

Excretion in Humans

IGCSE Biology ■ Topic 13

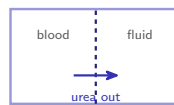
IGCSE Biology



Excretion in Humans

What we will cover

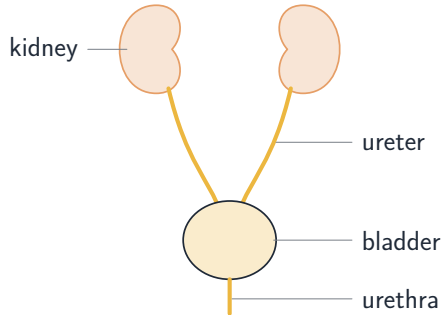
- 1 Excretion & the urinary system
- 2 The nephron
- 3 The liver & urea
- 4 Dialysis



dialysis

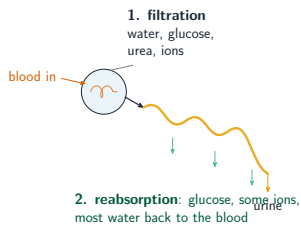
1 The kidneys

Excretion and the urinary system



- **carbon dioxide** 二氧化碳 – made during respiration, and breathed out through the lungs.
- **urea** 尿素 – made in the **liver** 肝脏, and removed by the kidneys together with excess water and **ions** 离子.

The nephron



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

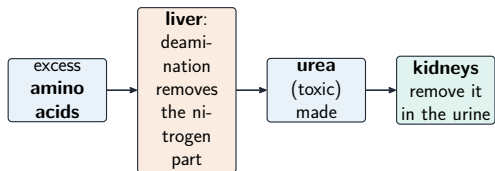
- **filtration** 过滤 at the **glomerulus** 肾小球 – water, glucose, urea, ions out
- **reabsorption** 重吸收 – **all** glucose, **some** ions, **most** water back

What is left is urine.

2

Urea and dialysis

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.

3

Recap

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

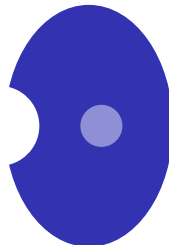
filter, then reabsorb glucose, ions, water

4 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