

COGS17

HOMEWORK 1

Given the definitions provided below, enter the corresponding vocabulary term(s) in the column on the left. HINT: A "vs." in definition indicates that 2 terms are required

SOME BASIC TERMS

Connecting to the SAME side vs. connecting to the OPPOSITE side	
Towards the sides vs. toward the middle	
Towards the stomach or the bottom of the human head vs. towards the back or the top of the human head	
A structure above another vs. one below another	
Planes through head as seen from the front vs. the side vs. above/below	

CNS / PNS

Division of the Forebrain that ultimately becomes the Thalamus, Hypothalamus and the eye	
Division of the Forebrain that ultimately becomes the Cerebral Cortex, Basal Ganglia, Limbic System, etc.	
Hindbrain structure, controls vital reflexes	
Hindbrain structure, acts as bridge between Hindbrain and higher centers	
Hindbrain structure, involved primarily with guided, timed movements	
Network of cells moving medially through hind- and mid-brain, involved in arousal	
Core strip of cells through hind-and mid-brain, involved in sleep	
Midbrain structure involved in motor processes	
Midbrain structure involved in sensory processes, includes Superior (visual) and Inferior (auditory) Colliculi	
Forebrain structure, oversees 4Fs, temperature, clock; communicates with and through the endocrine system	
Forebrain structure, "Master Gland", stimulated by Hypothalamus	
Forebrain structure, a principal stop along most sensory, motor & arousal pathways, projects to cortex	
A set of forebrain structures involved in motivation and emotional expression	
Part of above system, involved in the formation of new memories	
Part of above system, associated especially with anger and fear, also with recognizing emotion in others	
Part of above system, "re-entrant" layer mediating between cortex and lower systems, especially for +/-evaluation	
Part of above system, receives smell info from olfactory receptors	
Forebrain structure including Caudate Nucleus, Putamen & Globus Pallidus, involved in organization of movement sequences	
Forebrain structure including Nucleus Accumbens, involved in arousal of cortex, attention & reinforcement	
Forebrain structure, outer "bark" of brain, 6-layered, highly convoluted	
Set of axons connecting the two cerebral hemispheres	
Lobe of the cortex, posterior, primarily involved in visual processing, including V1 (Striate Cortex)	
Lobe of the cortex, lateral, primarily involved in auditory processing (e.g. A1 and Wernicke's) and higher visual (IT)	
Lobe of the cortex posterior to the Central Sulcus, primarily involved in somatosensory and visuo-spatial mapping	
Lobe of the cortex anterior to Central Sulcus, including Motor & Premotor Areas (including Broca's and Mirrors cells) and...	
Most anterior part of above lobe, involved in self control, strategy, cultural rules, etc.	
Part of the CNS other than the brain	
Part of the Spinal Cord through which sensory info enters vs. through which motor info exits	
"Law" governing above directions of information flow	
Area of the Spinal Cord (as seen in cross-section) consisting of somas. of myelinated axons	
Tube through core of Spinal Cord containing fluid	
Four hollow chambers (plus aqueducts) in brain that produce the fluid that feeds, cleans and cushions brain	
Fluid, produced by ventricles, found within Spinal Cord and in covering surrounding CNS	

Three-layered (Dura-Mater, Fluid-filled Arachnoid-Space, and Pia-Mater) protective covering that surrounds CNS
 Semi-permeable barrier, controls what chemicals enter brain, created by closing gaps between capillaries' endothelial cells
 That part of the PNS that is responsible for the body's interaction with the environment
 That part of the PNS that is responsible for assessing and maintaining the body's internal environment
 "Wandering" nerve in the ANS that enervates multiple organs
 That part of the ANS that produces the "fight or flight" response vs. that which facilitates relaxation and replenishment
 Extreme compensatory response of one system to extreme activation of the other - can lead to fainting, ulcers, voodoo death

