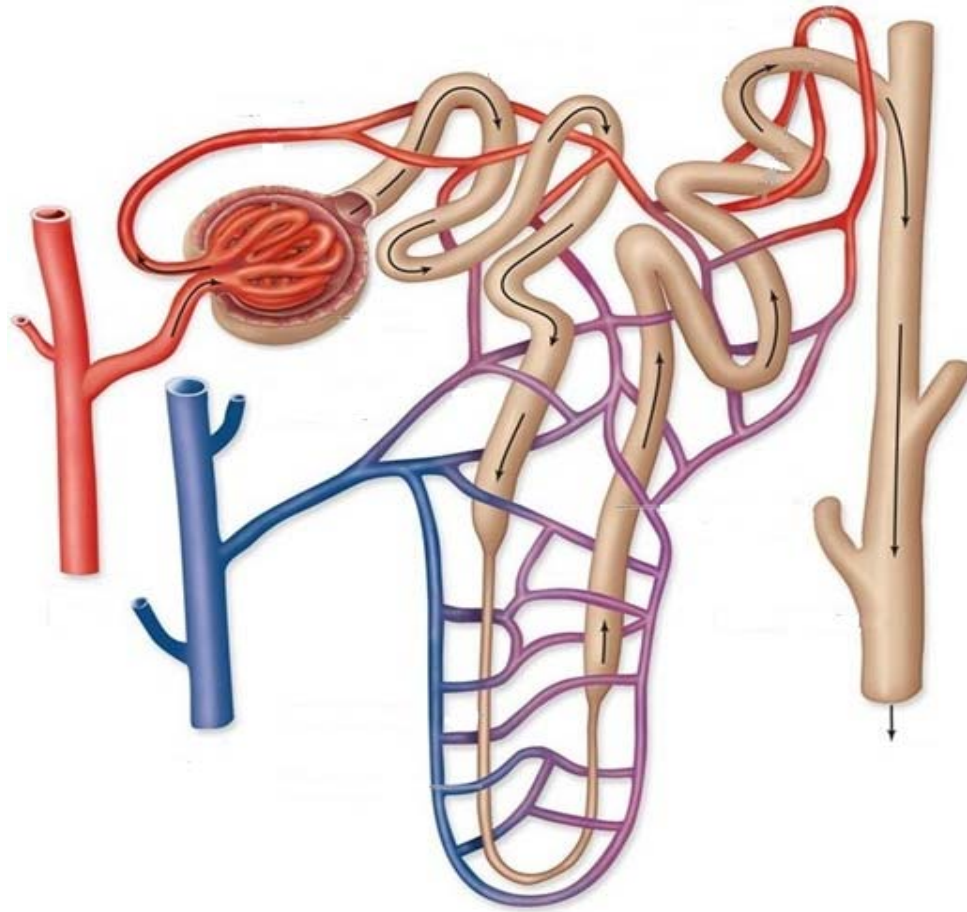


## Anatomy of the Nephron and Urine Production Honors Anatomy

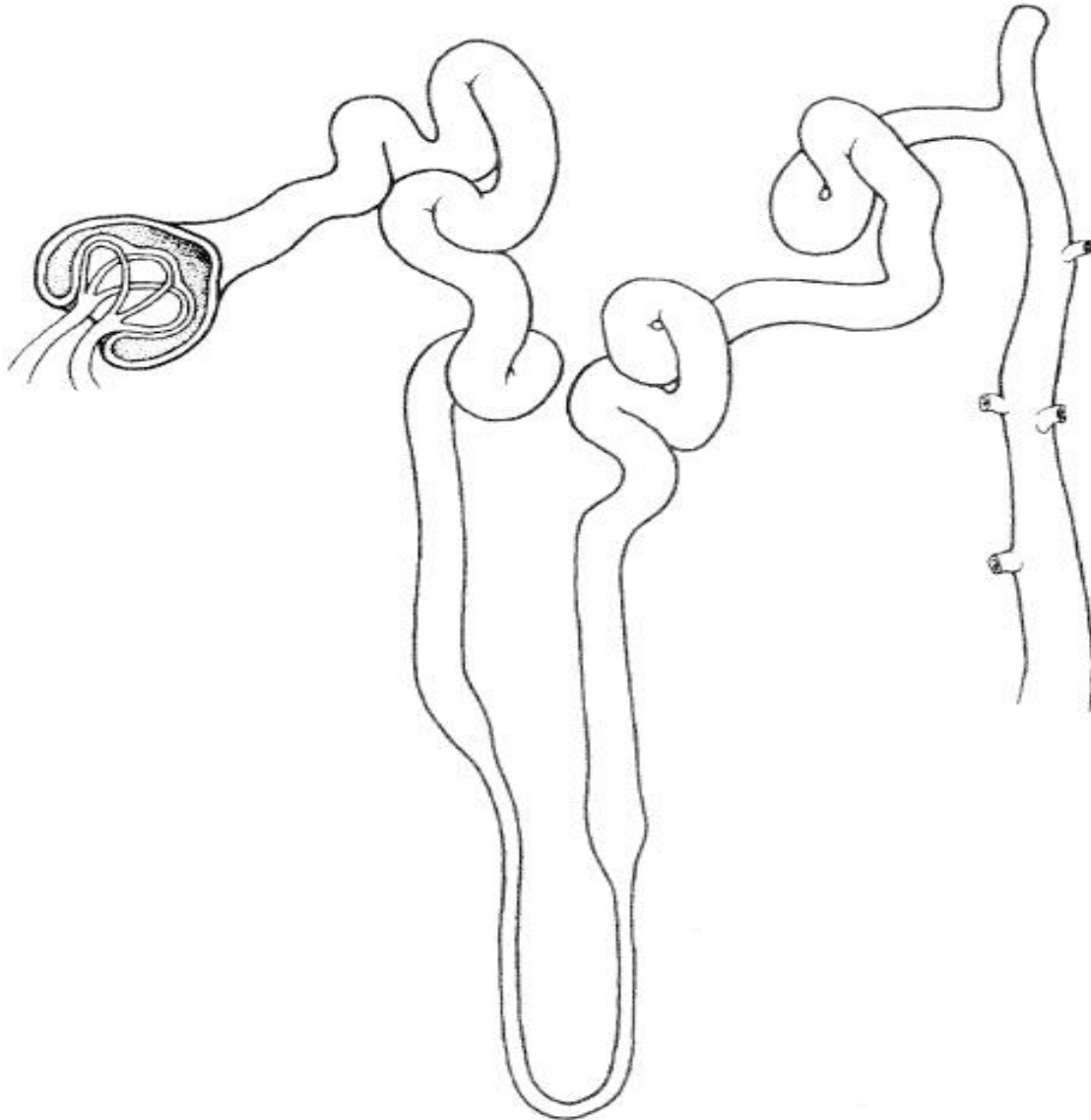
Using the list below, label the different parts of the nephron.



- |                    |                          |                            |                  |
|--------------------|--------------------------|----------------------------|------------------|
| Afferent arteriole | Distal convoluted tubule | Peritubular capillaries    | Loop of Henle    |
| Bowman's capsule   | Efferent arteriole       | Proximal convoluted tubule | -Ascending limb  |
| Collecting duct    | Glomerulus               | Venule                     | -Descending limb |

- The separation of smaller molecules from larger molecules that occurs between the glomerulus and Bowman's capsule is called \_\_\_\_\_.
- The movement of substances, ions, molecules, or fluids from any tubules of the nephron into the peritubular capillaries is called \_\_\_\_\_.
- The movement of substances, ions, molecules, or fluids from the peritubular capillaries into any tubules of the nephron is called \_\_\_\_\_.
- Beginning with the glomerulus and ending in the collecting duct, draw a flow map illustrating the pathway of the formation of urine.  
(You will be using the terms above with the exceptions of efferent arteriole, afferent arteriole, peritubular capillaries venule,

Using the list below, label the parts of the nephron.



