

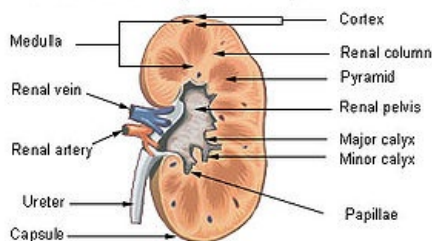
Kidney function

The kidneys are a paired organ housed in the retroperitoneum with several vital functions.

Exclusion function

The kidneys excrete those substances that are in excess in the body. E.g. water sodium, potassium, phosphate and calcium ions, but also by-products of metabolism, such as uric acid, which is a product of purine metabolism, urea (as the end product of protein metabolism) and creatinine as the end product of creatine metabolism of muscles.

Frontal section through the Kidney



The structure of the kidney

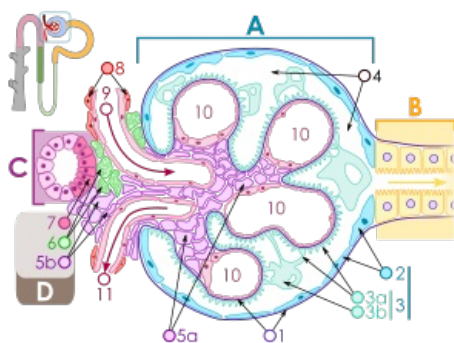


Diagram of the structure of the glomerulus:

A – Glomerulus B – Proximal tubule C –
Convoluted part of the distal tubule D –
Juxtaglomerular apparatus 1. Basal lamina 2.
Bowman's capsule - parietal layer 3.
Bowman's capsule - visceral layer 3a.
Pedicles 3b. Podocyte 4. Bowman's space
(urinary space) 5a. Mesangium –
Intraglomerular cell 5b. Mesangium –
Extraglomerular cell 6. Granular cells (
Juxtaglomerular cells) 7. Macula densa 8.
Myocytes (smooth muscle) 9. Vas afferens
10. Capillaries of the glomerulus 11. Vas
efferens

increases (exceeds excretion of bicarbonate), the acidity of the extracellular fluid decreases and acidosis occurs. In alkalosis, the opposite is true. Complicated mechanisms of hydrogen cation regulation cause a slow onset of effect, which occurs only after a few days. However, this disadvantage is compensated by the possibility of regulation for a relatively long time.

[For more information see Function of the kidney in maintaining acid-base balance.](#)

Links

Related articles

- Kidneys
- Calcium phosphate metabolism
- Erythropoietin
- The renin-angiotensin-aldosterone system
- Kidney function in maintaining acid-base balance
- Natriuretic peptides

Resources

Endocrine function

Renin is secreted by the juxtaglomerular cells, which have been transformed from the muscle cells of the vessels lining the distal tubule. It is secreted as a response to reduced blood flow to the kidneys, to stimulation by the vegetative system or to a reduced concentration of sodium and chlorine in the distal tubule. Renin is part of the renin-angiotensin-aldosterone system, which maintains the composition of blood plasma and is involved in the regulation of blood pressure.

[For more information see Renin-angiotensin-aldosterone system.](#)

Erythropoietin is a substance that regulates the production of red blood cells and is largely produced in the kidneys (90-95%).

Vitamin D is converted in the kidneys to the active metabolite calcitriol. Its function is to support the absorption of calcium and phosphates in the intestine and participate in the management of calcium metabolism in bones.

Control of blood volume and blood pressure

Pressure diuresis: As soon as the volume of blood in the circulation increases, vasoconstriction occurs reflexly in the arteries and thus the arterial pressure and filtration pressure in the kidneys increase. More glomerular filtrate is formed, secretion of hormones involved in water absorption is reduced, and urine output is increased, thereby reducing circulating volume and lowering blood pressure. **Humoral regulation of blood volume:** increasing blood volume in the right atrium induces the secretion of atrial natriuretic factor (ANF), which increases the excretion of sodium and, with it, water in the renal distal tubule. With increased pressure, the secretion of antidiuretic hormone and renin also decreases.

Maintenance of acid-base balance

A large amount of bicarbonate anions are filtered into the glomerular filtrate and are then actively reabsorbed as needed. Hydrogen cations are actively secreted into the tubules. The change in the size of the output of these two ions is proportional to very small changes in the extracellular concentration of these ions. As the amount of excreted hydrogen cation

- ROKYTA, Richard. *Physiology for bachelor's studies in medicine, nursing, science, pedagogy and physical education*. 2nd edition edition. ISV, 2008. ISBN 80-86642-47-X.