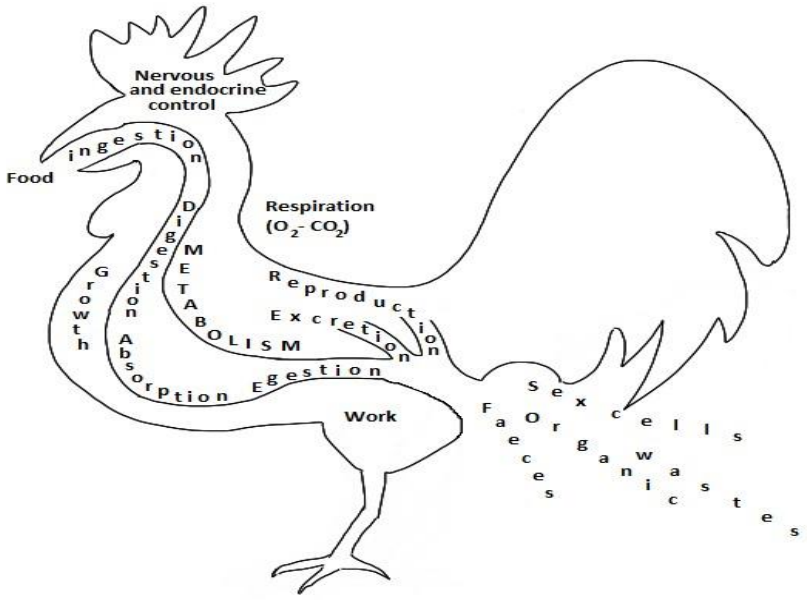
(AVIAN EXCRETORY SYSTEM/ URINARY SYSTEM)

1- Major organs of the avian excretory system are the kidneys, the ureter and the cloaca. Two kidneys, each with a ureter that carriers the urine produced by the kidneys to the cloaca where it leaves the body. The functional units of kidneys are nephrons.

2- No urinary bladder in bird's body.

3- The two kidneys of the domestic fowl each generally with three lobes are found immediately behind the lungs on each side of the vertebral column and closely associated with it. They are brownish in color and their consistency is such that they are easily damaged during their removal. The kidneys are normally left in when a broiler carcass is processed.



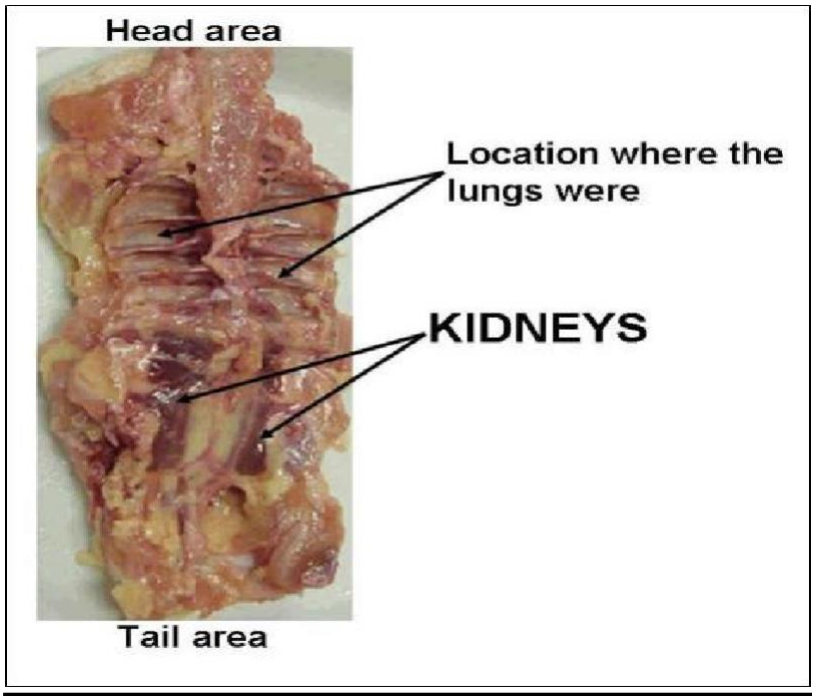
The differences between mammalian & bird's excretory system;

1- **Kidneys** (in case of birds consist of two kidney each kidney consist of three lobes while in mammalian kidneys consist of two beans shape kidneys).

2- **Nephrons**: Two types of nephrons (mammalian & reptilian nephrons) while, only mammalian nephrons present in mammalian kidney.

3 - **Uric acid** (in mammalian urine is made up of urea while in case of birds is composed of crystals of uric acid).

4- Birds have **renal portal system**, the **unique feature** in avian s kidney.

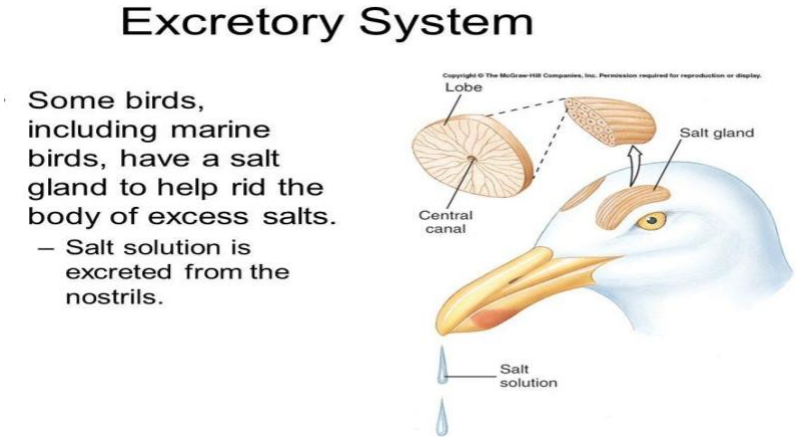


Excretion:

1- Waste product removal e.g. nitrogenous- (**Uric acid** birds, **Urea** mammalian and **Ammonia** fish).
2- **Toxic compounds** (with metabolism).
3- **Functions: Homeostasis**;
1- Blood Volume/ Extra- cellular volume.
2- Blood Osmolality.
3- Acid/ Base, pH.

Excretory Organs:

1- Kidneys; secrete uric acid (final product of protein metabolism).
2- Gastro- intestinal tract secretions e.g. bile.
3- Salt glands; excrete access water.
4- No sweat glands.
5- Lungs; Water loss by breathing.



The primary component of poultry waste is **uric acid**, the major end product of protein utilization. Uric acid is a white, pasty substance. Poultry waste is comprised of urine and feces (see Figure 2); these are not separate. **Uric acid is the main product of nitrogen metabolism in birds** and is not water soluble; this is why solids make up part of the urine.

Gout is a metabolic disorder associated with the kidneys. In gout the kidney function is slowed down to a point were uric acid accumulates in blood and body fluids. It can also leads to accumulation of white uric acid crystals in soft tissues of various organs.

There are two types of gout – visceral and articular. **Visceral gout** is a condition in which uric acid crystals are seen in soft tissues. The visceral form of gout is commonly found in broilers resulting in economic losses due to mortality and morbidity.

The kidney damage can arise from infection with certain strains of Infectious Bronchitis, **Avian Nephritis virus**, exposure to some mycotoxins, or inadequate water intake. Residual toxic effects due to some of the disinfectants have also been reported.

Articular gout is a condition in which urate crystal deposits are seen in joints. This condition is rarely seen in broilers. Main causes are genetics and high protein diets.