

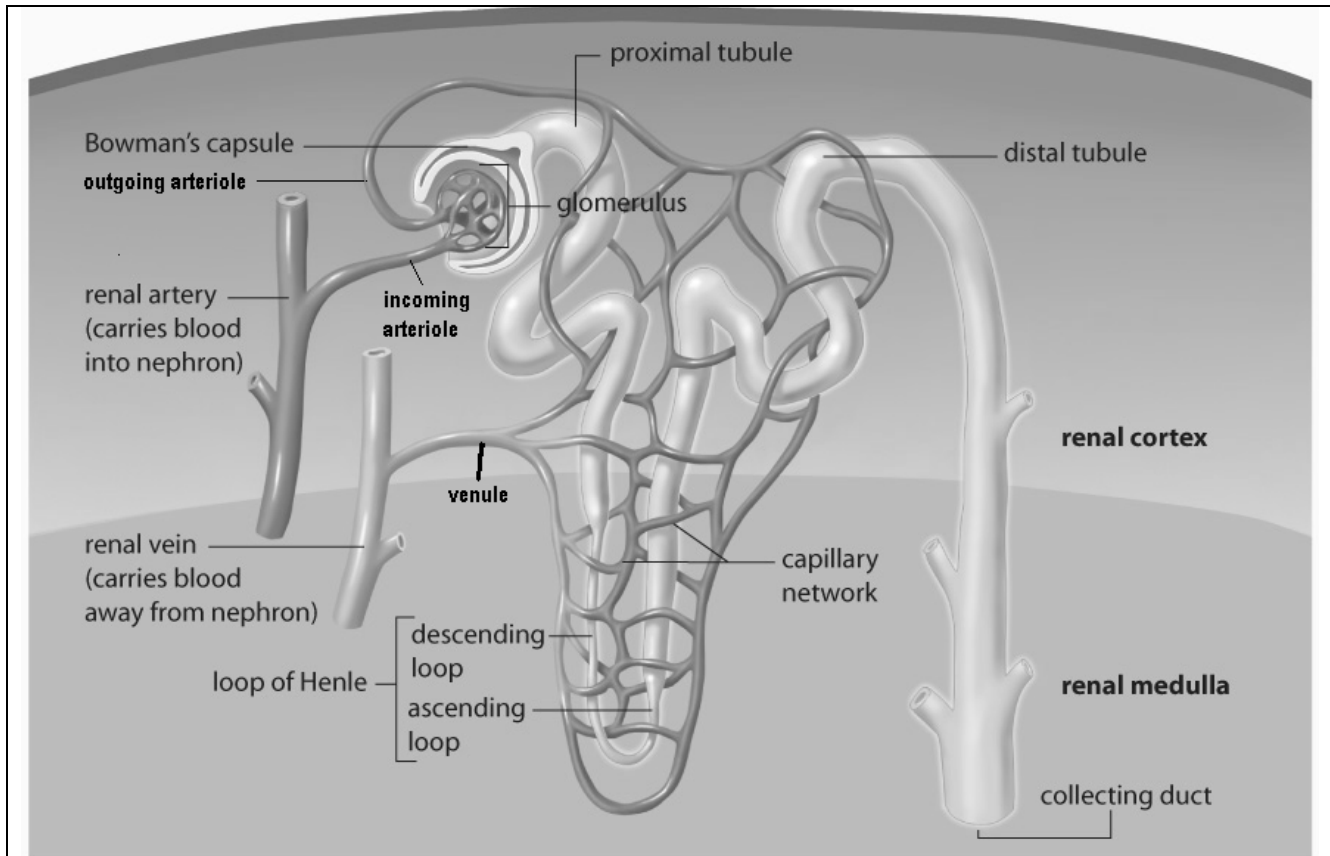
How the nephron cleanses the blood

Cleansing the blood of wastes, excess salts, and water can be compared to house cleaning. Cleaning out a desk drawer involves separating useful items from garbage, then keeping the useful items and discarding the garbage. You can choose one of two ways to do this. In one method, you would dump everything out of the drawer and then reclaim the useful items, leaving a pile of garbage. An alternative would be to sort through the materials in the drawer, removing the garbage and leaving the useful items in place.

The cleansing of blood in nephrons involves mostly the first method. Useful molecules as well as wastes and excess substances are filtered out of the blood. Then useful molecules are reclaimed back into the blood, leaving wastes (urine) to be excreted. A review of blood composition will help you to understand how it is cleansed.

1. List all the components of whole blood, beginning with the largest particles. Note that some components are waste molecules and some are useful. Some useful components occur in excess amounts.

Study the diagram of a nephron with its surrounding blood vessels that follows. Remember that blood passes through *two* capillary beds as it flows around the nephron, and that exchange of components between blood and surrounding tissues can only occur through thin capillary walls.

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2. Identify where useful molecules and wastes are filtered out of the blood and into the nephron.

3. Where are useful molecules reabsorbed from the nephron back into the blood?

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Functions of the Nephron

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4. Which structure transports the waste molecules (urine) left behind after reabsorption?

5. Which parts of the nephron are in the cortex of the kidney? Which parts penetrate deep into the medulla?

6. A common misconception is that “kidneys filter wastes out of the blood.” Use the words “filtration” and “reabsorption” to explain why this statement is false.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.