Kidney

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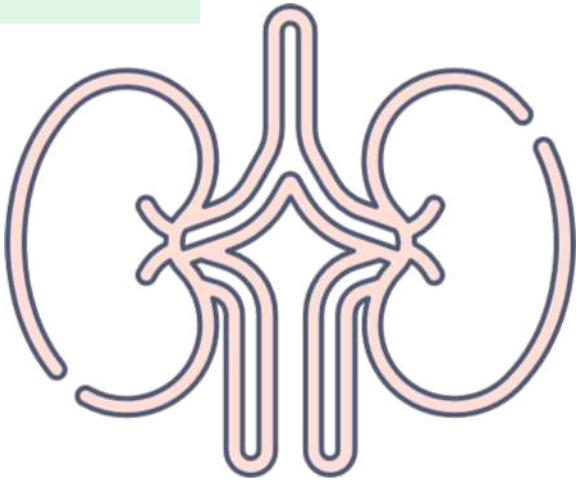


ILOs

01

Identify anatomical position of kidney.

02

Describe functional Unit of kidney.

03

Outline function of kidney.

04

Mention kidney Diseases.

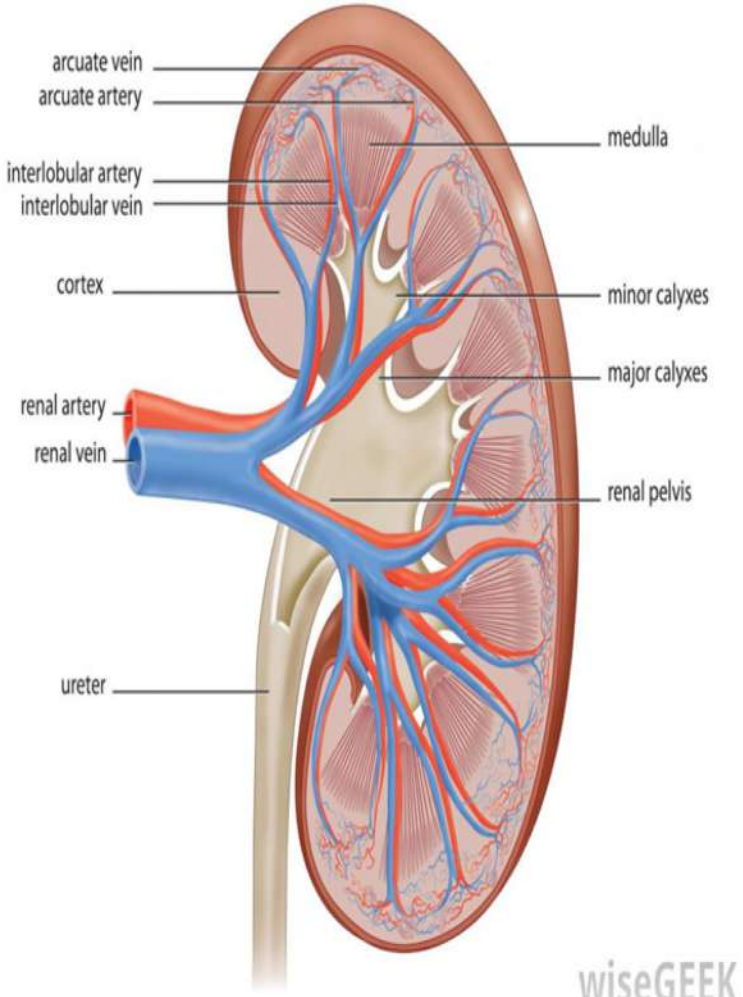
Introduction

The kidneys, two brown organs, are among the most important organs involved in the daily functions of the body, and are one of a pair of organs in the abdomen. The kidneys remove waste and extra water from the blood (such as urine) and help maintain a balance of chemicals (such as sodium, potassium, and calcium) in the body. also make hormones that help control blood pressure and stimulate the bone marrow to make red blood cells.

