

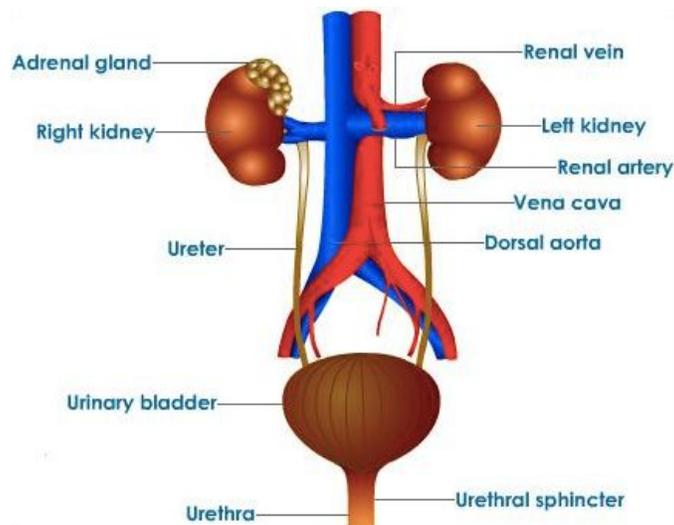
Excretory System

“And you shall eat it as barley cakes; and bake it using fuel of human waste in their sight.”

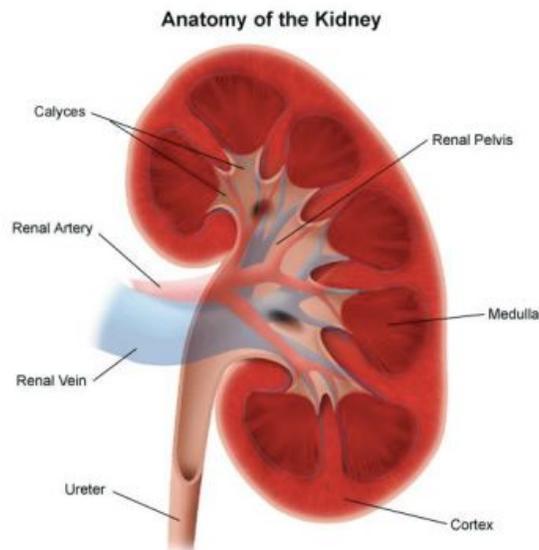
Ezekiel 4:12

“Then He said to me, 'See, I am giving you cow dung instead of human waste, and you shall prepare your bread over it.'” Ezekiel 4:15

- excretion: removal of waste substances from the body
CO₂, water vapor removed by lungs
solid waste from food removed by colon
- urea, uric acid, salts, nitrogenous wastes removed by kidneys and sweat glands
- urinary system excretes urine
consists of kidneys, ureters, urinary bladder, urethra

