

# Anatomy

## *URINARY SYSTEM*

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## *Classification of kidney*

1- lobulated kidney: found in embryo of all mammals and post embryo in (whale, seal, polar bear). The lobes are develop separately. The cortex and medulla are not fused, each lobe join with one calyx.



## 2-Simple kidney:

Lobes are fused in different degree.

A- multipapillated: furrowed kidney

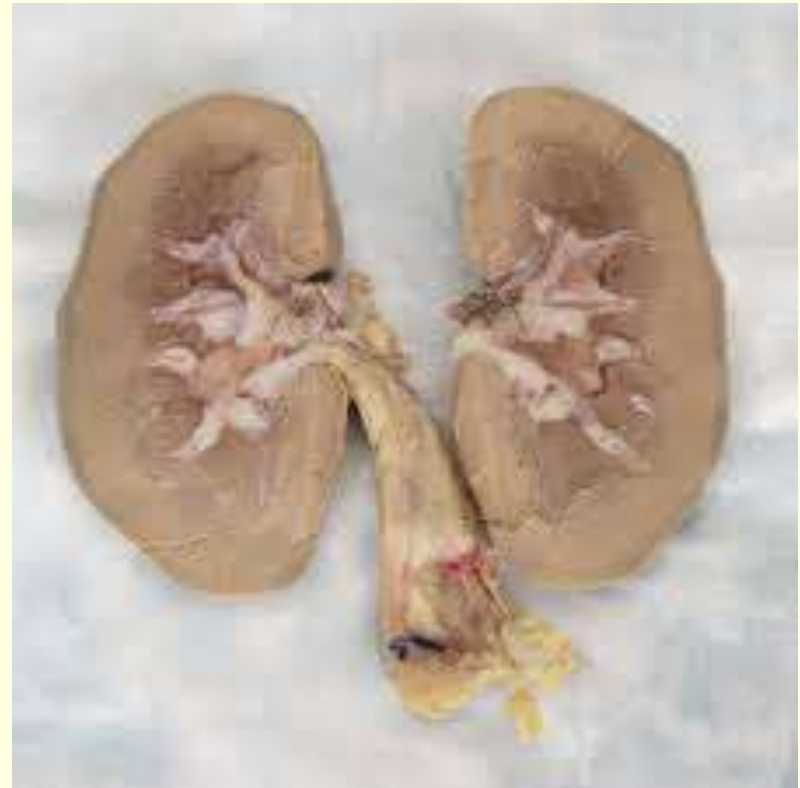
They are fuse only in the medial of lobes, cortex is not fused: ox



2-Simple kidney:

B-multipapillated: smooth kidney:

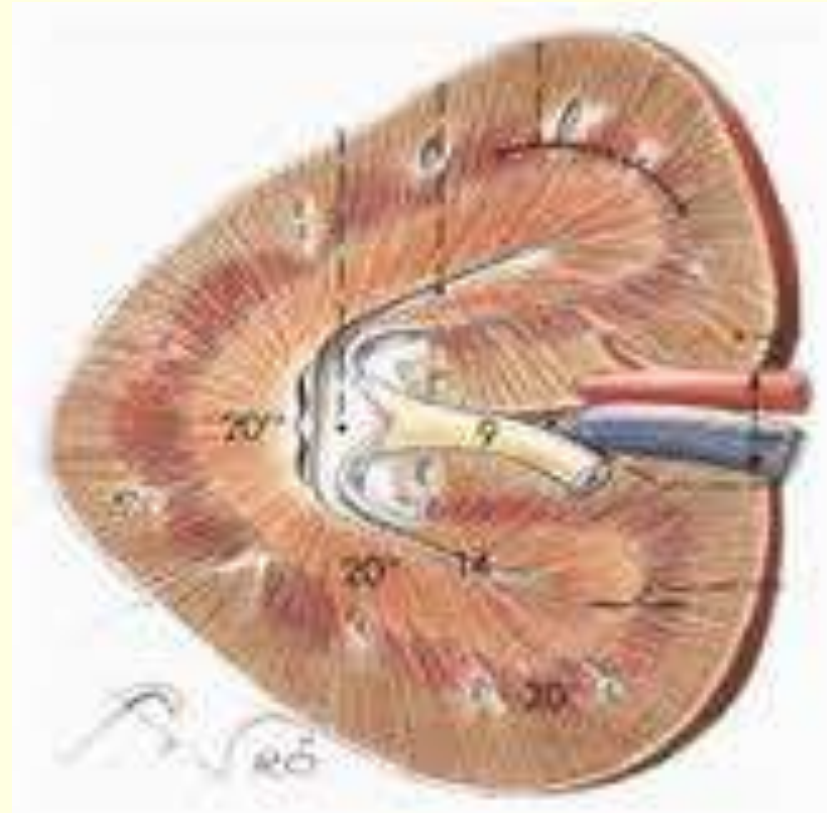
The cortex is fused therefore the surface is smooth and the papillae are separated. e.g. Pig.



