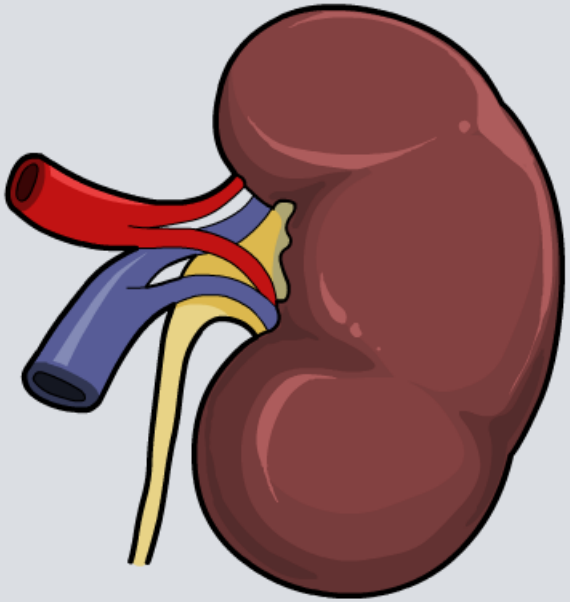
The Kidneys

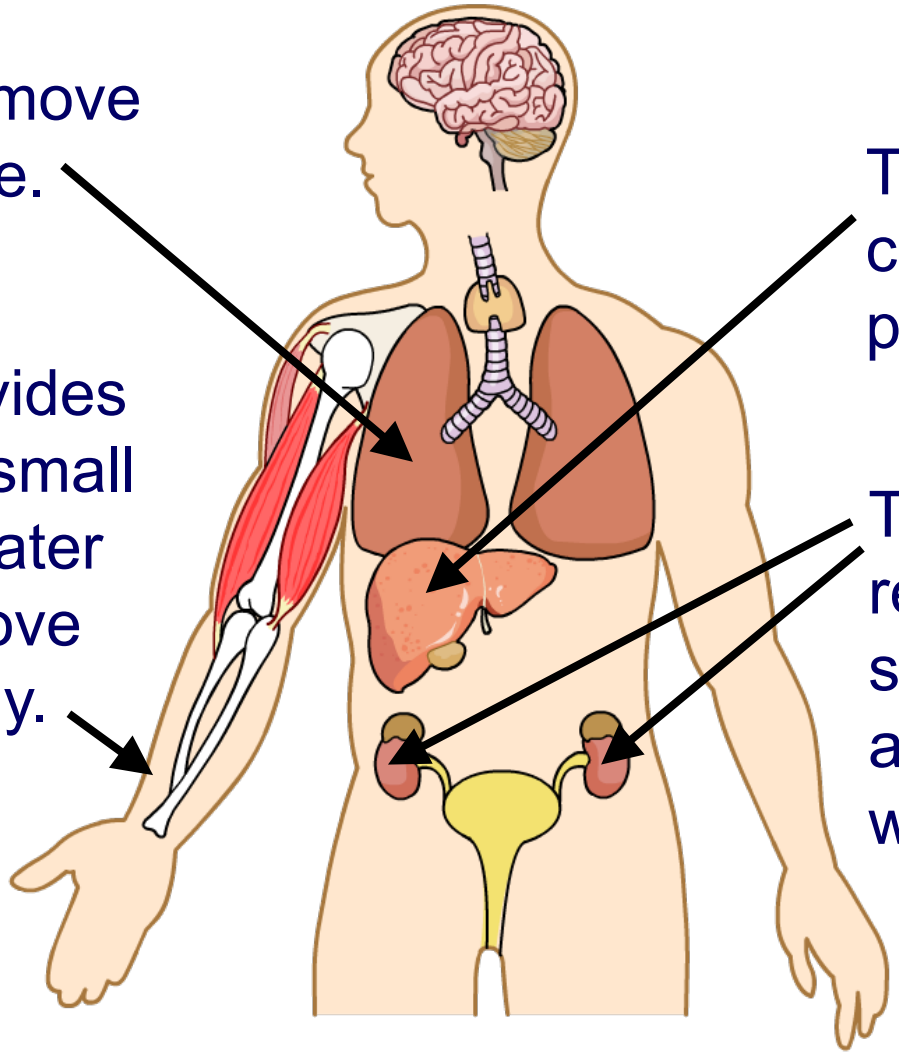


Waste removal

Several organs are important in removing waste from the body.

