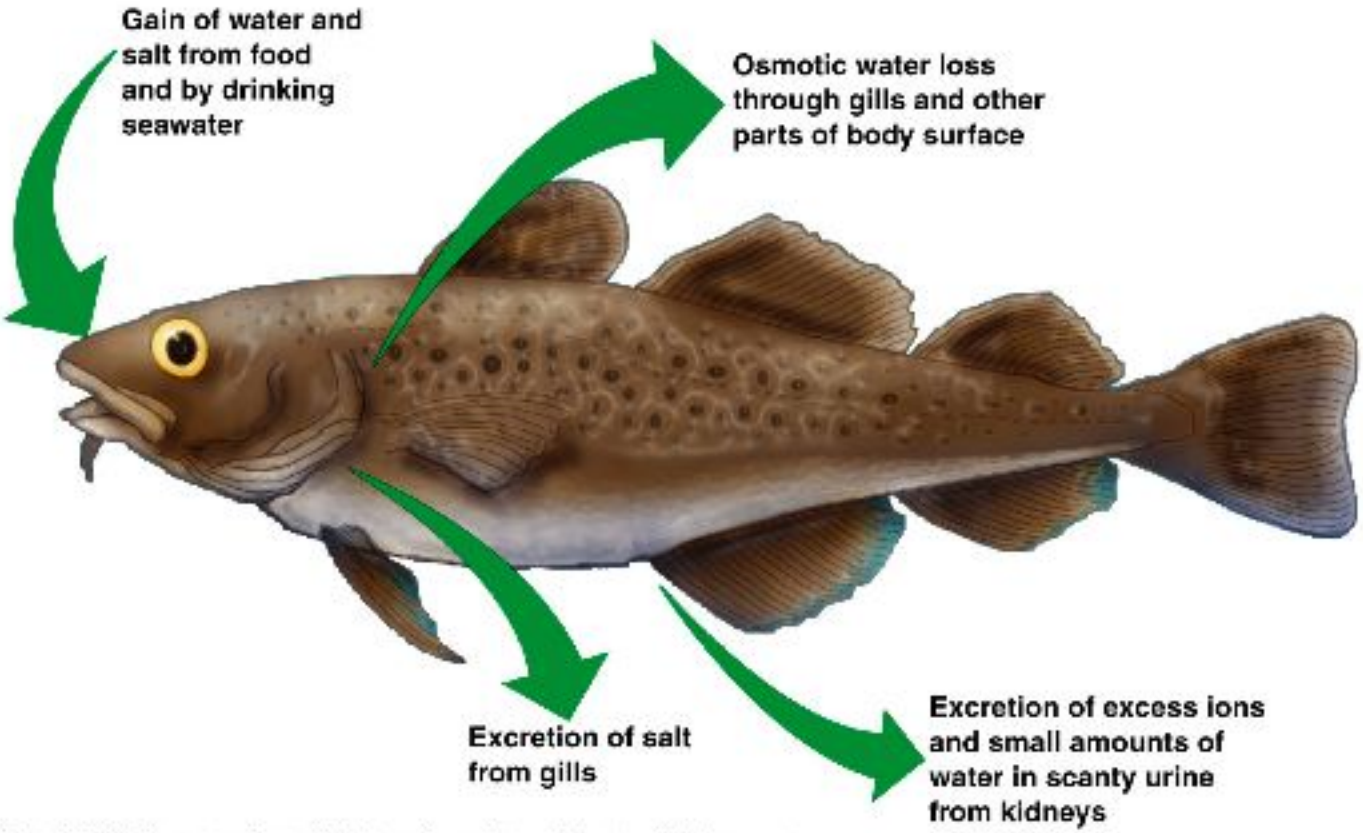
Waste removal - Urinary system

Bio 11

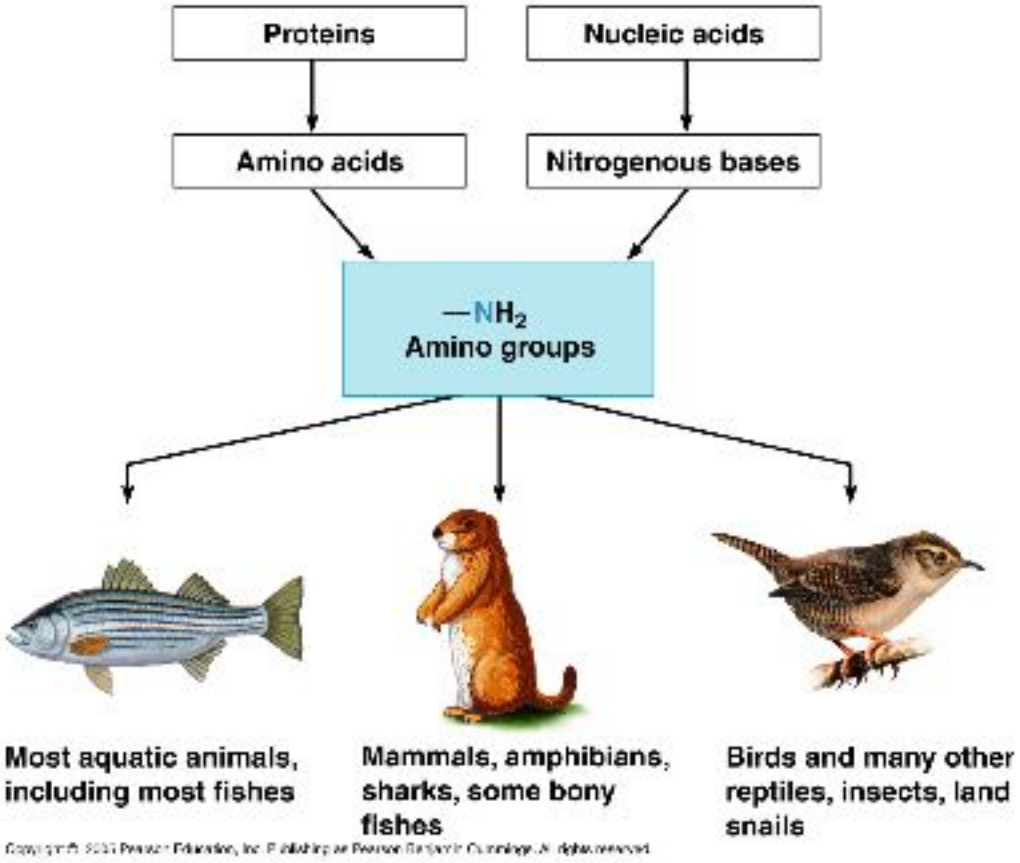
Urinary system

- Involved in homeostasis
- Regulates sodium, potassium, chlorine and calcium
- Regulates water levels in the blood
- pH of blood
- Glucose and amino acid levels
- Red blood cell levels - erthryopoietin
- Eliminates cellular waste ex. urea