## 2-Simple kidney:

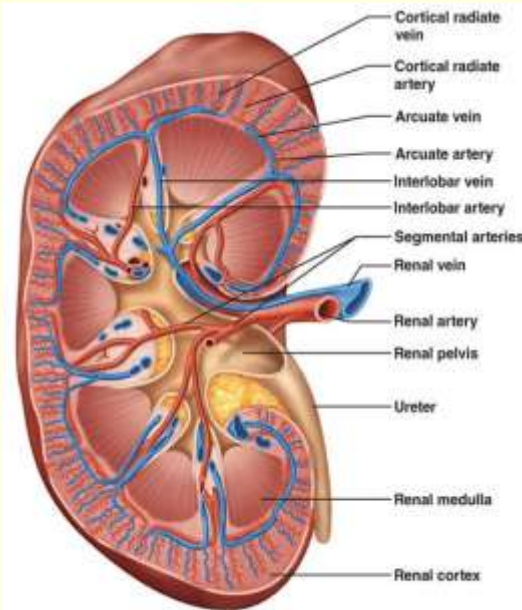
Unipapillated kidney smooth kidney.

The papillae are fused to form single big papilla, sheep, goat, horse, dog.

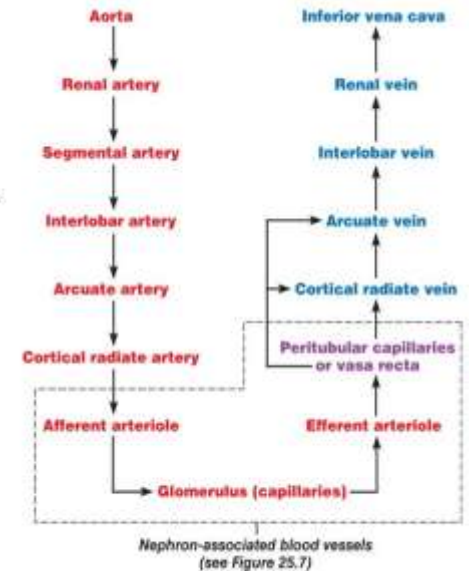


## Blood vascular system of kidney:

The kidney receive its blood supply through the renal artery which is branch of abdominal aorta. It pass directly via the hilus of the kidney and divided into number of branch, from this branch originate the interlobar arteries which inter the parecnchyma of the kidney between the cortex and medulla each artery give a number of archuate arteries



(a) Frontal section illustrating major blood vessels  
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(b) Path of blood flow through renal blood vessels

# Species differences:

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- **Shape:**
- Bean shape and smooth (not lobated): carnivores, small ruminants, pig and the horses left kidney.
- Heat- shaped and smooth: horse right kidney
- Lobated: ox.
- **Capsular veins:** the normal, distinct veins under the capsule of the cat s kidney.
- Mobile kidney: the left kidney of the cat and ruminants hangs down into the abdominal cavity, thus , is not retroperitoneal, the rumen pushes the left kidney to the right of the median plane in ruminants.

