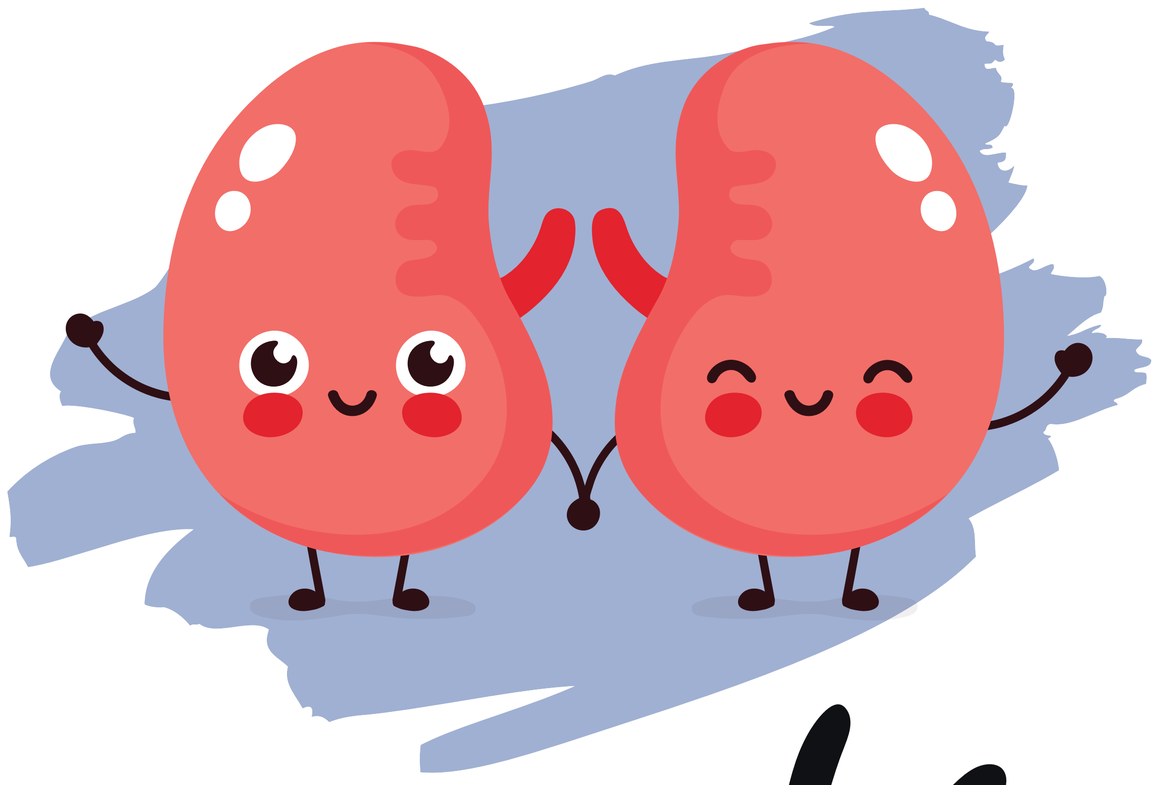
Urinary System

Kidney Functions Breakdown

The kidneys are two bean-shaped organs that produce urine by filtering all of the wastes, chemicals, toxins, extra water, etc out of the blood.

- The kidneys balance the amount of calcium, potassium, and sodium in the blood.
- They monitor blood pressure and make hormones that either increase or decrease BP.
- Kidneys can produce glucose to increase blood sugar.
- The rate of blood filtration of the kidney is 0.5 cups of blood a minute.



The kidneys play a crucial role in maintaining homeostasis by secreting erythropoietin, calcitriol, and renin which triggers the renin-angiotensin-aldosterone mechanism. .

- Kidneys help the body absorb more calcium by producing calcitriol.
- The angiotensin constricts the blood vessels and increases blood pressure.
- Erythropoietin triggers the production of red blood cells. This happens when the kidney detects lower RBC counts and when oxygen isn't high enough.

