

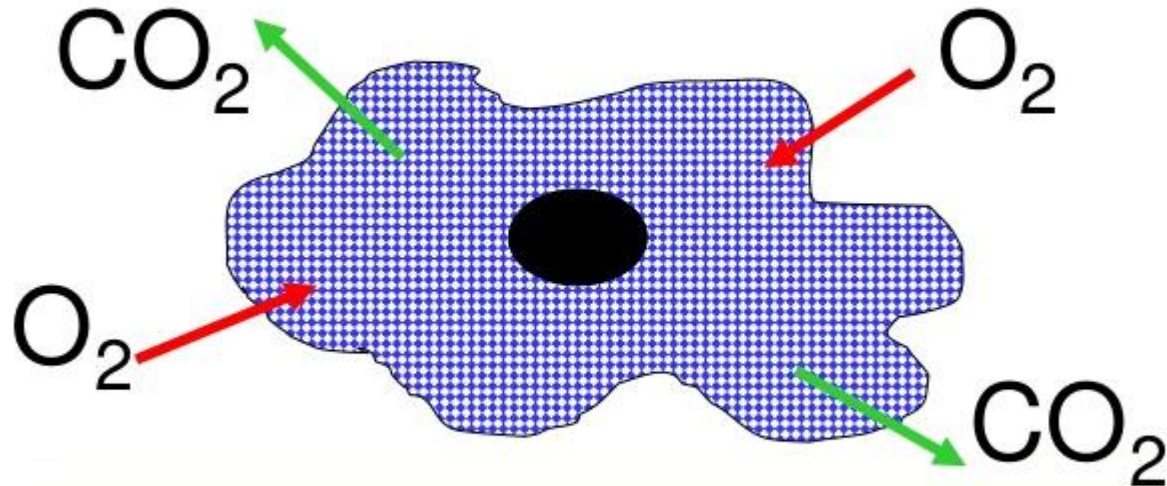
Animals excretion

- All animals eat to get energy, and their products of digestion have to be removed from body. This process is called **excretion**. All animals have special organs for excretion.

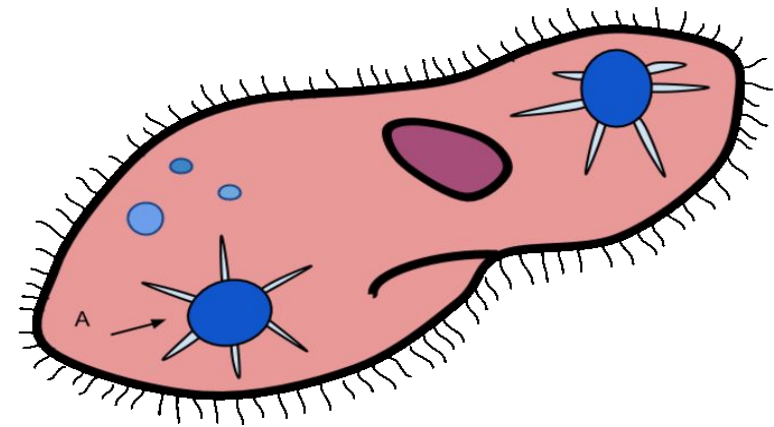
Protozoans (amoeba, paramecium)

- They have **contractive vacuole** to remove wastes, or **diffusion** is another way to remove waste(CO_2) from the cell.

Respiration of Amoeba sp.

