurotransmitter. Involved in learning & memory, regulates development & creation of nerve contacts.

ENDORPHINS

Euphoria neurotransmitters



Released during exercise, excitement, & sex, producing well-being & euphoria, reducing pain. Biologically active section shown.



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Image: Compound Interest. A simple Guide to Neurotransmitters. Retrieved from <http://www.compoundchem.com/2015/07/30/neurotransmitters/>

MAN - Blue Devils = Autonomic Nervous System

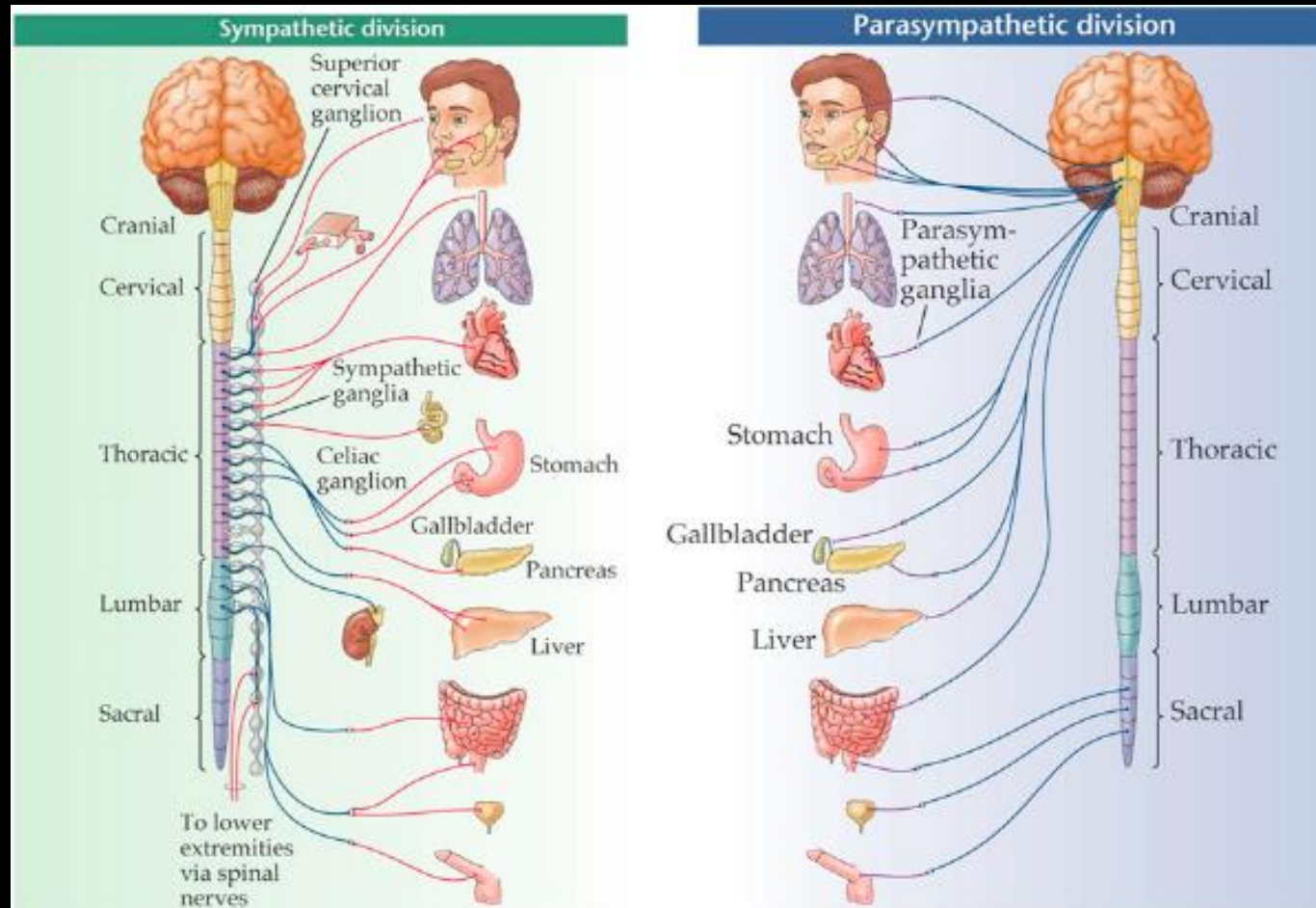


Image: Bethopedia. The Somatic and Autonomic Nervous System. Retrieved from <http://wiki.bethanycrane.com/somaticautonomicnervoussystem>

