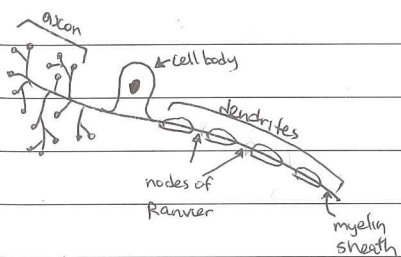
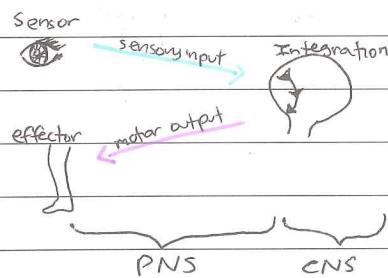
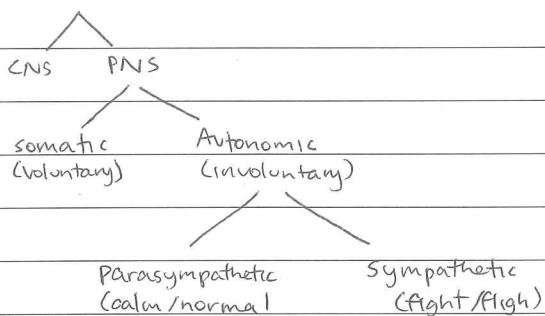


CHAPTER 2: Biological bases of behaviour

NERVOUS SYSTEM

Division	CNS (central)	PNS (peripheral)
Location	Brain + Spinal cord	all nerves leading from CNS
Function	Integration + Coordination	take sensory info to CNS and response to effector
Types of neurons	Interneurons	sensory neurons (afferent) motor neurons (efferent)

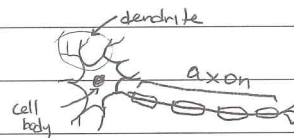
NERVOUS SYSTEM



SENSORY



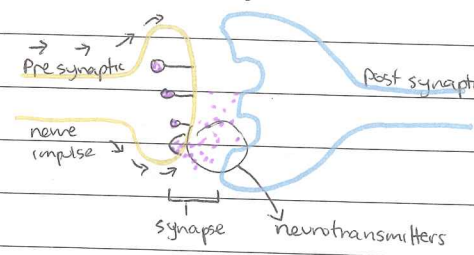
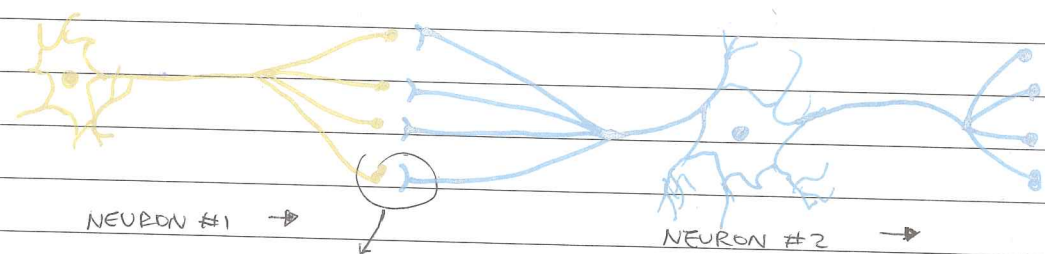
INTER



MOTOR

Neuron Type	Structure	Function
Sensory	- long dendrite - short axon	- to carry info from sensory receptor cells to the CNS
Motor	- short dendrite - long axon	- to carry info from CNS to the effector
Interneuron	- short dendrite - long / short axon	- carry info within the CNS

- Dendrites - make synaptic connections with other neurons by receiving impulse from post synaptic bulbs. Always go BEFORE cell body
- Cell body (soma) - contains nucleus and needed to sustain life of the cell
- Axon - conducts the nerve impulse to the terminal branches. AFTER cell body
- Myelin Sheath - inner sheath formed by Schwann cells around processes to speed up nerve conduction
- Terminal Buttons (terminal branches) - branched end that contains neurotransmitters
- Synapse - space between terminal buttons of one neuron and dendrites of the next neuron
- Neurotransmitters - chemicals that enable neurons to communicate.



All or NONE LAW - neuron fires at max intensity or none at all

- excitatory → excite the next cell
- inhibitory → inhibit (stop) action potential
- reuptake: reabsorbs excess neurotransmitters

NEUROTRANSMITTERS

Neurotransmitter	function	problems associated
Acetylcholine	motor movement	lack = Alzheimer's disease
Dopamine	motor movement + alertness	lack = Parkinson's over = schizophrenia
Endorphins / Serotonin	pain control mood control	-addictions lack serotonin = clinical depression
GABA	inhibitory neurotransmitter	seizures, sleep problems
Glutamate	excitatory neurotransmitter	migraines, seizures
Norepinephrine	Alertness, arousal	depression

receptor
the effector

Action potential - brief electrical charge that travels down the axon.

