

# Body Cavities

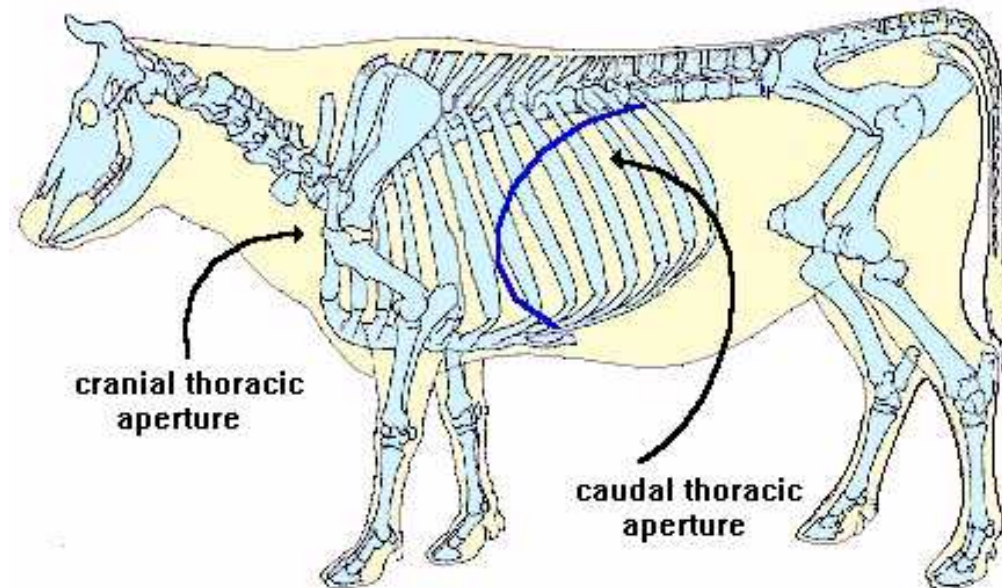
# BODY CAVITIES

There are three body cavities in an animal body

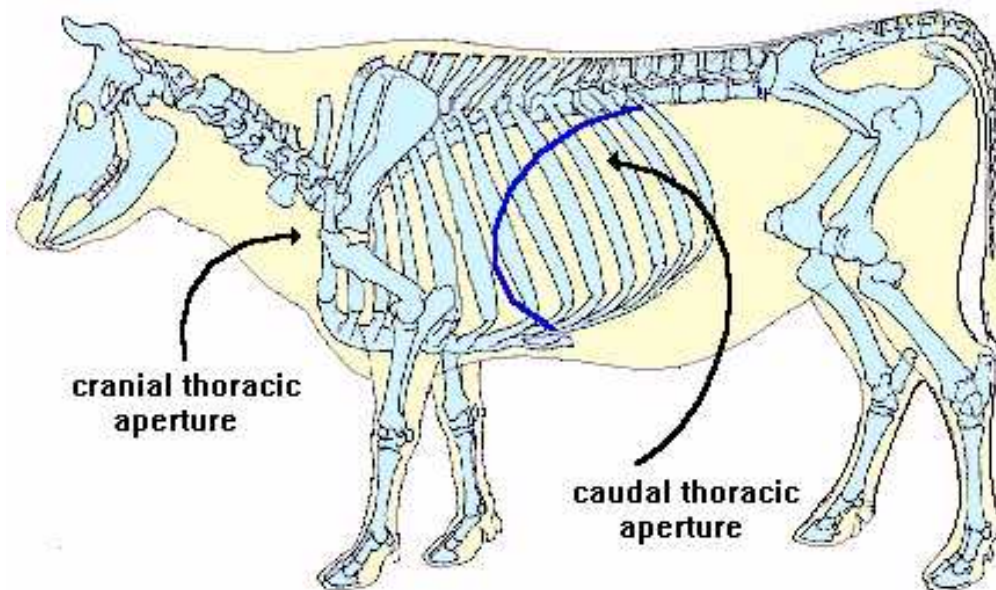
- Thoracic Cavity
- Abdominal Cavity
- Pelvic Cavity

