

📖 Topic Page: [kidney](#)

Definition: **kidney** from *Collins English Dictionary*

n

1 either of two bean-shaped organs at the back of the abdominal cavity in man, one on each side of the spinal column. They maintain water and electrolyte balance and filter waste products from the blood, which are excreted as urine. Related adjectives: **nephritic, renal**

2 the corresponding organ in other animals

3 the kidneys of certain animals used as food

4 class, type, or disposition (esp in the phrases **of the same** or **a different kidney**)

[C14: of uncertain origin]

> 'kidney, like *adj*

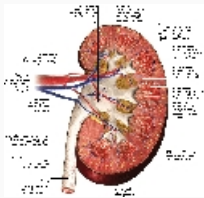


Image from: [Kidney cross section This cutaway shows the... in The Human Body Book: An Illustrated Guide to Its Structure, Function and Disorders](#)

Summary Article: **kidney**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

In vertebrates, one of a pair of organs responsible for fluid regulation, excretion of waste products, and maintaining the ionic composition of the blood – in other words the regulation of the concentrations of some chemicals in the blood. The kidneys are situated on the rear wall of the abdomen. Each one consists of a number of long tubules (see nephron) – the outer parts filter the aqueous components of blood, and the inner parts selectively reabsorb vital salts, leaving waste products in the remaining fluid (urine), which is passed through the ureter to the bladder.

The kidneys tasks can be broken down into a number of stages: filtering of the blood; re-absorbance of all sugar; re-absorbance of the dissolved ions needed by the body; re-absorbance of as much water as the body needs; and release of urea, excess ions, and excess water as urine.

The action of the kidneys is vital and so kidney failure is serious. However, if one kidney fails, the other enlarges to take over its function. A patient with two defective kidneys may still continue near-normal life with the aid of dialysis using a kidney machine or continuous ambulatory peritoneal dialysis (CAPD), or by a kidney transplant. Other diseases of the kidney can include the formation of kidney stones. These hard stones can build up as a result of high levels of blood calcium or high levels of uric acid, and can cause intense pain as they travel down the ureter, as well as causing bleeding in the tissues of the urinary tract.

Role in filtering blood Filtering of the blood is essential in that it removes unwanted chemicals. Any chemical passing through the kidney that is filtered out and not intentionally reabsorbed back into the body is lost in the urine. Poisons, unnatural chemicals, and pollutants can be lost this way. However, many mineral salts are small enough to pass through the kidney filter. To prevent the loss of important

chemicals such as glucose and mineral salts, they are reabsorbed back into the body by the kidney. This may be against a concentration gradient so energy derived from respiration must be used. This process is called active transport.

Regulation of water content The kidneys produce dilute urine if there is too much water in the blood or concentrated urine if there is too little water in the blood. This is regulated by a hormone – antidiuretic hormone (ADH). If the water content of the blood is too low, the pituitary gland releases ADH into the blood. This causes the kidneys to re-absorb more water and results in a more concentrated urine. If the water content of the blood is too high, less ADH is released into the blood. Less water is re-absorbed in the kidneys, resulting in a more dilute urine. So more water is lost in the urine.

Regulation of protein levels If more protein is eaten than is needed to make different proteins for the body, the excess is broken down in the liver. One product of this breakdown is urea and this has to be lost from the body. The kidneys do not reabsorb urea, so it is lost in the urine. Urine produced by the kidneys is temporarily stored in the bladder.

Dialysis In a dialysis machine a person's blood flows between partially permeable membranes. Waste urea passes out from the blood into the dialysis fluid. Treatment by dialysis restores the concentrations of dissolved substances in the blood to normal levels and has to be carried out at regular intervals. During dialysis it is important that useful substances in the blood, such as glucose and mineral ions, are not lost. To prevent this the dialysis fluid contains the same concentrations of these substances as blood. This ensures that only waste substances and excess ions and water diffuse (see diffusion) into the dialysis fluid.

Kidney transplant A kidney transplant enables a diseased kidney to be replaced by a healthy one from a donor. However, the donor's kidney may be rejected by the patient unless precautions are taken.

To prevent rejection a donor kidney with a 'tissue type' similar to that of the patient is used, the bone marrow of the patient is treated with radiation to stop white blood cell production, the recipient is kept in sterile conditions for some time after the transplant operation, and the recipient is treated with drugs that reduce the risk of rejection.

There are advantages and disadvantages of these two alternative approaches to dealing with kidney failure. Dialysis is tedious and occurs at regular intervals and may restrict how much a person can travel around. A transplant needs a suitable donor kidney to be available, which is by no means certain. After transplantation, patients have to take drugs for the rest of their lives. These drugs prevent rejection of the kidney but make a person more likely to catch diseases.

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