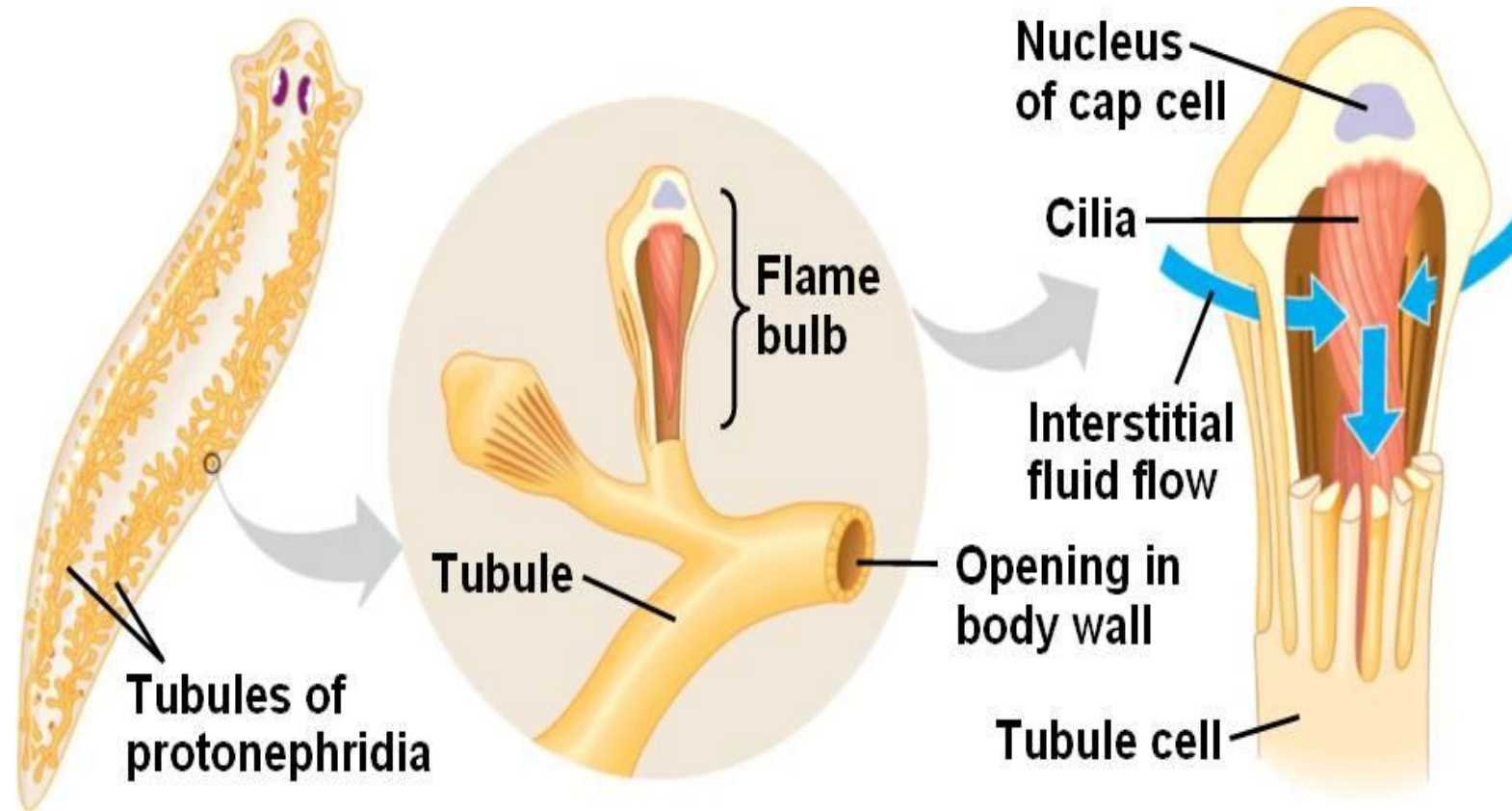


Exchange of oxygen and carbon dioxide occurs through the plasma membrane through simple diffusion.



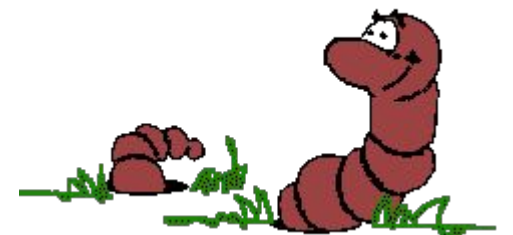
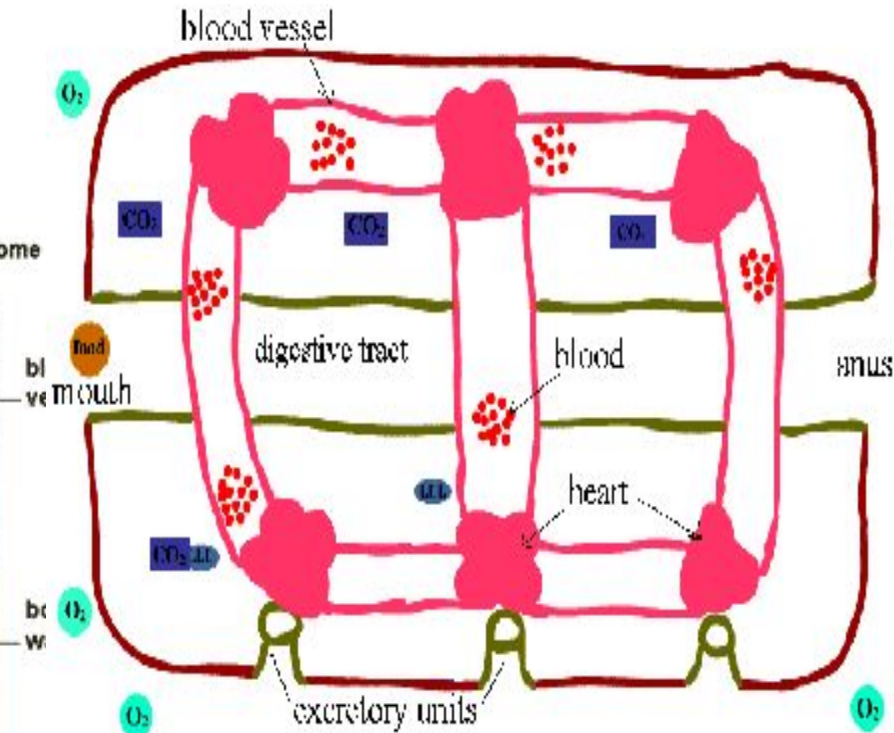
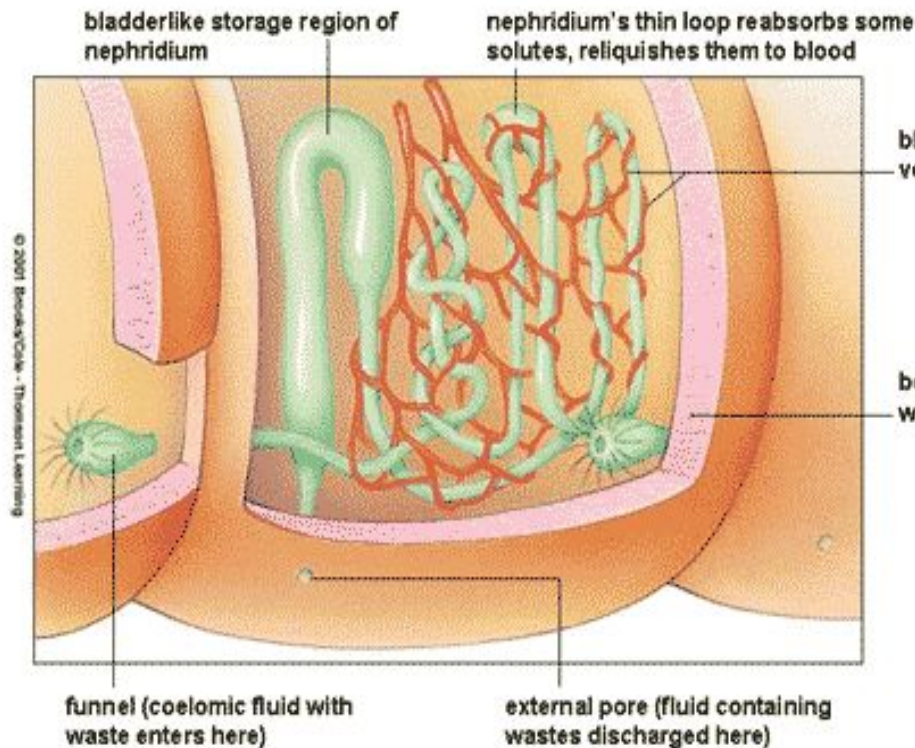
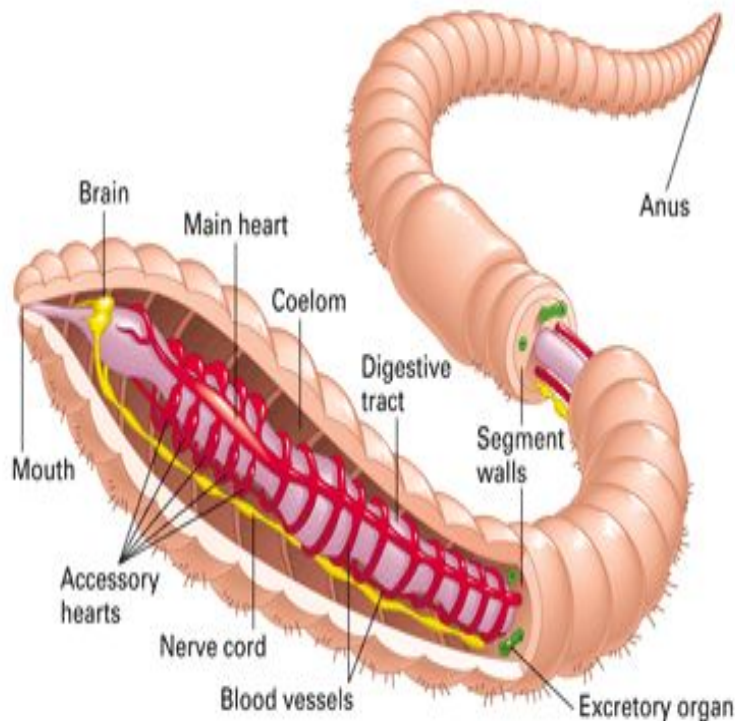
Flatworms(planaria)

