



How Your Kidneys Filter Waste from Blood

KS4 BIOLOGY

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What Do Kidneys Do?

Your **kidneys** are two **bean-shaped organs** that sit just below your ribs. Every single day, they filter about **180 litres of blood** to remove **waste products** that your body doesn't need. Without your kidneys, poisonous waste would build up in your blood and make you very ill.

How Blood Gets Filtered

Your kidneys work like a super-sophisticated cleaning system. Blood enters your kidneys through special blood vessels called **arteries**. Inside each kidney, there are about **one million tiny filtering units** called **nephrons**. Each nephron acts like a miniature water treatment plant.

Think of it like a kitchen sink strainer. Just as a strainer catches big pieces of food while letting water through, your nephrons separate what your body needs from what it should throw away.

The Three Stages of Filtration

First, **ultrafiltration** happens. Blood is pushed through tiny holes in the walls of blood vessels. Most of the water, glucose, urea (the main waste), and other small molecules squeeze through into a tube called the **Bowman's capsule**. Large molecules like proteins and blood cells are too big to pass through, so they stay in the blood.

Second comes **selective reabsorption**. As the filtered liquid travels down a long tube called the **proximal convoluted tubule**, your body recovers what it needs. Glucose, salts, and some water are reabsorbed back into the blood through the tube walls. This is important because you need these things!

Finally, **osmoregulation** fine-tunes your water balance. The remaining liquid, called **urine**, moves into the **collecting duct**. Water can be reabsorbed here too, depending on how much water your body needs. This is why you might produce more dilute

(watery) urine when you drink lots, or more concentrated urine when you're dehydrated.

Think of it like sorting recyclables. First you separate everything, then you pick out the useful stuff to use again, and finally what's left goes in the bin.

Where Does Urine Go?

The finished **urine** contains water, urea, and other unwanted substances. It flows down tubes called **ureters** to your **bladder**, where it's stored. When your bladder is full, you feel the urge to go to the toilet and pass urine out of your body.

Your kidneys are working 24 hours a day to keep your blood clean and balanced. That's why staying hydrated and looking after your kidneys is really important for your health!