

Excretion in Humans

IGCSE Biology ■ Topic 13

IGCSE Biology



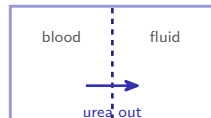
What we will cover

1 Excretion & the urinary system

2 The nephron

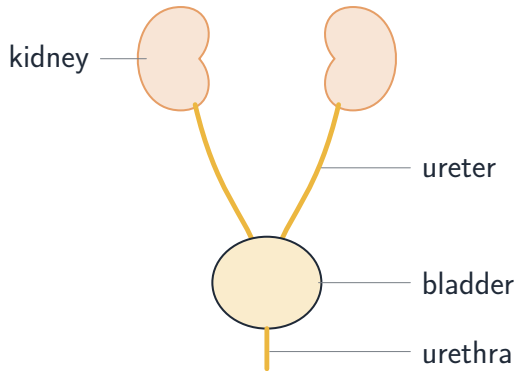
3 The liver & urea

4 Dialysis



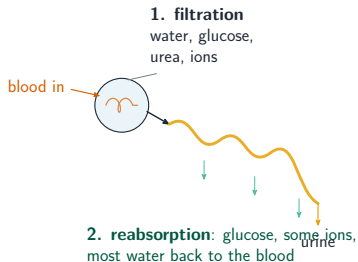
dialysis

Excretion and the urinary system



Kidneys and dialysis clean the blood

The nephron

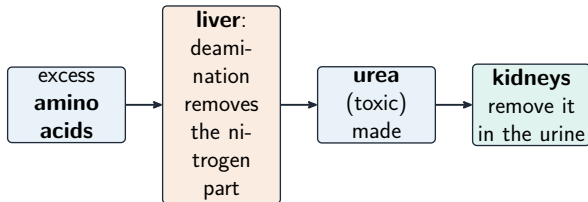


A **nephron** 肾单位 cleans the blood in two steps:

- **filtration** 过滤 at the **glomerulus** 肾小球 – water, glucose, urea, ions out
- **reabsorption** 重吸收 – **all** glucose, **some** ions, **most** water back

What is left is urine.

The liver and urea



The **liver** 肝脏 breaks down excess **amino acids** 氨基酸 by **deamination** 脱氨基作用, making **urea** 尿素.

Urea is **toxic**, so the kidneys must excrete it before it builds up.

Dialysis



If the kidneys fail, a **dialysis** 透析 machine does their job. Blood flows through; waste & excess water cross a thin membrane; clean blood returns.

Worked example – what the kidney does

Glucose is filtered out of the blood at the kidney, yet healthy urine has none. Explain.

- At the glomerulus, high pressure forces small molecules out: **ultrafiltration**.
- Water, glucose, salts and urea all cross; **blood cells and proteins are too big** to.
- So the filtrate **does** contain glucose at first.
- Further along the tubule, **all** the glucose is taken back into the blood: **selective reabsorption** 选择性重吸收.
- **Glucose in urine** therefore suggests diabetes – too much to reabsorb.

Two steps: **ultrafiltration** (by size, at the glomerulus) then **selective reabsorption** (useful things taken back). Urea is the **waste** that stays.

Topic 13 – key takeaways

1

Wastes

CO₂ via lungs; urea via kidneys

2

Urine path

kidney, ureter, bladder, urethra

3

Nephron

filter, then reabsorb glucose, ions, water

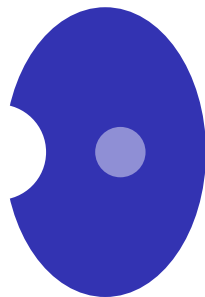
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Urea

liver makes it by deamination; it is toxic

Check yourself

- 1 Which organ makes urea?
- 2 What happens at the glomerulus?
- 3 What does the nephron reabsorb all of?
- 4 Why must urea be excreted?



Answers 1. the liver 2. filtration of the blood 3. glucose 4. it is toxic if it builds up