The **lungs** remove carbon dioxide.

The **skin** provides a surface for small amounts of water and salt to move out of the body.

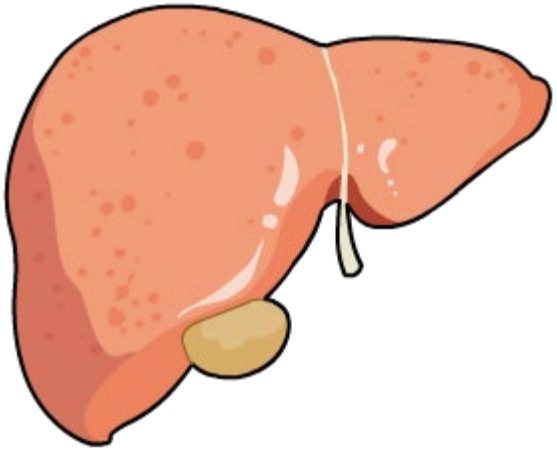


The **liver** converts excess protein into **urea**.

The **kidneys** remove unwanted substances such as urea, excess water and salt.

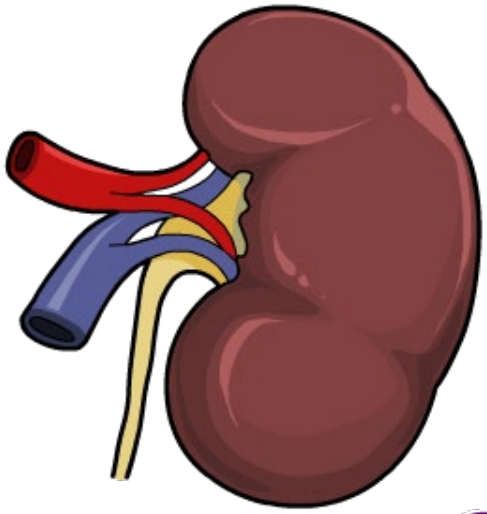
What is urea?

Excess **amino acids** in the body are broken down by the liver, producing a waste substance called **urea**.



This process is important because it converts **toxic ammonia** to urea, which is done using carbon dioxide.

Once formed, urea is transported by the circulatory system to the kidneys.



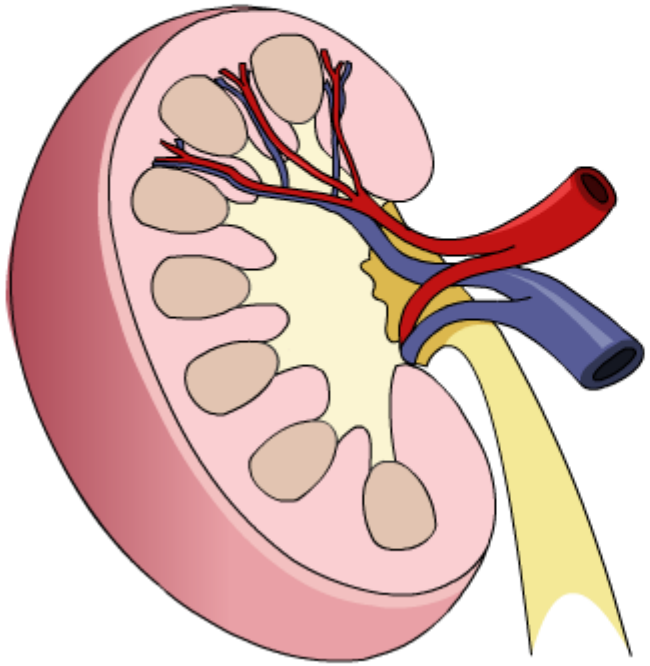
The kidneys filter the blood, removing urea and excess water and salt, which forms **urine**. Urine is stored in the bladder before being excreted from the body.

What are the different parts of a kidney?

