

Homeostasis

Define homeostasis.

Homeostasis

Why is homeostasis important for enzymes?

Homeostasis

Name three conditions controlled by homeostasis in the human body.

Homeostasis

What is the job of a receptor?

Homeostasis

What is a coordination centre? Give examples.

Homeostasis

What is an effector?

The human nervous system

What is the CNS?

The human nervous system

Put in order: effector, receptor, coordinator, stimulus, response.

It maintains the optimal conditions for enzyme action and for all cell functions.

The regulation of the internal conditions of a cell or organism to maintain optimum conditions for function, in response to internal and external changes.

Cells that detect stimuli (changes in the environment).

Blood glucose concentration, body temperature and water levels.

A muscle or gland that brings about a response which restores optimum levels.

It receives and processes information from receptors. Examples: the brain, spinal cord and pancreas.

Stimulus, receptor, coordinator, effector, response.

The central nervous system: the brain and spinal cord. It coordinates the response of effectors.

The human nervous system

What does a sensory neurone do?

The human nervous system

What does a relay neurone do?

The human nervous system

What does a motor neurone do?

The human nervous system

What is a synapse and how does it work?

The human nervous system

Describe a reflex action and why it is important.

The human nervous system

Ruler drop test: how is reaction time measured?

The human nervous system **Triple only**

Cerebral cortex: function?

The human nervous system **Triple only**

Cerebellum: function?

Carries impulses within the CNS, from the sensory neurone to the motor neurone.

Carries electrical impulses from a receptor to the CNS.

A gap between two neurones. A chemical diffuses across the gap and starts an impulse in the next neurone.

Carries impulses from the CNS to an effector (a muscle or a gland).

Partner drops a ruler without warning; the person catches it. The distance it falls shows reaction time. Repeat and take a mean.

Automatic and rapid, not involving the conscious part of the brain. It protects the body from harm.

Coordinates muscular activity and balance.

Consciousness, intelligence, memory and language.

The human nervous system **Triple only**

Medulla: function?

The human nervous system **Triple only** **Higher tier**

Name three ways neuroscientists have mapped brain function.

The human nervous system **Triple only** **Higher tier**

Why is it difficult to investigate and treat brain disorders?

The human nervous system **Triple only**

Retina: function?

The human nervous system **Triple only**

Optic nerve: function?

The human nervous system **Triple only**

Sclera and cornea: functions?

The human nervous system **Triple only**

Iris: function? What happens in dim light?

The human nervous system **Triple only**

What are the ciliary muscles and suspensory ligaments for?

Studying patients with brain damage, electrically stimulating parts of the brain, and MRI scanning.

Controls unconscious activities such as heart rate and breathing.

Contains the light receptors, which are sensitive to light intensity and colour. The image is focused here.

The brain is very complex and delicate.

Sclera: tough outer layer that protects the eye. Cornea: transparent front surface that refracts light into the eye.

Carries impulses from the retina to the brain.

They change the shape of the lens: the ciliary muscles contract or relax, and the ligaments loosen or tighten.

Controls how much light enters the pupil. In dim light the pupil widens so more light enters.

The human nervous system **Triple only**

What is accommodation?

The human nervous system **Triple only**

Focusing on a near object: what happens?

The human nervous system **Triple only**

Focusing on a distant object: what happens?

The human nervous system **Triple only**

Myopia and hyperopia: what are they and how are they corrected?

The human nervous system **Triple only**

Name newer treatments for eye defects.

The human nervous system **Triple only**

What monitors and controls body temperature?

The human nervous system **Triple only**

Body temperature too high: responses?

The human nervous system **Triple only**

Body temperature too low: responses?

Ciliary muscles contract, suspensory ligaments loosen, the lens is thicker and refracts light strongly.

The process of changing the shape of the lens to focus on near or distant objects.

Myopia (short sight): focus in front of retina, concave lens. Hyperopia (long sight): focus behind retina, convex lens.

Ciliary muscles relax, suspensory ligaments are pulled tight, the lens is pulled thin and only slightly refracts light.

The thermoregulatory centre in the brain, which has receptors sensitive to blood temperature. Skin receptors send it impulses.

Hard and soft contact lenses, laser surgery to change the shape of the cornea, and a replacement lens.

Blood vessels constrict (vasoconstriction), sweating stops and skeletal muscles contract (shiver).

Blood vessels dilate (vasodilation) and sweat is produced. Both transfer energy from the skin to the environment.

Hormonal coordination in humans

What is the endocrine system?

Hormonal coordination in humans

Nervous system vs hormones: speed and duration?

Hormonal coordination in humans

Why is the pituitary called the master gland?

Hormonal coordination in humans

Where are the pituitary, thyroid, adrenal glands and pancreas?

Hormonal coordination in humans

What does insulin do?

Hormonal coordination in humans

Type 1 diabetes: cause and treatment?

Hormonal coordination in humans

Type 2 diabetes: cause and treatment?

Hormonal coordination in humans **Higher tier**

What does glucagon do?

Hormone effects are slower but act for longer than nervous responses.

Glands that secrete hormones directly into the bloodstream. The blood carries them to a target organ.

Pituitary: base of the brain. Thyroid: neck.
Adrenal glands: on top of each kidney.
Pancreas: abdomen, just below the stomach.

It secretes several hormones that act on other glands to stimulate other hormones to be released.

