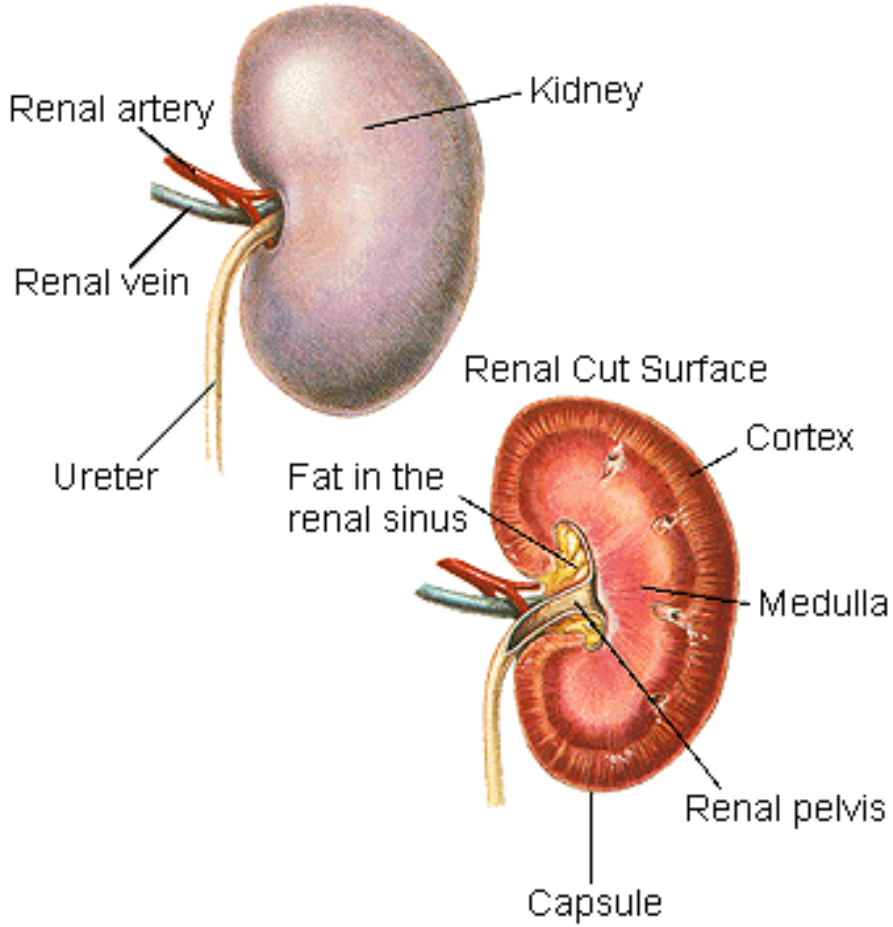
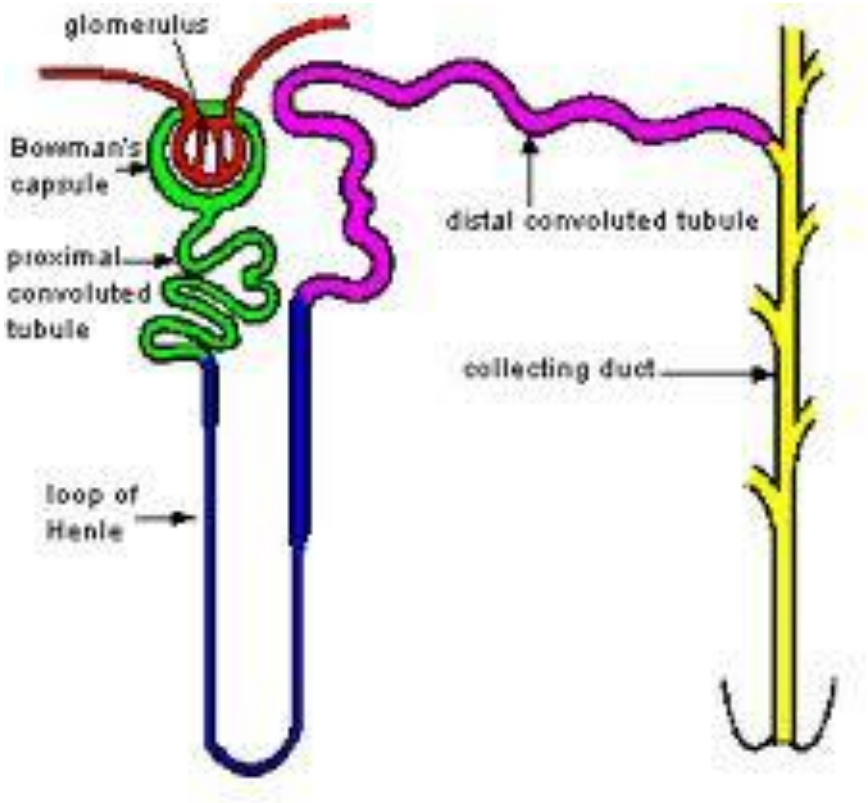
THE KIDNEY

Urine in for a good time!

