

Edexcel IAL Biology A-level

7.14-7.17 - Homeostatic Principles and Thermoregulation

Flashcards

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What is adrenaline?



What is adrenaline?

A hormone that is secreted by the adrenal glands under stressful conditions. It serves as a 'primary messenger', activating adenylyl cyclase

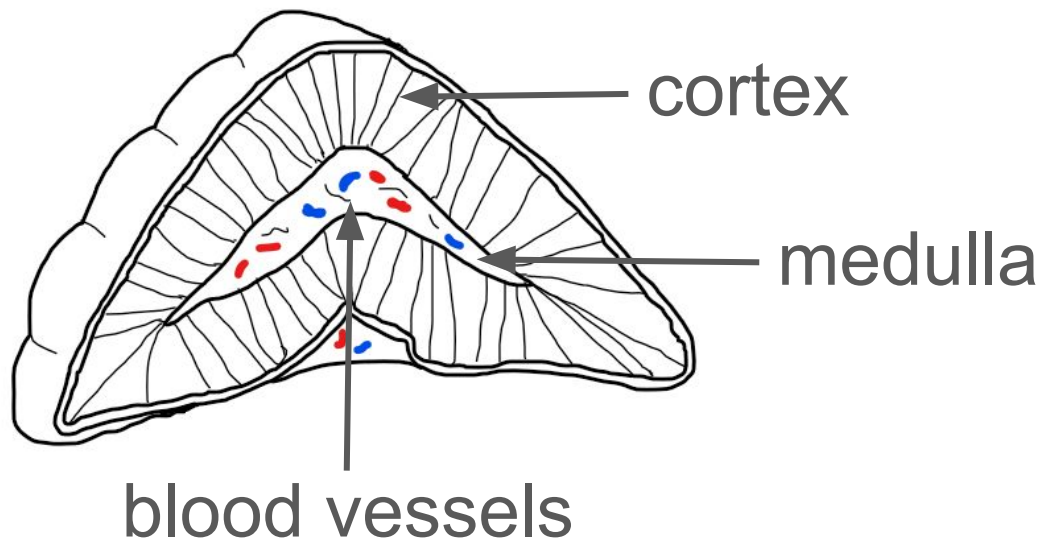


Describe the structure of the adrenal glands



Describe the structure of the adrenal glands.

Located above
kidneys

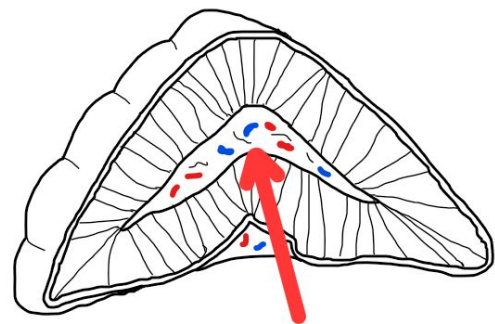


Where is adrenaline secreted from?



Where is adrenaline secreted from?

The adrenal medulla of the adrenal glands



**Adrenal
medulla**



State five effects of adrenaline secretion
on the body



State five effects of adrenaline secretion on the body

- Increased breathing rate and volume
- Increased heart rate
- Stimulates glycogen breakdown in the liver and muscles
- Stimulates pupil dilation
- Increases glycolysis in the muscles to produce ATP



What is tidal volume?



What is tidal volume?

The volume of air we breathe in and out during each resting breath



What is respiratory minute volume?



What is respiratory minute volume?

The volume of air we inhale or exhale from the lungs per minute



How do you calculate pulmonary ventilation rate?



How do you calculate pulmonary ventilation rate?

tidal volume x breaths per minute

These can be measured using a spirometer, a device which records volume changes onto a graph as a person breathes

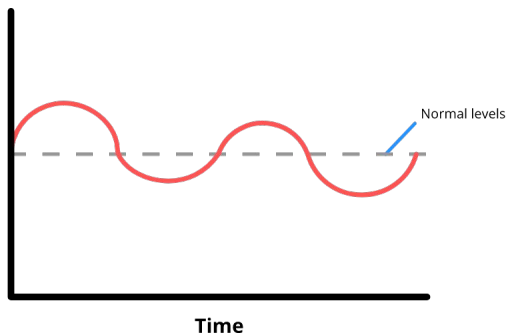


What is negative feedback?



What is negative feedback?

The product of a process that counteracts change to maintain an equilibrium around a normal level and minimise fluctuations. For example the homeostatic control of blood glucose levels

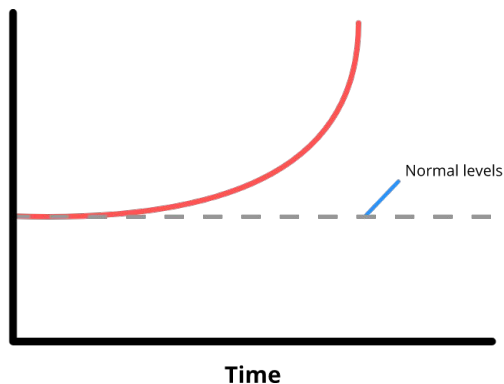


What is positive feedback?



What is positive feedback?

A process which causes an increase in change away from the normal levels. For example, the initiation of a nerve impulse



Define homeostasis



Define homeostasis

Maintaining a constant internal environment around an optimum despite external change



What is the hypothalamus?



What is the hypothalamus?

The region of the brain located near the pituitary gland that is involved in homeostatic control, including thermoregulation



How does the hypothalamus help to increase body temperature?



How does the hypothalamus help to increase body temperature?

- It stimulates **vasoconstriction** to reduce the blood flow to extremities and conserve heat in the inner body
- It stimulates the contraction of **hair erector muscles** which cause hairs to stand up which helps to trap a warm layer of air above the skin
- It stimulates **physiological changes** like the increase in **thermogenesis** by brown adipose tissue (BAT)
- It stimulates rapid skeletal muscle contraction (**shivering**) which requires large amounts of respiration which is an **exothermic** process (one which releases heat)



How does the hypothalamus help to decrease body temperature?



How does the hypothalamus help to decrease body temperature?

- It stimulates **vasodilation** which diverts blood flow away from the internal organs to the extremities where it can cool easily.
- It stimulates the production and secretion of **sweat** by sweat glands in the skin.
- It stimulates the **relaxation** of **hair erector muscles** to release any air trapped next to the skin