The pancreas fails to produce sufficient insulin. Normally treated with insulin injections.

Released by the pancreas when blood glucose is too high. Causes glucose to move from the blood into cells; in liver and muscle cells excess glucose becomes glycogen.

When blood glucose is too low, it causes glycogen to be converted into glucose and released into the blood.

Body cells no longer respond to insulin.
Carbohydrate controlled diet and exercise.
Obesity is a risk factor.

Hormonal coordination in humans **Higher tier**

How do insulin and glucagon form negative feedback?

Hormonal coordination in humans **Triple only**

How is water lost from the body, and what controls it?

Hormonal coordination in humans **Triple only**

What happens if cells gain or lose too much water by osmosis?

Hormonal coordination in humans **Triple only**

How do the kidneys make urine?

Hormonal coordination in humans

Triple only **Higher tier**

Excess amino acids: what happens in the liver?

Hormonal coordination in humans

Triple only **Higher tier**

What is ADH and what does it do?

Hormonal coordination in humans **Triple only**

Treatments for kidney failure, and basic principle of dialysis?

Hormonal coordination in humans

What do reproductive hormones do at puberty?

Via lungs (exhaling), skin (sweat) and kidneys (urine). Lungs and skin loss is not controlled; the kidneys adjust.

Each reverses a change in blood glucose, bringing the level back to normal, so the level stays near constant.

Filtration of the blood, then selective reabsorption of useful substances such as glucose, some ions and water.

They do not function efficiently.

Hormone from the pituitary when blood is too concentrated. Makes kidney tubules more permeable, so more water is reabsorbed.

Deaminated to form ammonia, which is toxic, so it is immediately converted to urea.

They cause secondary sex characteristics to develop.

Transplant or dialysis. Urea and excess ions diffuse from blood across a partially permeable membrane into dialysis fluid.

Hormonal coordination in humans

Oestrogen: where made and what does it do?

Hormonal coordination in humans

Testosterone: where made and what does it do?

Hormonal coordination in humans

FSH, LH, and oestrogen with progesterone: roles in the menstrual cycle?

Hormonal coordination in humans **Higher tier**

How do FSH, oestrogen, LH and progesterone interact?

Hormonal coordination in humans

How do oral contraceptives work?

Hormonal coordination in humans

Hormonal contraception: injection, implant, skin patch?

Hormonal coordination in humans

Name four non-hormonal contraception methods.

Hormonal coordination in humans

How do intrauterine devices work?

Main male reproductive hormone, made by the testes. Stimulates sperm production.

The main female reproductive hormone, made in the ovary. With progesterone, it is involved in maintaining the uterus lining.

FSH causes an egg to mature and oestrogen release; oestrogen inhibits FSH and stimulates LH; progesterone maintains the lining and inhibits FSH and LH.

FSH: egg maturation. LH: release of the egg. Oestrogen and progesterone: maintaining the uterus lining.

Slow release of progesterone, inhibiting maturation and release of eggs for months or years.

They contain hormones which inhibit FSH production, so no eggs mature.

They prevent the implantation of an embryo, or release a hormone.

Barrier methods (condoms, diaphragms), spermicides, abstaining when an egg may be in the oviduct, surgical sterilisation.

Hormonal coordination in humans **Higher tier**

What is a fertility drug?

Hormonal coordination in humans **Higher tier**

Describe IVF.

Hormonal coordination in humans **Higher tier**

Give disadvantages of fertility treatment.

Hormonal coordination in humans **Higher tier**

Adrenaline: where made and what does it do?

Hormonal coordination in humans **Higher tier**

Thyroxine: where made and what does it do?

Hormonal coordination in humans **Higher tier**

What is negative feedback?

Plant hormones **Triple only**

What is auxin and what does it do?

Plant hormones **Triple only**

Phototropism and gravitropism?

FSH and LH mature several eggs; eggs collected and fertilised in the lab; embryos develop; one or two are inserted into the uterus.

It contains FSH and LH, given to a woman. She may then become pregnant in the normal way.

Made by the adrenal glands in fear or stress. Increases heart rate and boosts oxygen and glucose delivery to brain and muscles.

Stressful emotionally and physically, success rates not high, and multiple births risk babies and mother.

A change is reversed to bring the level back to normal. Thyroxine levels are controlled this way.

From the thyroid gland. Stimulates the basal metabolic rate and is important in growth and development.

Phototropism: growth response to light.
Gravitropism (geotropism): growth response to gravity.

A plant hormone. Unequal distribution of auxin causes unequal growth rates in roots and shoots.

Plant hormones **Triple only**

Why does a shoot bend towards light?

Plant hormones **Triple only**

Seedling practical: what to record?

Plant hormones **Triple only** **Higher tier**

Gibberellins and ethene: functions?

Plant hormones **Triple only** **Higher tier**

Uses of auxins?

Plant hormones **Triple only** **Higher tier**

Use of ethene?

Plant hormones **Triple only** **Higher tier**

Uses of gibberellins?

Length measurements and careful, labelled biological drawings to show the effects of light or gravity.

Auxin builds up on the shaded side, cells there grow faster, so the shoot bends towards the light.

As weed killers, as rooting powders, and for promoting growth in tissue culture.

Gibberellins initiate seed germination.
Ethene controls cell division and ripening of fruits.

To end seed dormancy, promote flowering and increase fruit size.

In the food industry to control ripening of fruit during storage and transport.