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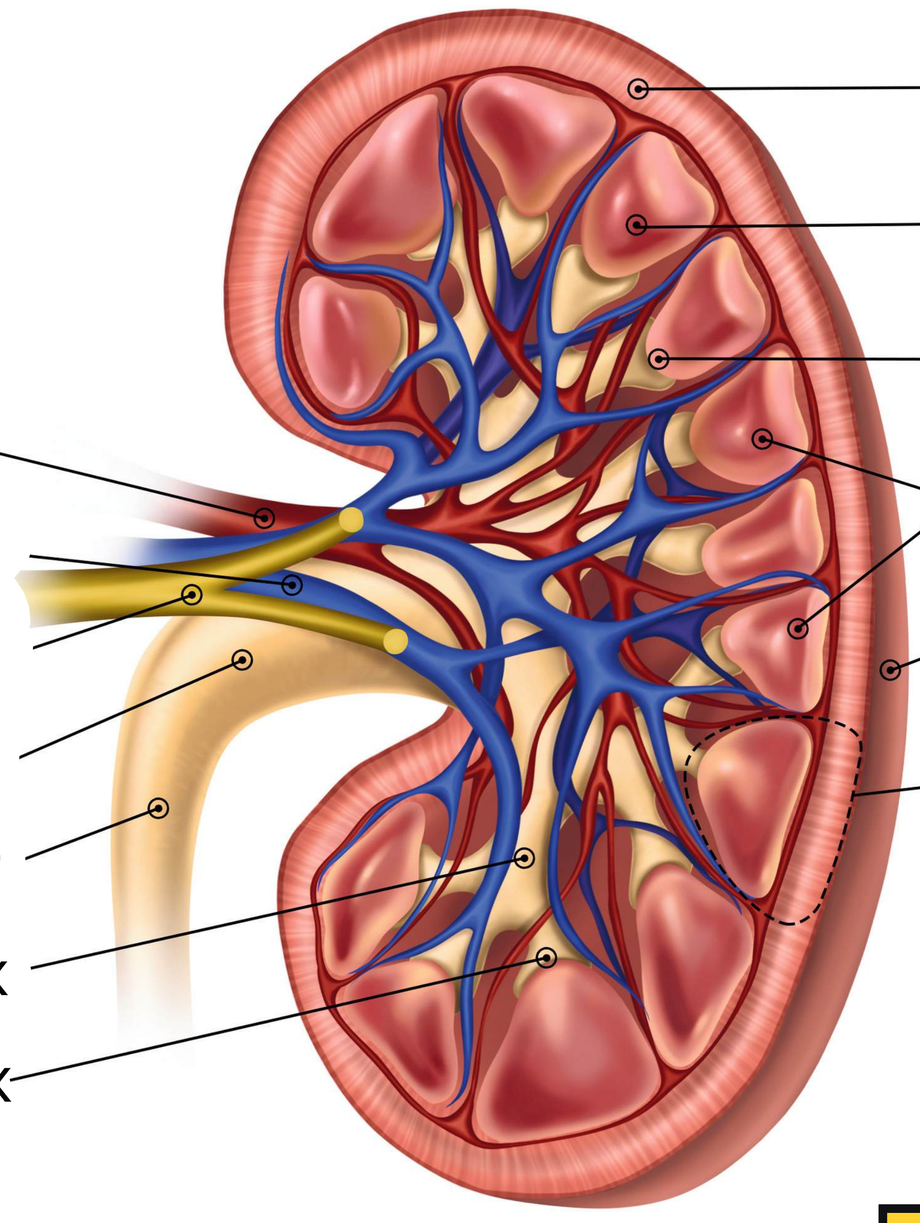
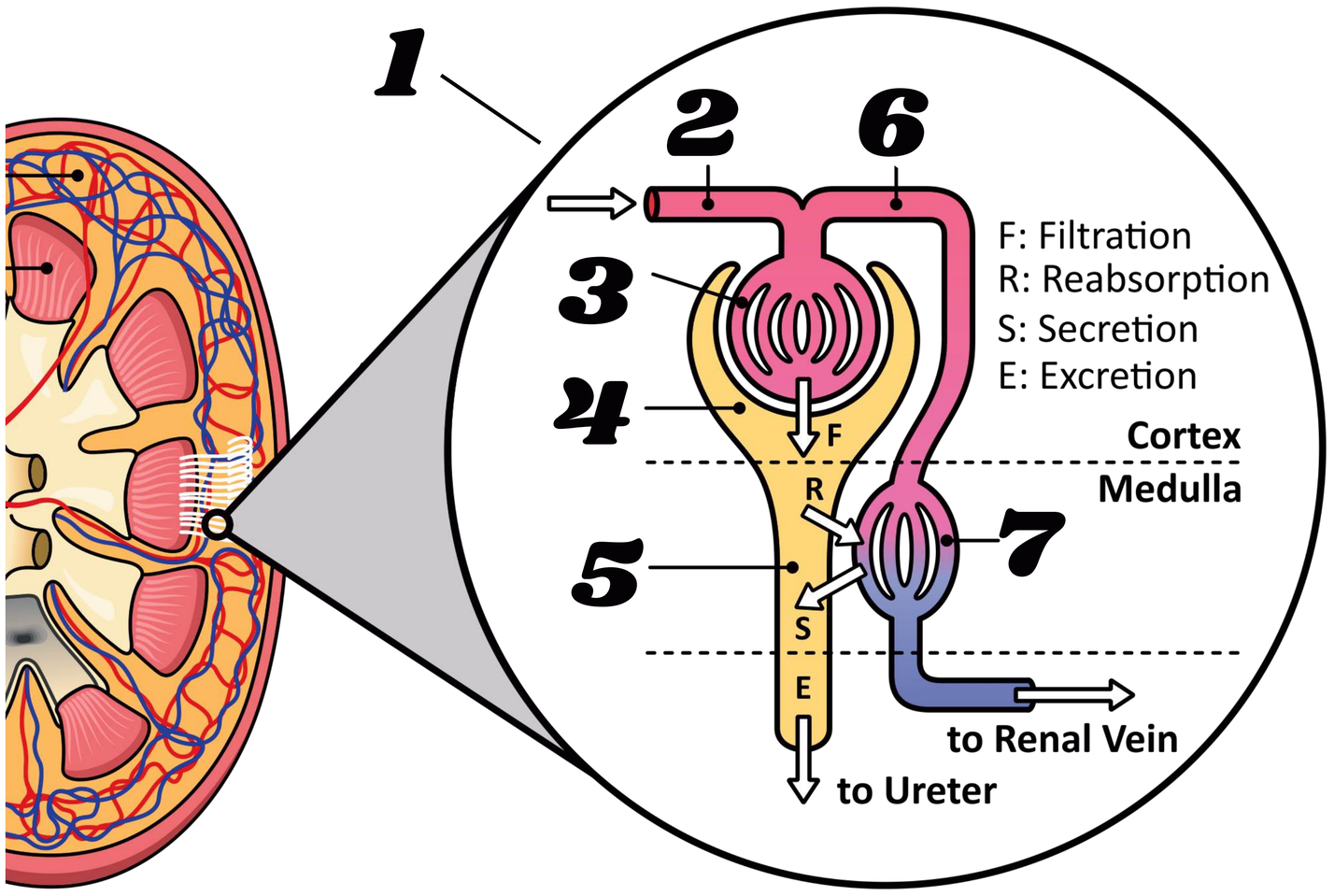


