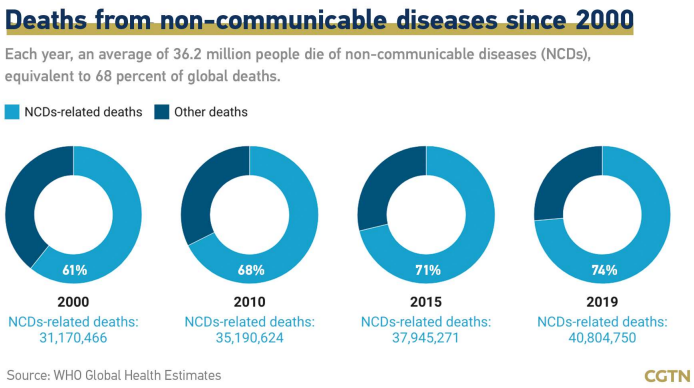
Synergy Science Knowledge Organiser
7 Lifestyle and Health

Health and Disease

- Health is 'a state of physical, mental and social well-being' and not merely the absence of disease. Factors including diet, stress and life situations can affect both physical and mental health.
- Diseases stop part of the body from working properly. This causes symptoms, which are experienced by the person affected by the disease.

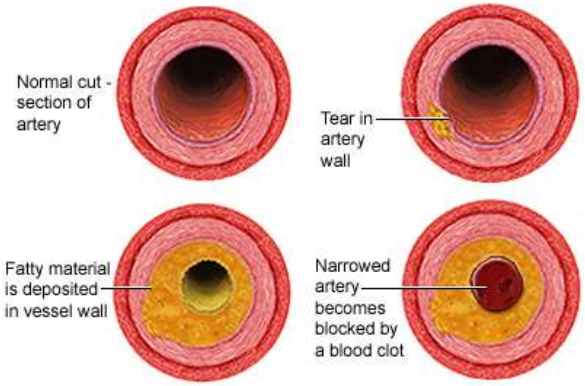
Risk Factors for Non-Communicable Disease

- Risk factors are aspects of a person's lifestyle, or substances present in a person's body or environment, that have been shown to be linked to an increased rate of a disease. For some a causal mechanism has been proven.
- Examples are:
  - the effects of diet, smoking and exercise on cardiovascular disease
  - obesity as a risk factor for Type 2 diabetes
  - the effect of alcohol on liver and brain function
  - the effect of smoking on lung disease and lung cancer
  - the effects of smoking and alcohol on unborn babies
  - carcinogens and ionising radiation as risk factors in cancer.

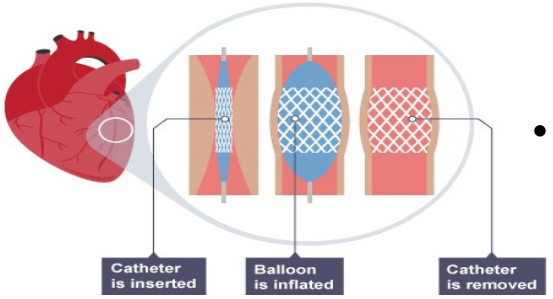


Cardiovascular Disease

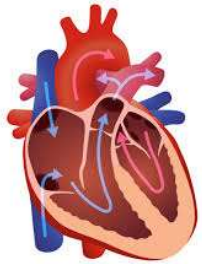
- In coronary heart disease layers of fatty material build up inside the coronary arteries. This reduces the flow of blood through the coronary arteries. This can lead to a heart attack.