The structures of the kidney

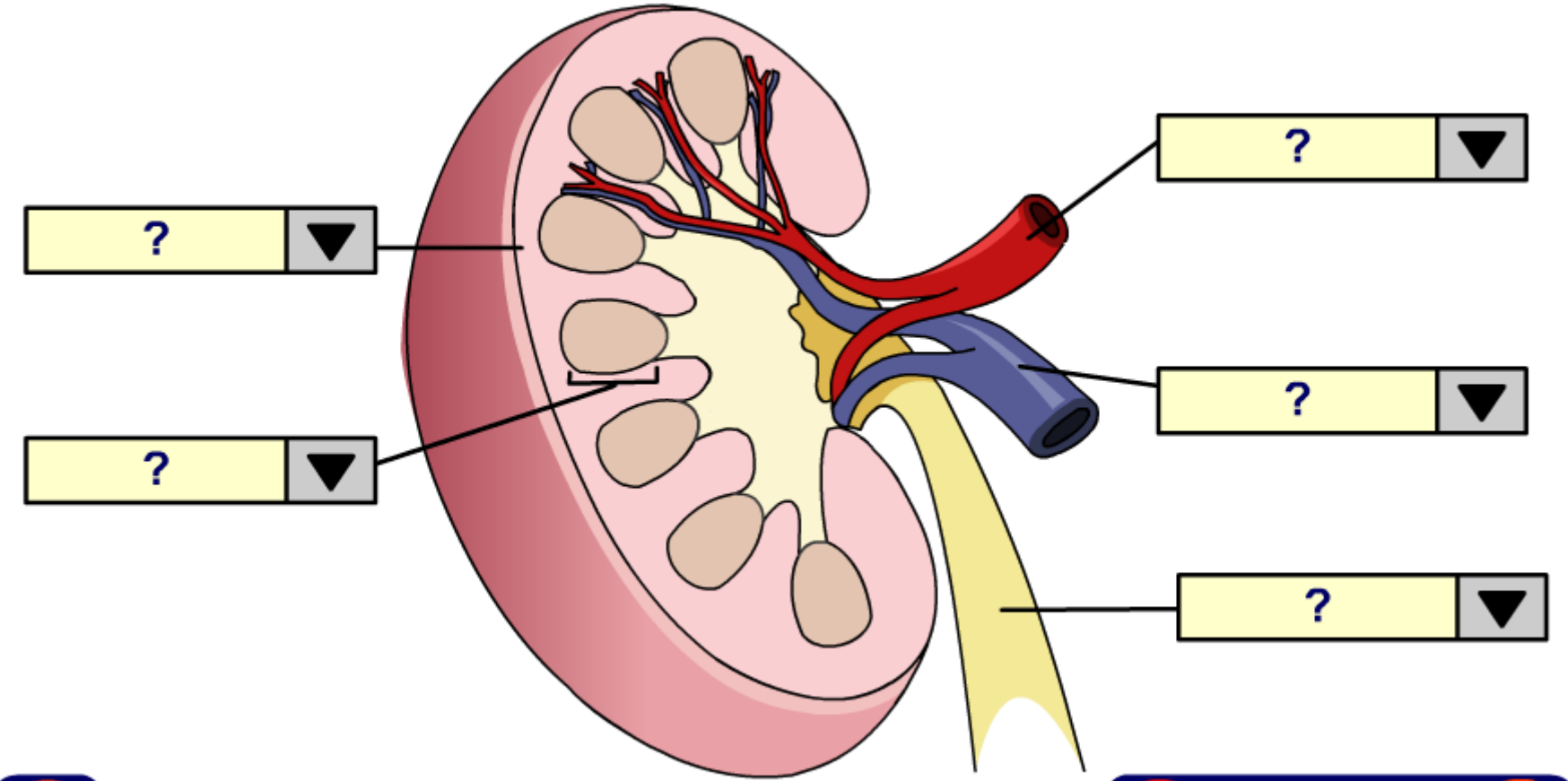
Click on a button for more information about each structure within the kidney.