- Flatworms use **flame cells** to excrete wastes. Many flame cells come together to form a *net of tubules*. Tubule collect wastes and excrete them through pores.



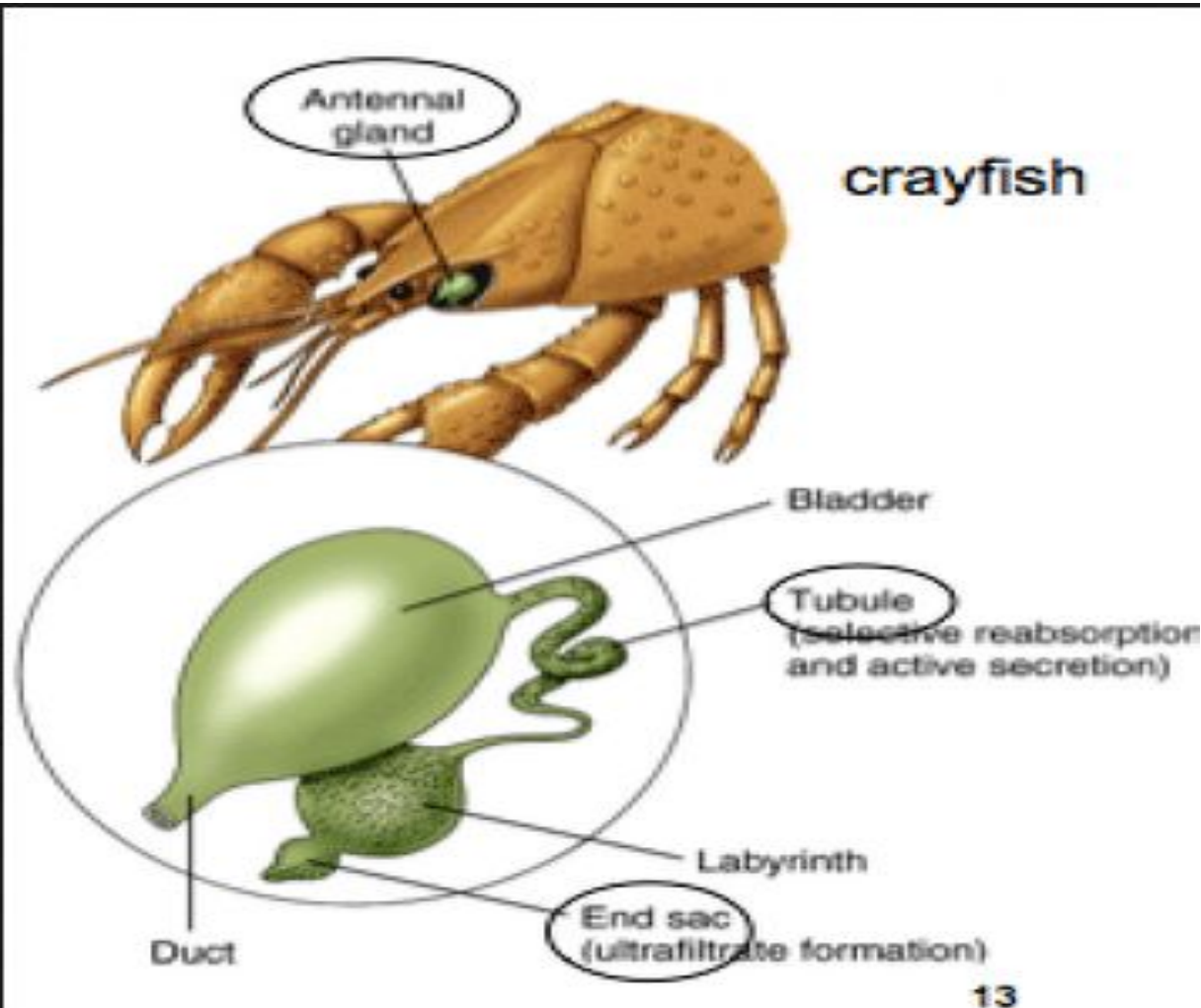
Segmented worms (earthworm)

- Segmented worms have net of ciliated tubules called **nephridia**. They remove wastes outside through the **pores**.

