

Brain Terms

To Be Learned for the Hour Exam

--To be learned in stages. Do not try to learn these all at once (you are not medical students!). Keep the list by you as you read (particularly "Meet Your Brain") and familiarize yourself with these terms gradually. You may want to set up flash cards.

--Distinguish use-knowledge and recognition-knowledge. In general, boldface indicates use-knowledge and unbold, recognition.

NAVIGATIONAL TERMS (use-knowledge)

central nervous system (CNS)

brain and spinal cord

peripheral nervous system (PNS)

nervous system other than CNS; includes spinal ganglia, cranial nerves III-XII, and autonomic nervous system (ANS)

autonomic nervous system

the part of the nervous system that innervates internal organs, blood vessels, and glands; visceral PNS; consists of sympathetic, parasympathetic, and enteric divisions

midline

line that bisects the nervous system into two halves

lateral

toward the side, away from the midline

medial

toward the midline, away from the side

frontal

anterior to the central sulcus

ventral

toward the belly (in a dog), toward the front in a human

dorsal

toward the back (in a dog), toward the rear in a human

rostral

toward the nose (frontward)

caudal

toward the tail (rearward)

anterior

pointing frontward

posterior

pointing rearward

superior

above another part or pointing up

inferior

below another part or pointing down

distal

distant from point of origin

proximal

close to point of origin

ipsilateral

on the same side

contralateral

on the opposite side

Cross-sections

coronal

along a right-left axis (think crown-tiara)

sagittal

along a fore-and-aft axis (think arrow)

horizontal or transverse

parallel to the earth's surface

Neuroanatomical

sulcus (sulci)

fold or groove in surface of cerebrum that separates gyri

gyrus (gyri)

protuberance, bump, or bulge on the surface of cerebrum

central sulcus

sulcus dividing frontal lobe from parietal lobe

cerebellum

structure attached to the brain stem at the pons; movement control

brainstem

diencephalon including midbrain, pons, and medulla. WRONG?

frontal lobe

region of the cerebrum anterior to the central sulcus (behind the forehead, above the roof of the mouth and nasal cavities)

parietal lobe

region of the cerebrum posterior to the central sulcus (under the parietal [wall] bones forming sides and top of skull)

occipital lobe

region of the cerebrum posterior to the parietal lobe, lying under the occipital bone (lower back of skull)

temporal lobe

region of the cerebrum lying under the temporal bone (i.e., under the temples)

Groups of Neurons

cortex (Cx)

folded layer of tissue that forms anterior forebrain; cognitive functions

lamina

a layer of cell bodies separated from other cell bodies by dendrites and axons

nucleus

a well-defined cluster of neuron cell bodies (usually in the CNS)

substantia

a not-well-defined cluster of neuron cell bodies deep in the brain

ganglion

a cluster of neuron cell bodies (outside the CNS, except for "basal ganglia")

tract

collection of axons with common origin and common destination

bundle	collection of axons without common origin and destination
locus	a small, well-defined group of cells
fasciculus	a group of axons that, growing together, stuck together

The Neuron

soma	the cell body
axon	thin process that transmits information away from soma and toward target
dendrite	tree-shaped process that transmits information toward cell body
synapse	the gap between cells over which information passes
receptor	protein molecule on cell surface that binds to neurotransmitter and alters activity of cell
action potential	the negative voltage pulse that runs down the axon
sodium-potassium pump	what creates and sustains the voltage within the neuron
axon hillock	bulge where axon joins soma; threshold for action potential
myelin	fatty covering of axon, with nodes for sodium-potassium pump
vesicle	bubble near axon terminal filled with neurotransmitter
reuptake	process by which excess neurotransmitter goes back to pre-synaptic cell

Major Regions (use-knowledge)

Forebrain (Prosencephalon, "forward-brain")

Telencephalon ("end-brain")

Cerebral cortex (cerebrum)

Hippocampus

memory structure in temporal lobe
nuclei at lowest level of telencephalon;
start movement through thalamus

Basal ganglia

Diencephalon ("between-brain")

Thalamus relays sensory information to cortex; feedback loops for movement, etc.

Hypothalamus regulates visceral functions; gateway from brain to body

Subthalamus

Midbrain ("mesencephalon," "middle-brain")

colliculi (sight, hearing)

or "Rhombencephalon" (literally, "parallelogram brain")

Hindbrain

Metencephalon ("afterbrain")

Pons and Cerebellum

Myelencephalon ("marrow-brain")

Medulla

Important structures (use-knowledge)

amygdala	involved in emotions, especially fear
cingulate gyrus	involved in selecting actions
corpus callosum	connects hemispheres
caudate nucleus	associated with motion
hippocampus	associated with memory acquisition, especially spatial
hypothalamus	regulation of visceral functions
orbitofrontal cortex	control of reward- and punishment-related behaviors

prefrontal cortex
thalamus

most advanced planning and inhibition; "executive" functions
relay station for sensory and motor information

Less important Structures (recognition-knowledge)

arcuate fasciculus
arcuate gyrus
basal forebrain
basal ganglia
dorsal raphe
frontal eye field
Heschl's gyrus
inferior colliculus
inferior parietal lobule
inferior temporal cortex
insula
locus coeruleus
M1
mammillary body
nucleus accumbens
periaqueductal gray
pineal gland
pituitary gland
pons
premotor area
preoptic area (monitors its own [ergo body] temperature)
pulvinar
putamen
reticular formation
S1
striate cortex
superior colliculus
V1

Neurotransmitters (Boldface=use-knowledge, the rest recognition)

Acetylcholine

Acetylcholine (ACh)

Active at neuromuscular junctions.

Monoamines

Indoleamines

Serotonin

If low, increased aggression, impulsiveness, depression. LSD imitates.

Catecholamines

Dopamine

Neurotransmitter that addictive drugs imitate or increase.

Reinforcement. Parkinson's D₁ D₅ receptors: sexual behavior. D₂: orgasm.

Norepinephrine Noradrenaline (Br.)

Synthesized from dopamine.

Epinephrine Adrenaline (Br.)

Both hormone and neurotransmitter. Synthesized from

Amino acids

Glutamate

Most abundant **excitatory** neurotransmitter

GABA

Most abundant **inhibitory** neurotransmitter

Others

Peptides

Endorphins

Stimulate same receptors as opiates

Substance P

Released by nerves sensitive to pain.

Neuropeptide Y

In hypothalamus.

Many others

Purines

Adenosine

inhibits basal forebrain cells that promote arousal, wakefulness

ATP

Stores energy. Also a neuromodulator

Others

Gases

Nitric Oxide

Neuromodulator. (Viagra)

Others?