

**Key Vocabulary**

**Adrenal gland** - A gland located on top of a kidney that produces the hormone **adrenalin**.

**Endocrine gland** - An organ that makes and releases hormones into the blood.

**Hormone** - Chemical messenger that is released into the blood from an endocrine gland and causes target cells to change how they work.

**Pancreas** - Organ in the body that produces some digestive enzymes, as well as the hormones **insulin** and **glucagon**.

**Pituitary gland** - An organ just below the brain that controls many activities of the body (e.g. metabolic rate and the menstrual cycle).

**Glycogen** - A polymer storage material made from glucose, particularly in liver cells

**Glucagon** - A hormone that increases blood glucose concentration.

**Menstrual cycle** - A monthly cycle involving the reproductive organs in women.

**Oestrogen** - A hormone produced by the ovaries which is important in the menstrual cycle.

**Progesterone** - One of the hormones released by the ovaries.

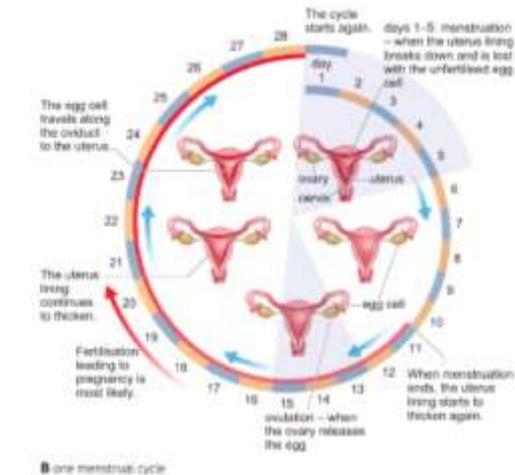
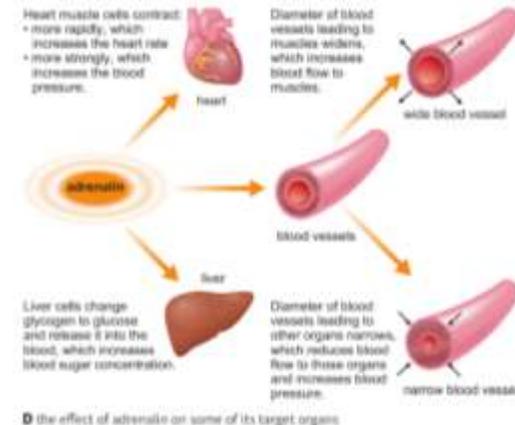
**Important Information**

The hormonal system uses chemical messengers called **hormones**, which are carried by the blood and so take time to get around the body. Different hormones are released by a range of **endocrine glands**, including the **pituitary, thyroid, adrenals, ovaries, testes** and **pancreas**.

Adrenalin has many target organs, including the liver in which it causes the breakdown of a storage substance called **glycogen**. Glycogen is a polymer made of glucose molecules. When glycogen is broken down, the glucose molecules can be released into the blood providing additional glucose for respiration.

The **menstrual cycle** is a cycle of changes in a woman's reproductive system that takes about 28 days. The cycle continues from **puberty** (at around 12 years) to **menopause** (in early 50s), and prepares the woman's body for the **fertilisation** of an egg cell, leading to **pregnancy**.

**Graphs and Diagrams**



**Luteinising hormone** - A hormone produced by the pituitary gland that causes ovulation.  
**Follicle-stimulating hormone (FSH)** - A hormone produced by the pituitary gland that causes egg cells to mature in ovaries.

**Corpus luteum** - A structure formed from the egg follicle after an egg cell is released from an ovary. It produces progesterone.

**Homeostasis** - Controlling the internal environment of the body at stable levels.

**Hypothalamus** - Part of the brain that monitors and controls body temperature.

**Thermoregulation** - The control of body temperature, especially in core parts of the body (e.g. heart, liver and brain).

**Osmoregulation** - The control of the balance of water and mineral ions in the body.

**Nephron** - Long tubule found in the kidney where filtration of blood occurs, and reabsorption of useful substances, leaving waste and excess substances in urine.

**Selective reabsorption** - Taking back particular (useful) substances, such as glucose and some mineral ions, into the nephron.

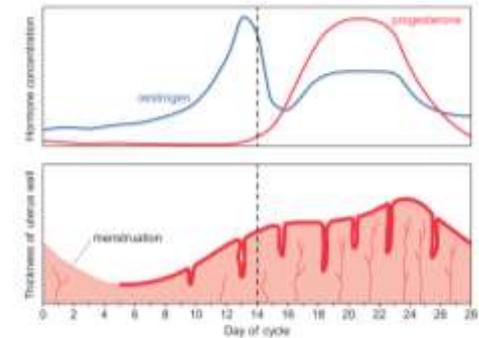
**FSH** (follicle-stimulating hormone) and **LH** (luteinising hormone) are released from the pituitary gland. The release of these hormones is controlled by the concentration of oestrogen (which increases as the egg follicle matures) and of progesterone (which is released after ovulation when the follicle becomes a structure called the **corpus luteum**). Diagram

The normal temperature of the major organs (heart, liver and brain) of the human body is about 37°C, although this varies slightly between people. A temperature above 38°C is a **fever**, and below 36°C causes **hypothermia**. Both fever and hypothermia are dangerous because they affect how well the enzymes in the body work. **Thermoregulation** is the control of body temperature, which keeps the temperature of the major organs close to 37°C most of the time.

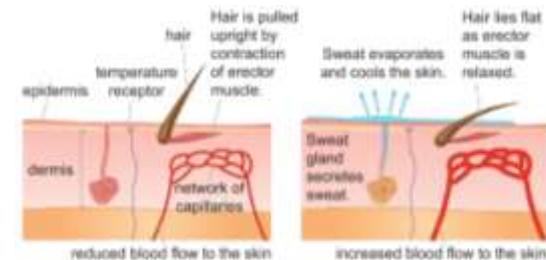
Each kidney contains thousands of tiny microscopic tubes called **nephrons**. **Urine** is made in the nephron in a series of stages.

The nephron is adapted in several ways for reabsorption of substances.

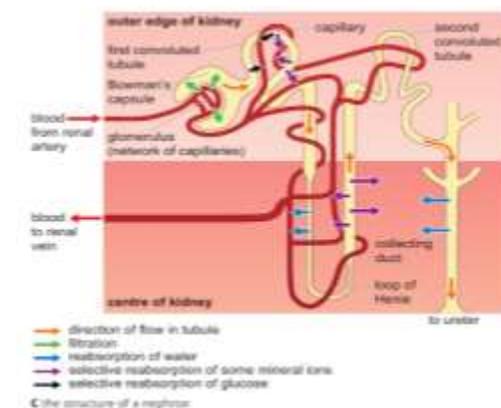
- There is a large surface area of contact between the nephron and capillaries.
- The cell membrane of the cells lining the first convoluted tubule has tiny folds called **microvilli**. These increase the surface area : volume ratio of the cells.
- Cells that have protein pumps in their cell membranes contain many mitochondria.



**C** Changes in the concentrations of hormones in the blood cause changes in the thickness of the uterus wall during the menstrual cycle.



**D** how the skin responds when the core body temperature is too low (left), and when core body temperature is too high (right)



**E** the structure of a nephron