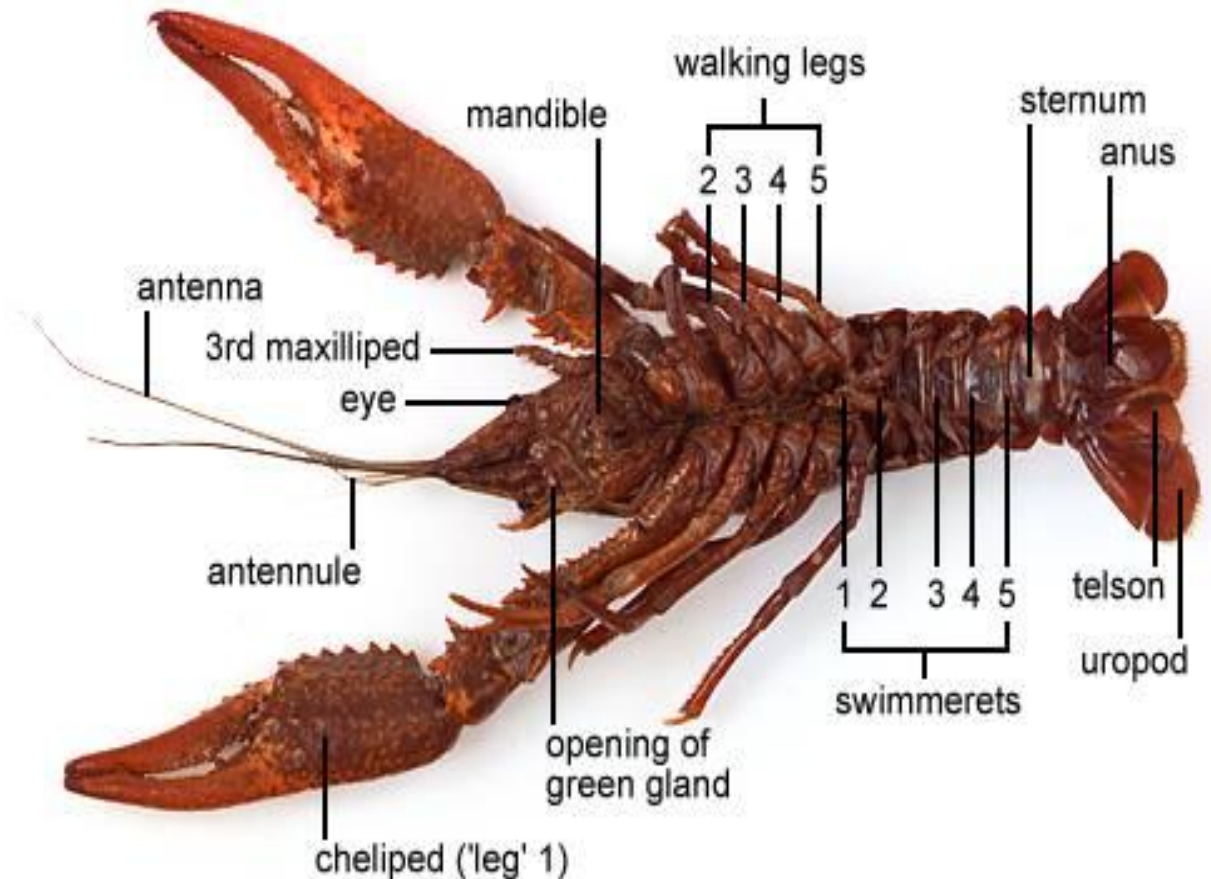


Crustaceans(crayfish, lobster)

- Excretory organs of crustaceans are **green glands**.