# Thoracic Cavity

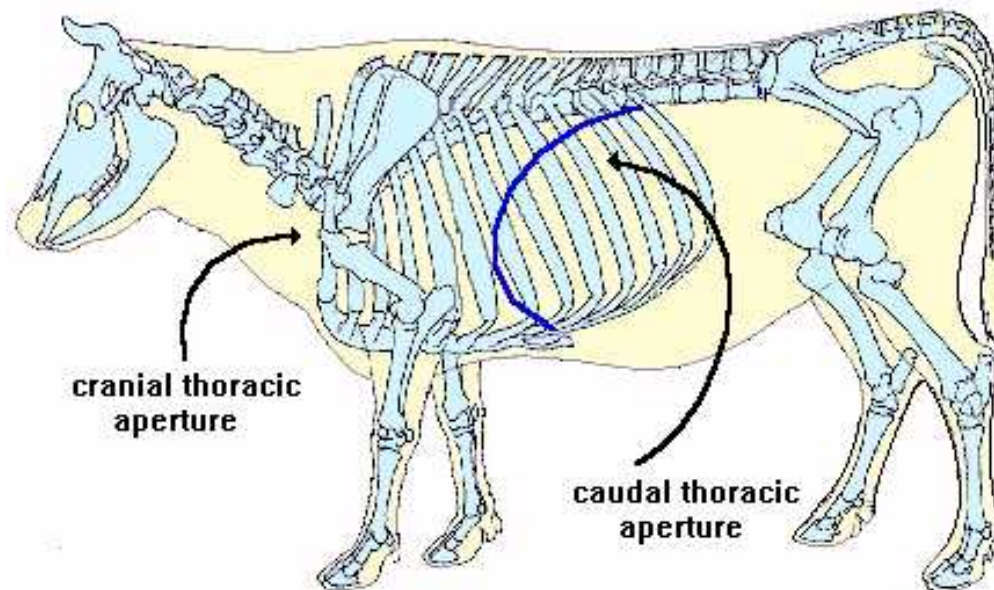
- The thoracic cavity is the second in size of the three body cavities. In form, it is somewhat like a truncated cone with the base cut off very obliquely and directed backwards
- It presents a roof, floor, two lateral walls, a caudal wall and an cranial aperture or inlet
- The bodies of the thoracic vertebrae form the roof. The lateral walls are formed by the ribs and intercostal muscles. The sternum forms the floor
- The caudal wall is formed by the convex face of the diaphragm



- The inlet is small, narrow and oval. It is bounded above by first dorsal vertebra below by the first segment of the sternum and laterally by the two first ribs
- It is closed in life by structures passing into and out of the thorax viz., the longus colli muscles, the trachea, the oesophagus, vessels, nerves and lymph glands
- A longitudinal septum termed the mediastinum thoracis or septum mediastinale, extends from the dorsal wall to the ventral and caudal walls, and divides the cavity into two lateral chambers termed the pleural cavity. Each of these chambers is lined by the serous membrane, called the pleura



- The mediastinum is, for the most part, not median in position, as might be inferred from its name this is correlated with the fact that the largest organ contained in it the heart, is placed more on the left side than on the right consequently the right pleural cavity and lungs are larger than the left
- Practically all the thoracic organs are in the mediastinal space between the pleurae, with the exception of the lungs, caudal vena cava and part of the right phrenic nerve
- The part in which the heart and the pericardium are situated together with that dorsal portion is usually called the middle mediastinal space; the parts before and behind this are termed respectively the cranial and caudal mediastinal spaces



## **SPECIES DIFFERENCES**

### **Sheep and Goat**

- It resembles that of ox
- The pleural sacs form a cul-de-sac on each side of the first lumbar vertebra
- Perforations are present in the cranial mediastinum of the sheep and it is not perforated in goat

### **Horse**

- The thoracic cavity is larger
- The pleura are thin and the caudal mediastinum appears fenestrated and when these apertures are present the two-pleural sacs communicate with each other
- The apertures do not exist in the fetus

### **Pig**

- The thorax is rounded due to strongly curved ribs
- The pleural sacs extend forward to the first intercostals space

## **Dog**

- Thorax is proportionately larger
- Mediastinum is imperforate, but permeable to gas and water

