

# Kidneys

by Sophia



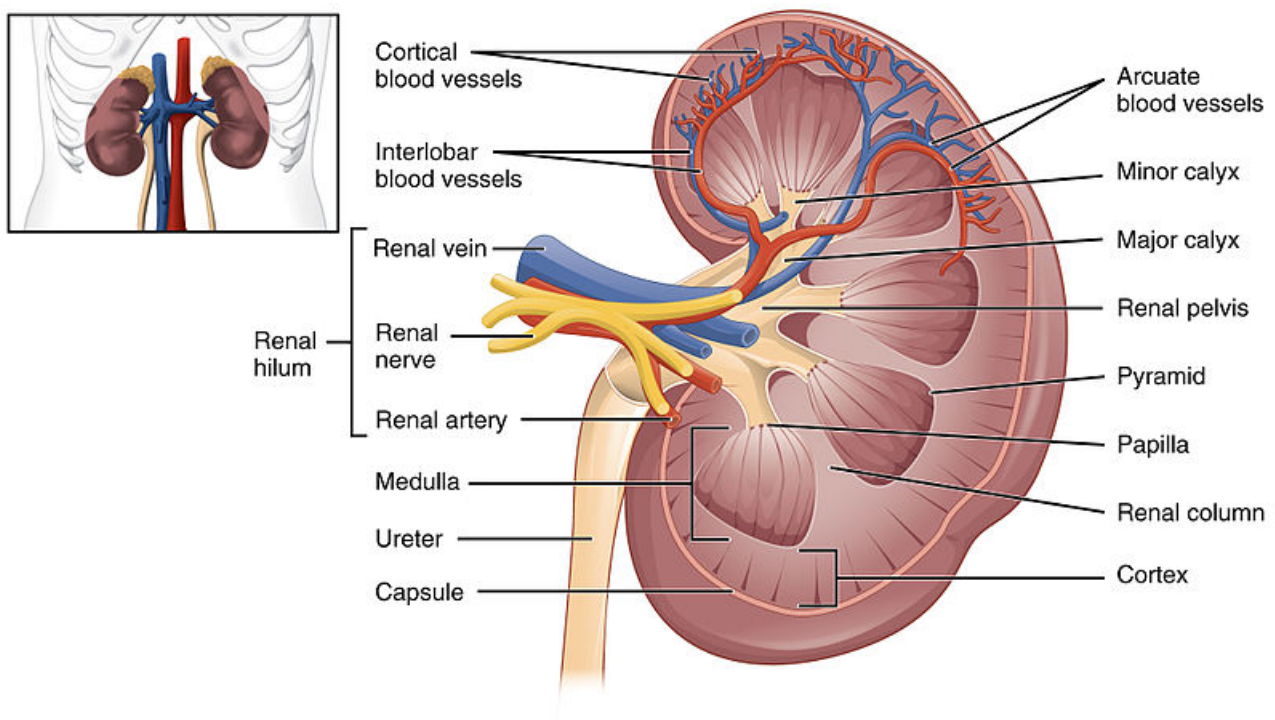
## WHAT'S COVERED

In this lesson, you will learn to identify the major structures and functions of the kidneys. Specifically, this lesson will cover:

## 1. Urine Formation

The kidneys regulate the composition and volume of bodily fluids by filtering waste and excess water from the blood. This process starts when blood enters either kidney through the renal arteries (“renal” means having to do with the kidneys). It then passes through microscopic tubes called **nephrons**, which do the actual filtering. From there, the filtered blood leaves the kidney through the renal veins. The waste and excess water removed by the nephrons become urine, which flows through a structure called the renal pelvis, out of the kidney and into the ureter.

The diagram below is a cross section of a kidney.