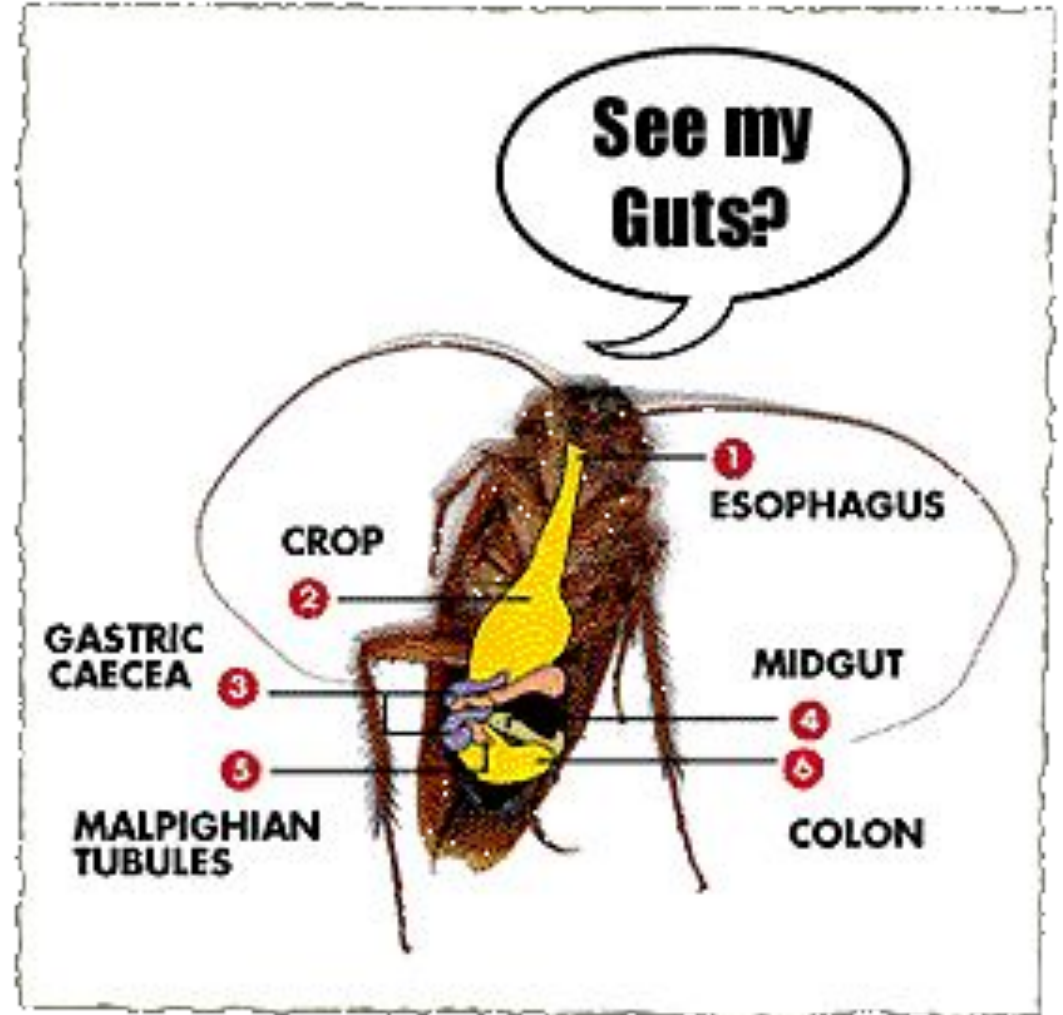
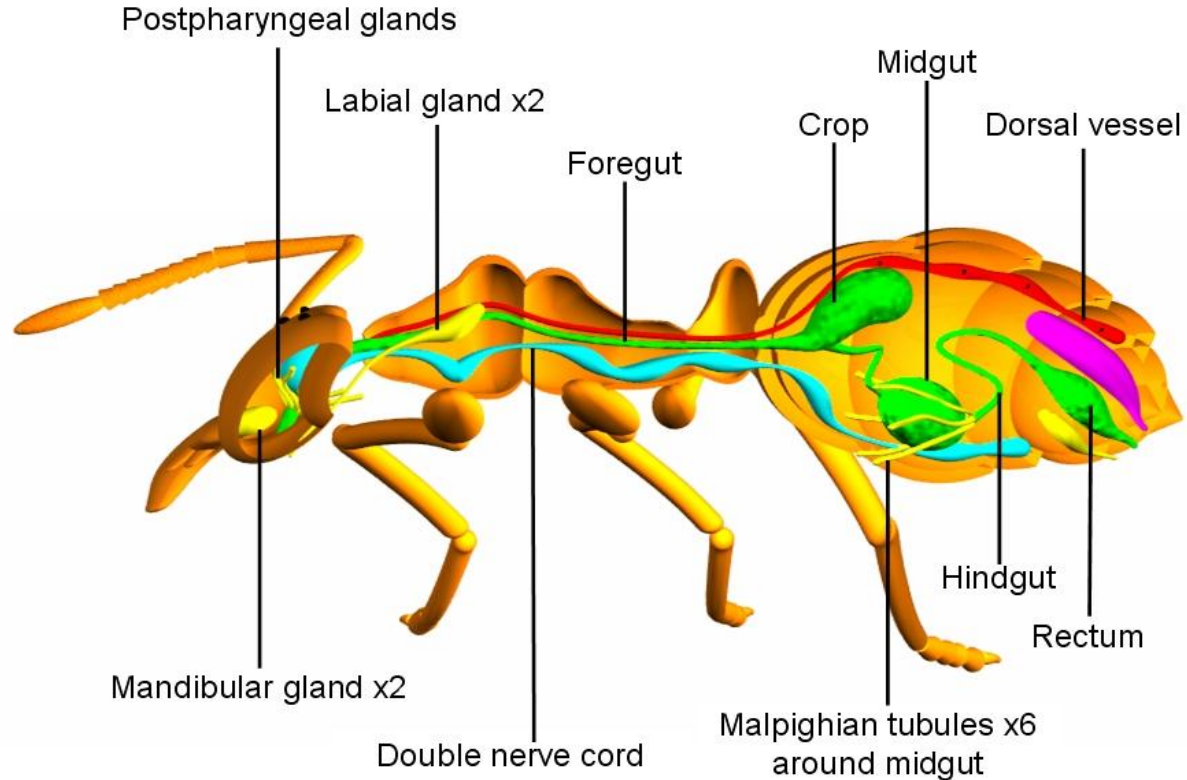
Crayfish - Ventral View (Male)



Insects(ant, bee)