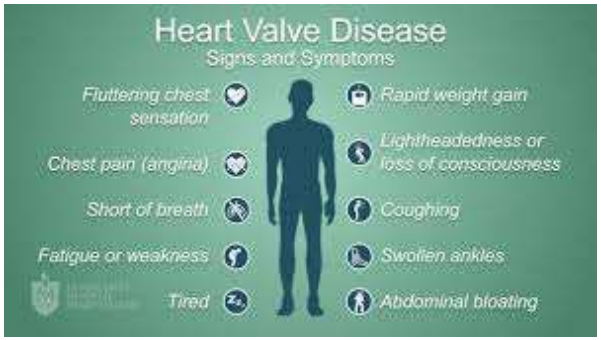


- Statins are widely used to reduce blood cholesterol levels, which slows down the rate of fatty material deposit.



- Stents are used to keep the coronary arteries open.
- In some people heart valves may become faulty, preventing the valve from opening fully, or the heart valve might develop a leak.
- Faulty heart valves can be replaced using biological or mechanical valves.
- In the case of heart failure, a donor heart, or heart and lungs, can be transplanted. Artificial hearts are occasionally used to keep patients alive whilst waiting for a heart transplant, or to allow the heart to rest as an aid to recovery.





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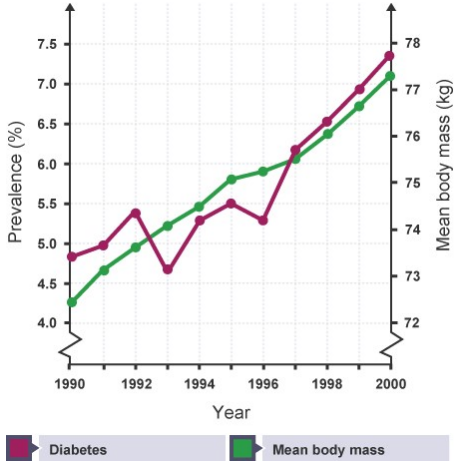
Homeostasis

- Homeostasis is the regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes. Homeostasis is important because it maintains optimal conditions for enzyme action and all cell functions.
- Control of blood glucose concentration, control of body temperature and control of water levels in the human body are examples of homeostasis.
- An organism maintains homeostasis by monitoring its internal conditions and responding appropriately when these conditions deviate from their optimal state.
- These automatic control systems may involve nervous responses or chemical responses. Many of the processes are coordinated by hormones.

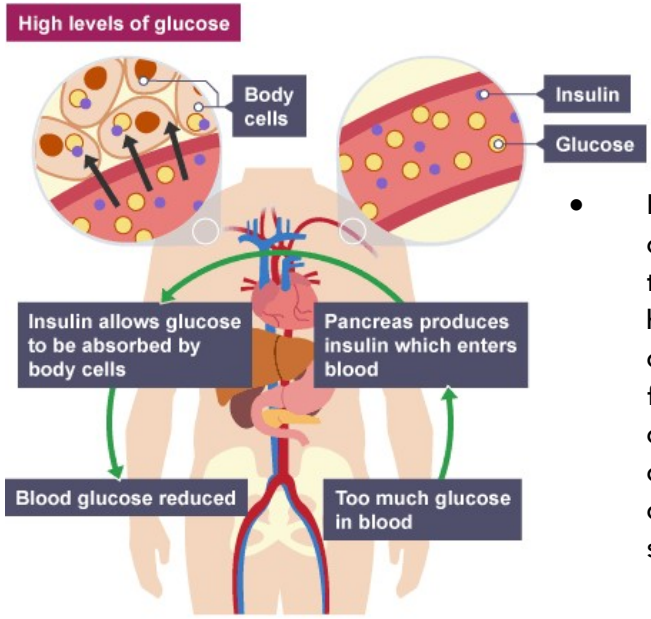
Diabetes

- Type 1 diabetes is a disorder in which the pancreas fails to produce sufficient insulin. It is characterised by uncontrolled high blood glucose levels and is normally treated with insulin injections.
- In Type 2 diabetes the body cells no longer respond to insulin produced by the pancreas. A carbohydrate controlled diet and an exercise regime are common treatments. Obesity is a risk factor for Type 2 diabetes.

