A2 Coordination Cheat Sheet

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Nervous & Endocrine systems

	Nervous system	Endocrine system
Communication	Action potential/Impulses	Hormones
Nature of communication	Electrical (& chemical)	Chemical
Mode of transmission	Neurones/Nerve cells	Blood
Response destination	Muscles/Glands	Target organs/Tissues/Cells
Transmission speed	Faster	Slower
Effects	Specific/localised	Widespread
Response speed	Faster	Slower
Duration	Short-lived/Temporary	Long-lasting/Permanent
Receptor location	On cell surface membrane	On cell surface membrane or within the cell
ATP requirement	Higher	Lower

Both systems involve *cell signaling*, *chemicals* & *signal molecules binding to receptors*.

Definitions

Dendrites	Thin, short and highly branches cytoplasmic processes extend from the cell body.
Receptor cells	Cells that respond to a stimulus by initiating an action potential.
Transducers	Convert energy from one form into energy in an electrical impulse in a neurone.
Reflex arc	The pathway along which impulses are transmitted from a receptor to an effector without involving the conscious regions of the brain.
Reflex action	An immediate response by an effector to a specific stimulus without involving the conscious regions of the brain.
Neurotransmitters	Chemical messengers that are released from neurons and they are used to stimulate another cell.

Structure of the sensory & motor neurones

	Sensory neurone	Motor neurone
Function	Transmits impulse from receptors to the CNS.	Transmits impulse from the CNS to the effectors.
Cell body	In the middle of the neurone and NOT within the CNS.	At the end of the neurone and within the CNS.
Axon	Short	Long
Dendrites	Attached to dendron.	Attached to cell body.
Terminal branches	present	present

$ The dendrites provide *large surface area* for the axon terminals of the other neurons.
$ Relay neurons are found *entirely within the CNS* & they transmit impulses from the sensory to the motor neuron.

Role of a chemoreceptor cell (in human taste buds)

1. Chemicals act as a stimulus.
2. Chemoreceptors are specific in detecting taste and they are transducers.
3. Na^+ diffuses into the cell upon the stimulation of the receptor, via microvilli.
4. The membrane gets depolarized.
5. Ca^{2+} channels are stimulated to open and Ca^{2+} enter the cell.
6. This causes the movement of vesicles containing neurotransmitters, and the neurotransmitters are released by exocytosis, stimulating an action potential.

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