

Name:

Date:

Class:



IGCSE BIOLOGY EDEXCEL 9-1

CHAPTER WORKBOOK

Coordination and Response in Animals

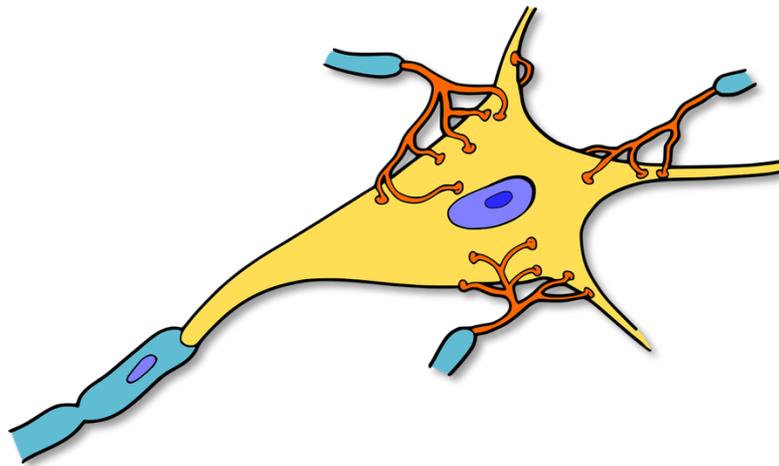


Image: pixabay.com

Coordination and Response

Complete the sentences below.

characteristic	adrenaline	impulse	
testosterone	eye	muscles	
sensory	relay	oestrogen	
stimulus	motor	glands	respond

The ability to detect and to changes in the environment is a of all living organisms. This involves a, such as a bright light, reaching a receptor, such as the retina in the, and an effector, such as in the eyelids.

There are three types of nerve cell (or *neurone*) and they are, and neurones. The *signal* sent along a neuron is called an

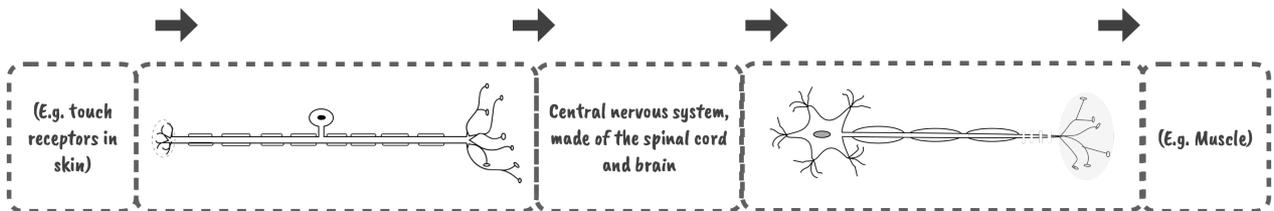
Muscles are effectors but so too are which release hormones. Some examples of these are, and



The Nervous System

1. The diagram below summarises the nervous system. Add labels between the arrows using the words below.

Motor neuron	Sensory neuron	Effector
Receptor	Coordination	



2. State the two main components of the central nervous system.

.....

3. Fill in the spaces below summarising examples of responses to stimuli.

Stimulus	Receptor	Coordination	Effector	Response
Bright light			Muscles in eyelids	
	Temperature receptors on skin	Neurones and CNS		Put jacket on

