

Excretion in humans

IGCSE Biology 0610 · Topic 13 revision notes

Everything from the 2 lessons of this topic on a few pages: the key idea of each lesson, the diagram to remember, the points to learn and the traps examiners set. Read it, cover it, test yourself.

1. Excretion and the liver

2. The kidney

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1 Excretion and the liver

Syllabus 13.1

Excretion is the removal of the waste products of metabolism and substances in excess of requirements. **Carbon dioxide is excreted through the lungs**, and **the kidneys excrete urea and excess water and ions** as urine, which passes down the ureters to the bladder and out through the urethra. Extended: the liver joins amino acids into proteins (assimilation); excess amino acids are **deaminated**, their nitrogen-containing part being removed to form urea, which is toxic and so must be excreted.

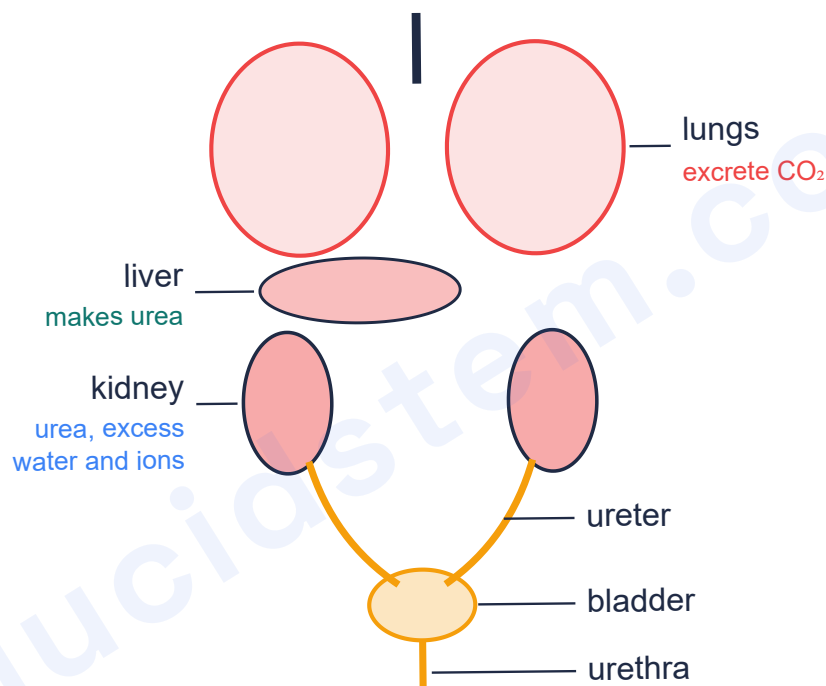


Fig. 1: the human excretory organs; urine flows from each kidney down a ureter to the bladder and leaves through the urethra

Lungs, kidneys, liver.

- ✓ **Lungs:** excrete carbon dioxide from respiration.
- ✓ **Kidneys:** excrete urea, excess water and excess ions as urine.
- ✓ **Route:** kidney, ureter (two), bladder, urethra (one).
- ✓ **Extended:** liver assimilates amino acids into proteins; excess are deaminated and the nitrogen-containing part forms urea, which is toxic.

Watch out!

Do not mix up the ureter and the urethra. There are two ureters, each running from a kidney to the bladder; there is one urethra, running from the bladder to the outside. Remember the order: kidney, ureter, bladder, urethra.

Urea is made in the liver, not in the kidneys. The kidneys only remove urea from the blood and excrete it. Deamination removes the nitrogen-containing part of the amino acid; it does not destroy the whole molecule.

Egestion is not excretion. Faeces are mostly undigested food that never entered the body cells, so removing them is egestion.

Excretion removes substances made by metabolism, such as carbon dioxide and urea.

2 The kidney

Syllabus 13.1

Extended: a kidney cut lengthways shows an outer **cortex** and an inner **medulla**. In each nephron, blood in the **glomerulus** is filtered: **water, glucose, urea and ions** pass into the nephron, while blood cells and proteins stay in the blood. As the filtrate flows along the nephron, **all of the glucose, some of the ions and most of the water are reabsorbed** into the blood. What is left is **urine**: urea, excess water and excess ions.

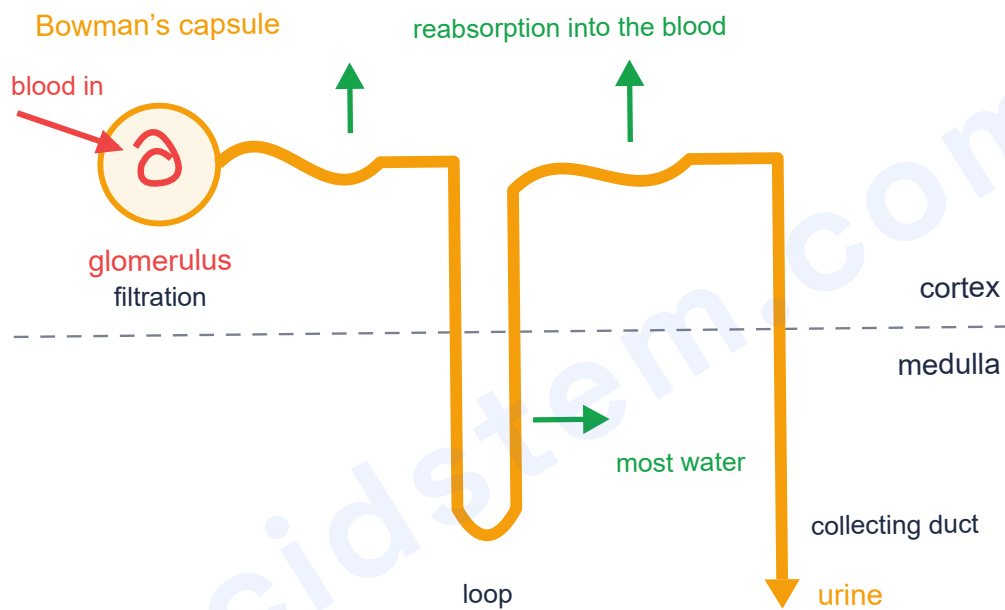


Fig. 1: a nephron (simplified); filtration in the glomerulus in the cortex, then reabsorption into the blood along the tubule, leaving urine in the collecting duct

Filtered, then sorted.

- ✓ **Cortex** outer, **medulla** inner.
- ✓ **Glomerulus filters** water, glucose, urea and ions; blood cells and proteins stay in the blood.
- ✓ **Reabsorbed:** all the glucose, some ions, most water.
- ✓ **Urine:** urea, excess water, excess ions; no glucose, no protein.

Watch out!

The cortex is the outer layer and the medulla is the inner layer. The pale space in the middle, joined to the ureter, is the pelvis, not the medulla.

Filtration does not pick out the useful substances: glucose is filtered out along with urea, because both are small. The nephron sorts useful from waste later, by reabsorption.

Healthy urine contains no glucose and no protein. Glucose is filtered, but all of it is reabsorbed; protein is never filtered at all. Keep the two reasons separate.