- renal artery
- renal vein
- ureter
- cortex and medulla



Labeling the kidney

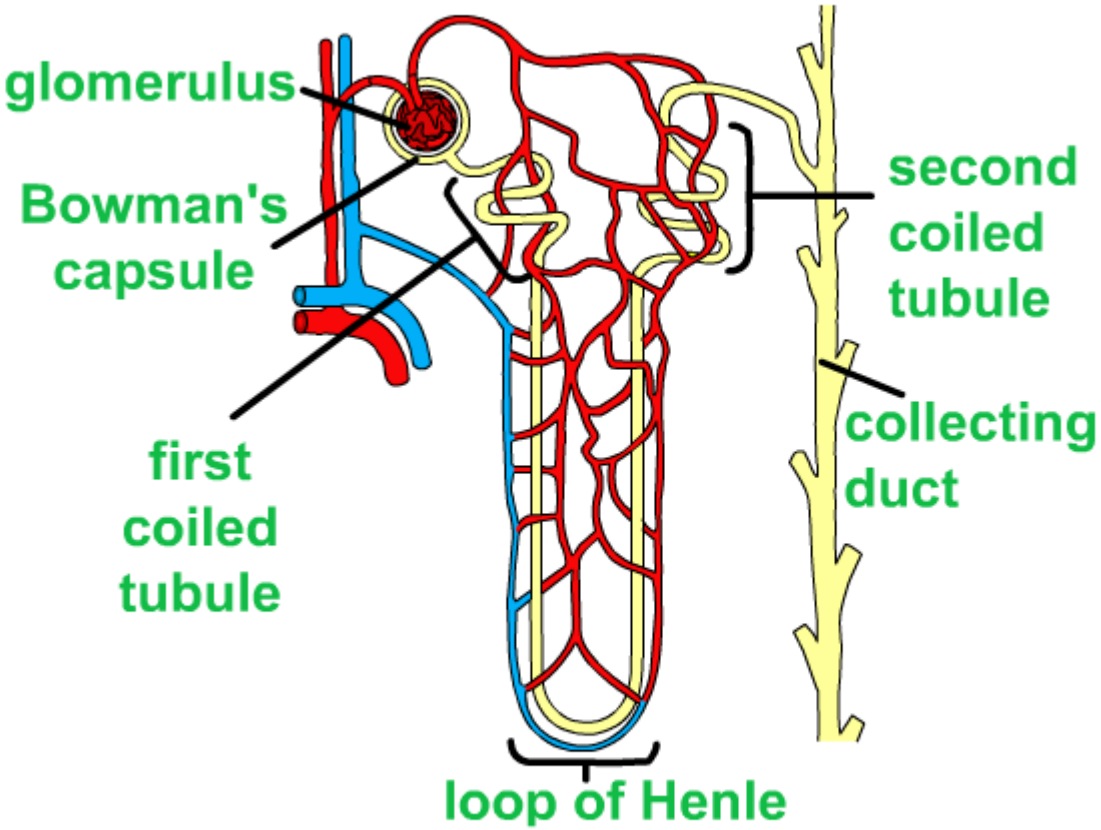
Can you label each part of the kidney?



How does a nephron filter different substances?

A nephron is a filtering unit of the kidney, made up of several different areas. Blood vessels of the renal vein and artery surround the nephron.

Click "**play**" to find how the nephron filters blood.



Stages in the nephron

What is the order of stages in the filtration of blood?

1. Small substances enter the Bowman's capsule
2. Water moves out of the loop of Henle
3. Water moves out of the collecting duct
4. Urine enters the ureter
5. Blood from the renal artery enters the glomerulus
6. Glucose, some water and salt are reabsorbed
7. Salt moves out of the loop of Henle

? C solve

Controlling water content

How is the water content of the body controlled?

If body fluids become too concentrated or dilute, the body can become damaged.

Click "**play**" to find out how a hormone helps to control the body's salt and water levels.

Regulating water content

What are the missing words about the role of ADH?

1. The hypothalamus detects a **high** water content in the body. This results in [?] ADH being produced by the [?].

2. The second coiled tubule and collecting duct become [?] permeable to water.

3. [?] water moves out of the nephron, back into the body.

solve

Analyzing urine

Changes in the color, clarity, pH and the presence of certain substances in urine can help doctors diagnose medical conditions:

- Protein or red blood cells in urine can indicate kidney damage or disease, as these substances would not normally filter through the glomerulus.
- Glucose in urine is often an indication of diabetes. A person with diabetes will have a high level of glucose in the blood.

Which sample?

Match the urine sample to the appropriate patient

very dark in color	marathon runner
containing glucose	person with diabetes
containing protein	person who has drunk a lot of fluid
very light in color	football player kicked in kidneys

?

solve