## Kidney of the horse

The **right kidney** is heart shape.

dorsal surface is related to the diaphragm and ventral surface is related to the liver.

not covered with the peritoneum, \*the cranial pole is thick rounded and lies in the renal impression of the liver.

\* The caudal pole is thin, narrow.

The **left kidney** is bean shape longer than the right and situated caudally to right one. its ventral surface is covered with peritoneum.

Cranial pole is related to the succacecus of stomach.

Caudal pole is longer than the caudal

**Fixation** the kidneys are hold in position by

- 1- pressure of other organ
- 2- renal fascia
- 3- hepato renal ligament right
- 4- suspensory ligament left.





## **Kidney of the Ox**

Superficially divided by fissure into lobes are about 20 in number.

The right kidney lies ventral to the last ribs.

The left kidney when rumen is full pushes this kidney caudally across the median plane, so that it is situated on the right side caudal to the right kidney.

The kidneys are embedded in a large amount of fat termed adipose capsule.

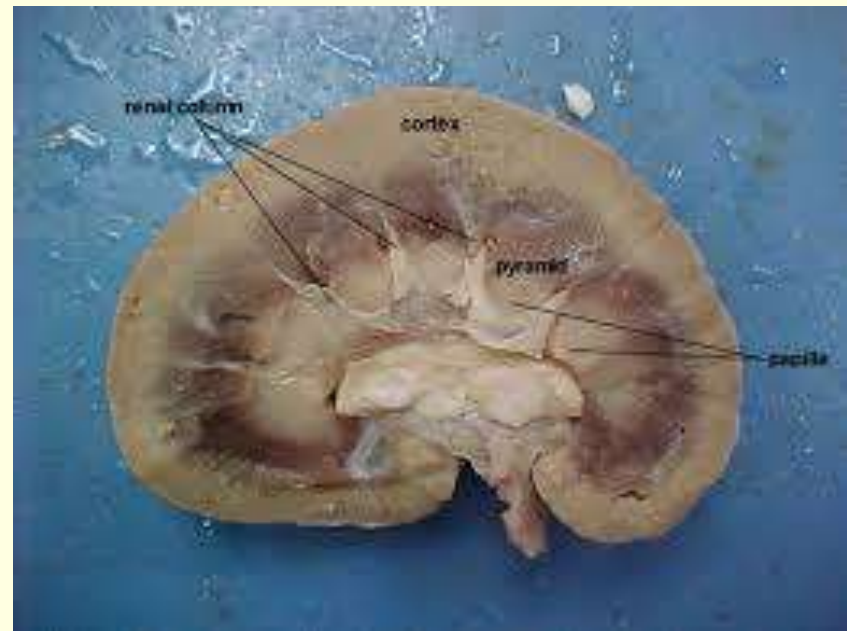
The weight is about 600-700 gm

Structure: the pelvis is absent, the ureter being at the junction of two wide thin-walled tubes, the major calyces, each of which gives off a number of branches and these divided into several funnel-shaped minor calyces each of which embraces a renal papilla.