MNT – Buccaneers = cannabinoid system

Brain regions that express the CB₁ cannabinoid receptor

Red = abundant CB₁ receptor expression Black = moderately abundant CB₁ receptor expression

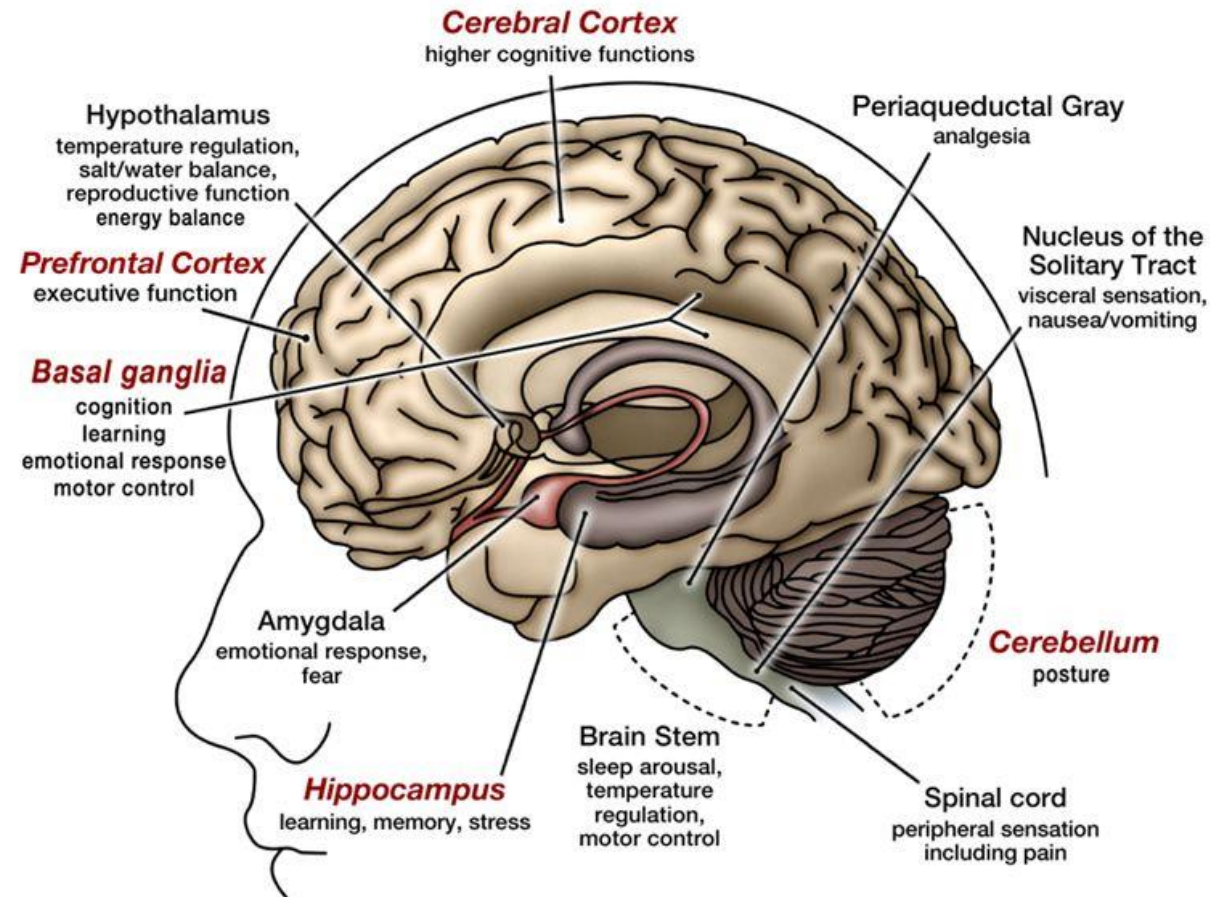


Image: Retrieved from <http://www.mymedicineconsulting.com/terpenehealer/cannabinoids-terpenes-and-autism-putting-the-pieces-together>