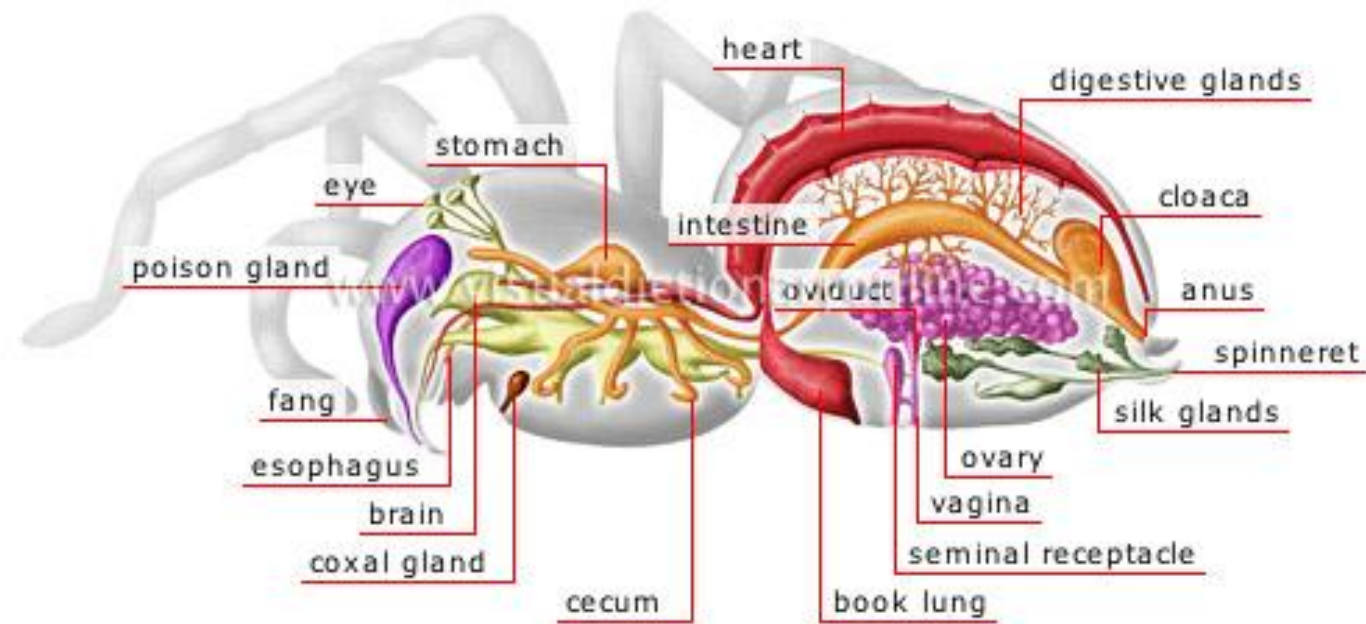
- Insects use **Malpighian tubules**

Cutaway of an ant showing some of the major glands and other structures



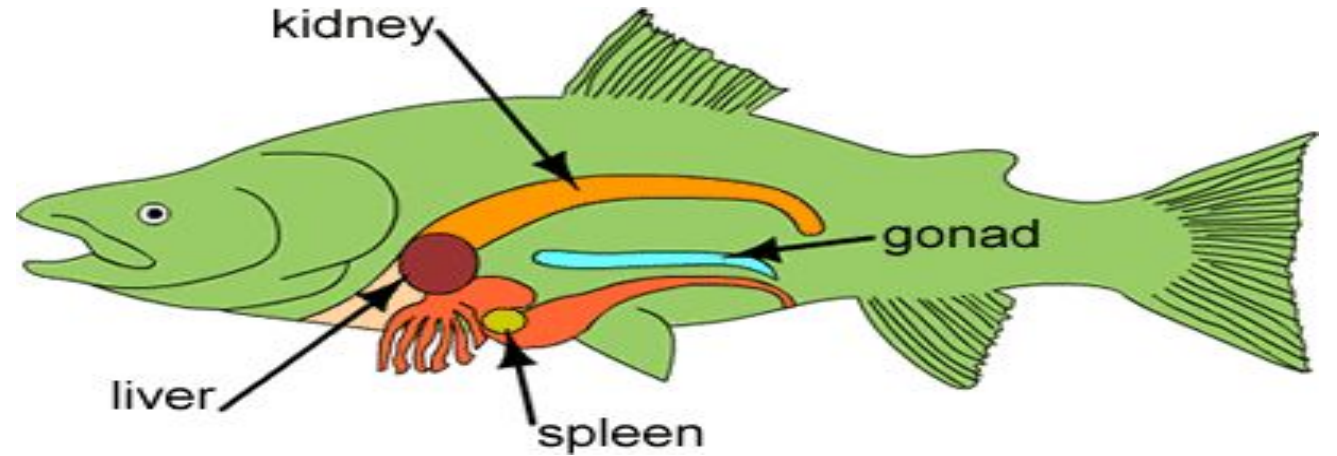
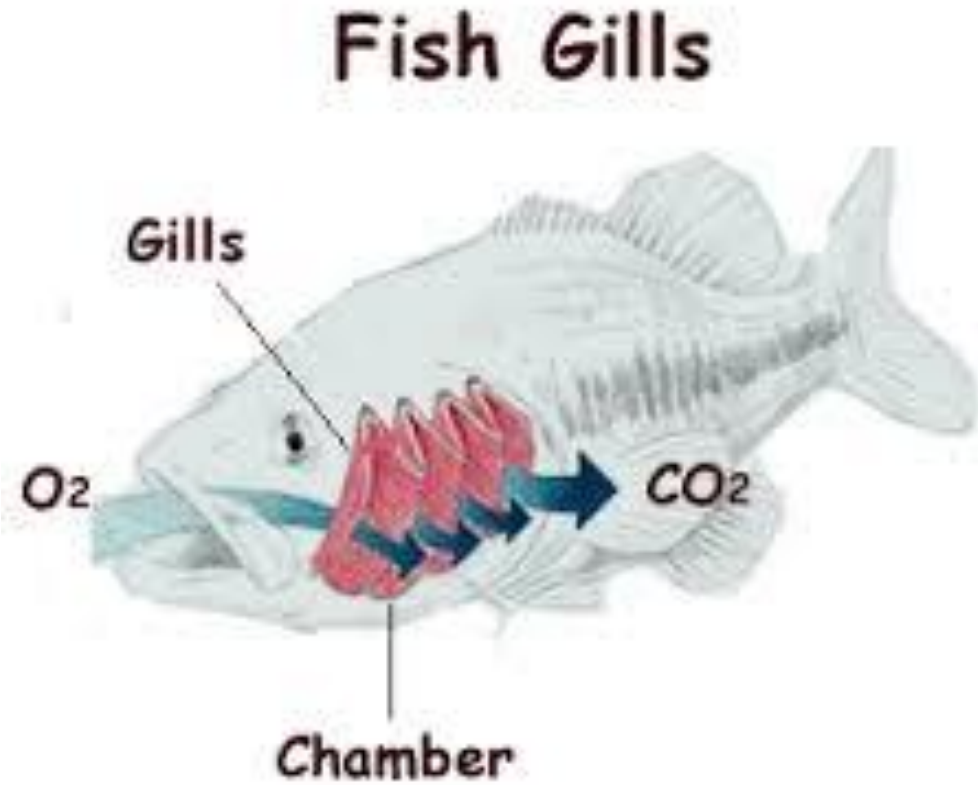
Arachnida(spider)