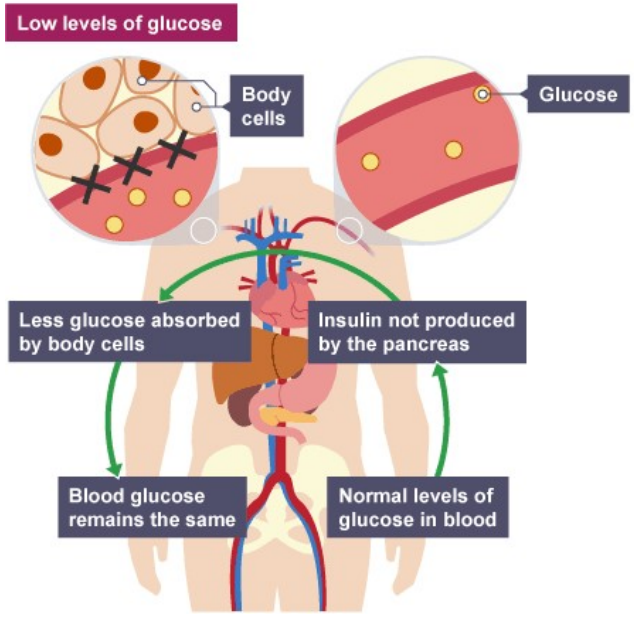


Controlling Blood glucose

- Blood glucose concentration is monitored and controlled by the pancreas.



- If the blood glucose concentration is too high, the pancreas produces the hormone insulin, which causes glucose to move from the blood into the cells. In liver and muscle cells excess glucose is converted to glycogen for storage.



- (HT only) If the blood glucose concentration is too low, the pancreas produces glucagon, which causes glycogen to be converted into glucose and released into the blood.

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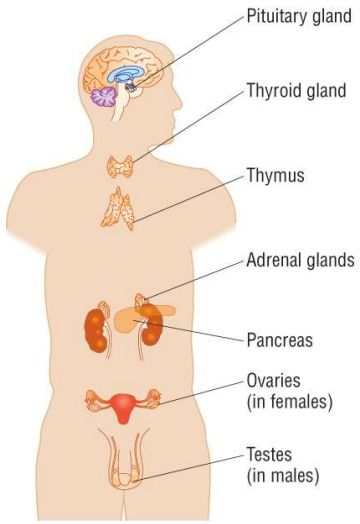
Human Reproductive Hormones

- During puberty reproductive hormones cause secondary sex characteristics to develop.
- Oestrogen is the main female reproductive hormone produced in the ovary. At puberty eggs begin to mature and one is released approximately every 28 days. This is called ovulation.
- Testosterone is the main male reproductive hormone produced by the testes and it stimulates sperm production.

