Year 11 – Paper 2 - Biology Knowledge Organiser - Homeostasis and response

Homeostasis

Unless chemical and physical conditions in the body are kept within strict limits, cells die. Thus, our bodies constantly and automatically regulate the internal conditions in the body to maintain optimum functions. This regulation is called **homeostasis**.

Some factors that need controlling by homeostasis in the human body:

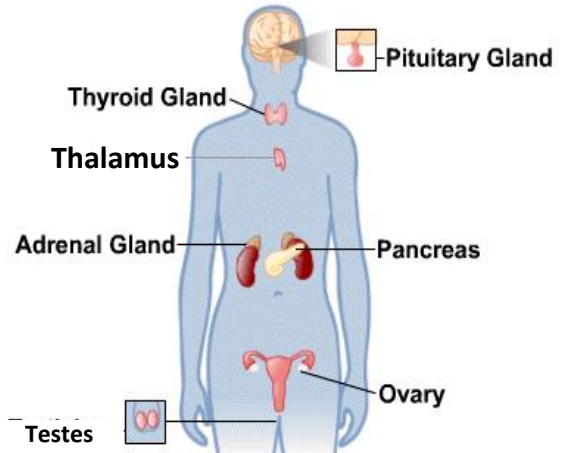
- Blood glucose concentration
- Body temperature
- Water levels
- Nitrogen levels.

The human nervous system

The nervous system is a network of neurones (nerve cells), bundled into nerves. It includes the nerves all over the body and the **central nervous system**, which consists of the **brain** and **spinal cord**. The nervous system allows us to react to the surroundings and control our behaviour. It can act involuntarily (in **reflexes**) or voluntarily.

The human endocrine system

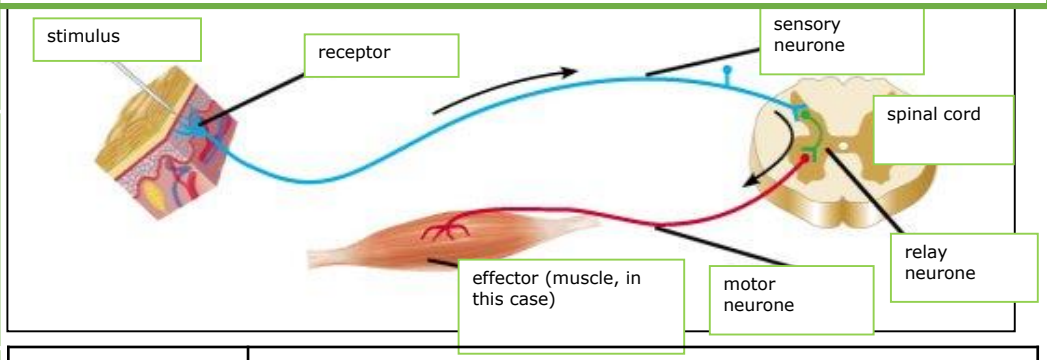
Hormones are released by endocrine glands directly into the bloodstream so they can be transported to a target organ or tissue and cause an effect. In comparison with the nervous system, the effects caused by the endocrine system are slower but act for longer. The hormones themselves are large chemical molecules.



The reflex arc and reflex actions

Reflex actions, for instance pulling your hand away from a pain stimulus, follow a simple pathway.

1. The receptor detects the stimulus and passes electrical impulses along the sensory neurone to the CNS (the spinal cord part, in this case).
2. There is a junction (tiny gap) between the sensory neurone and the relay neurone called a **synapse**. Here, a chemical is released that diffuses across the gap and causes an electrical impulse to pass along the relay neurone.
3. There is another synapse between the relay neurone and the motor neurone, again a chemical is released that causes the electrical impulse to pass along the motor neurone.
4. The impulse arrives at the effector – in this example, a muscle that contracts to pull your hand away from the source of pain.



Key Terms	Definitions
Stimulus	A change in the environment, detected by a receptor cell. E.g. light, sound, chemicals (smells and tastes), pressure, pain, temperature etc.
Nerve	A nerve is just a collection of many nerve cells; nerve cells are called **neurones**. Neurones transmit (carry) information as **electrical impulses**.
Hormone	A large chemical released by an endocrine gland; hormones have target tissues/organs and they produce an effect when they reach them.
Target organ/tissue	The destination of a hormone and the place where the effect caused by the hormone actually happens.
Secrete	The proper term for 'release' of a chemical in the body, such as a hormone from an endocrine gland.
Insulin	The hormone released by the pancreas that lowers blood glucose concentration, by making cells take in glucose from the blood.
Glycogen	Large chemical, made from glucose, that acts as a store of glucose in liver and muscle cells.
Pituitary gland	The 'master gland' of the endocrine system, since, through its hormone release, it can make other endocrine glands release hormones.