## **Rabbit**

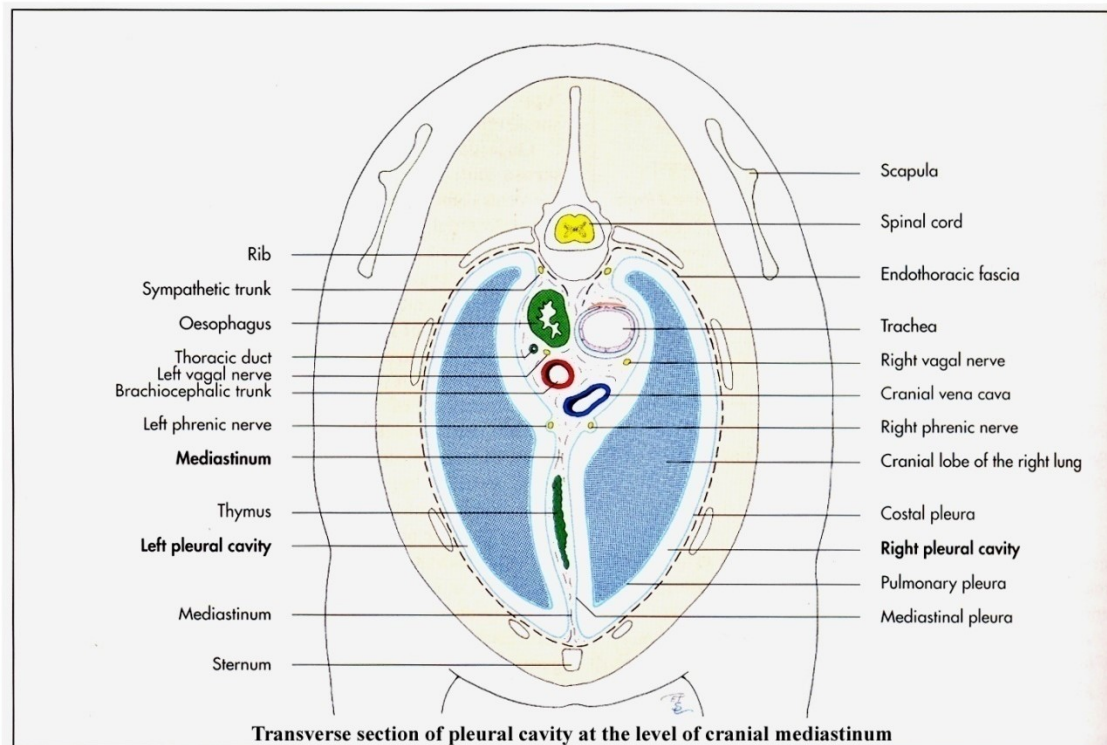
- General plan resembles the ox

## **Fowl**

- Since the diaphragm is absent, there is no separate thoracic cavity

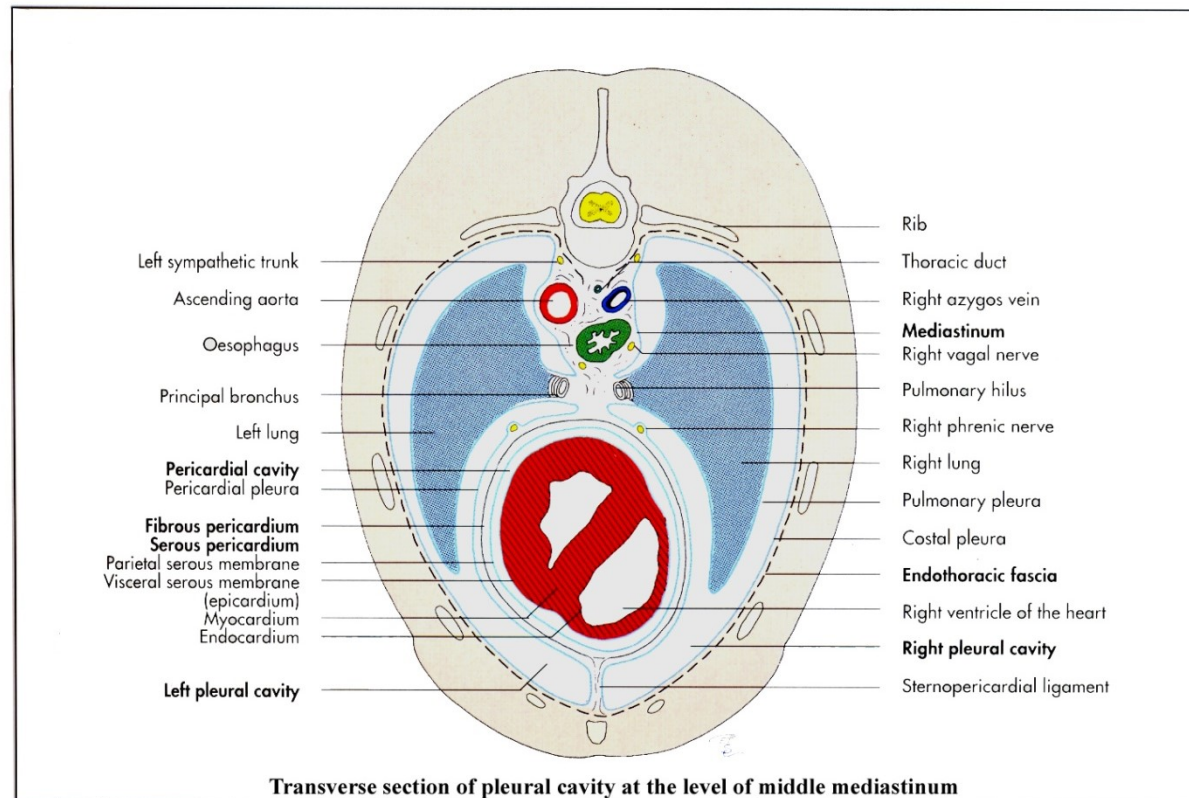
## PLEURAE

- The pleurae are serous membranes, which enclose on each side a pleural cavity. These line the walls of the thorax from the lateral laminae of the mediastinum, and then reflected from the latter upon the surface of the lungs. Thus we distinguish parietal, mediastinal and pulmonary or visceral parts of pleura