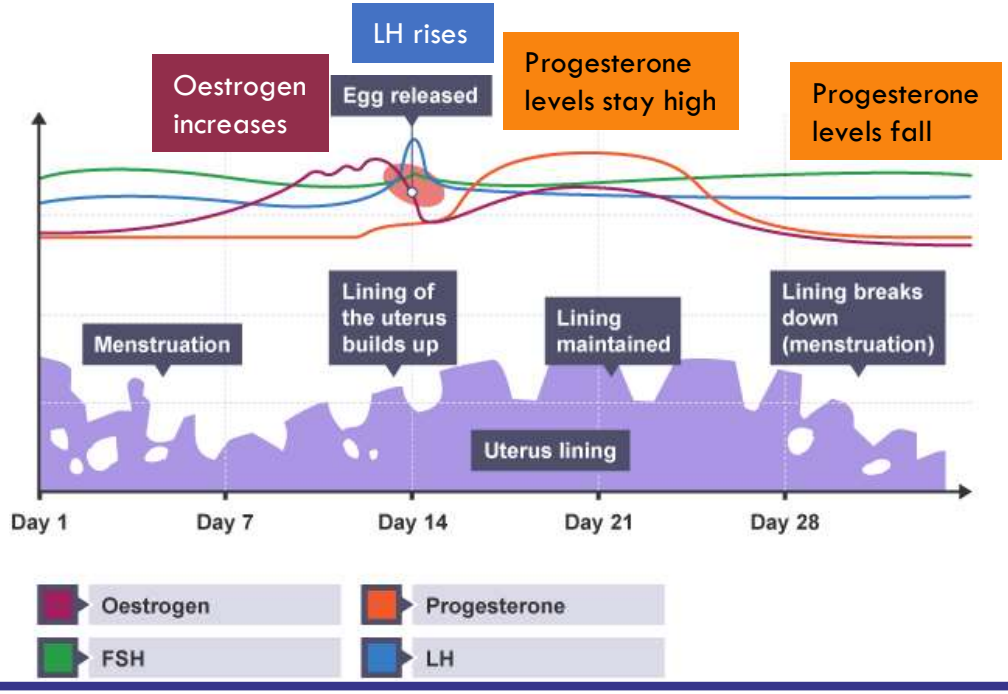


Contraception

- Fertility can be controlled by a variety of hormonal and non-hormonal methods of contraception. These include:
  - oral contraceptives that contain hormones
  - injection, implant or skin patch of slow release progesterone
  - barrier methods such as condoms and diaphragms
  - intrauterine devices
  - spermicidal agents
  - abstaining from intercourse at times when an egg may be fertilised
  - surgical methods of male and female sterilisation.

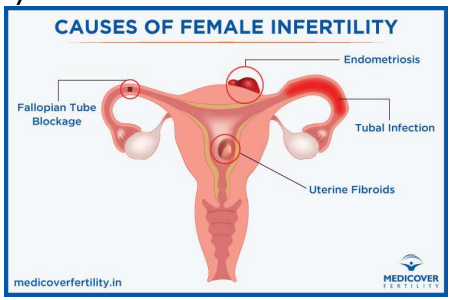
The Menstrual Cycle

- Several hormones are involved in the menstrual cycle of a woman.
  - Follicle-stimulating hormone (FSH) causes maturation of an egg in the ovary.
  - Luteinising hormone (LH) stimulates the release of the egg.
  - Oestrogen stops FSH production so only one egg matures, causes LH to be released and the uterus lining to build up
  - High progesterone levels maintain the uterus lining, a sudden drop in progesterone causes the uterus lining to break down.



Treatments for Infertility – Higher Tier Only

- The uses of hormones in controlling fertility include:
  - giving FSH and LH in a 'fertility drug' to a woman whose own level of FSH is too low
  - In Vitro Fertilisation (IVF) treatment, which involves giving a mother FSH and LH to stimulate the maturation of several eggs.



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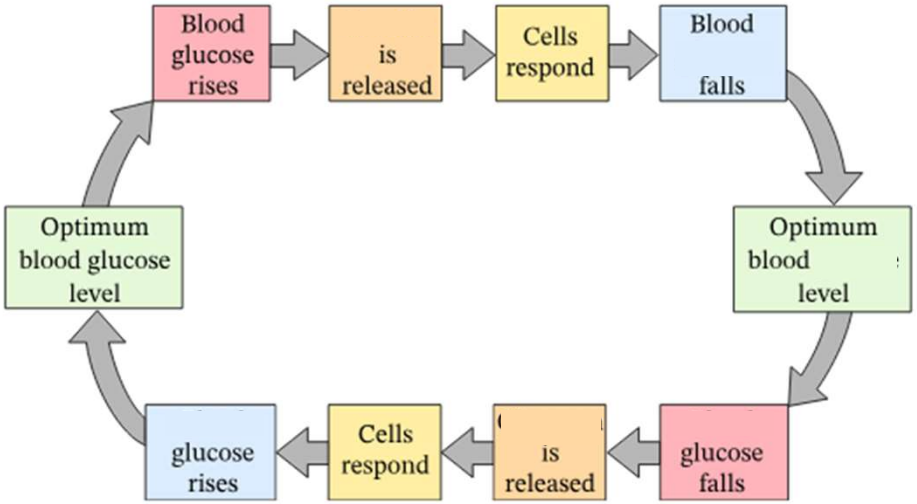
Human Reproductive Hormones