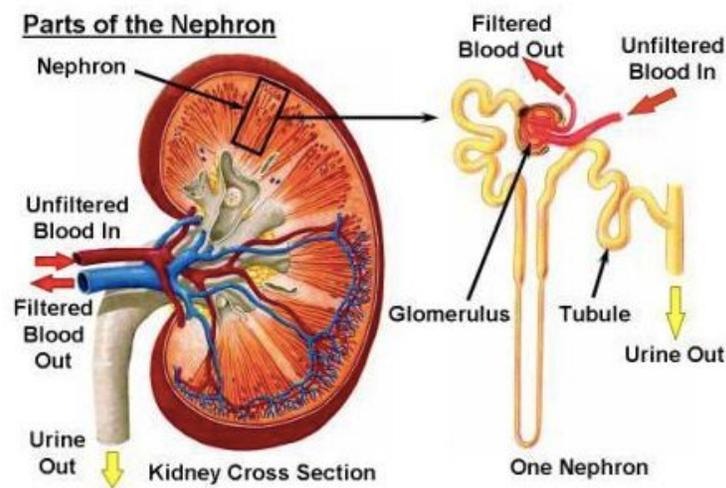


Kidneys



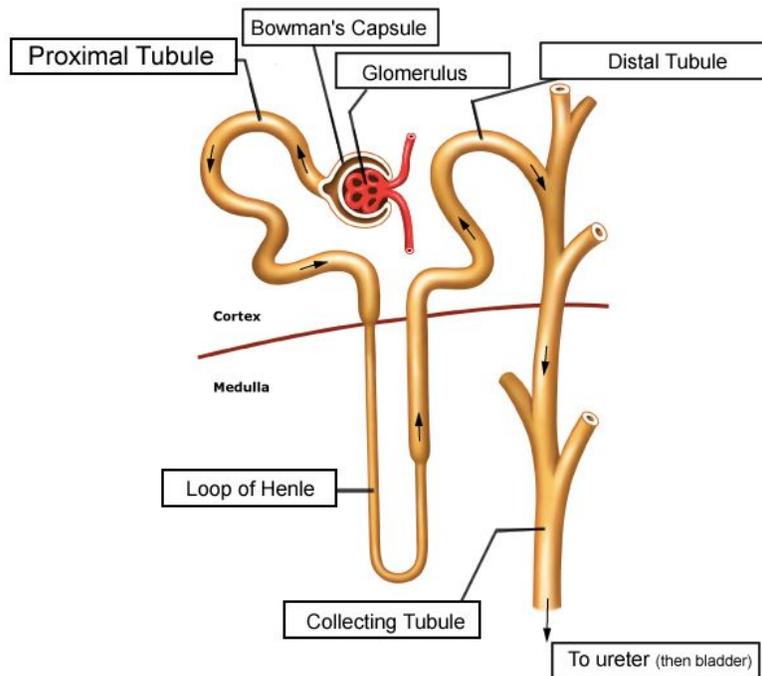
- kidneys: most important excretory organs

- primary function to cleanse blood of wastes
- attached to back wall of abdominal cavity;
- kidneys remove waste from blood → liquid waste mixed with water to form urine → ureters → urinary bladder (stores urine) → urethra (tube which carries urine to outside of body)
- renal cortex: solid-looking outermost part of the kidney; contains many small arteries and veins that carry blood to and from one million nephrons located in the cortex
- medulla: region located inward from the cortex
includes the cone-shaped renal pyramids: fibrous/striped triangular zones in the medulla that contain the collecting ducts, which collect urine from the kidney tubules of the nephrons in the cortex; also contains the renal columns that contain middle-sized arteries and veins that carry blood between the nephrons in the cortex and the renal artery and vein
- renal pelvis: hollow area in the center of the kidney is the renal pelvis (which should not be confused with the bone called the pelvis); collecting ducts drain into the pelvis → the urine passes out through the ureter to the urinary bladder



Nephrons

- nephrons: microscopic network of blood vessel and renal tubules where blood is filtered and purified liquids absorbed
- blood enters nephron →
- glomerulus contains capillaries / Bowman's capsule surrounds glomerulus and collects water, substances that escape blood →
- fluid flows through renal tubule where glucose, hormones, etc. removed from fluid and returned to blood (reabsorption) →
- waste products such as urea remain in renal tubule = urine → urine drains out of nephron → pumped to bladder



Filtration

- everyday 48 gal of blood passes through kidneys to be filtered
- 1-2 quarts retained as urine
- filtering action of glomerulus requires certain amount of blood pressure to push molecules through capillary walls
- if ↓ pressure then kidneys release enzyme renin which acts on circulatory system to ↑ blood pressure
- ADH: antidiuretic hormone produced by pituitary gland to regulate water reabsorption; ↑ thickness of blood/body fluids signals hypothalamus to signal pituitary gland → ADH changes ability of capillaries to allow more water to be reabsorbed; when hypothalamus detects enough/too much water in body fluids then stops producing ADH
- dialysis: separating molecules of different sizes using a membrane; blood from a patient pumped into dialysis machine → blood passes through artificial material which filters our urea and other wastes → blood returned to person