

Difference Between Bowman's Capsule and Glomerulus

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Key Difference - Bowman's Capsule vs Glomerulus

The nephron is the functional unit of the [kidney](#). It consists of a renal corpuscle and renal tubule. The renal corpuscle is the component that filters [blood](#) in the nephron of the kidney. The renal corpuscle is made up of a tuft of [capillaries](#) known as glomerulus and a capsule which is collectively known as [Bowman's capsule](#). Bowman's capsule is a membranous double-walled capsule which surrounds the glomerulus of the nephron.

The glomerulus consists of [endothelial cells](#). They are a cluster of capillaries situated at the beginning of the nephron. Based on their location in the nephron, two types of nephrons can be identified. In cortical nephron, glomerulus is situated in the renal cortex. In juxtamedullary nephron, glomerulus is situated in the renal medulla. The **key difference** between Bowman's capsule and glomerulus is, **Bowman's capsule is a double-walled capsule surrounding the glomerulus of nephron whereas glomerulus is a cluster of small blood capillaries in the nephron.**

What is Bowman's Capsule?

The Bowman's capsule is also known as a glomerular capsule. It is a cup-like a sac. And can be found at the beginning of the tubular part of the nephron of the mammalian kidney. The glomerulus is surrounded by the Bowman's capsule. It performs the first step of blood filtration in order to form [urine](#). The fluid from the blood in the glomerulus is collected by the Bowman's capsule. This glomerular filtrate is further processed along the other parts of the nephron in order to form urine. The hydrostatic pressure forces small molecules like water, [glucose](#), [amino acids](#) and NaCl from the blood in the glomerular capsule into the nephron. This particular process is defined as the [ultra filtration](#).

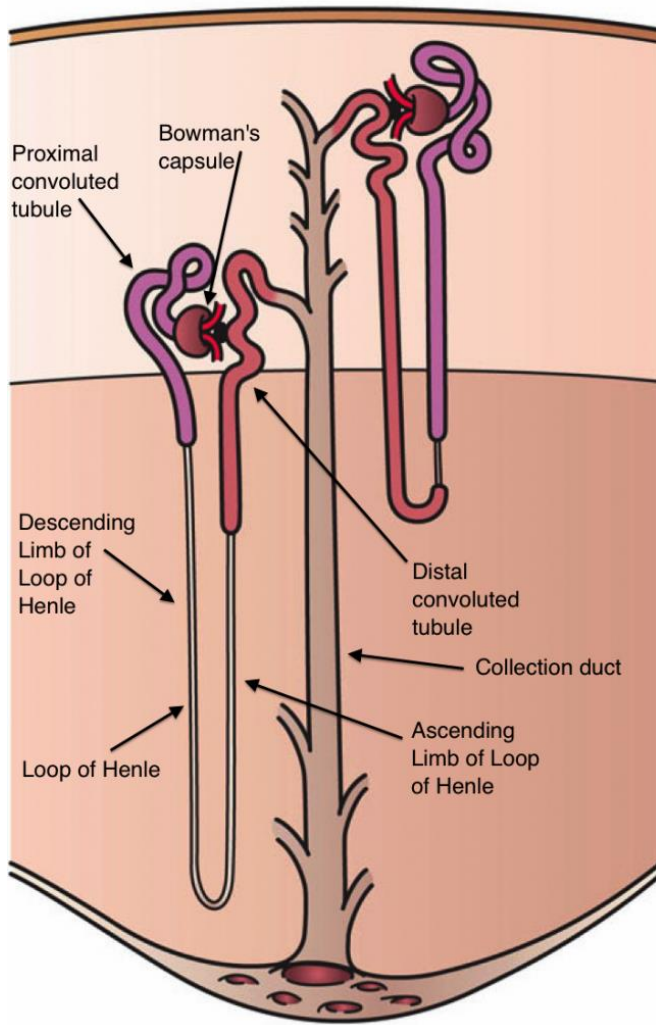


Figure 01: The Bowman's Capsule

The Bowman's capsule was identified in 1842 for the first time by a scientist named as Sir William Bowman. There are two poles on the outside of Bowman's capsule. The vascular pole is the side where afferent and efferent [arterioles](#) enter and leave. The urinary pole is the side where proximal convoluted tube starts. From outside to inside there are several layers in the Bowman's capsule. They are as follows,

Parietal layer - It is a single layer of [squamous epithelium](#). This does not participate in filtration.

Bowman's space - The filtrate enters to this layer after passing through the filtration slits.

Visceral layer - It just lies above the glomerular base membrane. It is made up of specialized cells called as podocytes. The glomerular capillaries lie beneath the visceral layer. It performs the main function of filtration.

Filtration barrier - It is composed of the fenestrated endothelium of glomerular capillaries, the fused basal lamina of endothelial cells and podocytes, and the filtration slits of podocytes. This layer permits water, ions, and small molecules from the blood into the Bowman's space.

What is Glomerulus?

The glomerulus is a tuft of blood capillaries in the ball-shaped structure (Bowman's capsule) which actively participating in the blood filtration in order to form urine. It is a key structure in the renal corpuscle of the functional unit of the kidney known as "nephron." The glomerulus is also involving in ultrafiltration of blood where water, ions and small molecules like glucose filter from blood to Bowman's capsule which is further processed by the tubular part of the nephron.

