

Unit 3: A Level Biology

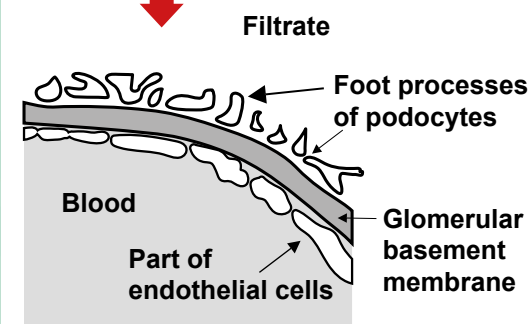
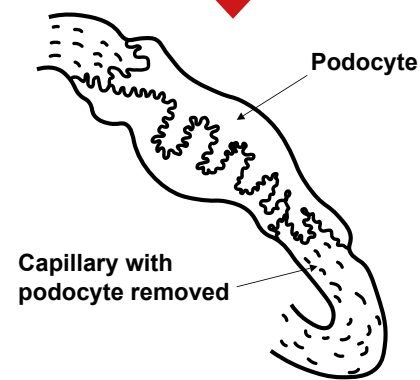
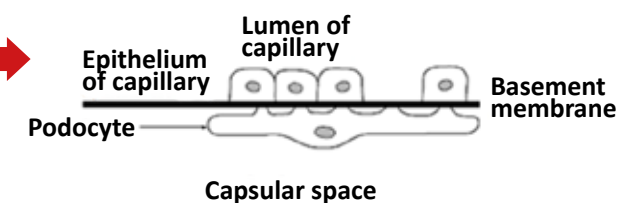
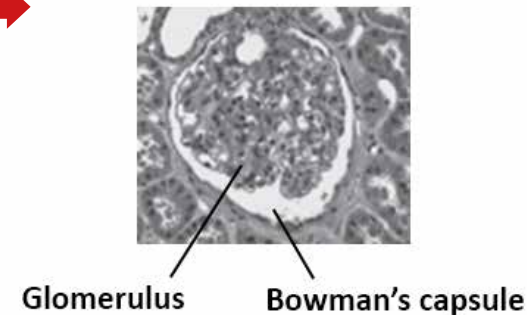
Ultrafiltration and selective reabsorption

Blood is filtered in the glomerulus and Bowman's capsule under pressure. This is **ultrafiltration**.

The **glomerulus** is a knot of capillaries. The blood in the glomerulus is under high pressure because the diameter of the **efferent arteriole** leaving the glomerulus is **narrower** than that of the **afferent arteriole** entering the glomerulus.

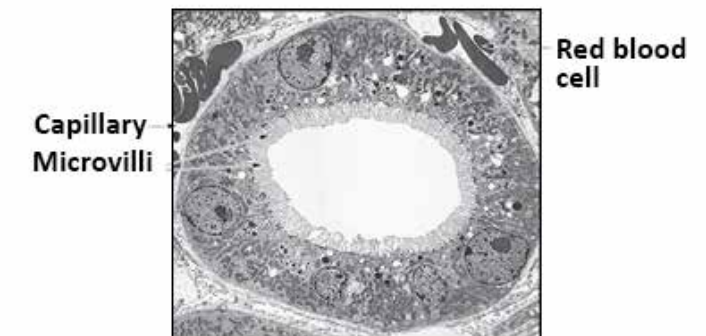
Small molecules are forced out of the blood, water, glucose, salts and urea, forming a **filtrate** in Bowman's capsule.

The filter has three layers: **fenestrations** between the epithelial cells of the capillary, **pores** in the basement membrane of the epithelial cells of the capillary form a **molecular sieve** and **filtration slits** in the podocytes (cells that cover the capillaries).



The **filtrate** passes from Bowman's capsule to the **proximal convoluted tubule**.

All the glucose, some of the salts and 85% of the water from the filtrate are **reabsorbed** into the blood in the proximal convoluted tubule.



The cells have:

- microvilli to increase the surface area for absorption
- mitochondria to provide ATP for active transport
- tubule made of a single layer of cuboidal epithelium to provide a short diffusion pathway
- blood flow through the capillaries to maintain a concentration gradient.

Active transport of sodium ions out of the cells makes a low concentration inside the cells, so Na^+ and glucose diffuse into the cells from the filtrate.