

Section 1.2: Nerves & Hormones

The Nervous System

- That the nervous system allows humans to respond to changes in the environment (stimuli) and to coordinate their behaviour.
 - That receptor cells detect stimuli.
 - That light receptor cells in the eyes contain a nucleus and cytoplasm, and are surrounded by a cell membrane, like most other animal cells.
 - That receptor cells in the ears detect sound and aid balance, that chemical receptors in our nose and tongue allow us to smell and taste, and that receptors in our skin respond to touch, pressure, pain and changes in temperature.
 - That information from receptors travels via neurones to the brain, where a response is coordinated.
 - That effectors are muscles and glands, and that muscles respond to nervous impulses by contracting, and glands respond by secreting hormones.
-

Synapses and Reflexes

- That the connections between neurones are called synapses and that a nerve signal is transferred across a synapse by chemicals that diffuse across the gap.
 - That reflexes are fast, automatic responses involving receptors, sensory neurones, relay neurones, motor neurones, synapses and effectors.
 - That in a simple reflex, stimuli are detected by receptors and transmitted to the central nervous system as nervous impulses via sensory neurones. The impulses are then transferred via a relay neurone in the CNS to a motor neurone, which sends impulses to an effector. The effector then produces a response.
-

Homeostasis

- That internal conditions within the body, including body temperature, ion content, water content and blood glucose level need to be carefully controlled.
 - That body temperature must be controlled to allow the enzymes involved in bodily processes to work at their best.
 - That ions are removed from the body via the skin in sweat and via the kidneys in urine.
 - That water leaves the body via the lungs in breath, the skin in sweat and the kidneys in the urine.
 - That blood glucose must be regulated to ensure our cells get enough energy.
-

Hormones

- That hormones are chemical messengers which travel in the blood to activate target cells.
 - That hormones are secreted by glands, e.g. follicle stimulating hormone (FSH) by the pituitary gland and oestrogen by the ovaries.
-

The Menstrual Cycle

- That the menstrual cycle (the monthly sequence of events in which the female body releases an egg and prepares the uterus in case it receives a fertilised egg) is controlled by hormones. These are secreted by the ovaries (e.g. oestrogen) and the pituitary gland (e.g. FSH and LH).
 - That FSH causes eggs to mature and the ovaries to produce oestrogen, that luteinising hormone (LH) stimulates egg release and that oestrogen inhibits FSH production.
-

Controlling Fertility

- How the hormones oestrogen and progesterone can be used to decrease fertility.
- That oral contraceptives containing large doses of oestrogen used to cause many side effects, so oral contraceptives now contain lower doses of oestrogen or just progesterone.

- That progesterone-only pills cause fewer side effects than oral contraceptives containing oestrogen.
- How the hormones FSH and LH can be used as 'fertility drugs' to increase fertility.
- The pros and cons of using fertility drugs such as FSH and LH to control fertility, e.g. they may help women to get pregnant, but don't always work. They also increase the risk of multiple pregnancies.
- The basic process involved in In Vitro Fertilisation (IVF) — women are given FSH and LH to stimulate egg maturation and release. The eggs are collected and fertilised using sperm. The resulting embryos are grown until they are tiny balls of cells, at which point they are transferred into a uterus.
- The pros and cons associated with IVF, e.g. it can give a childless couple a child, but some women can react badly to the hormones and it's possible that the hormones may increase the risk of cancer. It also increases the risk of multiple births.

Plant Hormones

- That the plant hormone auxin is responsible for plant growth in response to light (phototropism), plant growth in response to gravity (gravitropism) and plant growth in response to moisture.
- How the uneven distribution of auxin leads to uneven rates of cell elongation, allowing plant shoots to grow towards light and away from gravity, and plant roots to grow towards moisture and gravity.
- That plant hormones are used as rooting compounds and weedkillers in agriculture and horticulture, and be able to evaluate their use.