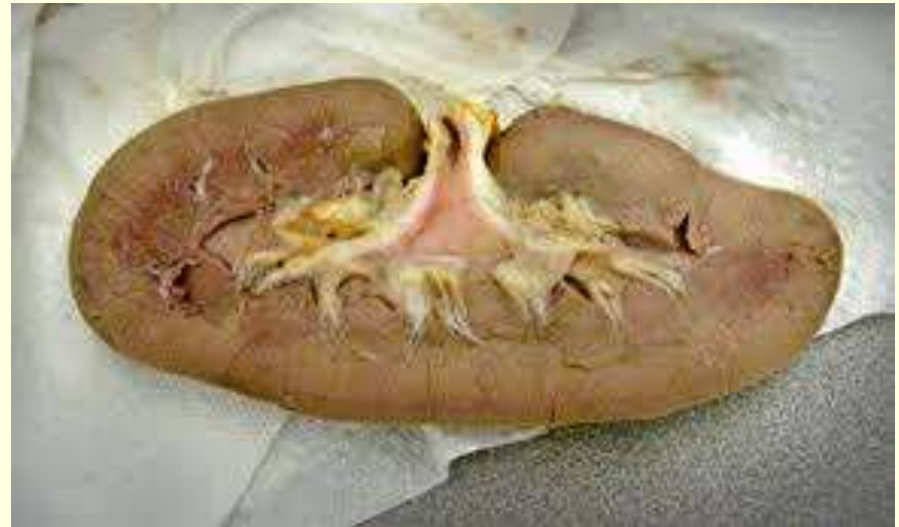
## Kidney of sheep and goat

The *kidneys of the sheep and goat* are quite unlike those of cattle but conform closely in external appearance and internal structure to those of the dog. Bean shape and smooth. being protected from distorting pressures by enclosure in thick masses of fat. The fat cushion makes the left kidney less subject to displacement by the rumen.



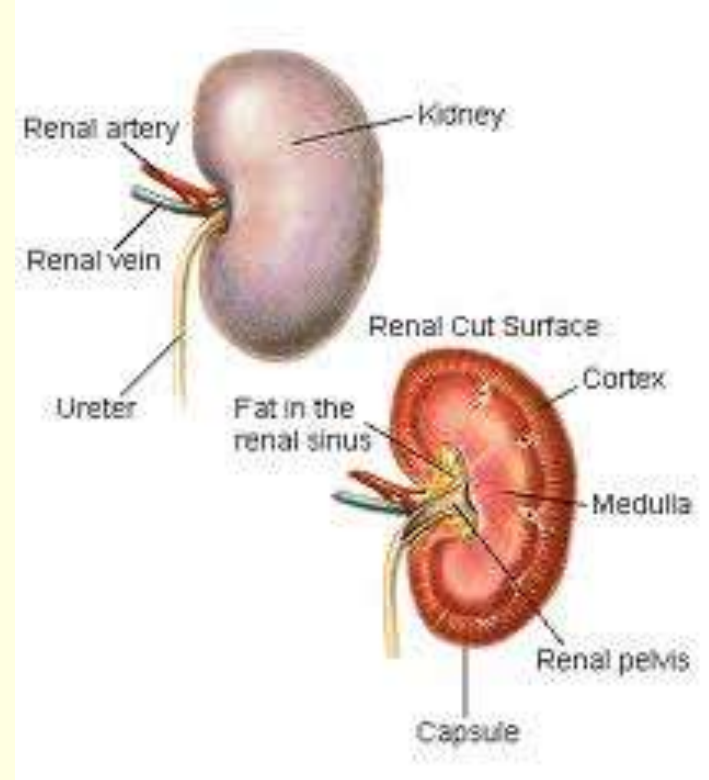
## **Kidney of the pig**

Smooth and bean shape. The pelvis is funnel shape divided into two major calyces which gives of 8-12 minor calyces, each embraces papilla.