Anatomical position of kidneys

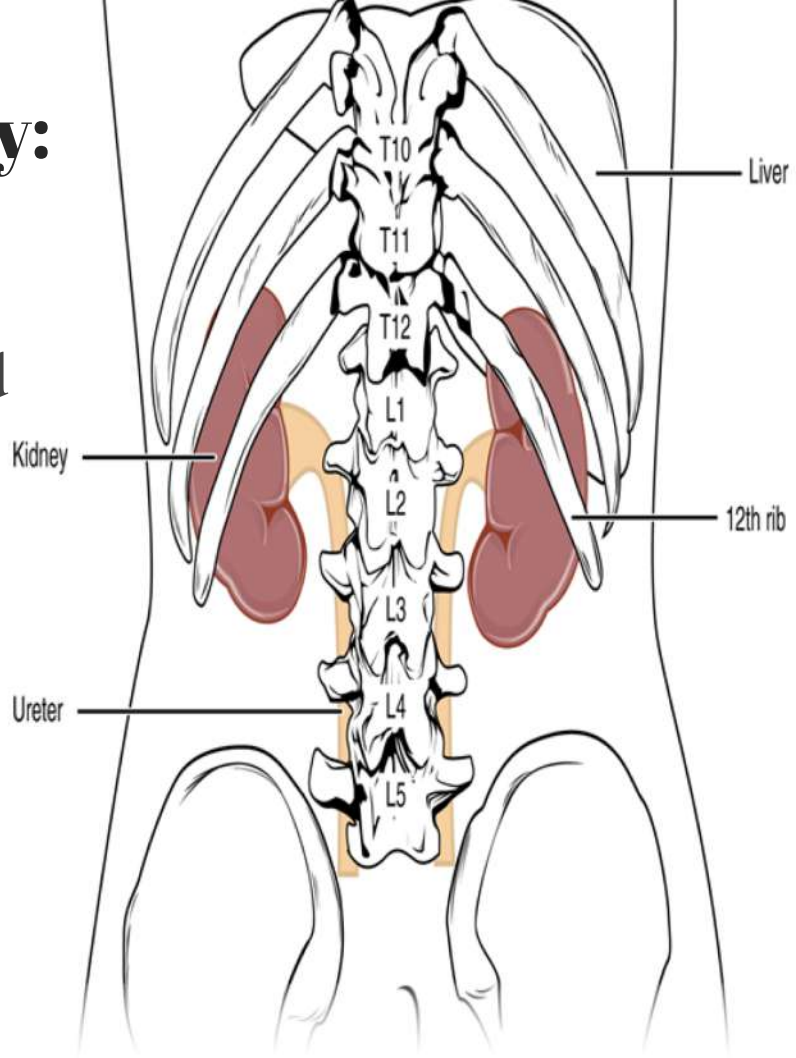
- The kidneys are bilateral bean-shaped organs, reddish-brown in color and located in the posterior abdomen.

- The kidneys lie retroperitoneally (behind the peritoneum) in the abdomen, either side of the vertebral column.



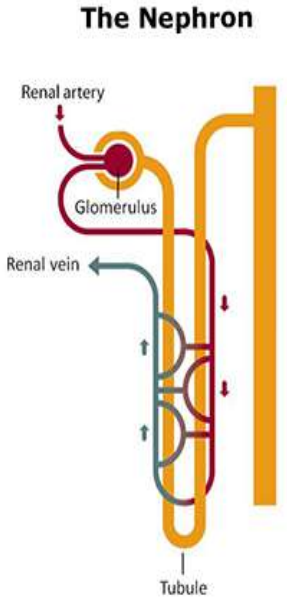
Anatomical position of kidney:

- They typically extend from T12 to L3, although the right kidney is often situated slightly lower due to the presence of the liver. Each kidney is approximately three vertebrae in length.



Functional unit of kidney :

- The functional unit of kidney is the Nephron. , the structure that actually produces urine in the process of removing waste and excess substances from the blood. There are about 1,000,000 nephrons in each human kidney
- The nephron consists of two main parts: The renal corpuscle & the renal tubule.



I Renal (Malpighian) corpuscle:

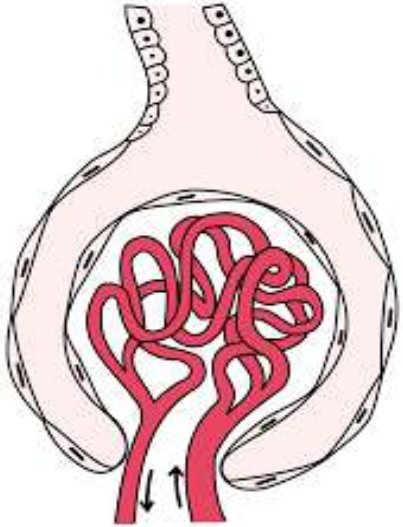
It is formed of:

1- Bowman's capsule:

- It is continuous with the lumen of the renal tubule.
- It opens into the proximal convoluted tubule

2- Glomerular:

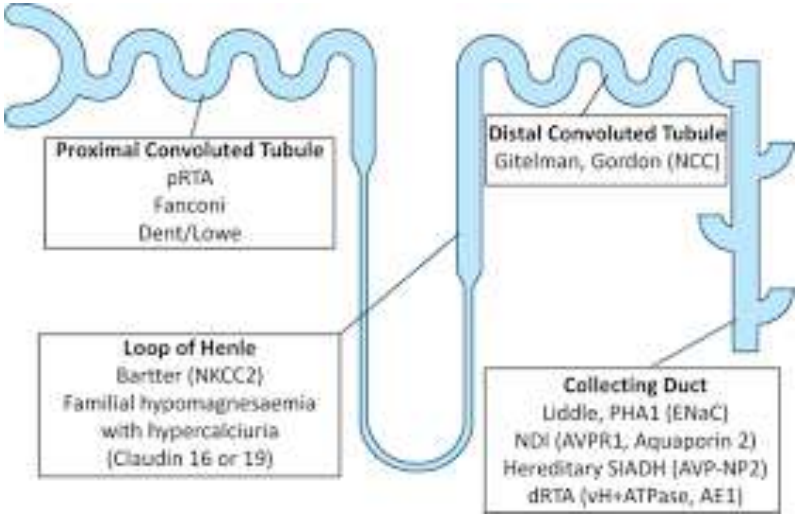
- It consists of multiple capillary vessels connected with each other by short vessels.
- These capillary vessels are surrounded by the thin membrane of the Bowman's capsule.
- Blood enters the glomerular from the short wide afferent arteriole, & blood leaves the glomerular by the narrow efferent arteriole.