All animals have ways of maintaining osmotic balance and ammonia levels



Ways to Get rid of the ammonia



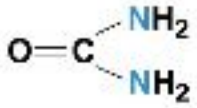
Ways to Get rid of the ammonia

Most aquatic animals, including most fishes

NH_3

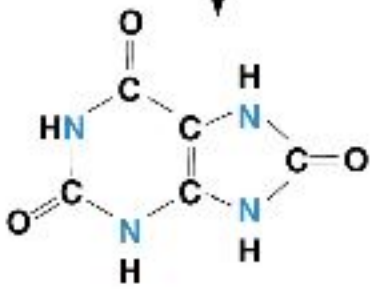
Ammonia

Mammals, amphibians, sharks, some bony fishes



Urea

Birds and many other reptiles, insects, land snails

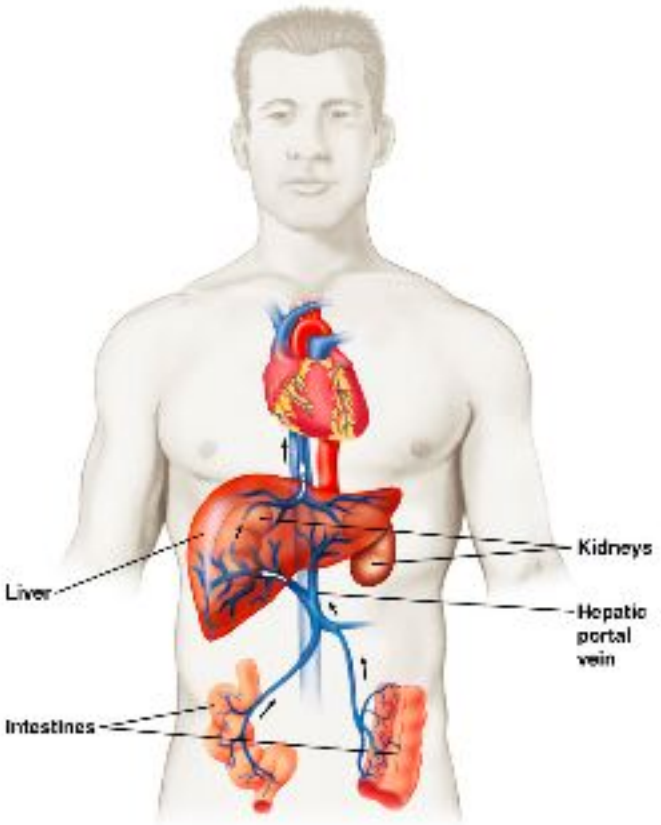


Uric acid

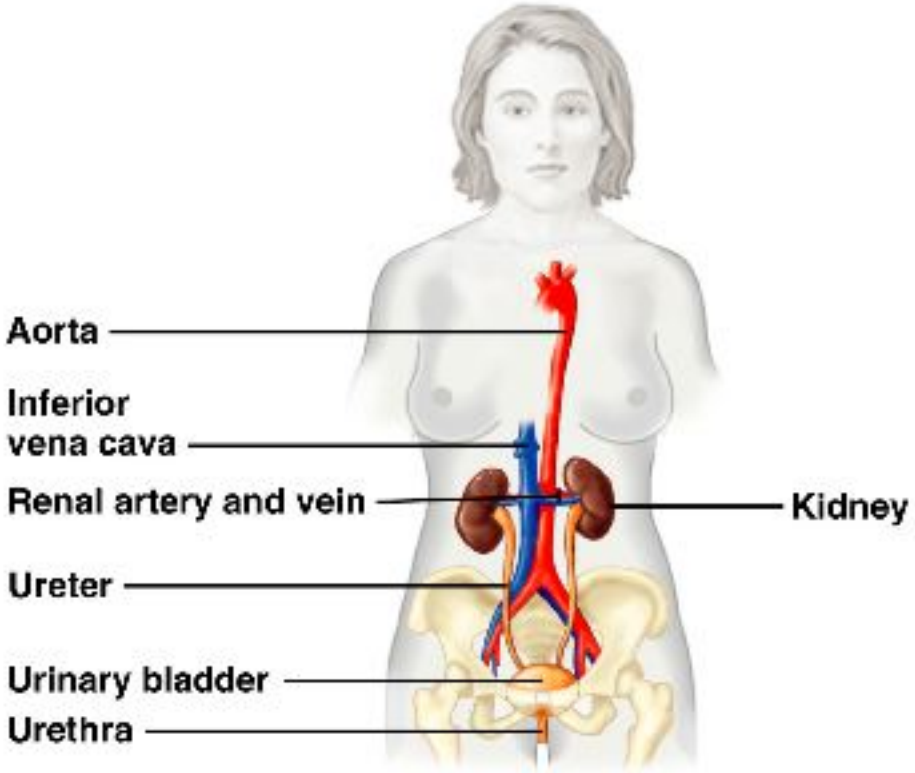
Ways to Get rid of the ammonia

- Urea highly soluble in water - 100,000X less toxic than ammonia
- Uric acid insoluble in water allows for less water loss
- Ammonia very toxic must be excreted very dilute

