IGCSE Biology Workbook

14. Coordination and Response

Part B: Hormones and Homeostasis

The stuff you need to know in this chapter:

14.3 HORMONES IN HUMANS

Core

- Define a hormone as a chemical substance, produced by a gland and carried by the blood, which alters the activity of one or more specific target organs
- Identify specific endocrine glands and their secretions, limited to adrenal glands and adrenaline, pancreas and insulin, testes and testosterone and ovaries and oestrogen
- Describe adrenaline as the hormone secreted in 'fight or flight' situations and its effects, limited to increased breathing and pulse rate and widened pupils
- Give examples of situations in which adrenaline secretion increases
- State the functions of insulin, oestrogen and testosterone

Extended

- Discuss the role of the hormone adrenaline in the chemical control of metabolic activity, including increasing the blood glucose concentration and pulse rate
- Compare nervous and hormonal control systems in terms of speed and longevity of action

14.4 HOMEOSTASIS

Core

- Define homeostasis as the maintenance of a constant internal environment
- Name and identify on a diagram of the skin: hairs, hair erector muscles, sweat glands, receptors, sensory neurones, blood vessels and fatty tissue
- Describe the maintenance of a constant internal body temperature in humans in terms of insulation, sweating, shivering and the role of the brain (limited to blood temperature receptors and coordination)

Extended

- Explain that homeostasis is the control of internal conditions within set limits
- Explain the concept of control by negative feedback
- Describe the control of the glucose concentration of the blood by the liver and the roles of insulin and glucagon from the pancreas
- Outline the symptoms and treatment of Type 1 diabetes (detail of β cells is **not** required)
- Describe the maintenance of a constant internal body temperature in humans in terms of vasodilation and vasoconstriction of arterioles supplying skin surface capillaries

14.5 TROPIC RESPONSES

Core

- Define gravitropism as a response in which parts of a plant grow towards or away from gravity
- Define phototropism as a response in which parts of a plant grow towards or away from the direction from which light is coming
- Investigate gravitropism and phototropism in shoots and roots

Extended

- Explain phototropism and gravitropism of a shoot as examples of the chemical control of plant growth
- Explain the role of auxin in controlling shoot growth, limited to:
  - auxin made in shoot tip (only)
  - auxin spreads through the plant from the shoot tip
  - auxin is unequally distributed in response to light and gravity
  - auxin stimulates cell elongation
- Describe the use in weedkillers of the synthetic plant hormone 2,4-D

(CIE, 2014)

Ref:

- CIE: Cambridge International Examination (2014) *0610 IGCSE Biology Syllabus Guide* [Online]

14.3 HORMONES IN HUMANS

Define hormone

Complete table to naming the main endocrine glands, what they secrete, and the function of the secretion.

Gland	Secretion	Function of secretion

"Fight or flight" refers to an animal's need to escape from or deal with danger.
State how the following things are affected by adrenaline and explain how these things are useful in a fight or flight situation.

a) Breathing rate:

b) Heart rate:

c) Eyes:

d) Liver:

Complete the table to compare the nervous system and endocrine system.

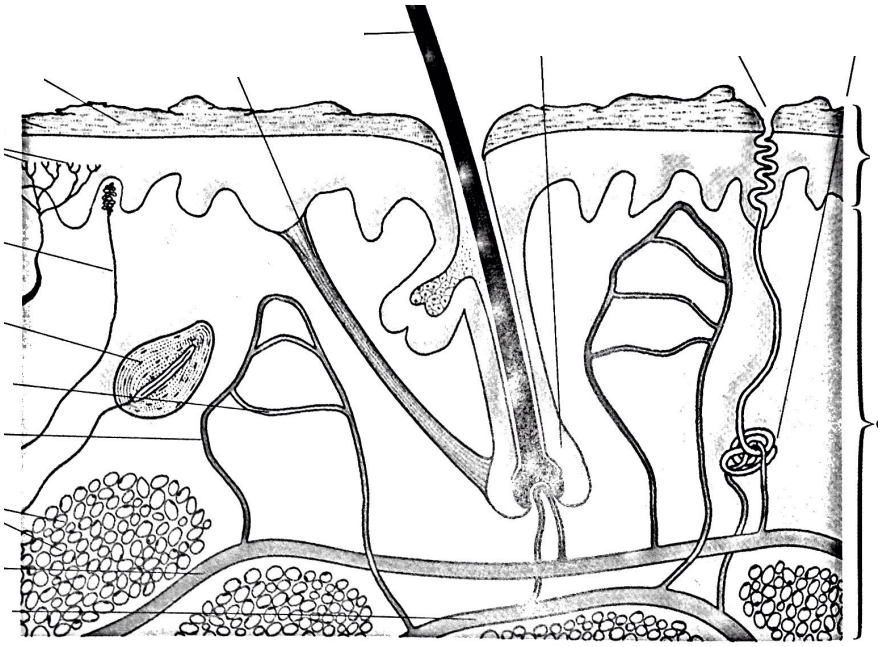
Nervous System	Endocrine System
Made up of neurons.	Made up of _____.

14.4-A HOMEOSTASIS

Define homeostasis

State the difference between ectothermic and endothermic organisms

Label the skin diagram



Explain how body fat has a warming effect.

It takes a relatively large amount of energy to raise the temperature of water and make it evaporate. Explain how the body uses this to help stay cool.

Explain what shivering is AND how it is useful in controlling body temperature.

Summarise the role of the hypothalamus in temperature regulation. Use bullet points.

Why is the hypothalamus said to be a "negative feedback" system?

Explain how the following changes in arterioles affect body temperature:

Vasodilation:

Vasoconstriction:

14.4-B BLOOD GLUCOSE CONTROL

Complete the sentences explaining how blood glucose levels are controlled:

- Blood glucose levels must remain _____. When the blood-glucose level becomes high, the _____ secretes insulin, which causes the _____ to convert glucose into _____ until the levels return to normal.
- If the blood-glucose levels become low, _____ is secreted by the _____ causing the liver to break down _____ into glucose, so the level rises.

Draw a flow diagram to represent the control of blood glucose described above:

Explain how the above process is different with a person who suffers from type I diabetes.

List the physical symptoms of both hyperglycemia and hypoglycemia

Hyperglycemia:

Hypoglycemia:

State two methods of measuring blood glucose levels

14.5 TROPIC RESPONSE

Define the words

Gravitropism:

Phototropism:

Draw a diagram to summarise the role of auxin in gravitropism

Draw a diagram to summarise the role of auxin in phototropism

2,4-D is a synthetic (man-made) type of auxin. Explain the effect it has on the growth of:

Grass:

Weeds:

Explain how this has a positive effect on grass.