4. Complete the table to list receptors and what they respond to.

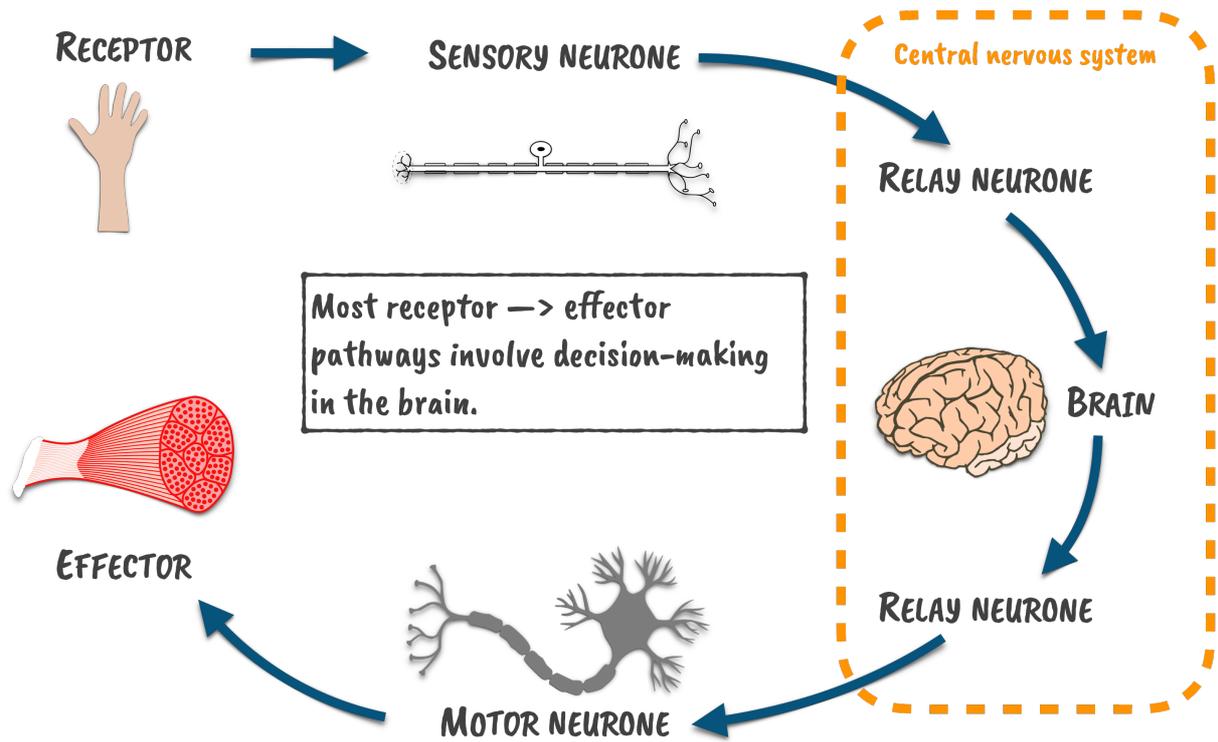
Receptor	Responds to
Retina	
	Sound
	Taste
Nose	
	Kinetic energy on skin
Skin temperature receptors	

5. Draw a labelled diagram of a motor neuron. Include the following labels:



The Reflex Arc

1. The diagram below summarises regular coordination and response.



a) Outline how the situation is different for the reflex arc response.

.....

.....

b) Explain the benefit of the reflex arc response.

.....

.....

2. Complete the story board to outline an example of the reflex arc. Include simple diagrams. Choose any appropriate stimulus you want.

1. Stimulus	2. Sensory neurone	3. Central Nervous System
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
4. Motor Neurone	5. Effector	6. Response
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>



Synapses

1. What is a synapse?

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.....

2. Label the diagram. Use the words in the box.

Post-synaptic neurone	Pre-synaptic neurone	
Receptors	Synapse (gap)	Neurotransmitters