- The parietal pleura line the thoracic walls. On the lateral thoracic wall it is adherent to ribs and intercostal muscles and is termed the costal pleura
- Behind it is closely attached to diaphragm, forming the diaphragmatic pleura



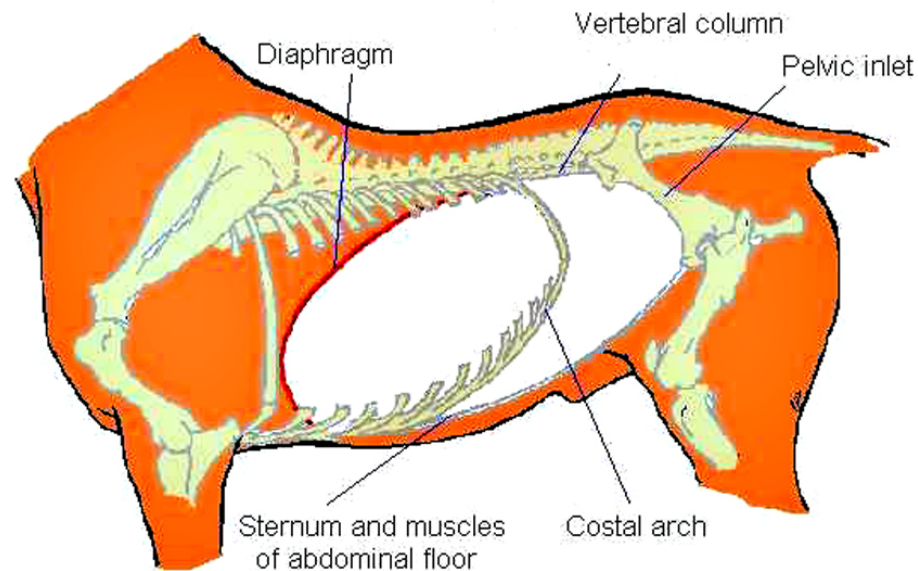


- The mediastinal pleura cover the organs in the mediastinal space.
  - The part which is adherent to the pericardium is the pericardiac pleura.
- From the mediastinum, each pleura is reflected on the corresponding lung forming the pleura pulmonalis or the visceral pleura. The reflection occurs around and behind the hilus of the lung