BRN – Bluegolds = Opiate Receptors

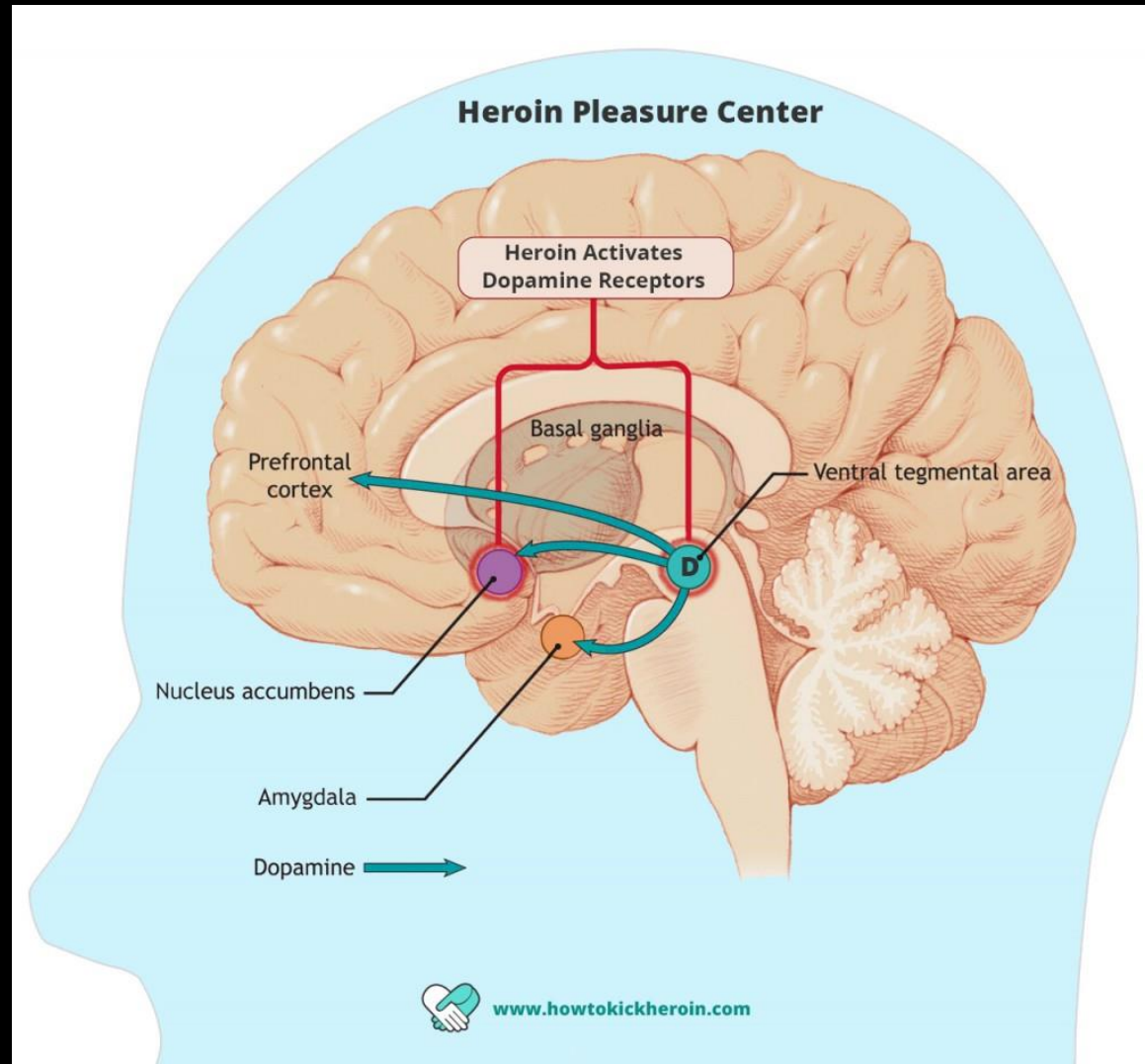
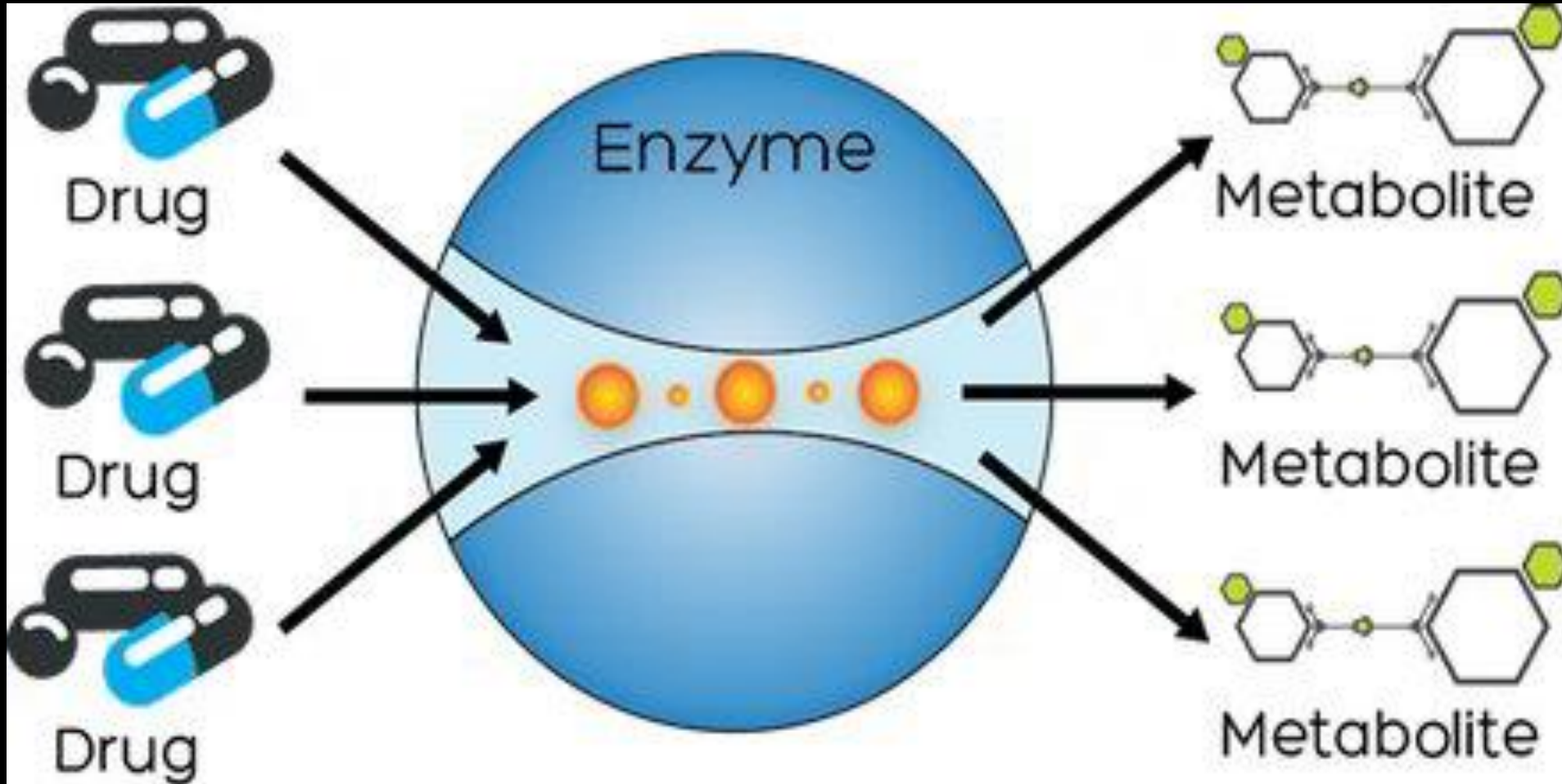
