3.7 Homeostasis regulates through negative feedback

Student worksheet answers (pages 56–57)

Homeostasis

1 What is homeostasis?

the maintenance of your internal environment; ensures optimal temperature, pH, concentrations. etc.

2 When does negative feedback occur?

when the body responds to a stimulus in a way that removes the initial stimulus.

3 Conversely, what would positive feedback do?

The body responds to a stimulus in a way that increases the initial stimulus.

4 Outline the negative feedback mechanism that the body experiences when it is too cold.

Temperature receptors on the skin detect cooling, the brain coordinates a response, and sends this to the effector muscles making them shiver to produce more energy as heat.

5 Outline the negative feedback mechanism that the body experiences when it is too hot.

Temperature receptors on the skin detect heating, the brain coordinates a response, and sends this to the blood vessels to increase blood flow (lose heat) and to your sweat glands to increase sweat (lose heat).

6 What would be the effect of positive and negative feedback in the following circumstances?

a The body becomes too hot.

• positive feedback

the body gets hotter

• negative feedback

the body gets cooler

b The body has too much glucose in the blood:

• positive feedback

the body produces more glucose

• negative feedback

the body remove the glucose

7 What would happen to the body if it was unable to release the hormones which control homeostasis?

It would shut down and die because it would be unable to function at the conditions it was designed for.

8 How are glucose molecules able to provide you with energy?

Glucose reacts with oxygen to produce carbon dioxide, water and ATP (which provides you with energy).

9 Why is too much glucose in the blood unhealthy?

It causes water to be lost from the body through osmosis because too much glucose is reacting with oxygen.

EXTEND YOUR UNDERSTANDING

10 After you eat, sugar moves from your food and into your blood, essentially giving you a sugar high, which you interpret as having more energy. Answer the questions under the following graph.

a When do you have the most energy?

after an hour of eating

b When do you have the least energy?

before eating and 2 hours afterwards

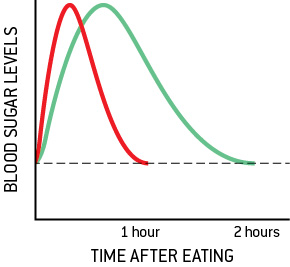
c When blood sugar levels are too low, how do you feel?

lethargic and tired

d What should you do when they are too low?

Eat something to put glucose back into your body so that it produces more energy.

e If this graph represents blood sugar levels after eating a banana, on the graph, draw what your blood sugar levels would look like after eating a Mars Bar.



f Why do doctors recommend that you eat slow-release foods?

Foods that release energy slowly must be broken down by the body before the glucose is able to react through the process of cellular respiration. This give you a more constant supply of energy.

g What happens when you eat sugary foods? What impact does this have on your energy levels?

The body gets an alomost immediate high of energy becauses it has just consumed glucose, which is easily taken into the blood. The body then either burns this to produce energy or stores it as glycogen, removing it from your system, so you experience a low of energy, get lethargic and tired.