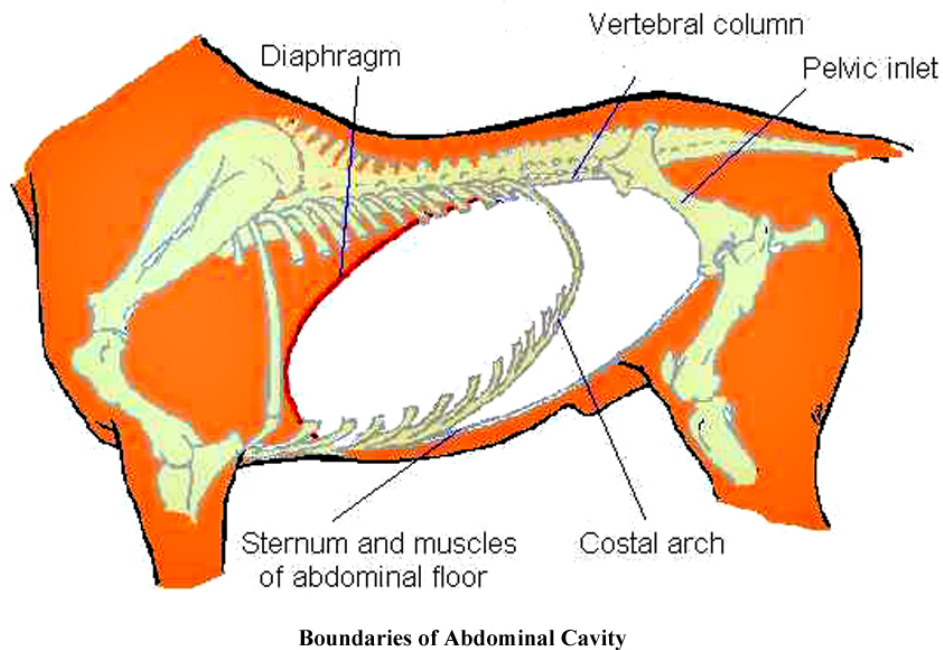
# ABDOMINAL CAVITY

- The abdominal cavity is the largest of the body cavities
- It is separated from the thoracic cavity by the diaphragm and continuous behind with the pelvic cavity; the line of demarcation being the terminal line or pelvic inlet
- The cavity is ovoid in form and is compressed laterally
- Its long axis extends obliquely from the centre of pelvic inlet to the sternal part of diaphragm
- Its greatest dorso ventral diameter is at the level of the first lumbar and the greatest transverse diameter near the pelvis.



Boundaries of Abdominal Cavity

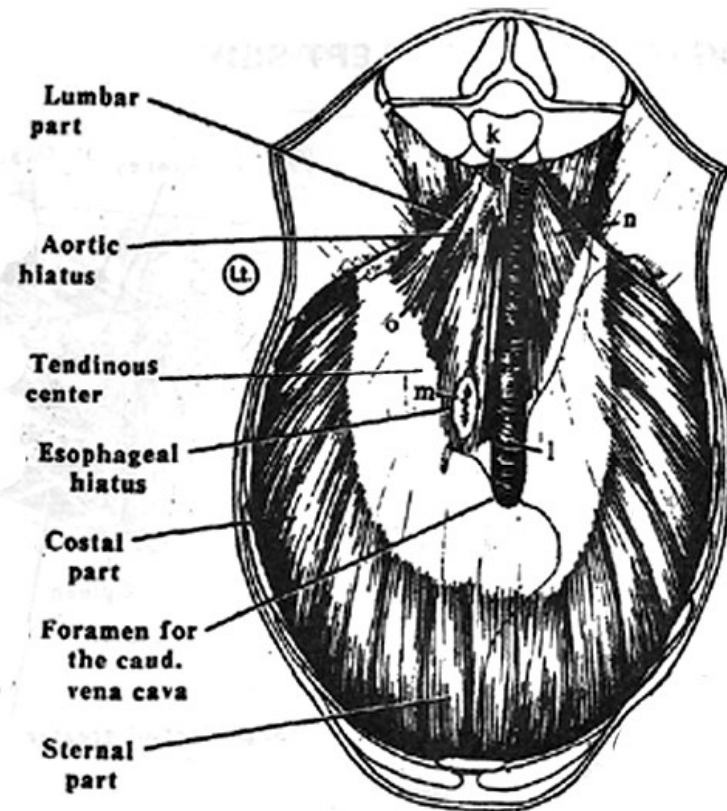
- It presents a roof, floor, two lateral walls and cranial wall.
- The lumbar vertebrae, lumbar part of diaphragm and sub-lumbar muscles forms the roof
- The oblique and transverse abdominal muscles, tunica abdominalis, part of ilia, iliacus muscles, cartilages of asternal ribs and parts of caudal ribs below the line of attachment of diaphragm form the lateral walls
- The two recti abdominis, aponeuroses of oblique and transverse abdominis muscles, tunica abdominalis and xiphoid cartilage form the floor
- The diaphragm forms the cranial wall



**Note:-**The costal attachment of diaphragm is almost vertical from the ventral end of the 8th rib to the dorsal end of the 13th rib (and the last 4 ribs enter more largely into the formation of the abdomen than in horse). The flank is more extensive than in horse. The transverse diameter between the last ribs is greater than in horse. The abdomen in the ox is more capacious than that of the horse