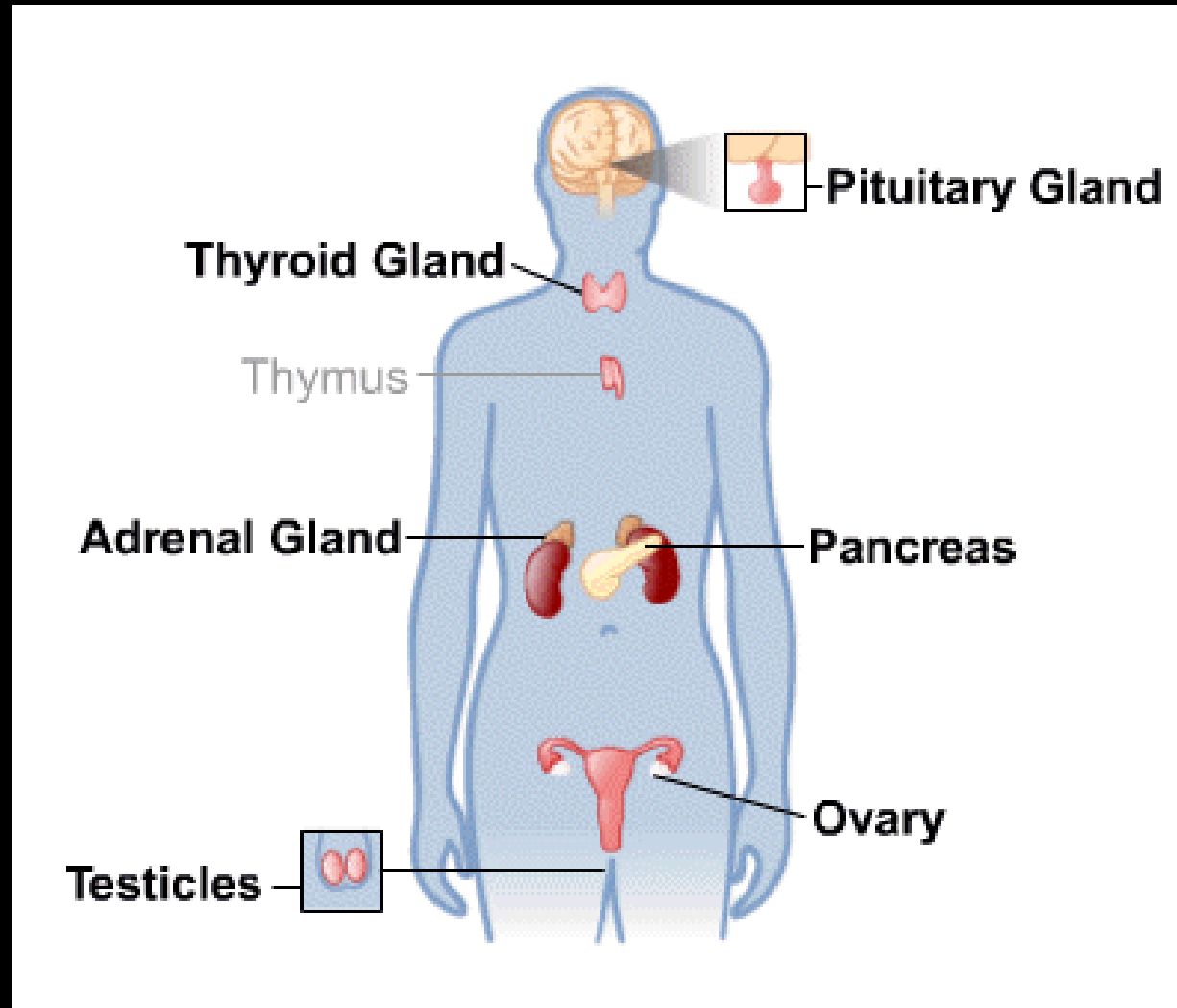