NEURAL FUNCTIONING

Cells in the Nervous System responsible for information transmission
 Cells in the Nervous System responsible for support, feeding, recycling, development, etc
 Organelles in a cell that are the site of protein production, crucial to much neural functioning
 Organelles in a cell that are the source of energy (ATP) to power active (rather than passive) functions in cell
 Processes (branches) of a neuron that receive the incoming message vs. the one that releases the outgoing message
 Difference in the amount of a given chemical inside/outside a cell vs. a difference in charge inside/outside a cell
 Symbols for 4 key chemical elements in neural functioning - including 3 positive ions, 1 negative ion
 Name for and amount of difference in charge inside/outside cell, in millivolts (mV), in a polarized cell ready to fire
 Energy-requiring pump that helps restore membrane potential after cell fires
 A sequence of depolarization that moves along an axon, resulting in the all-or-nothing release of NT
 Section of axon where depolarization sequence begins
 A greater or lesser change in the polarity of a neuron that results in a greater or lesser release of NT
 Propagation of info down an axon by way of chemical gates opening/closing vs. by flow of electrons
 "Jumping" electrical conduction that occurs in myelinated axons
 Glia cells wrapping around sections of an axon to insulate it and speed its information transmission
 Gaps between myelin sheaths on an axon
 Disease that destroys myelin; no ion gates under sheath so neurons cannot fire
 Period following an Action Potential during which the cell cannot (or is more difficult to) fire
 The event in which one cell releases NT and that NT affects another cell
 The gap between cells across which NT passively floats
 The cell that releases the NT vs. the cell that receives the NT
 The end of the axon from which NT is released, also called "button" or "end bulb"
 Packets of NT released by a neuron
 The release of NT into cleft via its packet opening at a Fusion Pore in the cell's membrane
 Area, usually on a dendrite, that is specialized for the attachment of NT
 An increase vs. a decrease in a cell's likelihood of releasing neurotransmitter
 Less polarized, less difference between inside of cell and outside of cell vs. more difference
 Cumulative effect of the activity of multiple Presynaptic cells; Can be temporal or spatial
 When NT has direct effect on ion channels in Postsynaptic cells, indirect effects via internal metabolic processes
 Chemicals released by Presynaptic cells that directly affect local Postsynaptic cells vs. ones that widely influence neural activity
 Chemical (endogenous or man-made) that acts to facilitate vs. to reduce the effects of specific NTs
 Process by which NTs or their components re-enter the Presynaptic cell for re-use.
 Enzyme in cleft that breaks down Acetylcholine
 Site on Presynaptic terminal that reacts to that cell's own NT, usually acting to turn off/down that cell's further NT release
 Synapses at a Presynaptic terminal that reacts to NT from another cell, excitatory or inhibitory

PLUS: List six important NTs (with their abbreviations) and three important hormones
 NTs
 Hormones

DEVELOPMENT

- In the new embryo, the outermost layer of cells - becomes the nervous system and skin
- In the growing (wormlike) embryo, the surface along the back that thickens and hardens
- A pair of ridges all along the above that begin to curl towards each other
- The long hollow chamber that is formed when the above meet and fuse; Inner surface becomes the CNS
- Outer surface of the above ridges that separate off and become the PNS
- A pathological condition involving a failure of the edges above to completely fuse, leading to birth defects or death
- Hollow core of developing embryo, source of cells of nervous system
- The original type of cells in this area that undergo division to populate the nervous system
- General term for the production of new cells
- Cell division that produces two identical offspring, produces one identical and one new (neuron or glial) cell
- The movement of cells from their place of origin to their later position
- An early type of glial cell that extends its processes out like wheel spokes for the developing neurons to move along
- The process by which neurons form new connections
- The specialized tip of a growing axon that detects the chemicals that guide its path
- Glia cells that are positioned to direct growing axons towards their target cells
- Chemicals that attract/repel Axon growth, help prevent cell death, and/or promote Axonal branching
- One type of the above, from muscles & organs, that promotes survival and growth of axons in the brain and Sympathetic NS
- Cell Death as determined by "suicide genes" that cause developing neurons to package their contents & destroy themselves
- Newly formed axonal branches that replaces another (that has died off) at a synapse
- New outgrowths on, or subdividing of, the processes that receive NT, in response to an enriched environment, learning, etc.
- A mnemonic for the rule that co-activated cells tend to be strengthened in their connectivity and out-compete neighboring cells

BRAIN STUDY TECHNIQUES	
	Name 3 types of neuronal stain that are injected live, but then examined in brain tissue slices
	Creating or exploiting brain damage to determine if that area is necessary to a certain function
	Method used to generate, for example, the "Penfield Map" of somatosensory cortex in live patients
	Do all three of the above get good spatial or temporal resolution?
	Which of the above yield information on brain FUNCTION?
	Record activity using a micro-electrode probe in an active subject
	Using a "electrode cap", technique detects the electrical dipoles generated by changing electrical potentials
	Does the above record localized changes in electrical activity or summation of changes over thousands of neurons?
	The time-locked average of many EEG trials to factor out other brain activity & focus on a particular response
	Detection of naturally occurring changes in magnetic fields created by brain activity (complementary to EEG)
	Devise used to measure extremely weak magnetic fields, such as those produced by brain activity
	Of the above four techniques, which requires confining the subject in a large apparatus?
	Of the above four techniques, which has the best spatial resolution?
	Of the above four techniques, which is the most expensive?
	Aspect of MRI that involves using pulse of radio waves to make hydrogen protons gyrate in body's fluid
	Aspect of MRI that involves aligning the magnetic fields of those gyrating protons
	Aspect of MRI that involves the release of energy when the protons are allowed to return to 'natural' alignment
	Example of a neurological disease revealed by MRI's capacity to distinguish white from grey matter
	Technique that makes use of the diff in how oxygenated vs deoxygenated hemoglobin in blood respond to magnetic fields
	Is deoxygenated hemoglobin more likely to be found at Active or Non-active sites in the brain?
	What does the "f" in "fMRI" stand for?
	Patient is injected w/radioactive fluid that is absorbed w/glucose into active cells & detected as gamma emissions
	Technique using 2-D x-rays of tissues that vary in how x-rays penetrate, to build up 3-D image
	Order of above four scanning techniques, best to worst, for detail resolution