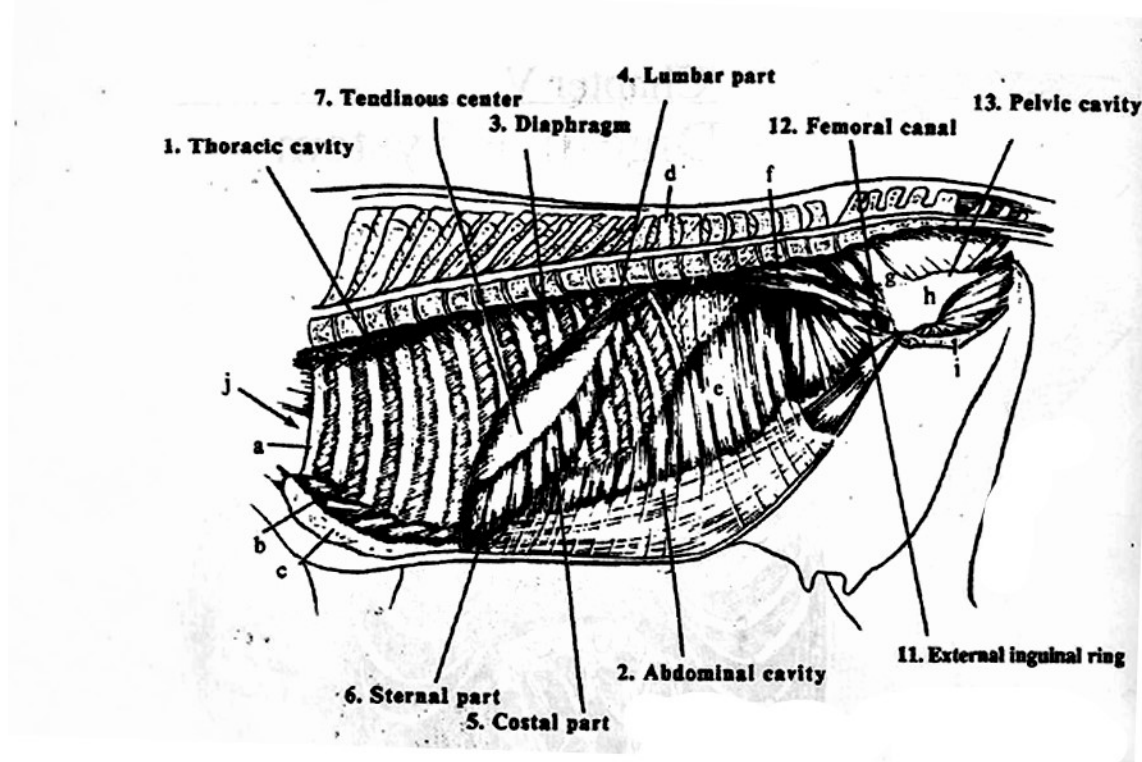
The walls of abdominal cavity are pierced by five openings, three of the diaphragm and two of the inguinal canals. In the fetus, there are in addition, the umbilical openings

- Foramen vena cava-for the passage of caudal venacava
- Hiatus oesophagi-for the passage of esophagus and dorsal and ventral branches of vagus nerve
- Hiatus aorticus-for the passage of abdominal aorta



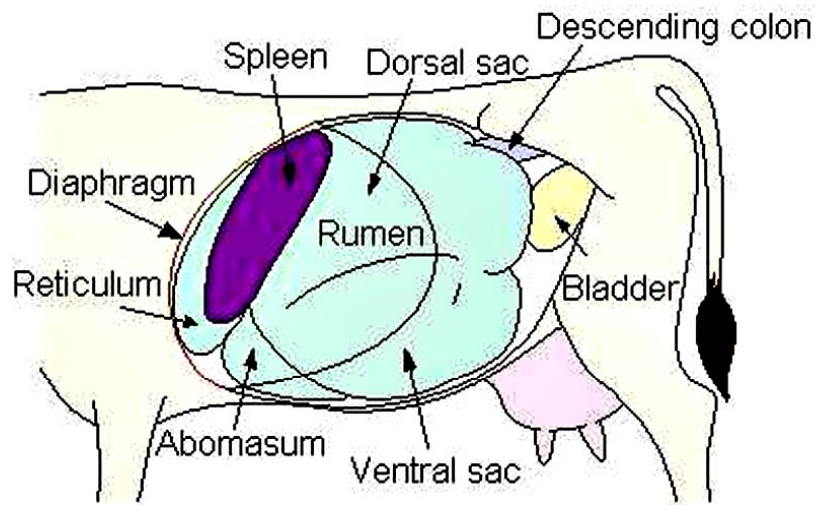
Diaphragm of Ox - Abdominal View

- Femoral ring-it is placed on either side of the pelvic brim and transmits femoral vessels
- Inguinal ring-for the passage of spermatic cord in males and external pudic vessels and nerves in the female
- Umbilical opening-it is placed only in the fetus for the passage of two umbilical arteries, two umbilical veins and urachus