Image: How to kick heroin. Retrieved from <https://www.howtokickheroin.com/how-heroin-works/>

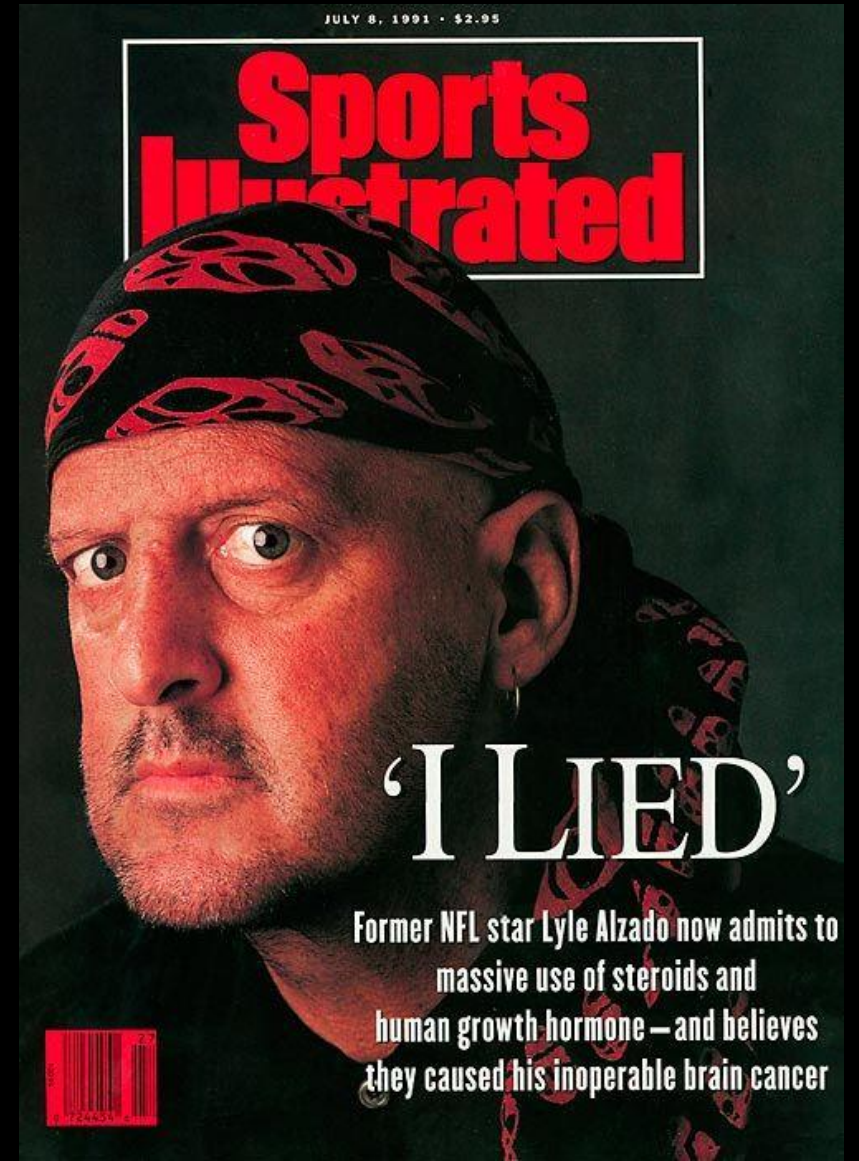
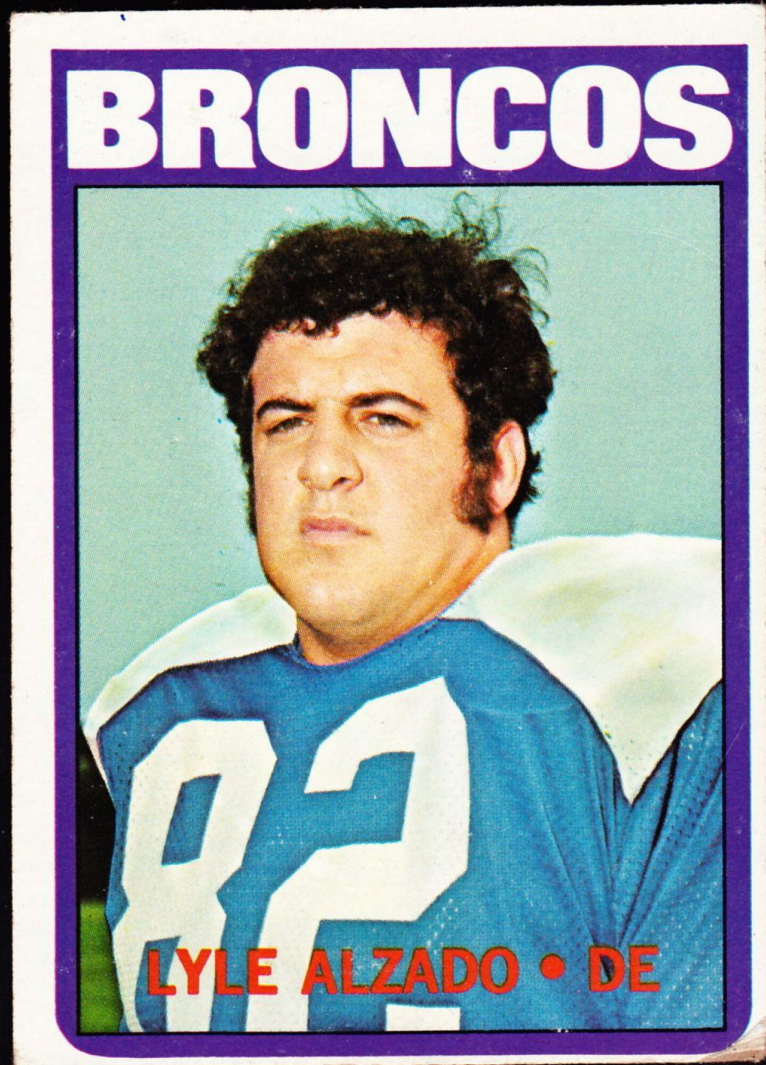
FOX – Titans = Drug Metabolism



MAN Phoenix = Endocrine System



MNT – Phoenix = Steroids



Wednesday...

- Answer four (4) of the discussion questions on page 154 of your textbook.
- Reference and cite at least one additional outside source of information to further explain your answer to a question.
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