

Urogenital system

Urinary system

The urinary and the genital organs are embryologically and anatomically connected. Both developed from a common mesodermal ridge along the caudal wall of abdominal cavity, and the excretory ducts of both systems initially enter a common cavity, the cloaca. The urinary organs are -:

1- **Kidneys**

2- **Ureters**

3- **Bladder**

1- **Urethra**

Note ; Kidney in the development of the embryo forms 3 types of kidneys-:

1- **Pronephros**

Which degenerate (rudimentary) and not functional in the mammals.

2- **Mesonephros**

Degenerate most of it is tubules and persist only 1/3 caudal from the stay in temporary function.

3- **Metanephros**

Which developed to the kidney in the adult .

The Kidneys

They are paired excretory organs which secrete the urine, they are red-brown in color and are situated against the dorsal wall of the abdomen.

Function of Kidneys

١-They are regulating the water and salt concentration of the body.

٢- Remove a liquid waste from the blood in the form of urine, a large amount of blood flushes continuously through kidneys .

٣-Produce erythropoietin, hormone that aids the formation of red blood cells.

Shape of Kidneys

Their shape varies from bean shape to heart shape or heart of plan card (right kidney in horse). Only in bovine the kidney is lobulated.

The Hilus

Is the depression through which pass artery, vein, nerve, lymph vessels and ureter and lead to renal sinus which lodges the renal pelvis

which is absent in bovine. In bovine the renal pelvis is absent so the ureter joins in the sinus and take over the role of the renal pelvis in the other animals.

The renal pelvis receives the urine from the renal papillary ducts and transmits the urine to the ureters. The kidney consists of external cortex and internal medulla .

The cortex is reddish- brown in color and granular, while the medulla projects into the renal pelvis or calices with one or more papilla. The basic features of kidneys -:

- 1- surfaces; dorsal and ventral .
- 2- borders ; lateral and medial.
- 3- poles ; cranial and caudal.

Kidneys of the Dog (A), Ox (B) and Horse (C), Longitudinal section in the dorsal plane

1 Ureter.

2-Renal pelvis Not present in the OX.

3-Renal crest Absent in the OX and Pig; Present but not shown in the horse.

4-Calices----- Present in the OX and Pig only.

5-Cranial branch of ureter ----- Present in the OX only.

6- Caudal branch of ureter ----- Present in the OX only.

∨- Terminal recess ----- Present in the Horse only.

∧- Opening of terminal recess in renal pelvis ----- Present in the horse only .

∩- Renal artery ----- Shown in the Horse only

Fixation

The kidneys are held in position by-:

∩- The pressure of adjacent organs.

∨- The renal fascia.

∩- Hepatorenal ligament (Right side).

∩- Suspensory ligament

Note: The right kidney is much more strongly attached than the left kidney.

Types of kidneys; The types of kidney according to the lobulation are-;

∩- Lobulated kidney:- The lobules are not fused (developed separately); so the cortex and medulla not fused, and each lobule connected with one calyx. Found in (wale , seal , polar bear and in the embryo of all mammals.

∨- Simple kidneys: characterized by the fusion of the lobules (renuli) . The fusion in different degree therefore they subdivided in to-;

a- Multipapillated furrowed kidney (in bovines)

The fusion is only in the middle of the lobules and the cortex is not fused. The surface of kidney is furrowed. It characterized by presence of calyces and has no pelvis.

b- Multipapillated smooth kidney-

The cortex is fussed therefore the surface is smooth but the papillae remain separated and connected with the same number of calyces with renal pelvis (Pig) .

c- Unipapillated smooth kidney;

Fusion of the papillae and form one single large papillae and project in the renal pelvis and no calyces (sheep, goat, carnivores and horse).

Kidney of the Horse

Right Kidney -;

It is heart shape, it is located ventral to the dorsal part of the last 12-13 ribs and the first lumbar transverse process. The dorsal surface is convex and related to the diaphragm , the ventral surface concave and related to the liver, pancreas, cecum and right adrenal gland it has no peritoneal covering. The medial border has renal v, the lateral border is rounded.

Blood supply

- **Each kidney is supplied by a renal artery a branch of the abdominal aorta.**
- **The renal artery gives several interlobar arteries, pass between renal pyramids at the corticomedullary junction , these vessels are prominent in gross sections of the kidney , they give rise to the arcuate arteries that curve over the bases of the pyramids . these in turn give origin to numerous interlobular arteries that supply the units or lobules into which the cortex is divided by the medullary rays.**
- **Each interlobular artery gives rise to many branches that supply the glomeruli.**