Most nephrons are found in the renal cortex, which is the outer layer of the kidneys, but they also reach into the inner layer, known as the renal medulla. A fibrous layer called the renal capsule encases the whole



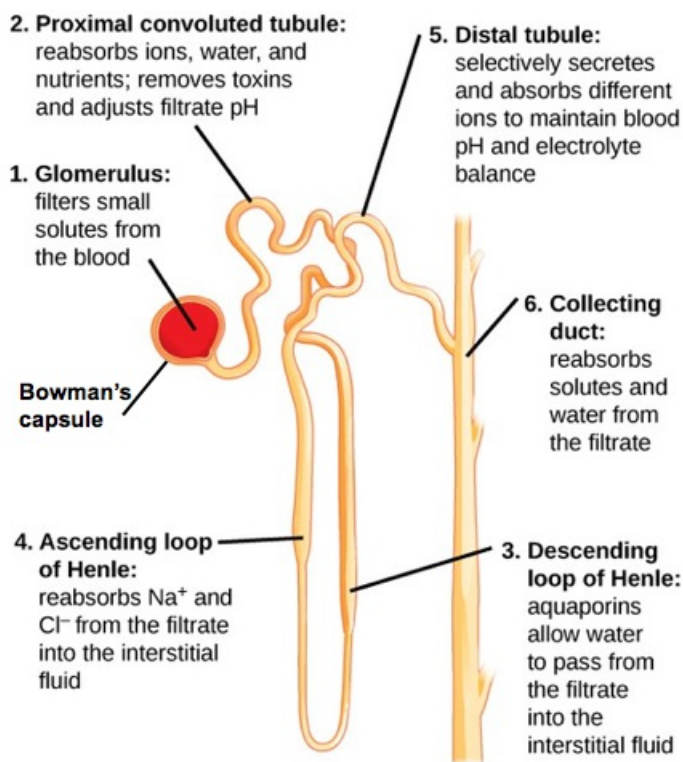
## TERM TO KNOW

### Nephron

Microscopic tubes within the kidneys that filter blood and produce urine; nephrons are made up of five parts: the Bowman's capsule, the proximal convoluted tubule, the loop of Henle, the distal convoluted tubule and collecting ducts.

## 2. Nephron Structure

Nephrons are made up of five parts, each of which plays an important role in the filtration of blood and formation of urine. They can be seen in the diagram below (numbers 3 and 4 are together one part).



The filtration process begins when blood enters the spherical **Bowman's capsule**, which contains a tuft of capillaries called a **Glomerulus**. These capillaries have membranes that let smaller materials like water molecules, minerals, and waste pass through, but not larger materials like proteins and cells.

The Bowman's capsule channels the water, minerals, and waste that have been removed from the blood into the **proximal convoluted tubule**. At this point, wanted materials like water and minerals are absorbed back into the blood.

The remaining waste then enters the **loop of Henle**, which has two parts: The descending loop of Henle and the ascending loop of Henle. This is the part of the nephron that leaves the renal cortex and enters the renal medulla before returning back to the cortex.

Next, the waste enters the **distal convoluted tubule** before flowing into the collecting ducts, which carry it to the renal pelvis and the ureter, at which point it leaves the kidney as urine.



## TERMS TO KNOW

### Bowman's Capsule

A capsule that surrounds the glomeruli, Bowman's capsule channels the filtered fluids from the glomerulus into the nephron.

### Glomerulus

The tufts of capillaries in the kidneys where the filtration of blood occurs; glomeruli have unique filtering membranes that repel cells and proteins and allow only small substances (water, electrolytes, wastes, etc.) to be filtered out of the blood.

### Proximal Tubule

The first tubular part of the nephron, the proximal convoluted tubule is where the majority of reabsorption of wanted materials back into the blood occurs and conversely where most secretion out of the nephron occurs.

### Loop of Henle

The second tubular part of the nephron, the loop of Henle dips down into the renal medulla and is the site where water conservation in the nephron occurs.

### Distal Convoluted Tubule

The last tubular part of the nephron, the distal convoluted tubule contains receptors for the antidiuretic hormone (ADH) and aldosterone, which are both important for water and salt retention.



## SUMMARY

This lesson has been an overview of the structure and function of the kidneys. You got to look at how the kidneys **form urine** and the **structure of the nephron** in the kidneys.

Keep up the learning and have a great day!



## ATTRIBUTIONS

- [Kidneys](#) | Author: Wikipedia | License: Creative Commons
- [Nephrons](#) | Author: Wikipedia | License: Creative Commons



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**Nephron**

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