Bowman's capsule

Glomerulus

Loop of Henle

Collecting duct

Proximal convoluted tubule

Ascending limb

Distal convoluted tubule

Descending limb

1. Draw green arrows illustrating **glomerular filtration** of the following substances: water, urea, glucose, amino acids, sodium, chloride. Label water, urea, glucose, amino acids, and salts
2. At the proximal convoluted tubule, the descending limb of the Loop of Henle and the collecting ducts, draw blue arrows illustrating the **tubular reabsorption** of water. Label water.
3. At the proximal convoluted tubule and the ascending limb of the Loop of Henle, draw purple arrows illustrating the **tubular reabsorption** of sodium and chloride. Label sodium ( $\text{Na}^+$ ) and chloride ( $\text{Cl}^-$ ).
4. At the proximal convoluted tubule, draw an orange arrow illustrating the **tubular reabsorption** of glucose. Label glucose.
5. At the proximal convoluted tubule, draw a yellow arrow illustrating the **tubular reabsorption** of amino acids. Label amino acids.
6. At the distal convoluted tubule, draw a red arrow illustrating the **tubular secretion** of hydrogen ions. Label hydrogen ions ( $\text{H}^+$ ).
7. At the distal convoluted tubule, draw a pink arrow illustrating the **tubular secretion** of ammonia. Label ammonia ( $\text{NH}_4^+$ ).
8. At the distal convoluted tubule, draw a brown arrow illustrating the **tubular secretion** of drugs. Label drugs.

Substances, water, molecules, and salts can move into and out of the nephron 3 ways; **active transport, passive transport, and facilitated diffusion.**

**Complete the paragraph about the formation and transportation of urine through the nephron.**

The excretion of metabolic waste and the formation of urine is performed by the   1  . Specifically, urine formation occurs in the   2   within the kidneys. Metabolic waste carried by blood arrives at the nephron via the afferent arteriole and finally into the   3  . Smaller metabolic waste, such as water, glucose, and ions diffuse from the glomerulus to   4   \_\_\_\_\_ in a process known as   5   \_\_\_\_\_. Filtered blood exits the glomerulus via the efferent arteriole which becomes the peritubular capillaries. From Bowman's capsule, metabolic waste travels to the \_\_\_\_\_   6   \_\_\_\_\_, then to the   7   \_\_\_\_\_ and   8   \_\_\_\_\_ of the Loop of Henle. From the Loop of Henle metabolic waste enters the \_\_\_\_\_   9   \_\_\_\_\_ before finally exiting the nephron through the   10   \_\_\_\_\_. All collecting ducts of nephrons transport their urine to the minor calyces in the kidney. Within each tubule of the nephron, specific processes occur to help rid the body of metabolic wastes, regulate water-salt balance, and regulate acid-base balance. In the \_\_\_\_\_   11   \_\_\_\_\_, water, glucose, and ions are transported out of the nephron and back into the   12   \_\_\_\_\_ by a process called   13   \_\_\_\_\_. Reabsorption also occurs in the Loop of Henle. The descending limb is responsible for the reabsorption of   14   \_\_\_\_\_, while the ascending limb is responsible for the reabsorption of the ions   15   and   16   \_\_\_\_\_. Conversely, in the \_\_\_\_\_   17   \_\_\_\_\_, substances such as hydrogen ions, ammonia, and drugs are transported out of the   18   \_\_\_\_\_ and into the kidney tubule by the process of   19   \_\_\_\_\_. Finally in the collecting duct, further reabsorption of   20   \_\_\_\_\_ is determined by the needs of the body. This final process determines whether the urine is concentrated or diluted. Movement of substances into and out of nephron tubules is accomplished by 3 processes;   21   \_\_\_\_\_, which requires energy to move substances,   22   \_\_\_\_\_, which does not require energy but uses the natural movement of substances from higher concentrations to lower concentrations, and by   23   \_\_\_\_\_, which utilizes diffusion and a carrier molecule to transport substances across the nephron.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
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