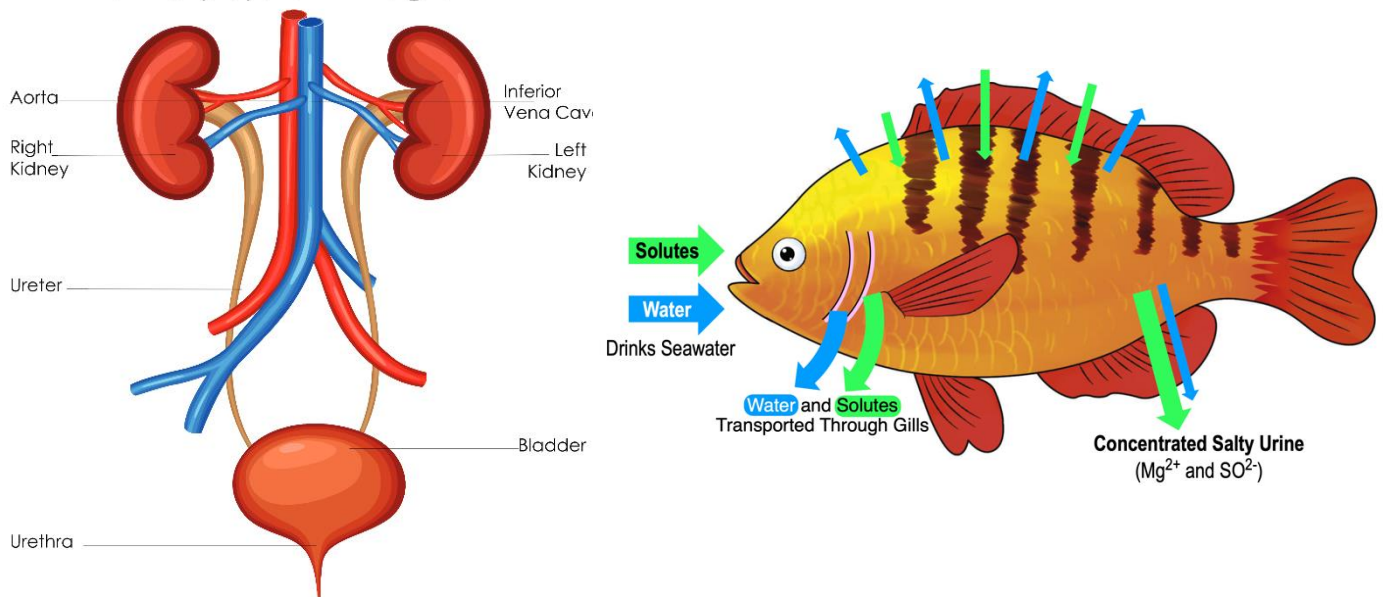


TOPIC: FLUID BALANCE

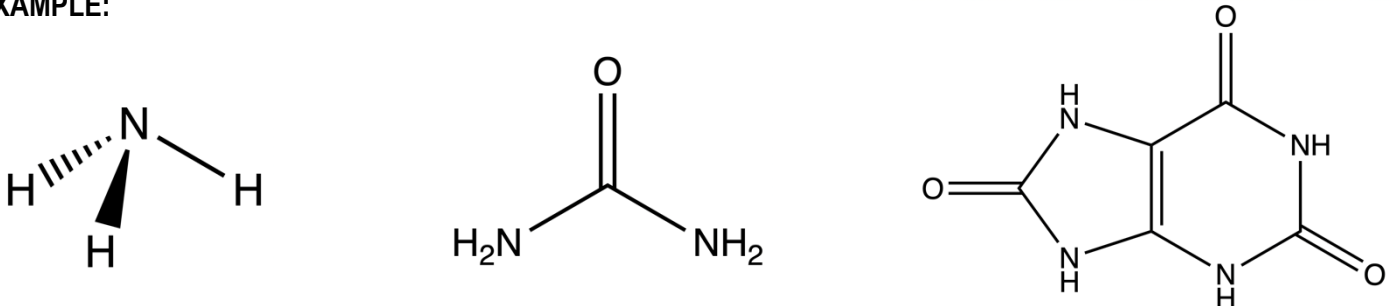
- **Osmoregulation** – regulation of solute balance and water loss to maintain homeostasis of water content
- **Excretion** – process of eliminating waste from the body, like nitrogenous waste
- **Kidney** – bean-shaped organs that filter blood plasma, and form urine
- **Ureter** – transport urine from the kidney to the bladder
- **Bladder** – organ that stores urine for elimination through the urethra
- **Urethra** – opening through which urine leaves

EXAMPLE: Urinary System Diagram



- **Nitrogenous waste** – nitrogen-containing metabolic wastes
 - **Ammonia** – toxic substance that must be heavily diluted, forms from the breakdown of proteins and nucleic acids
 - **Urea** – requires energy to produce, but is far less toxic than ammonia, excreted with minimal water loss
 - **Uric acid** – mostly insoluble, so excreted with almost no water loss, but energy intensive to produce
 - Type of waste tied to evolutionary history, habitat, and osmotic stress
 - Fitness trade-off between energetic cost of excreting waste and conserving water

EXAMPLE:



TOPIC: FLUID BALANCE

- Kidney is mostly made of nephrons, small specialized structures that carry out the filtration and formation of urine
 - **Cortex** – outer layer of the kidney
 - **Medulla** – inner, “saltiest” layer of the kidney
- **Nephron** – functional unit of the kidney made of tubule structures that transport filtrate surrounded by blood vessels
 - Nephron uses active transport of solutes to create a “salty” environment to reabsorb lots of water
 - **Cortical nephron** – most common type of nephron that doesn’t extend as deeply into the medulla
 - **Juxtamedullary nephron** – responsible for generating and maintaining strong osmotic gradient for reabsorption

EXAMPLE:

