AQA Biology GCSE

5.3 - Hormonal Coordination in Humans

Flashcards

Give the name of the body's coordination system which involves hormones

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The endocrine system

What is a hormone?

What is a hormone?

A hormone is a chemical messenger secreted by a gland. It travels in the blood to a target organ, where it causes a response.

What type of organ secretes hormones?

What type of organ secretes hormones?

Glands

Which gland controls many other glands in the body?

Which gland controls many other glands in the body?

The pituitary gland

Why is the pituitary gland considered a ‘master gland’?

Why is the pituitary gland considered a ‘master gland’?

It secretes a wide range of hormones, some of which may stimulate other endocrine glands.

What is the role of the pituitary gland in the endocrine system?

What is the role of the pituitary gland in the endocrine system?

- Secretes human growth hormone - controls human growth.
- Stimulates the thyroid gland.
- Stimulates ovulation and the production of oestrogen in the ovaries.
- Stimulates the production of sperm and testosterone in the testes.

What is the role of the thyroid gland in the endocrine system?

What is the role of the thyroid gland in the endocrine system?

Secretes the hormone thyroxine - controls metabolism, heart rate and body temperature.

What is the role of the pancreas in the endocrine system?

What is the role of the pancreas in the endocrine system?

Secretes the hormone insulin - controls blood glucose levels.

What is the role of the adrenal gland in the endocrine system?

What is the role of the adrenal gland in the endocrine system?

Secretes adrenaline - controls the body's 'fight or flight' response.

What is the role of the ovaries in the endocrine system?

What is the role of the ovaries in the endocrine system?

Secrete oestrogen, which coordinates the menstrual cycle and the development of female secondary sexual characteristics.

What is the role of the testes in the endocrine system?

What is the role of the testes in the endocrine system?

Secrete testosterone, which coordinates the production of sperm and the development of male secondary sexual characteristics.

Which organ monitors and controls blood glucose concentration?

Which organ monitors and controls blood glucose concentration?

The pancreas

How does the pancreas respond when blood glucose levels are too high?

How does the pancreas respond when blood glucose levels are too high?

The pancreas secretes the hormone insulin. Insulin binds to receptors on the liver and muscles, causing excess glucose to be converted into glycogen and stored.

How does the pancreas respond when blood glucose levels are too low?
(higher only)

How does the pancreas respond when blood glucose levels are too low? (higher only)

The pancreas secretes the hormone glucagon. Glucagon binds to liver cells, causing glycogen to be converted into glucose and released into the blood.

How is blood glucose concentration controlled using a negative feedback loop? (higher only)

How is blood glucose concentration controlled using a negative feedback loop? (higher only)

- When the blood glucose concentration rises or falls below the optimum, a hormone is secreted by the pancreas.
- The action of either hormone (insulin or glucagon) helps bring back the concentration to the correct level.

What is Type 1 diabetes?

What is Type 1 diabetes?

Type 1 diabetes is an autoimmune disorder in which the pancreas does not produce sufficient insulin to control the blood glucose concentration. As a result, blood glucose levels are often very high, leading to excessive urination, tiredness and weight loss.

How can Type 1 diabetes be treated?

How can Type 1 diabetes be treated?

- Insulin injections before meals - allows glucose to be converted into glycogen.
- Limiting carbohydrate intake.
- Attempts using pancreas and pancreatic cell transplants; investigations into genetic engineering of pancreatic cells.

What is Type 2 diabetes?

What is Type 2 diabetes?

Type 2 diabetes is a disorder in which the body's cells stop responding to insulin, leading to an uncontrolled blood glucose concentration. Its onset is linked with increasing age and obesity.

How can Type 2 diabetes be treated?

How can Type 2 diabetes be treated?

- Following a carefully-controlled diet
- Doing regular exercise
- Losing weight
- Use of drugs which increase insulin production and effectiveness

What is osmosis? (biology only)

What is osmosis? (biology only)

Osmosis is the movement of water from a dilute solution to a concentrated solution through a partially permeable membrane.

In what ways is water lost from the body? (biology only)

In what ways is water lost from the body? (biology only)

- During exhalation via the lungs
- Sweating
- Urine (some reabsorbed in the kidney)

In what ways are ions lost from the body? (biology only)

In what ways are ions lost from the body? (biology only)

- Sweating
- Urine (some reabsorbed in the kidney)

How are excess amino acids excreted from the body? (biology only) (higher only)

How are excess amino acids excreted from the body? (biology only) (higher only)

- Excess amino acids are deaminated in the liver to form ammonia.
- Ammonia is toxic, therefore it is converted into urea
- Urea is excreted from the body via sweat and urine.

How do the kidneys maintain the balance of water and other substances in the body? (biology only)

How do the kidneys maintain the balance of water and other substances in the body? (biology only)

- Filter blood in order to remove waste products eg. urea.
- Selectively reabsorb useful molecules eg. glucose, water, ions.

What is the full name of the hormone ADH?

(biology only) (higher only)

What is the full name of the hormone ADH?

(biology only) (higher only)

Anti-diuretic hormone

Where is ADH secreted in the body?

(biology only) (higher only)

Where is ADH secreted in the body?

(biology only) (higher only)

The pituitary gland of the brain

How does ADH affect the reabsorption of water in the kidneys?

(biology only) (higher only)

How does ADH affect the reabsorption of water in the kidneys? (biology only) (higher only)

- When the blood is too concentrated, the pituitary gland secretes more ADH.
- ADH travels in the bloodstream to the kidney and increases the permeability of kidney tubules to water.
- More water is reabsorbed in the kidneys, resulting in a smaller volume of more concentrated urine.

Why is kidney failure dangerous?
(biology only)

Why is kidney failure dangerous? (biology only)

When the kidneys are damaged, they may be unable to filter the blood properly. This may lead to:

- A build-up of toxic molecules (eg. urea) in the body.
- An uncontrolled ion and water balance and cells being damaged as a result of osmosis.

What are the two main ways of treating kidney failure?

(biology only)

What are the two main ways of treating kidney failure? (biology only)

- Dialysis
- Transplant

What is kidney dialysis?
(biology only)

What is kidney dialysis? (biology only)

Kidney dialysis is the use of a specialist machine to carry out the function of kidneys. Dialysis fluid contains the same concentration of glucose and ions as healthy blood. As a result, only excess and waste molecules are lost from the blood, and glucose and ions remain.

What is the function of reproductive hormones during puberty?

What is the function of reproductive hormones during puberty?

- Males: cause the development of secondary sexual characteristics.
- Females: cause the development of secondary sexual characteristics and the maturation of eggs.

What is the main male reproductive hormone?

What is the main male reproductive hormone?

The main male reproductive hormone is testosterone, which is produced by the testes and controls sperm production.

What is the main female reproductive hormone?

What is the main female reproductive hormone?

The main female reproductive hormone is oestrogen, which is produced by the ovaries and is involved in the menstrual cycle.

What is the menstrual cycle?

What is the menstrual cycle?

The menstrual cycle is the monthly cycle of physiological changes that occur in females, involving the shedding of the uterus lining (menstruation) and ovulation.

Describe the events of the menstrual cycle

Describe the events of the menstrual cycle

- Uterus lining thickens and eggs begin to mature in the ovaries.
- An egg is released from one of the ovaries (ovulation) - uterus lining remains thick.
- If the egg is fertilised, pregnancy may occur. If not, both the egg and the uterus lining are shed during menstruation.

What is ovulation?

What is ovulation?

Ovulation is the release of a mature egg from the ovaries, which occurs approximately every 28 days.

Name the four main hormones involved in the menstrual cycle

Name the four main hormones involved in the menstrual cycle

- Oestrogen
- Progesterone
- Follicle stimulating hormone (FSH)
- Luteinising hormone (LH)

What is the role of FSH in the menstrual cycle?

(higher only)

What is the role of FSH in the menstrual cycle? (higher only)

FSH is secreted by the pituitary gland. It controls the maturation of eggs within the ovaries (inside a follicle) and triggers the production of oestrogen by the ovaries.

What is the role of oestrogen in the menstrual cycle?

(higher only)

What is the role of oestrogen in the menstrual cycle? (higher only)

Oestrogen is produced by the ovaries and released due to the action of FSH - it causes the regrowth of the uterus lining.

It triggers the production of LH and restricts the release of more FSH.

What is the role of LH in the menstrual cycle? (higher only)

What is the role of LH in the menstrual cycle? (higher only)

LH is produced in the pituitary gland as a result of oestrogen. Its release triggers ovulation.

What is the role of progesterone in the menstrual cycle?

(higher only)

What is the role of progesterone in the menstrual cycle? (higher only)

Progesterone is secreted from the follicle of the ovary. It sustains the uterus lining and inhibits FSH and LH.

What is contraception?

What is contraception?

Contraception refers to any method of preventing pregnancy.

What are the two types of oral contraceptives?

What are the two types of oral contraceptives?

- Combined contraceptive pill (contains oestrogen and progesterone).
- Mini pill (contains only progesterone).

How does the contraceptive pill prevent pregnancy?

How does the contraceptive pill prevent pregnancy?

- Inhibits FSH - eggs do not mature.
- Prevents the development of the uterus lining - eggs cannot implant.
- Increases the thickness of cervical mucus - immobilises sperm cells.

What is the contraceptive patch?

What is the contraceptive patch?

- Contains both oestrogen and progesterone.
- It is a patch that is placed onto the skin for 7 days at a time.

What is the contraceptive implant?

What is the contraceptive implant?

A small rod inserted under the skin which continuously releases the hormone progesterone - lasts for 3 years.

What is the contraceptive injection?

What is the contraceptive injection?

An injection containing the hormone progesterone - lasts for approximately 3 months.

What is the IUS?

What is the IUS?

The IUS (intrauterine system) is a small plastic device that is inserted into the uterus. It releases progesterone which thickens cervical mucus and prevents the build-up of the uterine lining.

What is the IUD?

What is the IUD?

The IUD (intrauterine device) is a small copper-containing device inserted into the uterus, which prevents the implantation of embryos.

What is a spermicide?

What is a spermicide?

A spermicide is a chemical that kills or immobilises sperm cells - however, they are not very effective, and work better when combined with barrier methods.

What is a barrier method of contraception?

What is a barrier method of contraception?

A barrier method of contraception involves a physical separation between the sperm and the egg. They include:

- Condoms - thin sheath worn on the penis or inside the vagina - protects against STIs but may tear/break.
- Diaphragms - a thin cap placed over the cervix - prevent entry of sperm.

What surgical methods of contraception are available?

What surgical methods of contraception are available?

Sterilisation - in males, the sperm ducts are tied (vasectomy) and in females, the oviducts are tied.

What is abstinence?

What is abstinence?

Abstinence is the practice of not having sex, which also avoids pregnancy. Some people abstain from sex around the time of ovulation - this is known as the rhythm method, but it is quite unreliable.

How do fertility drugs increase the chance of pregnancy?
(higher only)

How do fertility drugs increase the chance of pregnancy? (higher only)

Many fertility drugs contain FSH - which stimulates oestrogen production and the maturation of eggs in the ovary. They also contain LH which triggers ovulation.

What is IVF?
(higher only)

What is IVF? (higher only)

IVF (in vitro fertilisation) is type of fertility treatment:

- Mother is given FSH and LH - stimulates maturation of eggs and ovulation.
- Eggs are fertilised using sperm in a laboratory - develop into embryos.
- 1 or 2 embryos are inserted into the mother's womb.

What are the advantages of fertility treatment? (higher only)

What are the advantages of fertility treatment? (higher only)

- Allows infertile couples to have children
- Can store a woman's eggs for later

What are the disadvantages of fertility treatment? (higher only)

What are the disadvantages of fertility treatment? (higher only)

- It can be a very expensive process.
- It has a low success rate - especially for older couples.
- Increases chance of multiple pregnancies - dangerous for mother and babies.
- Side effects of fertility drugs.

What is negative feedback?
(higher only)

What is negative feedback? (higher only)

Negative feedback is a type of control where the body responds to an increase or decrease in a factor by returning it to the optimum level.

What is thyroxine?
(higher only)

What is thyroxine? (higher only)

Thyroxine is a hormone released by the thyroid gland. Its release is triggered by the thyroid stimulating hormone (TSH). Thyroxine controls the body's metabolic rate, growth and development.

How is the release of thyroxine controlled by negative feedback?

(higher only)

How is the release of thyroxine controlled by negative feedback? (higher only)

- Levels of blood thyroxine falls - detected by receptors in the brain.
- Pituitary gland releases more TSH.
- More thyroxine produced and released by the thyroid gland.
- Blood thyroxine level returns to normal.

What is adrenaline?
(higher only)

What is adrenaline? (higher only)

Adrenaline is a hormone secreted by the adrenal gland in times of stress. It is responsible for the ‘fight or flight response’.

What are the effects of adrenaline?
(higher only)

What are the effects of adrenaline? (higher only)

- Increase in heart and breathing rate - delivers oxygen and glucose to the body.
- Stored glycogen converted to glucose.
- Dilation of pupils.
- Increased mental awareness.
- Blood diverted away from digestive system to muscles.