- Coxal glands and Malpighian tubules



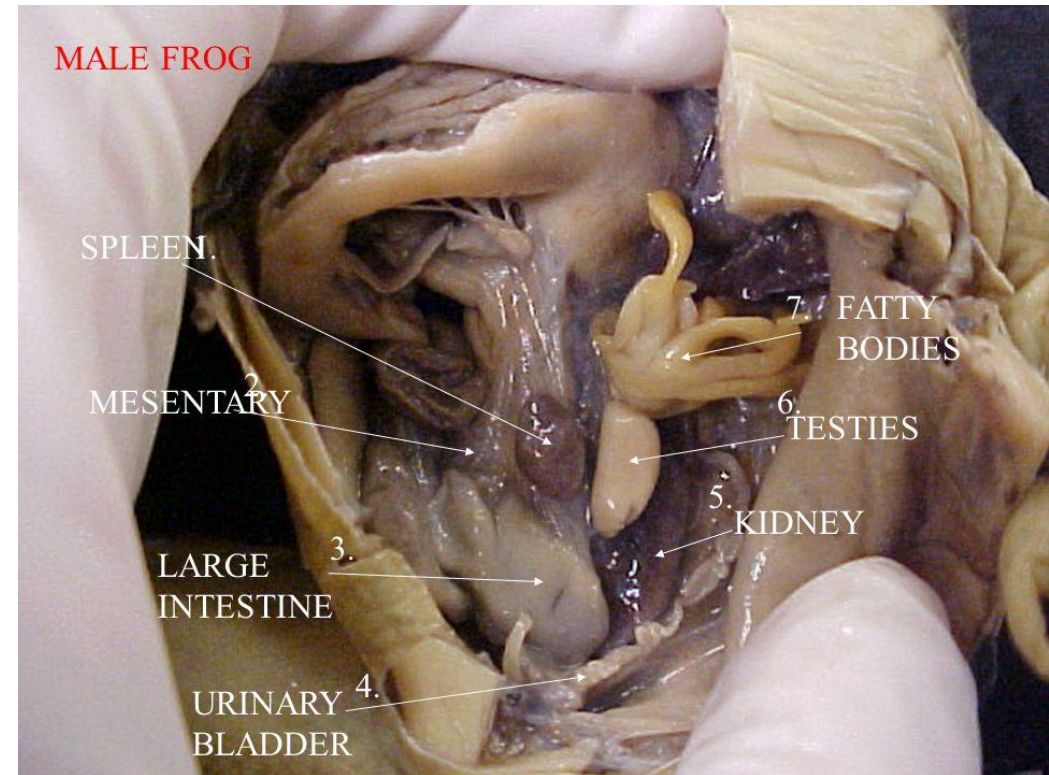
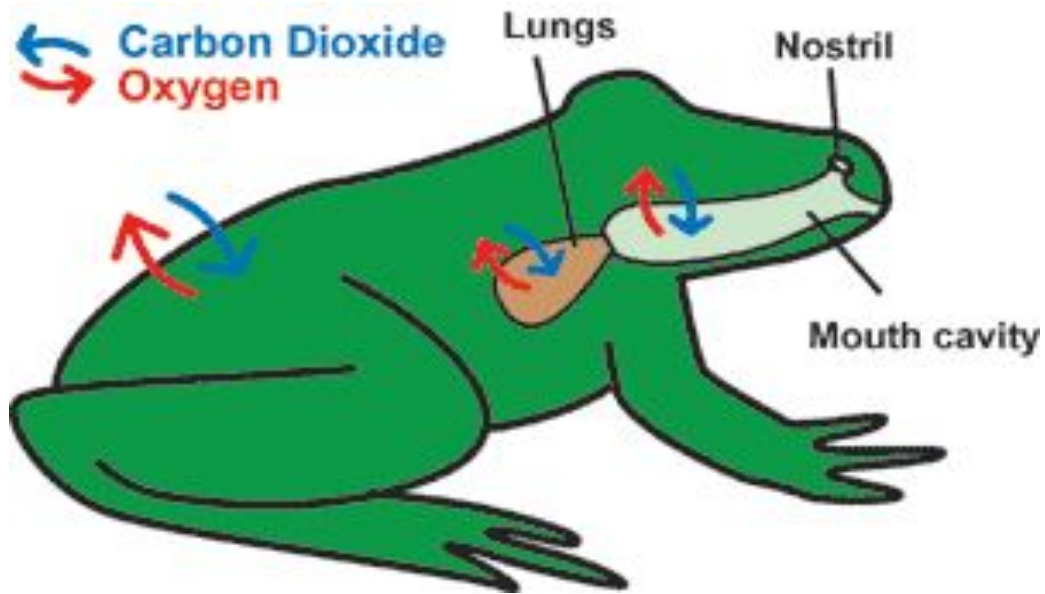
Fish

- They use **gills** to excrete CO_2 (carbon dioxide) and **kidneys** to remove *ammonia*.