Liver makes urea



Blood enters kidney through renal artery for filtering

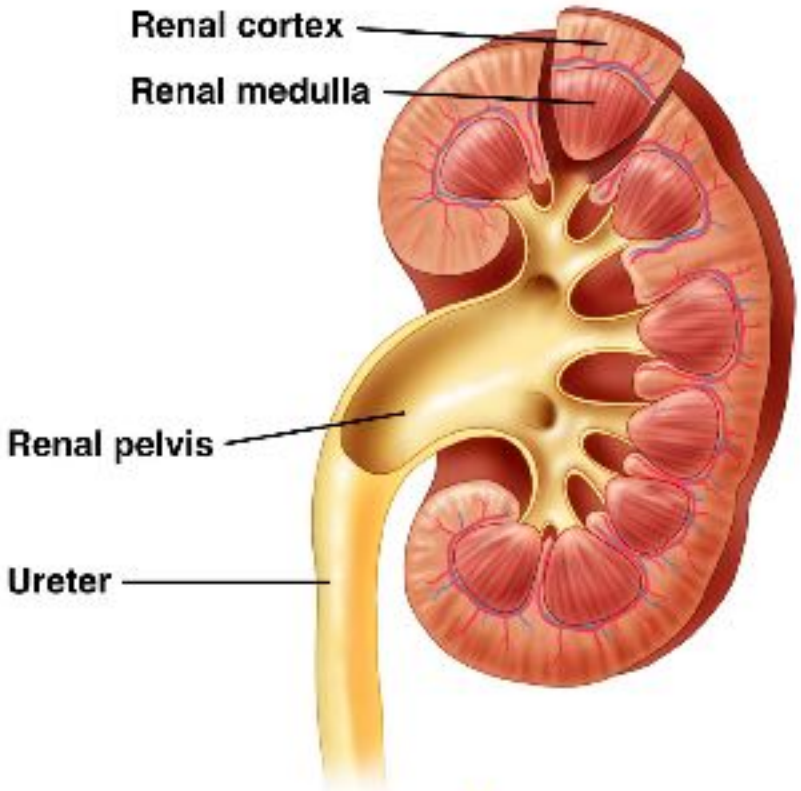


A The excretory system

Blood enters kidney through renal artery for filtering

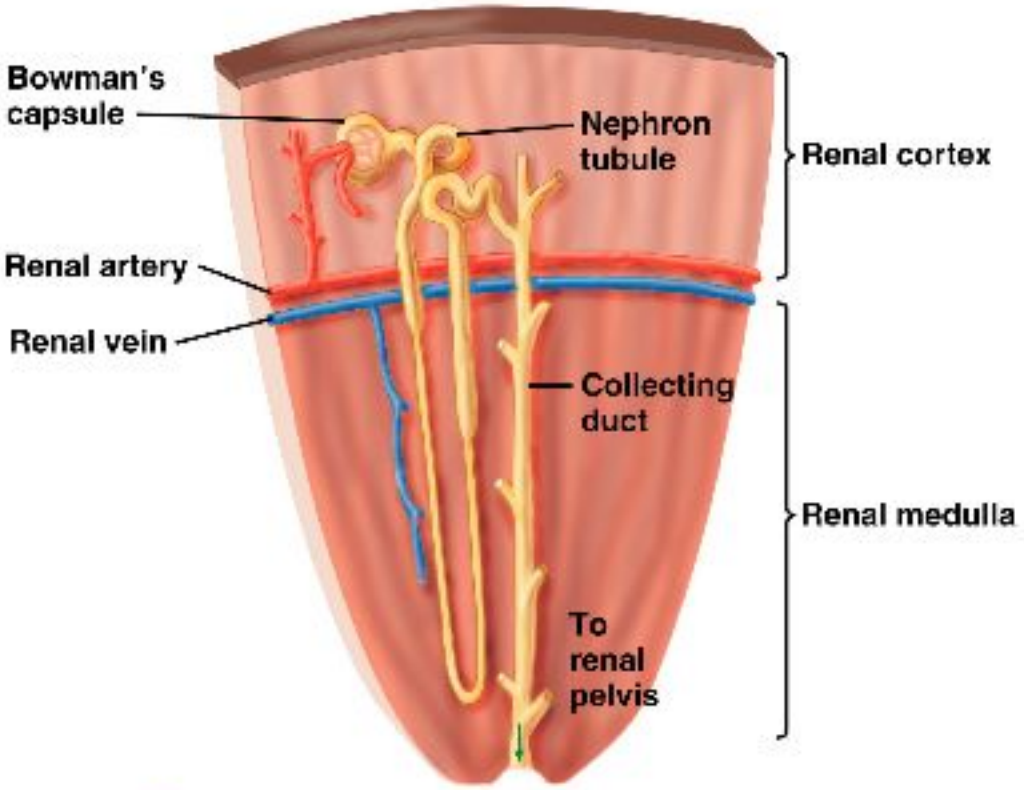
- Blood filtered by kidney
- Waste is collected in ureters
- Flows into bladder to be stored
- Exits out urthera
- sphincter controls passage of urine