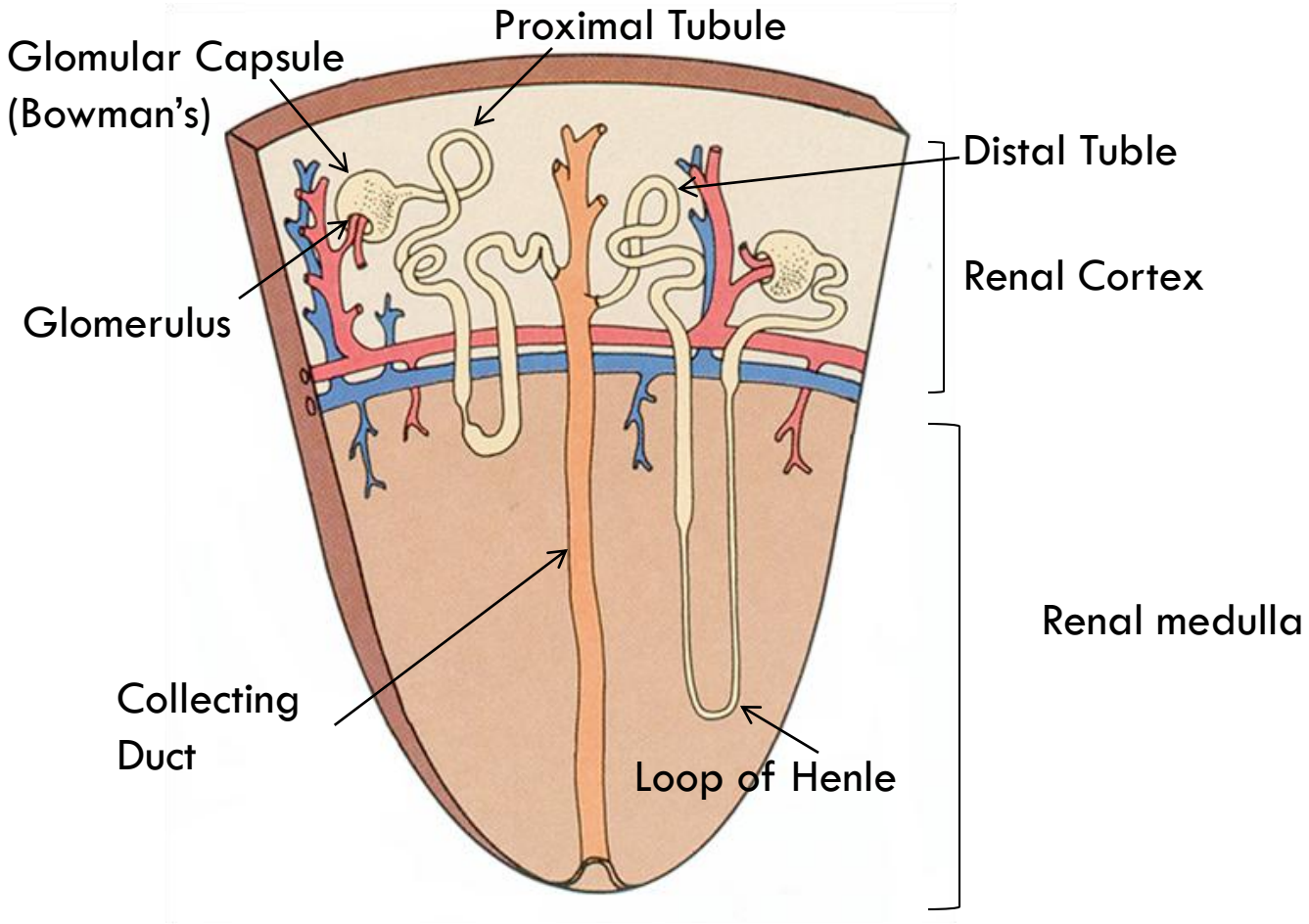
Anatomy of the Kidney



Anatomy of a Nephron

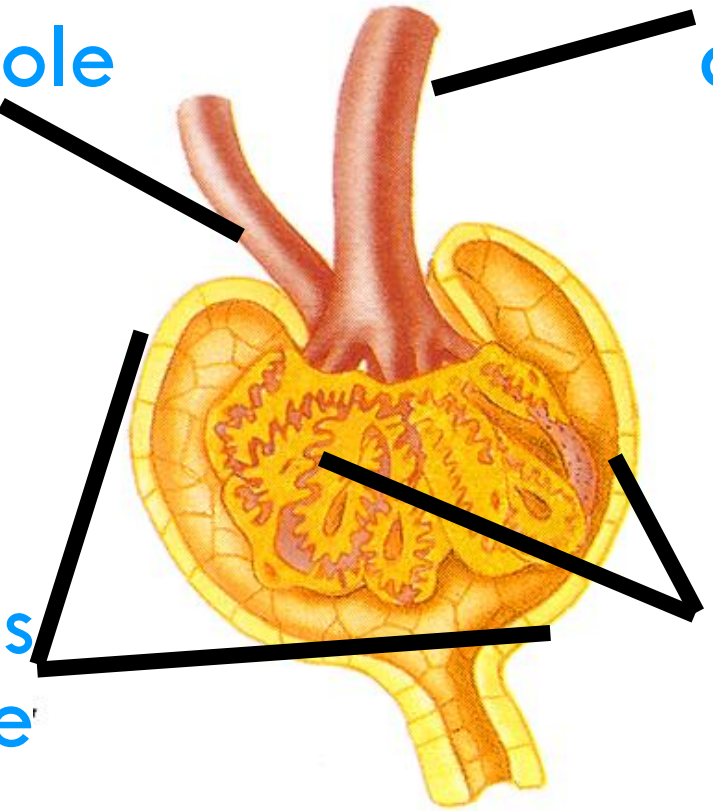


Where is the Nephron



Each kidney contains over 1 million nephrons and thousands of collecting ducts

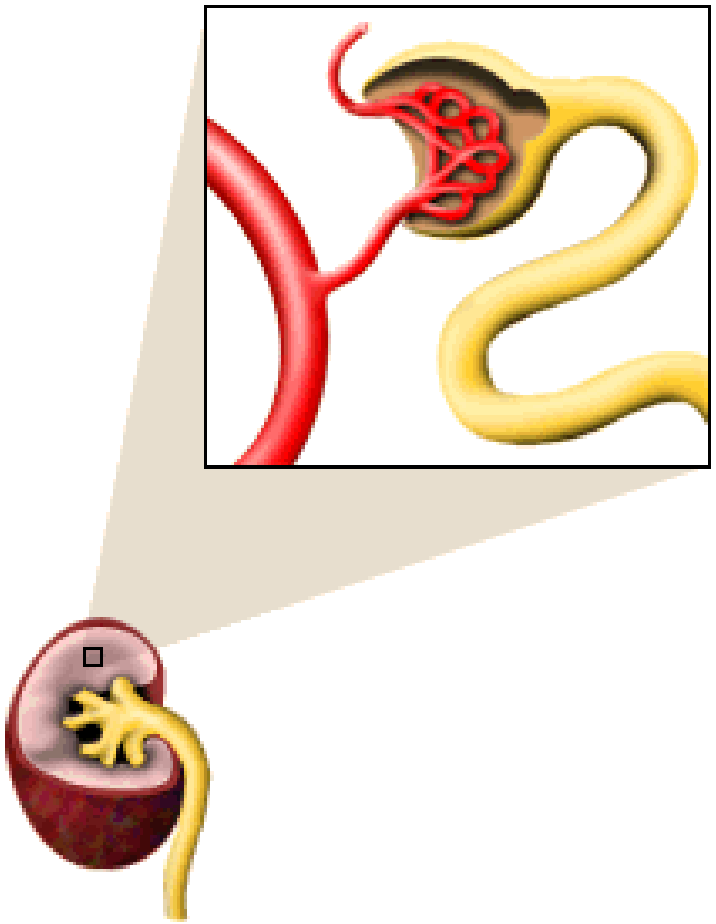
Glomerular Filtration



Filters blood; proteins can't pass through

Nephron

- Filtering unit of the kidney
- Blood enters full of waste and leaves filtered
- Blood enters under high pressure and flows into the capillary beds



Composition of Glomerular Filtrate

- Water
- Small Soluble Organic Molecules
- Mineral Ions

Proximal Convoluted Tubule

Reabsorbs: water, glucose, amino acids, and sodium.

- 65% of Na^+ is reabsorbed
- 65% of H_2O is reabsorbed
- 90% of filtered bicarbonate (HCO_3^-)
- 50% of Cl^- and K^+

Loop of Henle

Creates a gradient of increasing sodium ion concentration towards the end of the loop within the interstitial fluid of the renal pyramid.

- 25% Na+ is reabsorbed in the loop
- 15% water is reabsorbed in the loop
- 40% K is reabsorbed in the loop

Distal Convoluted Tubule

Under the influence of the hormone aldosterone, reabsorbs sodium and secretes potassium. Also regulates pH by secreting hydrogen ion when pH of the plasma is low.