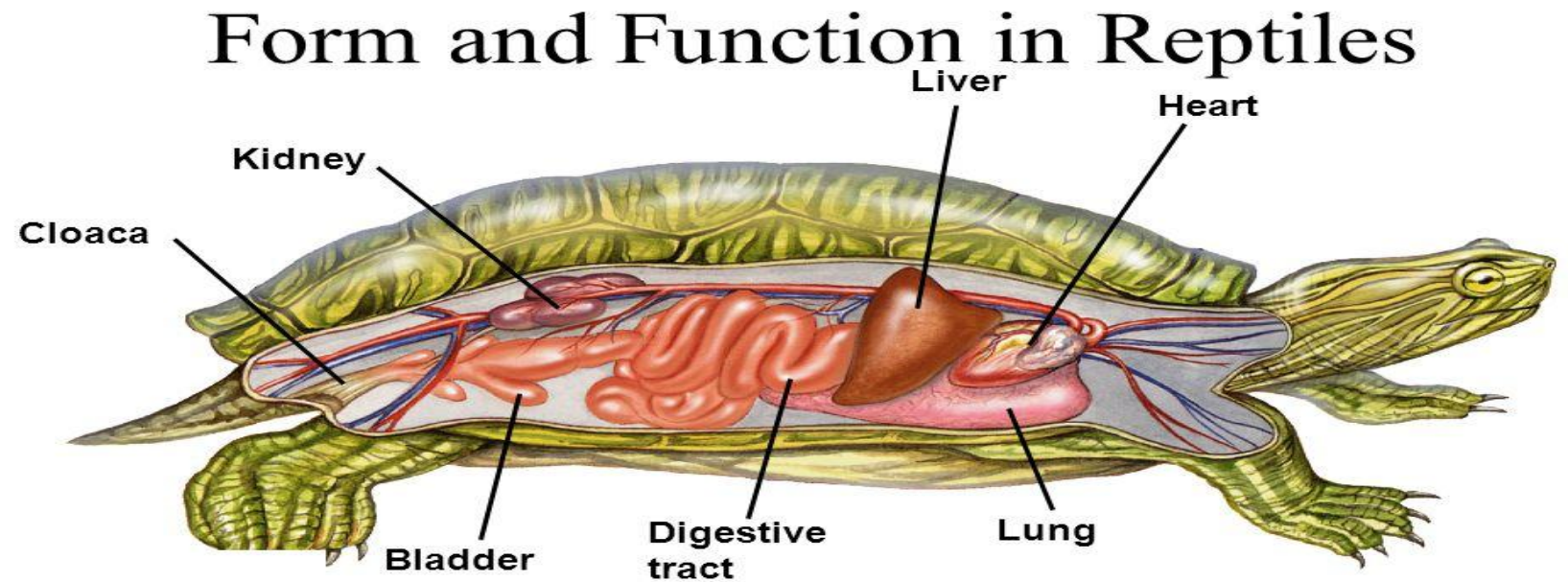
Amphibians (frog)

- Adult amphibians use **lung** and **skin** to excrete CO₂, and **oval kidney** to remove *ammonia*



Reptiles(lizards and crocodiles) and birds

- They remove **uric acid** from **kidney** through **cloaca**, and **lungs** to remove CO₂



Mammals

- They have bean shaped **kidneys** which are connected to **urinary bladder** by **ureters**. The waste products of mammals is *urine*. Some mammals also excrete salts by sweating.

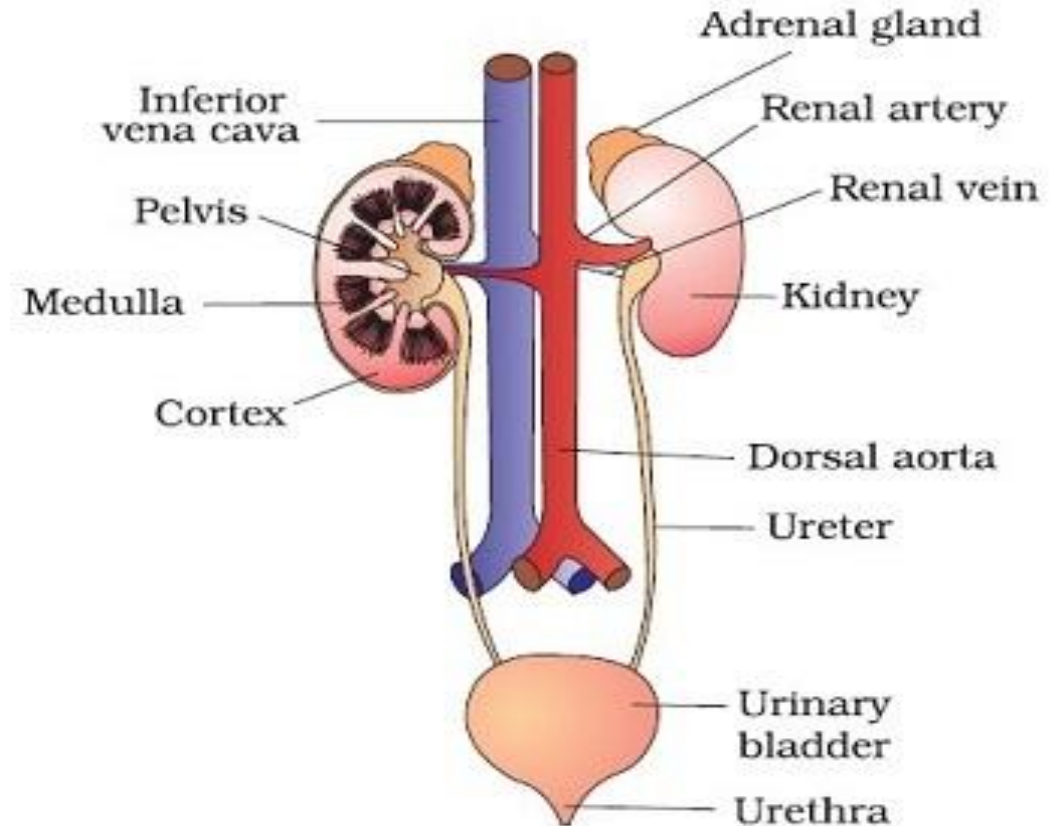


Figure 1. Human Urinary system