



The iris can dilate the pupil (aperture) to let in more light in dim conditions

Sense organ containing receptors sensitive to light intensity and colour

Human control systems include

Cells called receptors
Coordination centres
Effectors

Detect stimuli (changes in environment).
e.g. brain, spinal cord and pancreas that receive information from receptors.
Muscles or glands, which bring about responses to restore optimum levels.

Enables humans to react to their surroundings and to co-ordinate their behaviour



Information from receptors passes along cells (neurones) as electrical impulses to the central nervous system (CNS)

The CNS is the brain and the spinal cord.

Coordinates the response of effectors; muscles contracting or glands secreting hormones

Stimulus



Receptor



Coordinator



Effector



Response

Lights switch on



Cells in retina



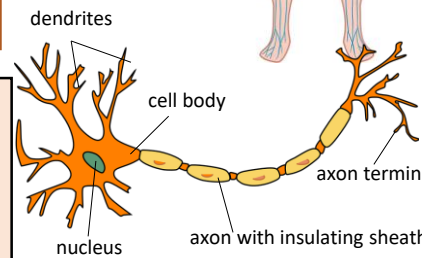
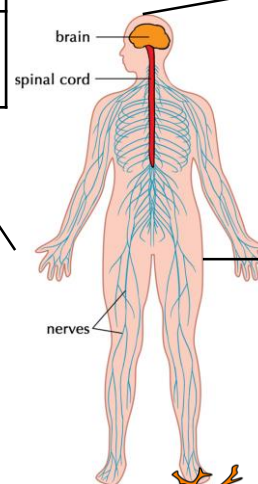
CNS



Muscles connected to iris

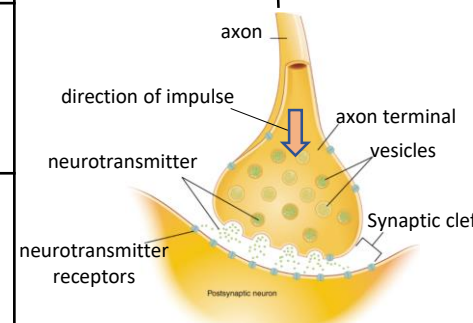


Pupils get smaller



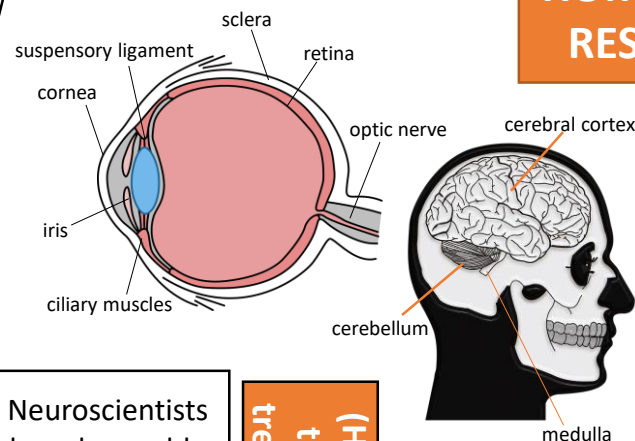
Typical motor neurone

Synapse (gap where two neurones meet).



AQA GCSE HOMEOSTASIS AND RESPONSE part 1

The Eye (Bio only)



The Brain (Bio only)

The brain controls complex behaviour. It is made of billions of interconnected neurones.

The brain has different regions that carry out different functions.

Cerebral cortex

Largest part of the human brain. Higher thinking skills e.g. speech, decision making.

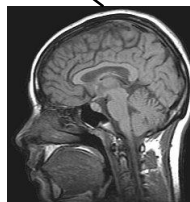
Cerebellum

Balance and voluntary muscle function e.g. walking, lifting.

Medulla

Involuntary (automatic) body functions e.g. breathing, heart rate.

Neuroscientists have been able to map regions of the brain by studying patients with brain damage, electrical stimulation and MRI.



(HT) The complexity and delicacy of the brain makes investigating and treating brain disorders very difficult

Treating brain damage and disease
e.g. Lobotomy – cutting part of the cerebral cortex

Benefit: thought to alleviate the symptoms of some mental illnesses.

Risks: bleeding in the brain, seizures, loss of brain function.
Procedure was abandoned in the 1950s due to risk.

Reflex arc

Receptor

Detect stimuli.

Sensory neurone

Long axon carries impulse from receptor to spinal cord.

Synapse

Gap where neurones meet. Chemical message using neurotransmitter.

Relay neurone

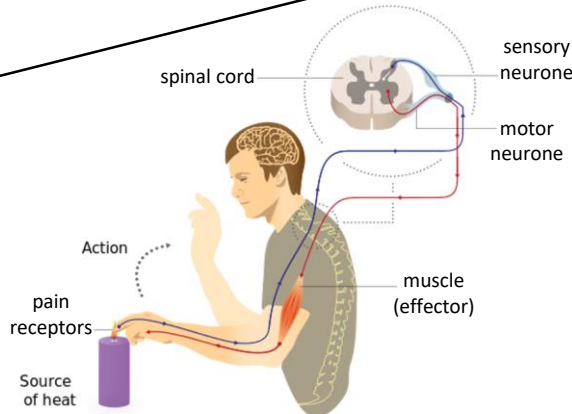
Allows impulses to travel between sensory and motor neurones in the spinal cord.

Motor neurone

Long axon carries impulse from receptor to effector.

Effector

Muscle or gland that carries out response.



Reflex actions are automatic and rapid; they do not involve the conscious part of the brain and can protect humans from harm.

Structures of the eye	Retina	Light sensitive cell layer.
	Optic nerve	Carries impulse to brain.
	Sclera	Protects the eye.
	Cornea	Transparent layer that covers the pupil and iris.
	Iris	Pigmented layer, controls size of pupil.
	Ciliary muscles	Controls thickness of lens.
	Suspensory ligaments	Connects lens to ciliary muscles.

Accommodation is the process of changing the shape of the lens to focus

Near object

Far object

Ciliary muscles contract, suspensory ligaments loosed, lens get thicker, light is more refracted.

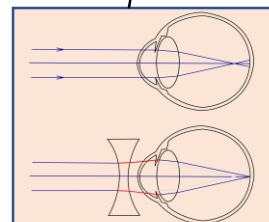
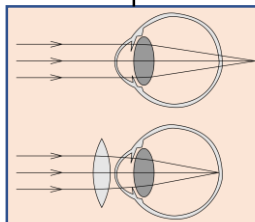
Ciliary muscles relax, suspensory ligaments pulled tight, lens pulled thin, light is only slightly refracted.

Hyperopia (long sightedness)

Myopia (short sightedness)

Treated using a convex lens so the light is focused on the retina.

Treated using a concave lens so light is focused on the retina.



New technologies now include hard/soft contact lens, laser surgery to change the shape of the cornea and a replacement lens in the eye.