The kidney



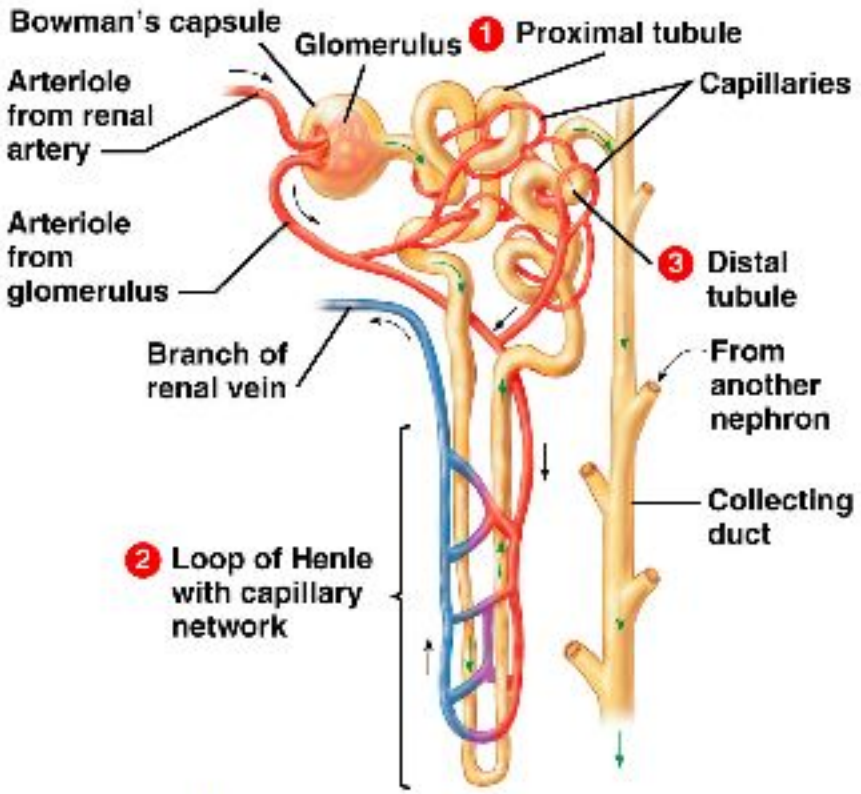
B The kidney

The nephron's placement in the kidney



C Orientation of a nephron within the kidney

The nephron

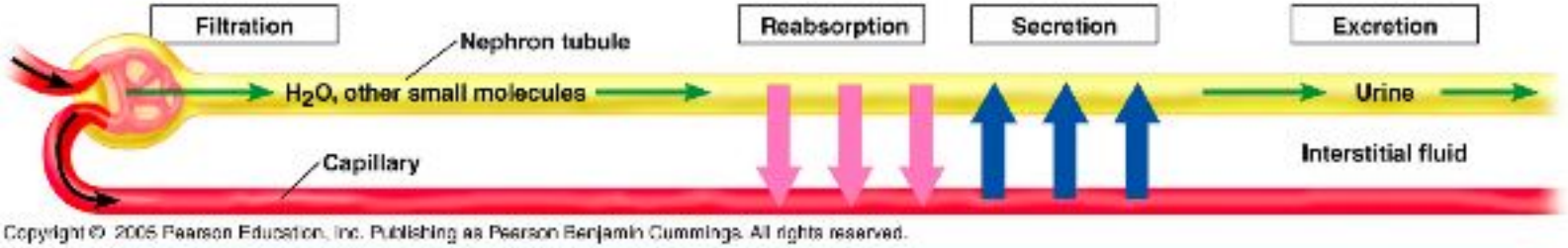


D Detailed structure of a nephron

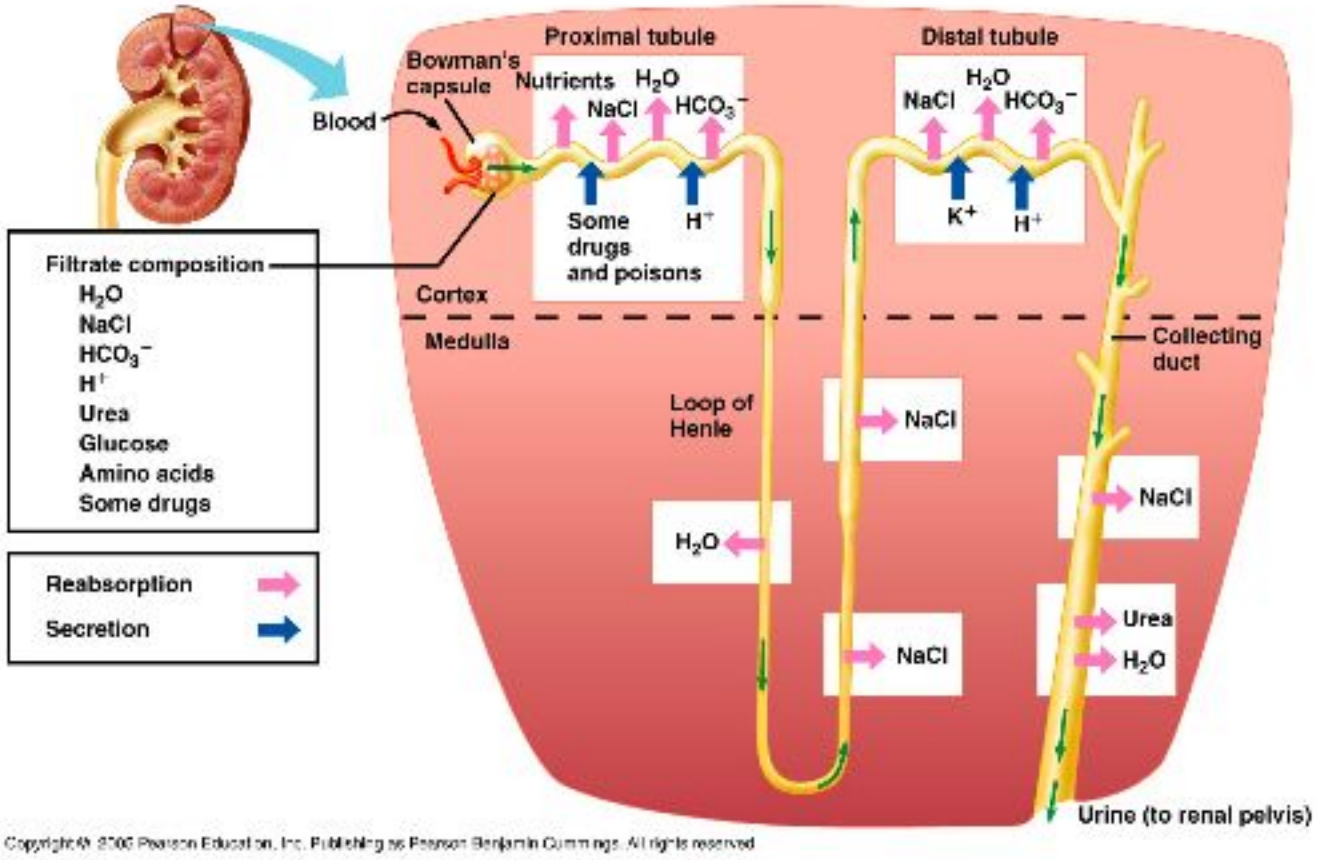
The nephron

- Glomerulus - knot of capillaries
- Filtrate - fluid that leaks from the capillaries
- Bowmen's capsule - collects the filtrate
- Tubule - composed of proximal, loop of Henle, distal tubule, and collecting duct.-- tubular re-absorption.