- The outer layer of the kidney is called the renal capsule and is made up of several layers of connective tissue.
- The renal artery is a very large blood vessel that allows the kidneys to filter the blood as it passes through.
- The renal cortex is the layer of the kidney that contains all the nephrons.
    - The parts of the kidney that filter the blood and convert the water and extras into urine.
- The renal medulla is the inner part of the kidney. This contains nephrons and most of their renal tubules. The renal tubule has a proximal convoluted tubule.
- The renal papillae are pyramid shaped, and they are located in the medulla. These begin to drain the urine from the kidneys.
- Renal pelvis – this structure drains the kidney of urine and transfers it to the ureters.
- The ureters are small tubes that transport urine from the kidneys to the bladder.
- The renal vein then takes the blood from the kidney back to the heart.

There is also an extra layer of fat that protects the kidneys from damage. It is essential that the kidneys stay untouched.

Urinary System

1. Nephron
2. Afferent arteriole
3. Glomerulus
4. Bowman's capsule
5. Proximal convoluted tubule
6. Efferent arteriole
7. Peritubular capillaries



- The renal tubule has a proximal convoluted tubule that is in the renal cortex. Then there is the loop of Henle, which is where most of the reabsorption takes place. Next is the distal convoluted tubule. This finishes off the reabsorption. The last part is the collecting duct, which pours the urine into the renal pelvis.

- Blood flows from the renal arteries into arterioles (2) then into the glomerulus, where it is filtered. Bowman's capsule is a part of the nephron that forms a cup-like structure around the glomerulus. The glomerular filtrate enters the proximal convoluted tubule, where water, glucose, ions, and other organic molecules are reabsorbed into the bloodstream through the renal vein. Reabsorption and secretion occur between the tubules and the peritubular capillaries.

- The renal corpuscles and the convoluted tubules of the nephrons are within the cortex (forming the cortical labyrinth), but the loops of Henle extend into the adjacent region known as the renal medulla.

- The bladder holds the urine until you are ready to expel it through the urethra. The bladder is made up of transitional epithelium, which means that these cells can expand and shrink as needed. There is also lamina propria, muscularis propria, and connective tissue.