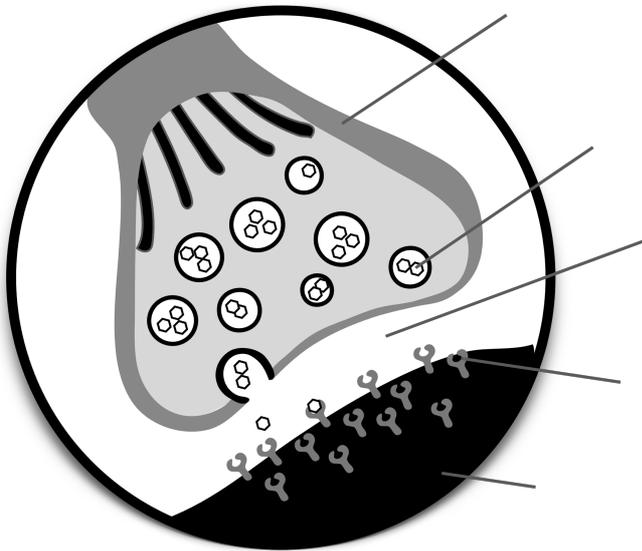
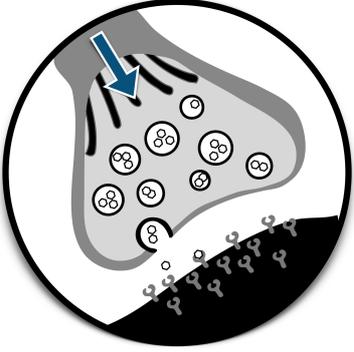
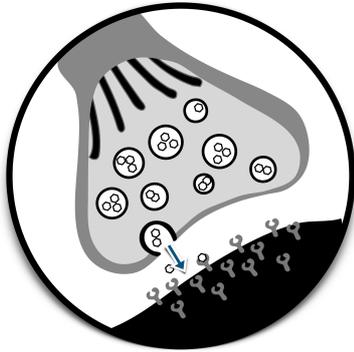
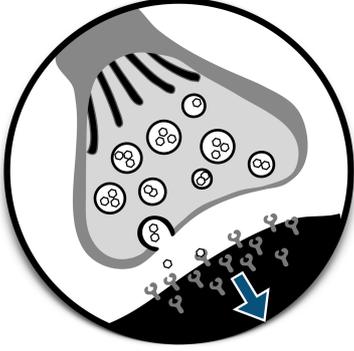
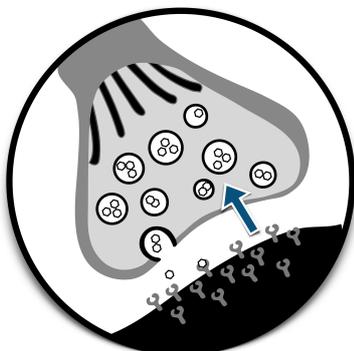


Image credit: pixabay.com

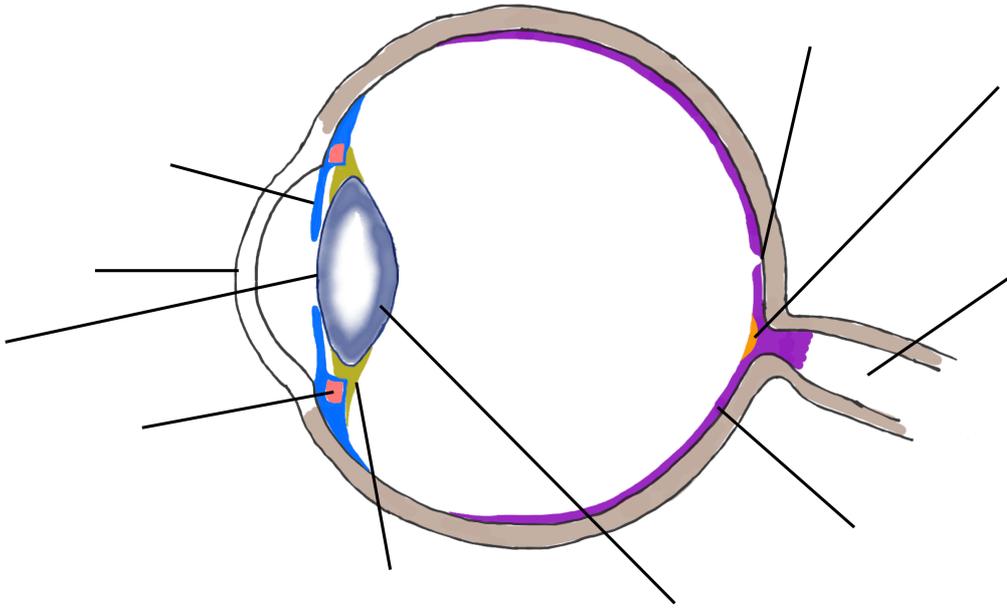
3. Add a brief description at each stage below outlining the transmission of a nerve impulse across a synapse.