- Task: Match the hormone with its function

Hormone	Role
FSH (follicle stimulating hormone)	Stops FSH being produced; repairs, thickens and maintains the uterus lining; stimulates the release of LH
Oestrogen	Maintains the lining of the uterus
LH (luteinising hormone)	Causes an egg to mature; stimulates the ovaries to release oestrogen
Progesterone	Triggers ovulation

Controlling Blood glucose

- Task: Complete the flow chart



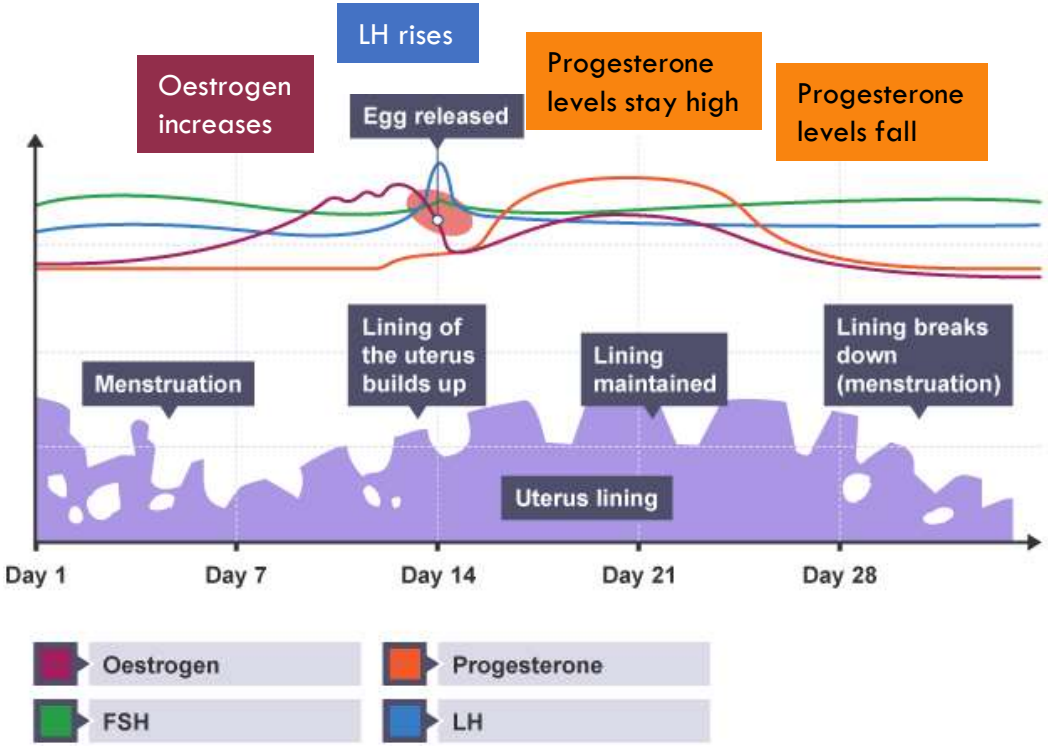
The Menstrual Cycle

- Task: Which hormone causes

The egg to be released _____

The lining of the uterus to build up_____

The lining of the uterus to break down_____



Highlight the keywords: Communicable, Non-communicable, Risk, causal, carcinogen, Cardiovascular, Glucose, Insulin, Glucagon, Pancreas, Liver, Blood, Diabetes, type 1, type 2, Menstrual cycle, ovulation, pituitary gland, FSH, LH, Oestrogen, Progesterone, Oral contraceptives, Implant, Intrauterine device (IUD), Abstinence