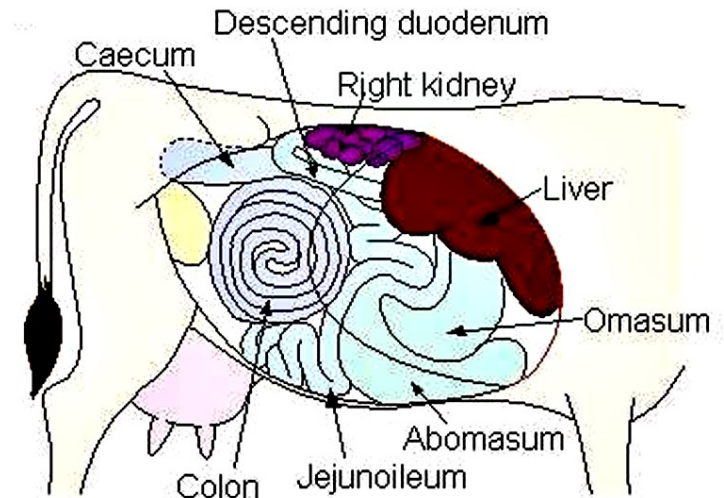


# Contents

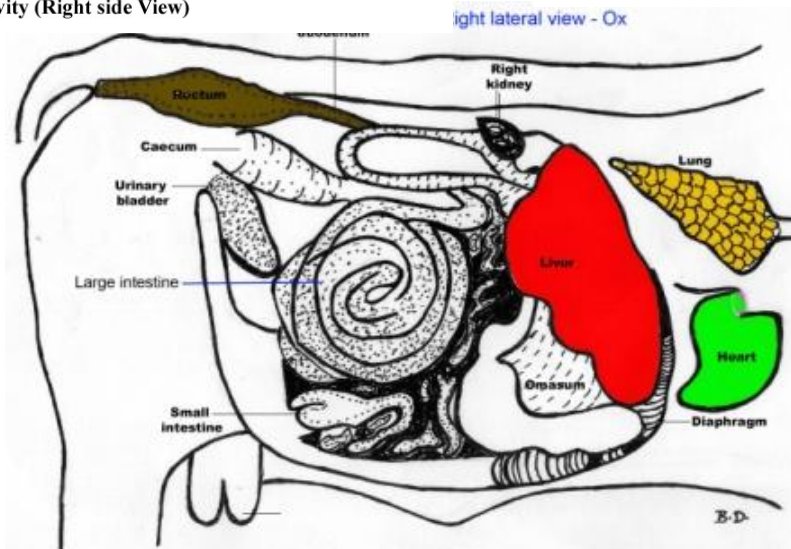
- Greater part of digestive and urinary organs, part of the internal genital organs, blood vessels, nerves, lymphatic glands, ductless glands and certain fetal remnants



Contents of Abdominal Cavity (Right side View)



Contents of Abdominal Cavity (Left side View)



Right lateral view - Ox

- For description of the location of these organs, the abdominal cavity is divided into 9 regions by four imaginary planes
- Two of these are sagittal and two are in transverse plane. Of the two, one transverse plane pass through the last thoracic vertebra and the other through the 5th lumbar vertebrae
- The transverse planes divide the abdomen into three zones, one behind the other - Epigastric, Mesogastric and Hypogastric
- These are again subdivided in to nine regions by sagittal planes, which pass through the centre of the inguinal ligament

Left parachondriac	Xiphoid	Right parachondriac
Left lumbar	Umbilical	Right lumbar
Left iliac	Prepubic	Right iliac

- Other regional terms used for descriptive purposes are sublumbar, diaphragmatic and inguinal
- The inguinal regions lie in front of the inguinal ligament. Flank is that part of lateral wall which is formed only of soft structures
- The triangular depression in the upper part of the flank (bounded dorsally by the lateral border of the longissimus, ventrally by the upper border of obliquus abdominis internus and in front by the last rib) is termed the paralumbar fossa