- only 10% of the filtered NaCl and 20% of water remains

Collecting Duct

Allows for the osmotic reabsorption of water.

ADH (antidiuretic hormone)- makes collecting ducts more permeable to water-- produce concentrated urine

Urine

Water- 95%

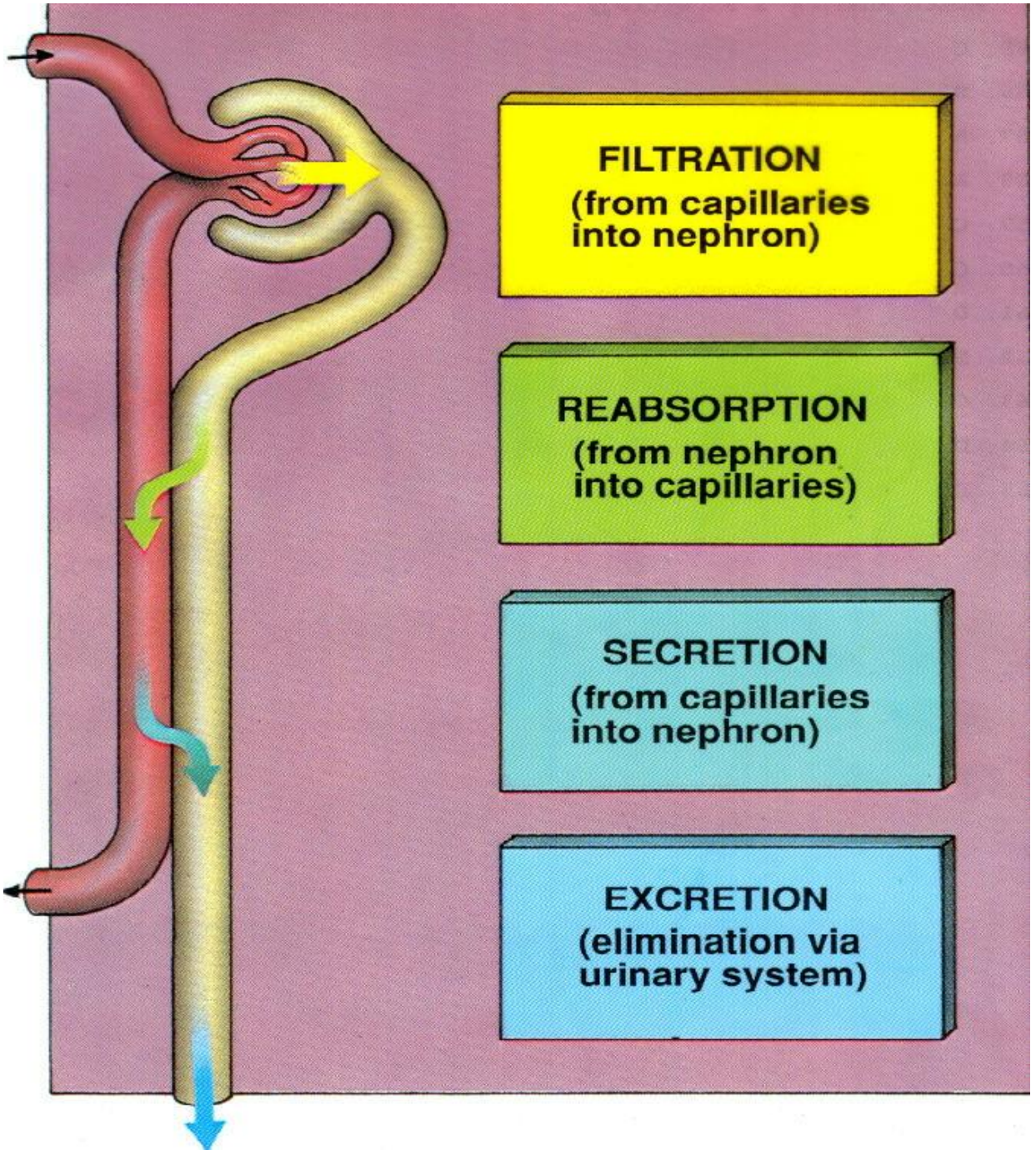
Nitrogenous waste:

- urea
- uric acid
- creatinine

Ions:

- sodium
- potassium
- sulfate
- phosphate

From the original 1800 g NaCl, only 10 g appears in the urine


FILTRATION
(from capillaries into nephron)
REABSORPTION
(from nephron into capillaries)
SECRETION
(from capillaries into nephron)
EXCRETION
(elimination via urinary system)