<p>1</p> 	<p>2</p> 	<p>3</p> 
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>4</p> 	<p>5</p> 	<p>6</p> 
<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

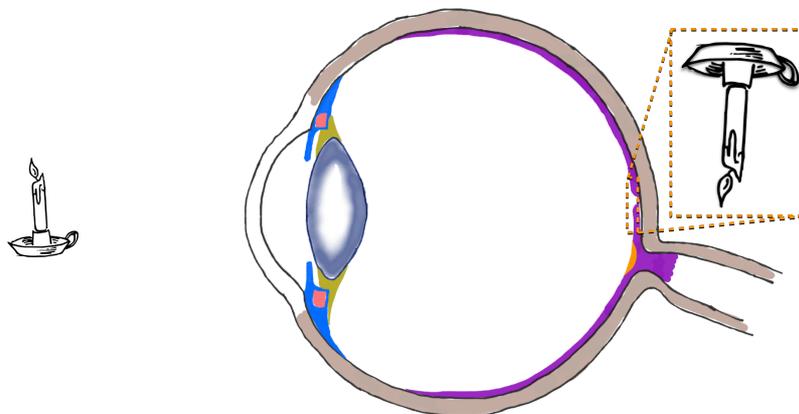
The Eye

1. Add the labels to the diagram of the eye. Use all of the words in the box.

Iris	Blind spot	Optic nerve	Lens
Pupil	Retina	Fovea	Cornea
Ciliary muscle		Suspensory ligament	



2. Add straight lines to the diagram to show how an image is formed on the retina.



3. Complete the sentences below.

pupil	retina	lens	colours
organ	rod	cone	dim
optic	correct	upside down	

The eye is an that receives light energy. Light enters through the and is refracted by the towards the As the light is refracted, it is received by the retina. There are two types of cells in the retina: cells which can respond to dim light but not, and cells which can respond to colour but not light. Once the stimulus reaches the retina, an impulse is transmitted along the nerve and eventually to the brain where the image is processed and recognized as being the way up.



Accommodation – Focusing on Near and Distant Objects

1. Look at the diagram below

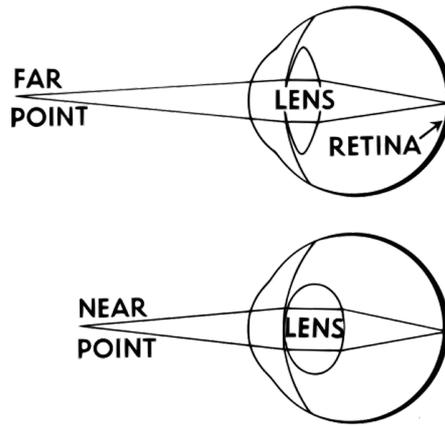


Image: derivative work: ~ ZirgueziiAccommodation_(PSF).png; User:OldakQuill [Public domain]

1. State and Explain the change in lens shape in the diagram above.

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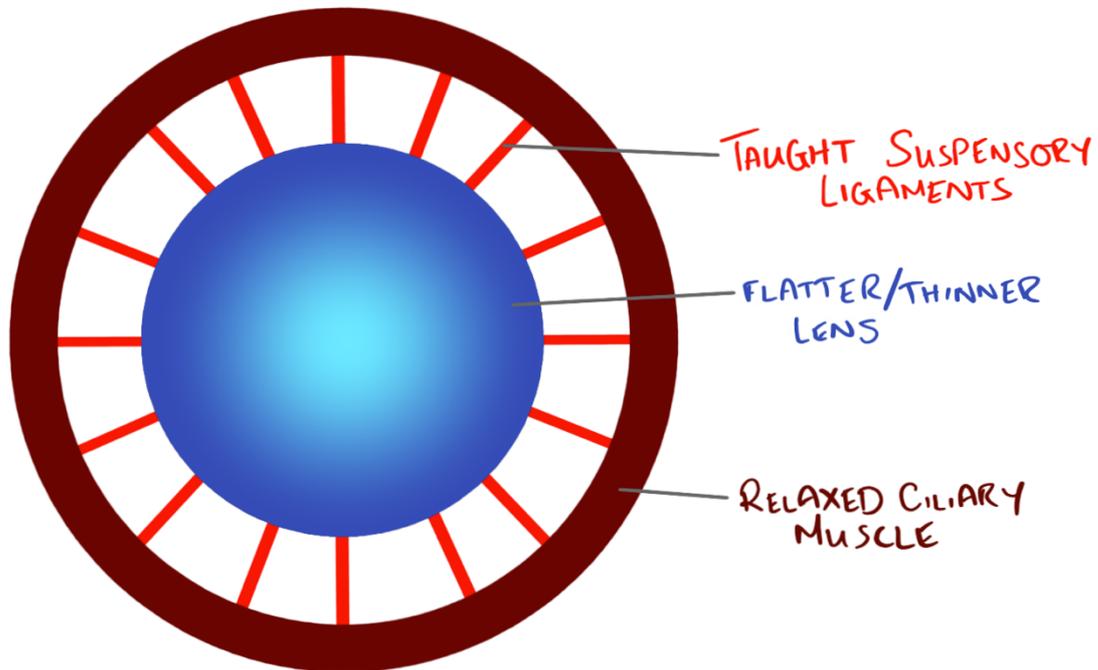
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2. Complete the sentences below to outline accommodation in the eye. You will need to use some words more than once.

