

Difference Between Cortical Nephron and Juxtamedullary Nephron

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Key Difference - Cortical Nephron vs Juxtamedullary Nephron

The [kidney](#) is one of the main organs of our body which performs the [ultrafiltration](#). The microscopic functional unit of the kidney is the nephron. The nephron is composed of two subunits. They are renal corpuscle and renal tubule. The renal corpuscle consists of [capillaries](#) known as glomerulus and encompassing structure called as Bowman's capsule. The renal tubule is extending from the [Bowman's capsule](#). The healthy people have 0.8 to 1 million nephrons in a kidney. There are two types of nephrons in kidney such as Cortical Nephron and Juxtamedullary Nephron. The **key difference** between cortical nephron and juxtamedullary nephron is, **the Cortical Nephron does not go deep into the medulla, and their glomerulus is in the cortex while Juxtamedullary Nephron goes deeper into the medulla and their glomerulus lies in the border of [cortex and medulla](#).**

What is a Cortical Nephron?

The majority of nephrons start from the cortex. They do not go deep into the medulla. These nephrons are having short loop of Henle. The short loop of Henle is not penetrating into the medulla. And hence they are called as cortical nephrons. The cortical nephrons are further divided into two groups. They are 1. Superficial cortical nephrons and 2. mid-cortical nephrons. Cortical nephrons are located in the outer part of the cortex. It has smaller glomerulus. The renal corpuscle of the cortical nephron is located near the superficial renal cortex. Their main function is the reabsorption of water and small molecules from the filtrate into the [blood](#) and secretion of waste from blood to [urine](#).

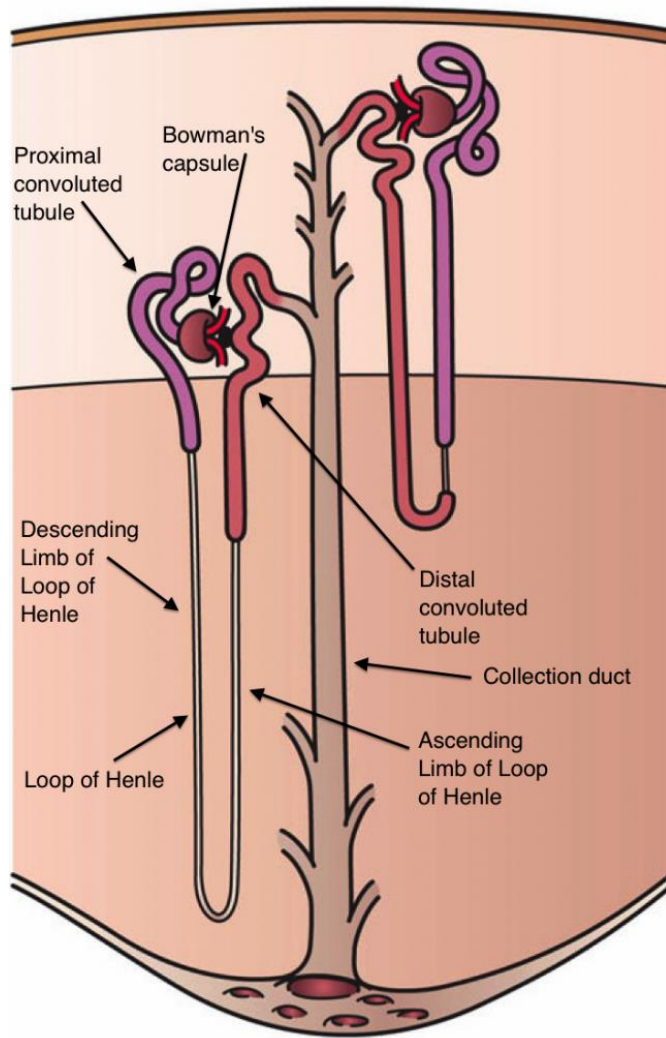


Figure 01: Kidney Nephron

The renin is a serine protease enzyme that is secreted by the kidneys. They participate in renin-angiotensin-aldosterone system (RAAS). The primary function of the renin is to maintain the volume of extracellular fluid and arterial vasoconstriction. Thus they control the arterial [blood pressure](#). The concentration of renin enzyme is really high in the cortical nephron. In humans, 85% of nephrons are cortical nephrons. But in other animals, this number can be differed based on the environment. For example, the animals in the arid lands consist less of cortical nephrons as their water consumption is very low.

What is a Juxtamedullary Nephron?

The juxtamedullary nephrons are the type of nephrons that can only be found in the [birds and mammals](#). The location of the juxtamedullary nephron is the inner part of cortex next to medulla.

As the name is suggesting, their renal corpuscle is located near the medulla. They have large glomerulus. And they also have a long loop of Henle which is penetrating deep into the renal medulla.