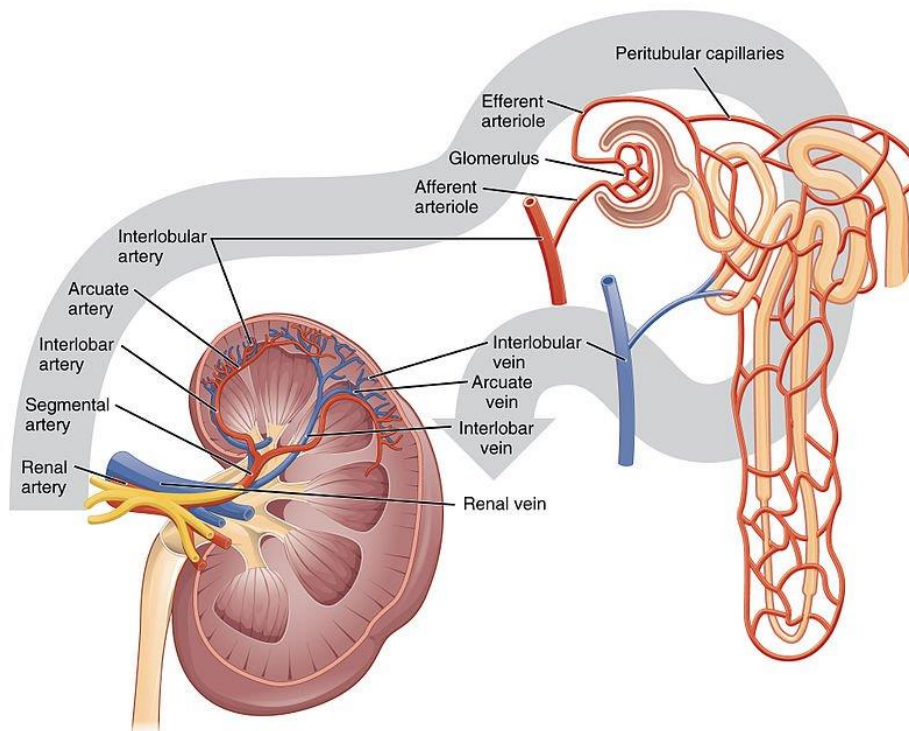


Figure 02: The Glomerulus

This structure was named after an Italian anatomist Marcello Malpighi (1628-1694). It was once known as "Malpighian corpuscle." It filters [blood plasma](#). The tuft of these blood capillaries is structurally supported by the intraglomerular mesangial cells. The blood is filtered through the walls of the tuft of blood capillaries through the glomerular barrier into the cup-like sac "Bowman's capsule." The filtrate (water and other small molecules) then enters the renal tubule of the nephron.

What are the Similarities Between Bowman's Capsule and Glomerulus?

- Both are part of the renal corpuscle.
- Both are present in “nephron” which is the functional unit of the kidney.
- Both participate in the ultrafiltration process of blood to form urine.
- The function of both these structures is highly important to form urine and remove waste materials from the body.

What is the Difference Between Bowman's Capsule and Glomerulus?

Bowman's Capsule vs Glomerulus	
Bowman's capsule is a membranous double-walled capsule which surrounds the glomerulus of the nephron.	The glomerulus is a tuft of capillaries in the nephron.
Structure	
Bowman's capsule is a cup-like a sac.	The glomerulus is a cluster of blood capillaries.
Number of Epithelial Layers	
Bowman's capsule consists of two epithelial layers.	Glomerulus consists of the single epithelial layer.
Function	
Bowman's capsule collects blood, filtrate it and sends it to renal tubule for further processing in order to form urine.	Glomerulus filters the blood plasma.
Blood Cells and Platelets	
Bowman's capsule does not contain blood cells and platelets.	Glomerulus contains blood cells and platelets.
Size	

Bowman's capsule is larger in size.

The glomerulus is smaller in size.

Summary - Bowman's Capsule vs Glomerulus

The Bowman's capsule is also called as a glomerular capsule. It is a cup-like a sac. This can be found at the beginning of the tubular part of the nephron of the mammalian kidney. The glomerulus is surrounded by the Bowman's capsule. Bowman's capsule performs the first step of blood filtration in order to form urine. The fluid from the blood in the glomerulus is collected by the Bowman's capsule. The glomerular filtrate is further processed along the other parts of the nephron in order to form urine. On the other hand, glomerulus is known as a tuft of capillaries which filters the blood plasma. It consists of endothelial cells. The Bowman's capsule is a double walled membranous sac-like structure. But glomerulus refers to a cluster of blood capillaries in the nephron.

Reference:

1. "Bowman's capsule." Encyclopædia Britannica, Encyclopædia Britannica, inc. [Available here](#)
2. "Renal corpuscle." Wikipedia, Wikimedia Foundation, 14 Nov. 2017. [Available here](#)

Image Courtesy:

1. 'Kidney Nephron' By Artwork by Holly Fischer ([CC BY 3.0](#)) via [Commons Wikimedia](#)
2. '2612 Blood Flow in the Kidneys' By OpenStax College - Anatomy & Physiology, [Connexions Web site](#). Jun 19, 2013. ([CC BY 3.0](#)) via [Commons Wikimedia](#)

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