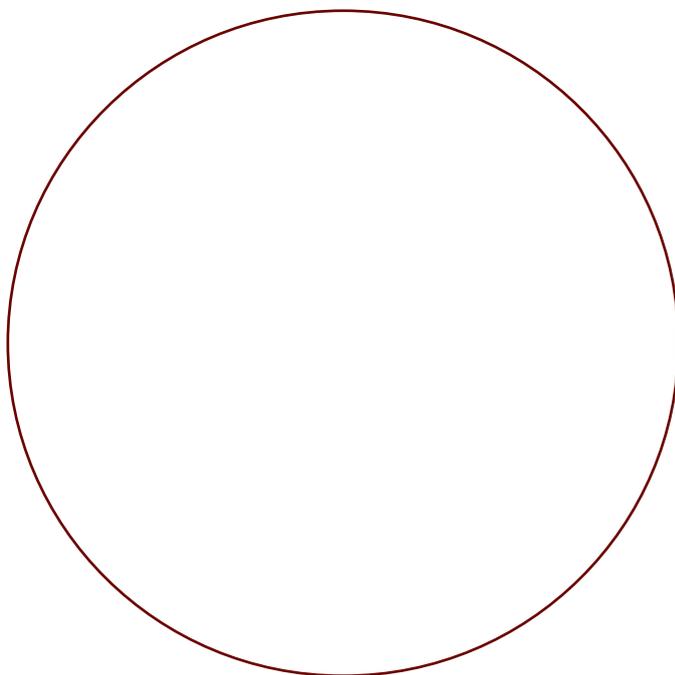
- The lens is held in place by ligaments .
- When the muscle contracts, it becomes thicker/fatter.
- When it contracts, the ligaments become less (more loose), allowing the lens to become so it can focus on near objects.
- When the muscle relaxes it becomes thinner. This causes the ligaments to become, pulling on the lens and making it to focus on distant objects.

3. Draw a second diagram to represent that changes that occur in the eye when focusing on a near object. Your diagram must be drawn to scale.

Focus on **far away** object

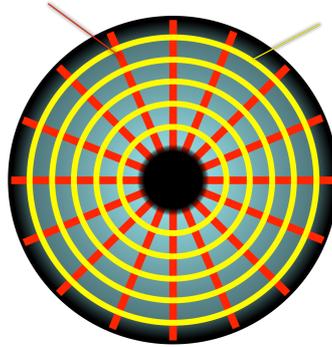


Focus on **near** object



The Iris Reflex – Responding to Light Intensity

1. The image below represent the iris of the eye, with the pupil in the centre. Label the diagram with *radial muscles* and *circular muscles*.



2. Complete the table with the missing words (some can be used more than once).

Brighter	Darker
Contracted	Relaxed
Dilated	Constricted

				
Pupils				
Radial muscles				
Circular Muscles				
Light intensity				

The Skin and Temperature Regulation

1. Body temperature regulation and body water content are examples of homeostasis.

Outline the term *homeostasis*.