## Kidney of the dog

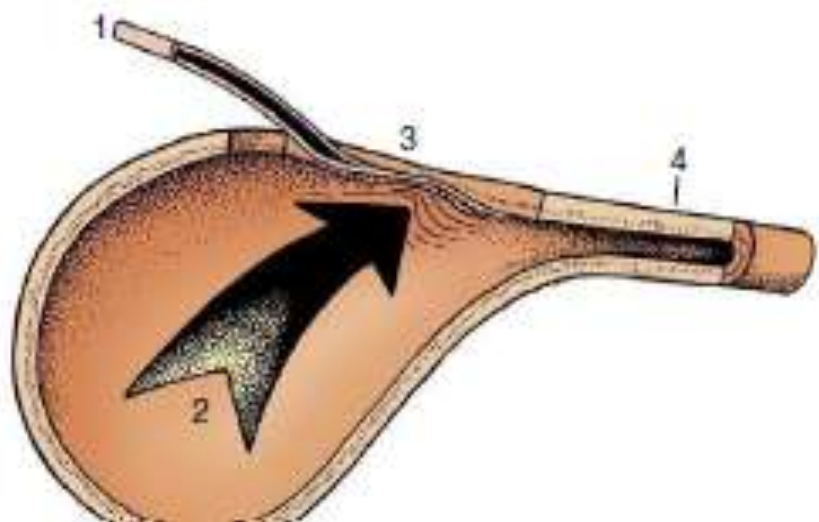
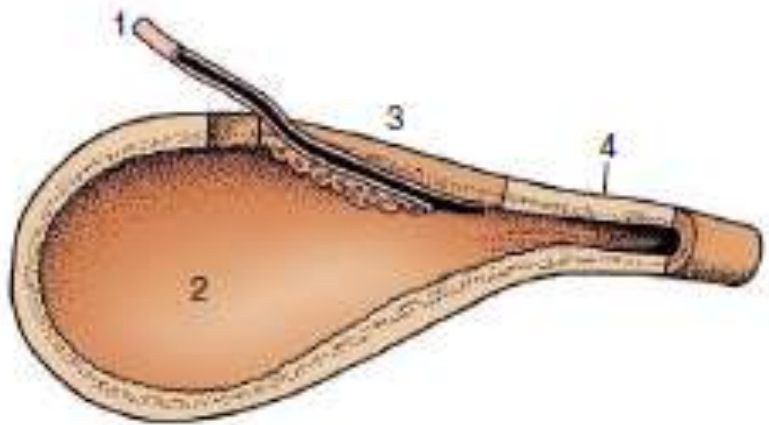
Bean shape, smooth, they are retroperitoneum and located in the sub lumbar region on either side of the aorta, both kidneys are palpable through the abdominal wall.



# ureter

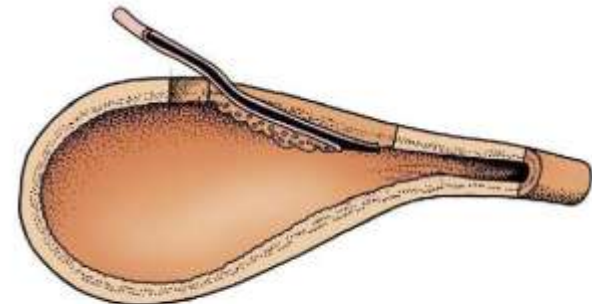
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- In cattle the ureter is formed by the coming together of the short passages that lead from the calices that enclose individual renal papillae
- In most domestic species the ureter begins in a common expansion, the renal pelvis, into which all the papillary ducts open—although in different ways in different species.
- The ureter penetrates the bladder wall very obliquely. The length of the intramural course guards against reflux of urine into the ureter when the pressure is raised within the bladder. It does not prevent further filling of the bladder because the resistance is overcome by peristaltic contractions of the ureteric wall.



# THE URINARY BLADDER

- The bladder is a distensible storage organ and thus can have no constant size, position, or relationships.
- The contracted bladder rests on the pubic bones; it is confined to the pelvic cavity in the larger species but extends into the abdomen
- The bladder has cranial blind end (apex) and caudal part its narrow ( neck) and leading into the urethra, and body
- At the apex especially in the young animals is a mass of scar tissue which is the remnant of the caudal part of urichus.
- Urichus is the tube that connect the primitive bladder with the allantoic sac.



# urethra

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- The muscular tube has an important role in the urine discharge from the urinary bladder.both male and female urethra associated anatomically with the genital organs.
- Female urethra: begins at the neck of bladder and extend caudally along the floor pelvic and open at the floor of the genital duct at the junctions of vagina and vestibule.
- Male urethra: extended from the neck of bladder to the colliculus seminalis and consist of pelvic part and penil part.