Reabsorption of amino acids, glucose etc…



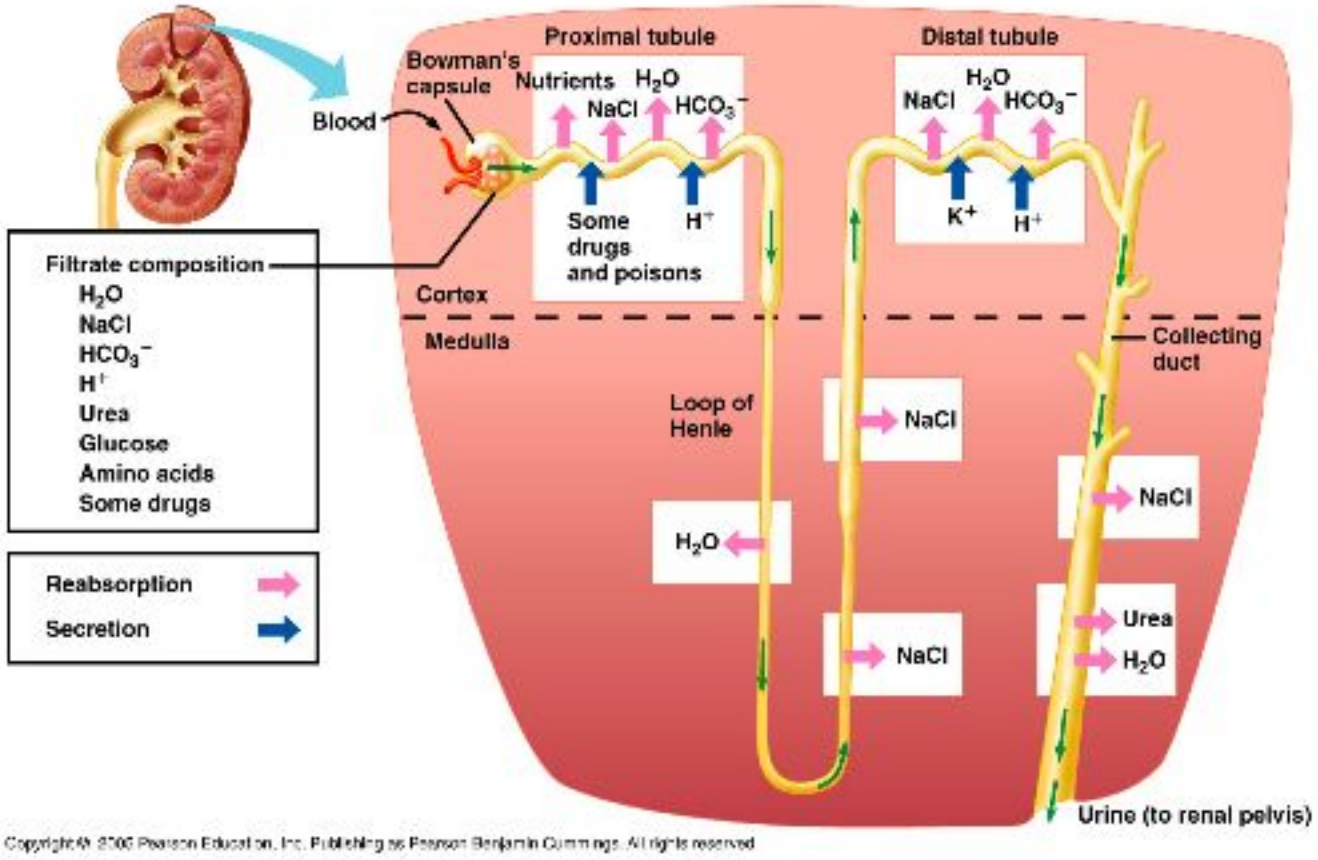
Kidney able to make urine more concentrated than blood



Kidney able to make urine more concentrated than blood

- Loop of Henle passes through a concentration gradient.
- Collecting duct moves through this gradient will collect more water

Kidney able to make urine more concentrated than blood



Regulation of urine output

- Urine regulated by the hormone ADH.
- Less ADH more urine.

Urine concentration

- Length of the loop of Henle determines the concentration of the urine
- Kangaroo rats -- very long (14X urine)
- Beaver -- very short (2X urine)
- Humans -- intermediate (4X)