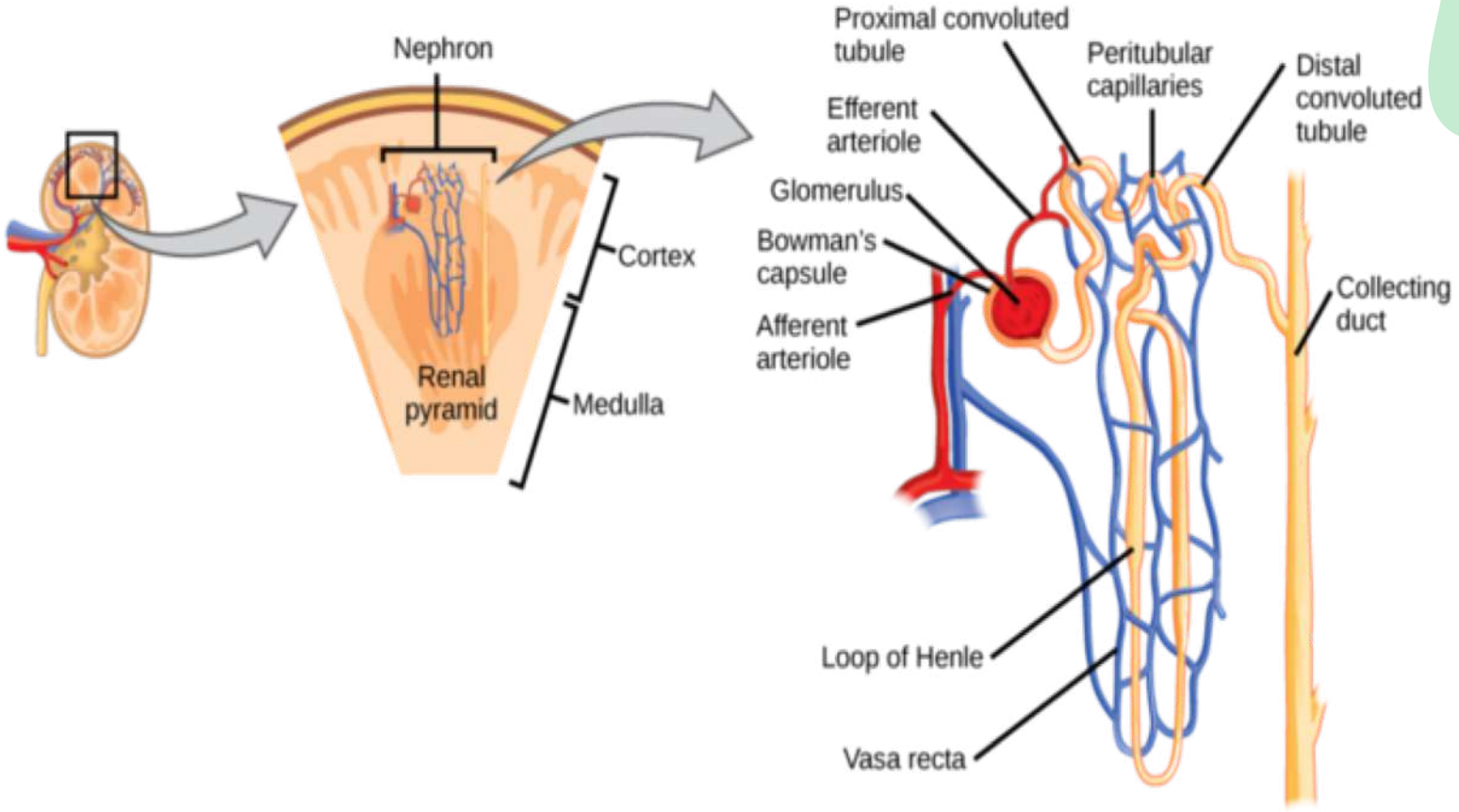


II Renal tubule:

It consists of:

- Proximal convoluted tubule (PCT).
- Loop of Henle.
- Distal convoluted tubule (DCT)
- Collecting tube & colleting duct




Nephron
Cortex
Renal pyramid
Medulla
Proximal convoluted tubule
Peritubular capillaries
Distal convoluted tubule
Efferent arteriole
Glomerulus
Bowman's capsule
Afferent arteriole
Collecting duct
Loop of Henle
Vasa recta

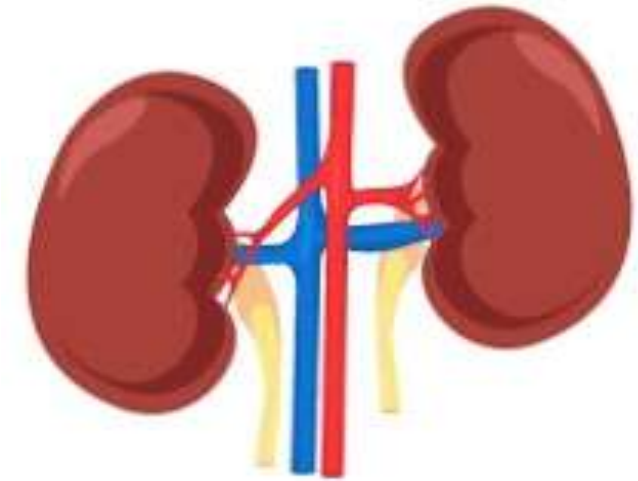
Functions of kidney:

1. **Homeostasis :**

- Excretion of metabolic waste products and foreign chemicals
- Regulation of water and electrolyte balances
- Regulation of body fluid osmolality and electrolyte concentrations.
- Regulation of arterial pressure.
- Regulation of acid-base balance.
- Secretion, metabolism, and excretion of hormones.

Secretion :

- Erythropoietin.
- Renin.
- 1,25dihydroxy colecaliferol.
- Prostaglandin (P6).



Excretion :

- Urea from amino acid
- Creatine from muscle creatine.
- Uric acid from nucleic acid or purine metabolism

The most common Kidney disease :

Renal failure:

Kidney failure can be divided into two categories: acute kidney failure or chronic kidney failure.

The type of renal failure is differentiated by the trend in the serum creatinine; other factors that may help differentiate acute kidney failure from chronic kidney failure include anemia and the kidney size on sonography as chronic kidney disease generally leads to anemia and small kidney size

Kidney stones :

are another common kidney disease. They occur when minerals and other substances in the blood crystallize in the kidneys, forming solid masses (stones). Kidney stones usually come out of the body during urination. Passing kidney stones can be extremely painful, but they rarely cause significant problems.

Glomerulonephritis:

is an inflammation of the glomeruli. Glomerulonephritis can be caused by infections, or drugs. It often gets better on its own.

Summary

- The kidneys, two brown organs, are among the most important organs involved in the daily functions of the body.
- The functional unit of kidney is the Nephron, there are about 1,000,000 nephrons in each human kidney.
- The nephron consists of two main parts: The renal corpuscle (bowman's capsule & glomerular) & the renal tubule(PCT, loop of Henle &DCT) .
- Functions of kidney: Homeostasis, Secretion of hormones & Excretion wastes.
- The most common Kidney disease :Renal failure, kidney stone & Glomerulonephritis

Thank for listeining

Reference

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