Science– Coordination and Control (Biology)

Year 9 Term 6

(1) Nervous system and Reflexes

Neurone– Nerve cell

CNS– Central Nervous system (Made up of the brain and spinal cord)

Reflex– A fast automatic response that does not involve the conscious part of our brain

	Nervous systems	Endocrine system
Type of Response	Electrical impulse	Hormone
Source	Central Nervous System (CNS)- brain and spinal cord	Released from glands in to the bloodstream
Speed	Very fast	Much slower

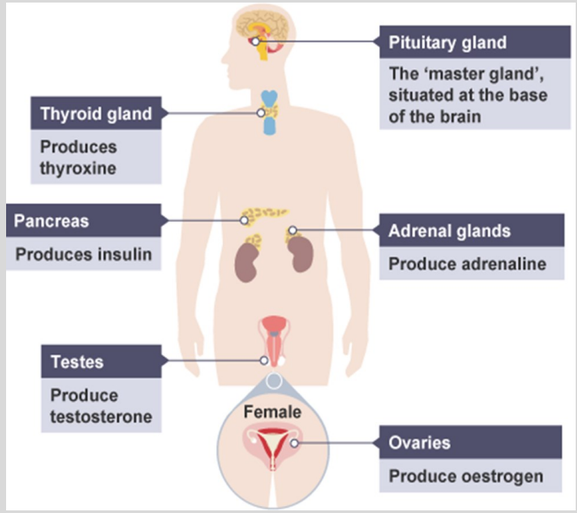
Stimulus
↓
Receptor
↓
Sensory neurone
↓
CNS - spinal cord (relay neurone)
↓
Motor neurone
↓
Effector (muscle or gland)
↓
Response

(2) Endocrine System and Homeostasis

Homeostasis– Maintaining internal body conditions at optimum (e.g. temperature, blood glucose, water content)

Negative Feedback– The act of responding to a change in the body to return it to its optimum

The Endocrine system is an organ system in our body that is made up of **glands** that release **hormones.** Hormones are **chemical messengers** made of protein, they are secreted (released) from glands in to the **blood** and travel to a target organ.



(3) Control of Blood glucose

When high levels of glucose are detected in the blood the **pancreas** secretes **insulin.** This stimulates the **liver** to convert **glucose** into **glycogen.**

When low levels of glucose are detected in the blood the **pancreas** secretes **glucagon**. This stimulates the **liver** to convert **glycogen** back into **glucose.**

Diabetes

	Type 1	Type 2
Who it affects	People of any age. Usually diagnosed in childhood.	Generally older people (over 40) and those overweight/ obese
Cause	Genetics. The person is unable to produce any or enough functional (working) insulin. Cannot convert glucose to glycogen.	Lifestyle– poor diet with high sugary and fatty foods. The body stops responding to insulin.
Control/ Treatment	Insulin injections and monitors. Diet and lifestyle– Exercise and low sugar food help.	Diet and lifestyle– Exercise and low sugar food.

(4) Menstrual Cycle & Contraception

The Menstrual cycle is a 28 day cycle that is controlled by 4 hormones.

Contraception: A method of preventing pregnancy.

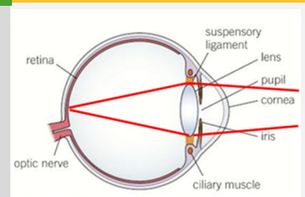
These methods can provide a **physical barrier** to stop the sperm fertilising the egg such as condoms, spermicides, diaphragm. Other contraceptives are hormonal and prevent the release of an egg or build up of the uterus lining e.g. the combined/ mini pill, the implant and IUD

Hormone	Made…	Function
FSH	Pituitary Gland	Stimulates an egg cell to develop within the follicle
Oestrogen	Ovary	Causes the uterus lining to thicken.
LH	Pituitary Gland	Stimulates follicle to burst and release the egg into the oviduct.
Progesterone	Corpus luteum inside the ovaries	Maintains the thickness of the uterus lining ready for the egg to implant.

Trinity TV

For more help, visit Trinity TV and watch the following

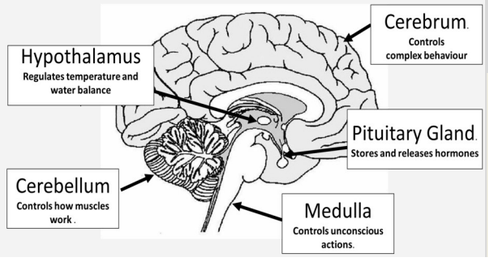
(5) The Brain and Eye



The lens and cornea at the front of the eye works together to refract light and focus it on one point on the retina. The retina contains receptor cells that send an electrical impulse along the optic nerve to the brain.

Vision Problem	Description
Myopia (short sightedness)	light is focussed in front of the retina as the eyeball is too long or the lens being too thick. Fixed with a concave lens.
Hyperopia (long sightedness)	light is focussed behind the retina as the eyeball is too short or the lens being too thin. Fixed with a convex lens.

The brain can be observed by doctors using X-rays, PET scans and MRI scans. Patient symptoms can also be observed to indicate which parts of the brain are damaged.

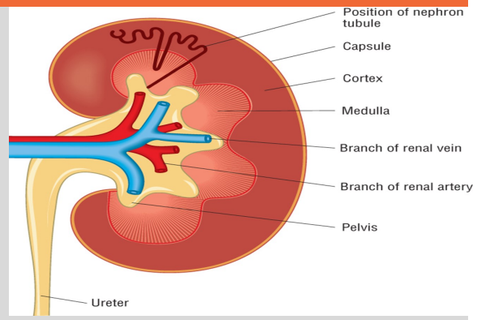


(6) The Kidney and Plant hormones

The kidneys have 2 roles

Excretion – Filter and remove waste products of metabolism (urea and excess salt

Osmoregulation – Regulate the water concentration of the blood by controlling the volume of water lost in the urine.



Plant Hormones

Plants respond to **stimuli**

Light (phototropism - plants grow towards light to ensure they have enough light for photosynthesis.

Gravity (Geotropism) - plants shoots grow away from gravity to ensure they towards light and roots grow towards gravity for water and nutrients.

Auxins	Gibberellin	Ethene
•Stimulate growth in cuttings •Stimulate growth in plant tissue cultures •Weed killer	•Stimulate germination •Induce flowering •Stimulate the growth of larger fruits (parthenocarpy)	•Induce ripening in fruit