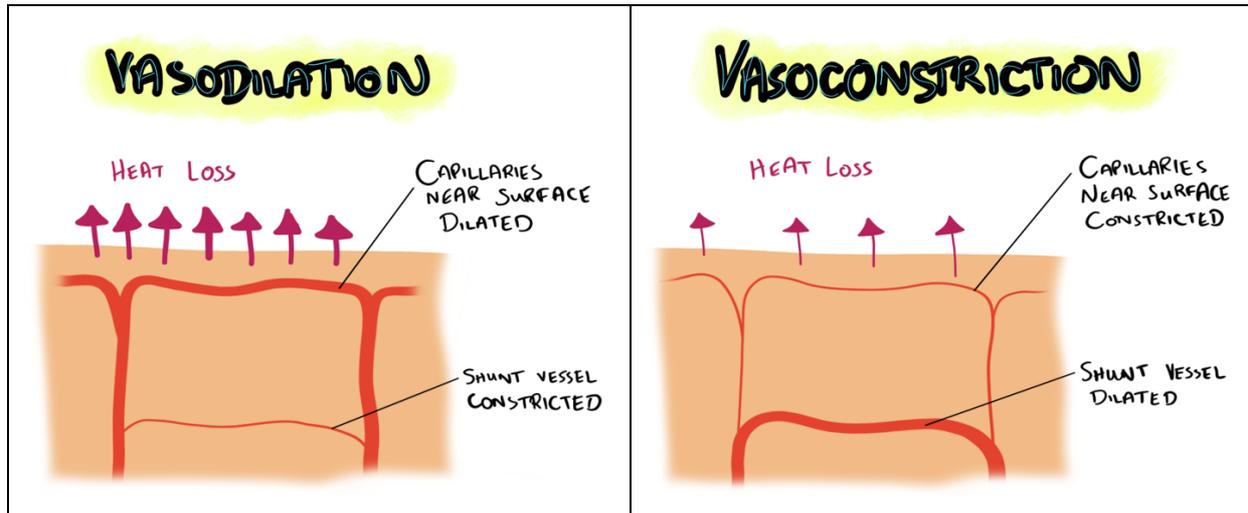
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2. When the body temperature rises, sweat glands in the skin release sweat, which is mainly water. Explain the benefit of this with regards to homeostasis.

.....
.....
.....
.....



3. The diagrams below summarise vasoconstriction and vasodilation. Complete the sentences with any appropriate words.



When the body temperature rises too high, energy must be lost by the body. The near the surface of the skin become (get wider). In addition, the vessels become (get narrower). These changes increase the volume of that flows through blood vessels at the surface of the skin. As the blood flow increases, more heat in the blood is to the surroundings and this the body temperature.

When the body temperature drops, the opposite happens: become constricted and vessels become This blood flow near the surface and therefore heat loss at the surface. This the body temperature.

Hormonal Control

1. Hormonal and nervous communication are two systems of coordination and response in animals. Complete the table to compare the two systems.

	Nervous System	Hormonal System
Messengers	Nerve impulses	
Route/Pathway		Blood stream
Voluntary or Involuntary	Both	
Speed of transmission		Relatively slow by comparison

2. Adrenaline is known as the *fight or flight* hormone.

a) State the source of adrenaline

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b) **State** and **explain** the effects of adrenaline on the following in animals.

Breathing rate

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Heart rate

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Blood diversion

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Liver

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.....

Pupils

.....
.....

Body hair

.....
.....



3. Insulin controls blood glucose levels.

a) Name the gland that secretes insulin.

.....

b) Draw a negative feedback diagram to outline blood glucose control.

4. Complete the table to summarise the sources and effects of oestrogen, progesterone and testosterone.

Hormone	Source	Effect
		Controls development of male secondary sexual characteristics
Oestrogen		
	Ovaries	Regulates the menstrual cycle



4. Complete the table to summarise the details of three hormones released from the pituitary gland.

Hormone	Source	Effect
	Pituitary gland	Acts on the kidneys to control the water content of the blood
FSH	Pituitary gland	
	Pituitary gland	Stimulates ovulation in females. Stimulates testosterone production in males.