↳ movement of positive Na^+ and K^+ ions through the membrane

threshold: level of stimulation required for neural impulse

from post

ENDORPHINS - natural, opiate-like neurotransmitters for pain control + pleasure

agonist

vs

antagonist

↳ molec excites

↳ molec inhibits

all body

→ **REFLEX** - simple automatic response to sensory stimulus

speed up

NEURAL NETWORK

↳ interconnected neural cells. networks learn as feedback strengthens

or inhibits connections

ers

of the

ENDOCRINE SYSTEM - set of glands that secrete hormones into the bloodstream

↓ slow

HORMONES - chemical messengers

Controlled by
HYPOTHALAMUS

→ **ADRENAL GLANDS** - glands above kidneys

• secrete epinephrine (adrenaline) and norepinephrine (noradrenaline)

• help arouse body in times of stress.

→ **PITUITARY GLANDS** - pea sized, located in the core of the brain

• regulates growth and controls other endocrine glands

↳ sex hormones: estrogen / testosterone

es at max
none at all

*Phrenology = size of head = intelligence (Franz Gall)

THE BRAIN

WAYS OF STUDYING

• clinical observations - accidents, mapping

• lesions (partial removal/destruction) - observe behaviour after

• **ELECTROENCEPHALOGRAPH (EEG)** - detects brain waves

• **Computerized Axial Tomography (CAT)** - Xcameras to show structure (not fun)

• **Magnetic Resonance Imaging (MRI)** - measure location/density of brain matter

- magnetic fields (no radiation)

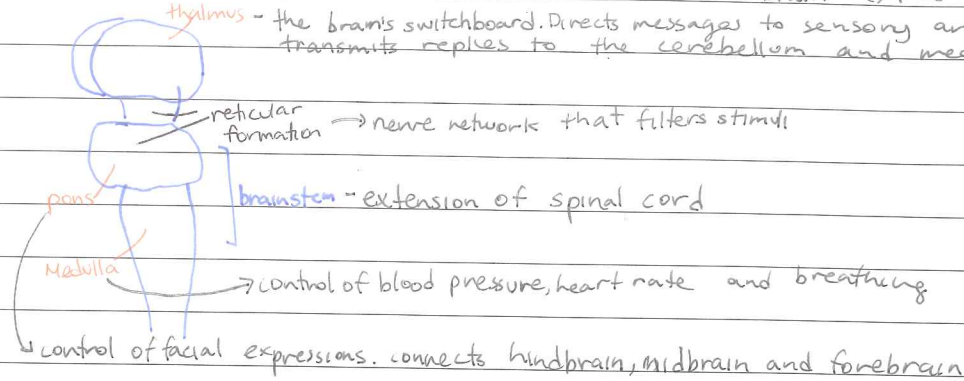
- structure, not fun

• **PET (Positron Emission Tomography)** - measures chemicals brains are using (measure activity)

• **fMRI (functioning MRI)** - shows structure + function (bloodflow shows activity)

a

THE BRAINSTEM - oldest/central core of the brain (ANS functions)



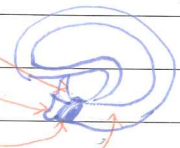
Cerebellum - "little brain" at the rear of the brain.

↳ processes sensory input and coordinating movement/balance

"Our brain processes most information outside of our awareness"

THE LIMBIC SYSTEM → part of endocrine system

- Hypothalamus
- Pituitary gland
- Amygdala
- Hippocampus



AMYGDALA - two lima bean sized clusters

- aggression/fear
- linked to emotion

HYPOTHALMUS - lying below thalamus

- directs maintenance activities (eating, drinking, body temp)
 - helps govern the endocrine system via the pituitary gland and is linked to emotion
- controls pituitary

HIPPOCAMPUS - arms surrounding the thalamus

- memories are processed in this area

CEREBRAL CORTEX → body's ultimate control/info processing center

- as we grow/develop/learn the dendrites of the neurons in the cerebral cortex grow/connect with other neurons

- wrinkles = fissures (more surface area)

→ glial cells - cells that support, nourish and protect neurons

• guide neural connections, provide nutrients, insulates myelin, and mops up ions/neurotransmitters

greater concentration → intelligence

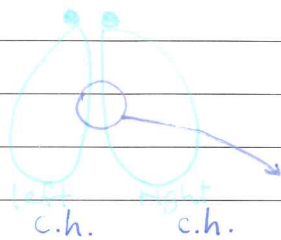
2 HEMISPHERES: left

right

- sensory/motor fxn of right side of body

- sensory/motor fxn of left side of body

← CONTRALATERAL CONTROL →



CORPUS CALLOSUM - band of fibers connecting the 2 hemispheres

4 LOBES: FPOT (separated by fissures)

→ frontal - speaking/muscle movements/plans + judgements

→ parietal - sensory input for touch/body position

→ occipital - visual areas (receives from opposite sides)

→ temporal - auditory areas (receives from opposite ear)

MOTOR CORTEX - at rear of frontal lobes that controls voluntary movements



→ mapping neural cortex (precise control = more cortical space)

→ neural prosthetics (monkey see, computer do)

SENSORY CORTEX - at front of parietal lobes that registers/processes body touch and movement sensations

→ more sensitive = more space

AUDITORY/VISUAL → receive input from eyes and ears

ASSOCIATION AREAS = everywhere else → integrate information

Broca's area → muscles for speech



14

PLASTICITY - brain is "flexible"

- other parts of brain can adapt to perform tasks if needed
- dendrites make new connections
- younger = more "plastic"

Gen

Mo

L