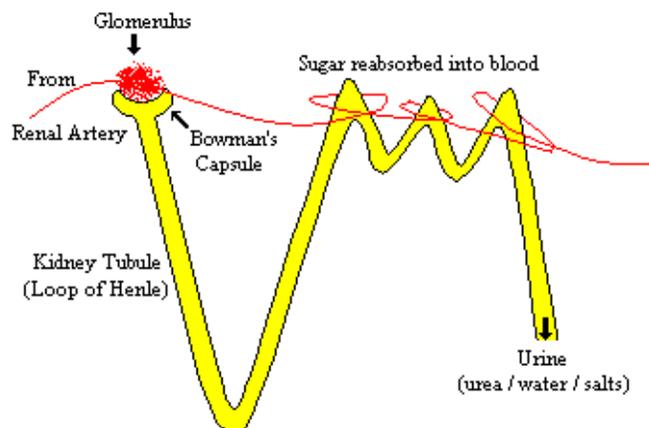


### Biology Revision Notes – Nervous Systems And Homeostasis

- The **nervous system** consists of the brain and the spinal cord (the **central nervous system** or CNS), as well as all the nerves in the body.
- Nerve cell** are very long and thin, allowing nerve impulses to travel in one direction only:
  - **Sensory nerve cells** – carry impulses from the sense organs to the CNS.
  - **Motor nerve cells** – carry impulses from the CNS to muscles and glands.
- Reflex actions** happen without thinking. **Voluntary actions** are those that you think about.
- The following words are to do with the nervous system:
  - **Stimulus** – a change in the environment.
  - **Receptor** – the sense organ that detects the change.
  - **Effector** – the organ that responds (usually a muscle).
  - **Response** – the reaction that takes place.
- The **reflex arc** is as follows:

Stimulus → receptor → sensory neurone → relay neurone → motor neurone → effector → response.

- A **synapse** is the chemical connection between two neurones.
- The **eye** functions in the following ways:
  - Light is focused on the **retina** with the **lens**, upside down (corrected by the brain).
  - In bright light, **circular muscles** in the **iris** contract to make the **pupil** smaller.
  - In dim light, **radial muscles** in the iris contract to make the pupil bigger.
  - To see a distant object, the **ciliary muscles** relax and the **suspensory ligaments** tighten to stretch the lens – making it thin to give a good focus on the retina.
  - To see a near object, the ciliary muscles contract and the suspensory ligaments slacken to make the lens fatter, and focus the image on the retina.
  - **Accommodation** is the process of altering the lens to focus.
  - The **sclerotic layer** is the tough white layer of the eye.
  - The **cornea** is a clear window in the sclerotic layer.
- Homeostasis** is the maintenance of a constant internal environment.
- The **skin** controls the temperature:
  - *If it's too hot* – sweating occurs, the hairs are lowered, and **vasodilation** occurs.
  - *If it's too cold* – shivering occurs, the hairs are raised, **vasoconstriction** occurs, and there is increased metabolism.
- Excretion** is the removal of waste products produced by the body (e.g. CO<sub>2</sub> in the lungs).
- In the **kidneys**:
  - There is a good blood supply, to filter out urea, salts and water.
  - This travels through the **cortex** (outside of the kidney), the **medulla**, and then the **pelvis**.
  - This **urine** travels through the **ureter** to the **bladder**.
  - The **sphincter muscle** relaxes when the bladder is full, to open up the **urethra**.
- Ultrafiltration** and the **nephron**:



13. The hormonal control of water loss:

Too little water → Blood → Brain → **ADH** (anti-diuretic hormone) → Blood → Kidneys.

14. The hormonal control of blood sugar:

*Blood glucose is too high* → Pancreas → Insulin → Liver → Changes **glucose to glycogen**.

*Blood glucose is too low* → Pancreas → Glucagon → Liver → Changes **glycogen to glucose**.

15. The **female menstrual cycle** has the following stages:

- Stage 1 → The **uterus lining** breaks down (days 1 to 4).  
→ **FSH** (follicle stimulating hormone) is released by the **pituitary gland**.
- Stage 2 → The **follicle** develops (days 4 to 14).  
→ **Oestrogen** is made by the **ovaries** to build up the uterus lining and inhibit FSH production. Oestrogen causes the pituitary gland to make **LH** (luteinising hormone).
- Stage 3 → LH causes the **egg** to be released on day 14.  
→ The **corpus luteum** develops, to produce **progesterone**.
- Stage 4 → The **progesterone** maintains the uterus lining.  
→ If the egg doesn't fertilise, the corpus luteum breaks down and the progesterone production is stopped.  
→ Progesterone and oestrogen are at their lowest level on day 28, therefore the cycle starts again.

16. FSH can be taken to stimulate egg production in **fertility treatment**.

17. Oestrogen can be taken as 'the pill' to stop egg production (it inhibits FSH).

18. A **tropism** is the way a plant responds to a stimulus. The response is slow growth movements.

19. Growth towards a stimulus is **positive**, and growth away from one is **negative**:

- **Phototropism** – the stimulus is light. The shoots are positive and the roots are negative.
- **Geotropism** – the stimulus is gravity. The shoots are negative and the roots are positive.
- **Hydrotropism** – the stimulus is water. The roots are positive.

20. **Auxin** is the plant hormone:

- It makes cells grow in the shoots, and inhibits growth in the roots.
- It is produced only in the shoot and root tips.
- It moves away from a light source, and towards gravity.

21. The following are types of **drugs**:

- **Sedatives** – slow you down and make you sleepy, e.g. tranquillisers and alcohol.
- **Analgesics** – are painkillers, e.g. aspirin, paracetamol, morphine and cocaine.
- **Hallucinogenic drugs** – distort the mind's ability to interpret the surroundings.

22. **Alcohol** has the following effects:

- It interferes with the messenger molecules in the synapses – slowing down messages.
- Heavy drinking damages the liver, as it is the liver that removes alcohol from the body.
- It takes one hour to remove one unit of alcohol from the body (1 unit = ½ pint beer etc.)

23. **Protein synthesis** takes place in the following stages:

- The **DNA** unwinds and is copied to **messenger RNA** (mRNA).
- The mRNA moves into the **cytoplasm**.
- **Transfer RNA** (tRNA) attaches onto each **codon** (group of three bases).
- This codes for specific **amino acids** – peptide bonds form to create a **protein** chain.