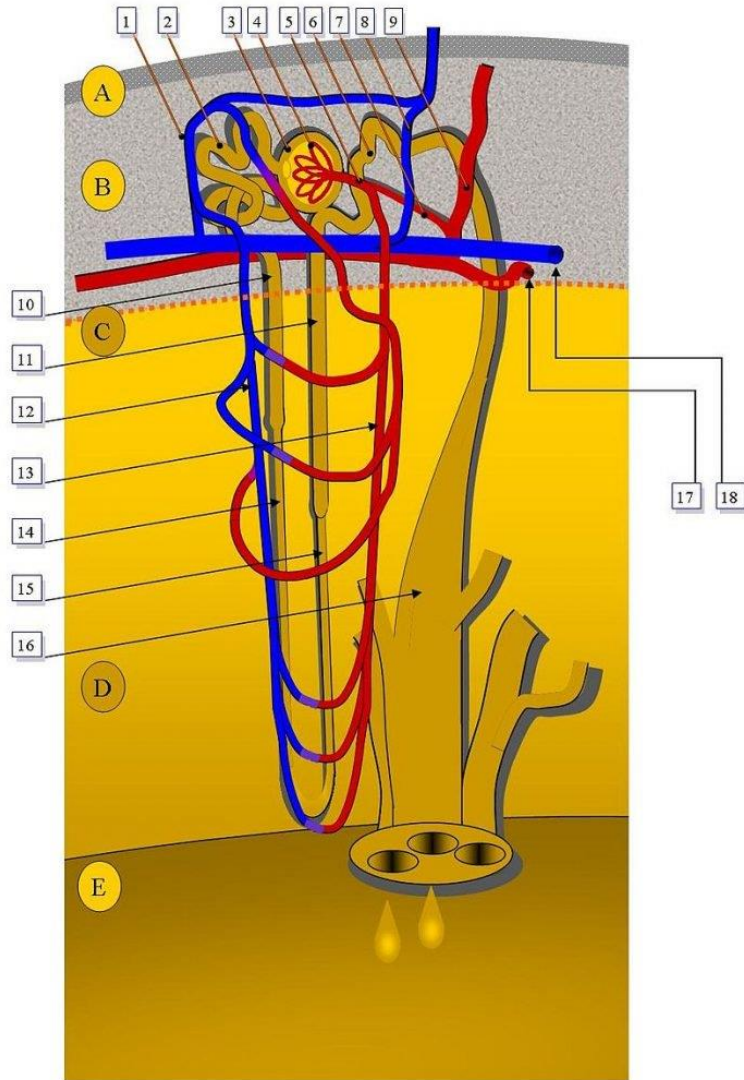


Figure 02: Juxtamedullary Nephron

In humans, 15% nephrons are the juxtamedullary type. The hairpin bend is penetrating deep into the renal medulla. They have less amount of the enzyme renin (almost no renin enzyme present). The main function of the juxtamedullary nephron is concentrating and diluting urine in the kidney. The greater gradient in the deep renal medulla makes these types of nephrons to work more than other types of shallow nephrons. These nephrons make more osmotic gradients in the renal medulla hence it helps in concentrating urine. The animals in arid lands have more of the juxtamedullary type of nephrons.

What are the Similarities Between Cortical Nephron and Juxtamedullary Nephron?

- Both are types of nephrons.
- Both are functional units of kidneys.
- Both are made up of renal corpuscles and renal tubules.
- Both of these nephrons help kidney's function which is ultra filtration.

What is the Difference Between Cortical Nephron and Juxtamedullary Nephron?

Cortical Nephron vs Juxtamedullary Nephron	
The cortical nephron is one type of nephron in the kidney which does not penetrate deep into the medulla, and the glomerulus is in the cortex.	The juxtamedullary nephron is another type of nephron which is going deeper into the medulla, and their glomerulus lies in the border of cortex and medulla.
Location	
The cortical nephron is in the outer part of the cortex.	The juxtamedullary nephron is the inner part of the cortex near to renal medulla.
Glomerulus Size	
The cortical nephron has smaller glomerulus.	The juxtamedullary nephron has larger glomerulus.
The length of the loop of Henle	
The cortical nephron consists of a short loop of Henle.	The juxtamedullary nephron consists of a long loop of Henle.
Concentration of renin	
The cortical nephron has a high concentration of renin enzyme.	The juxtamedullary nephron has almost no renin enzyme.
Total Number of Nephrons Percentage	

Cortical nephrons account for 85% out of a total number of nephrons in humans.	Juxtamedullary nephrons account for 15% out of a total number of nephrons in humans.
Sympathetic nerve innervations	
Cortical nephrons are rich in sympathetic nerve innervations.	Juxtamedullary nephrons are poor in sympathetic nerve innervations.
Function	
Cortical nephrons have reabsorption and secretion function of substances.	Juxtamedullary nephrons have the function of urine concentration.
The diameter of afferent and efferent arterioles	
The diameter of afferent arteriole is larger than efferent arteriole in cortical nephrons.	The diameter of afferent arteriole and efferent arteriole is equal to juxtamedullary nephrons.

Summary - Cortical Nephron vs Juxtamedullary Nephron

The nephron is the microscopic functional unit of the kidney which is designed to perform the major function of the kidney, that is Ultrafiltration. The nephron is composed of two subunits namely, renal corpuscle and renal tubule. The renal corpuscle consists of capillaries known as glomerulus and encompassing structure called as Bowman's capsule. The renal tubule is extending from the Bowman's capsule. The renal tubule and capsule are composed epithelial cells with the lumen. Two types of nephrons can be identified in kidneys. They are cortical nephrons and juxtamedullary nephrons. The cortical nephron does not go deep into the medulla, and their glomerulus is in the cortex. The juxtamedullary nephron is going deeper into the medulla, and their glomerulus lies in the border of cortex and medulla. The most abundant nephrons are the cortical nephrons in the kidney. This is the difference between cortical nephron and juxtamedullary nephron.

Reference:

1. "Nephron." Nephron - an overview | ScienceDirect Topics, sciencedirect.com/topics/medicine-and-dentistry/nephron.
2. "Nephron." Wikipedia, Wikimedia Foundation, 21 Nov. 2017. [Available here](#)

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