### **Sheep and Goat**

It is as in ox

### **Horse**

Abdomen is less capacious due to

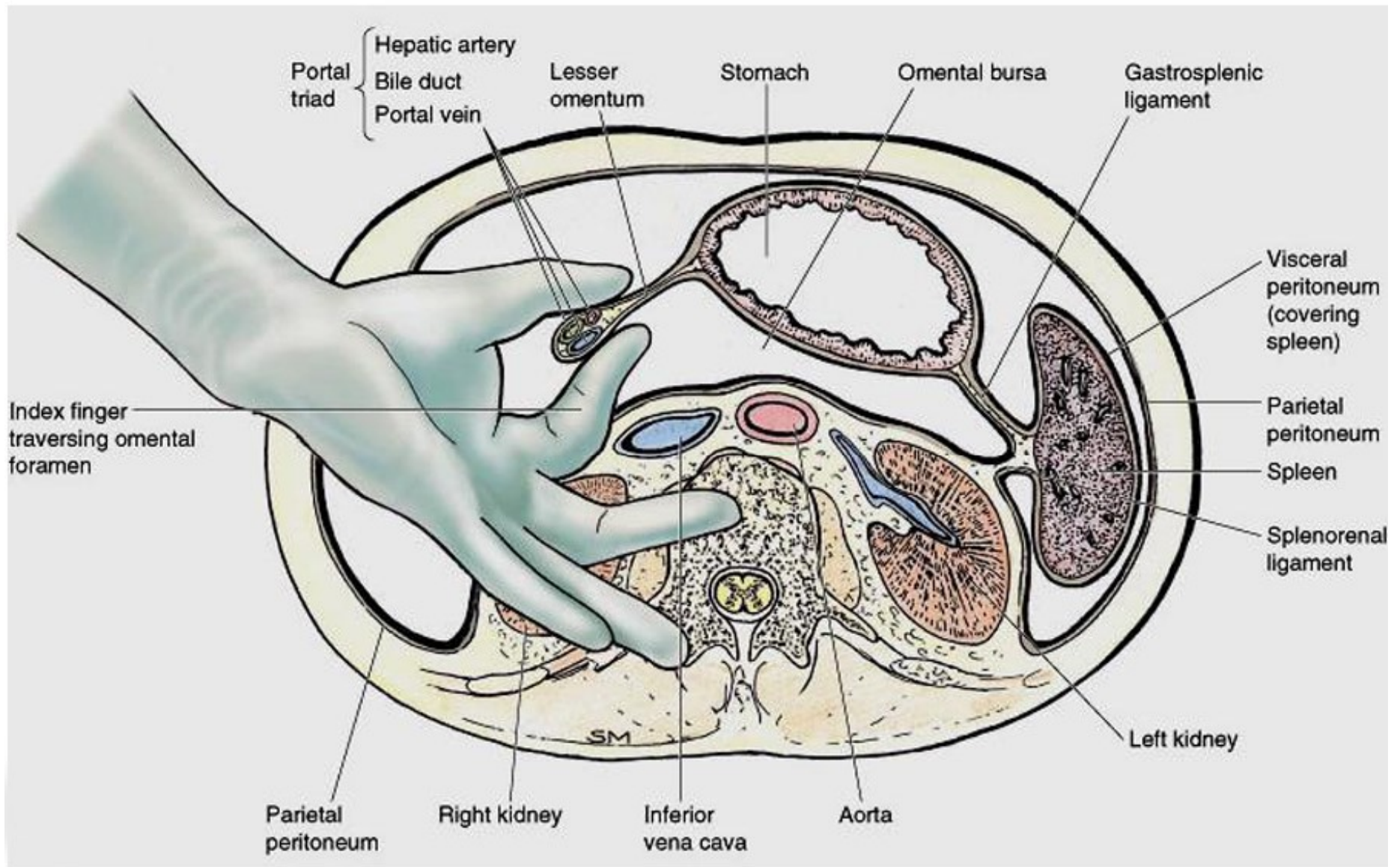
- the lumbar transverse process being one fourth shorter than in ox (flank less extensive)
- the transverse diameter between the last ribs being lesser than in ox
- the costal attachment of the diaphragm being a gentle curve and not steep as in ox

Flanks are not hollow and the floor of the abdomen is more tucked up

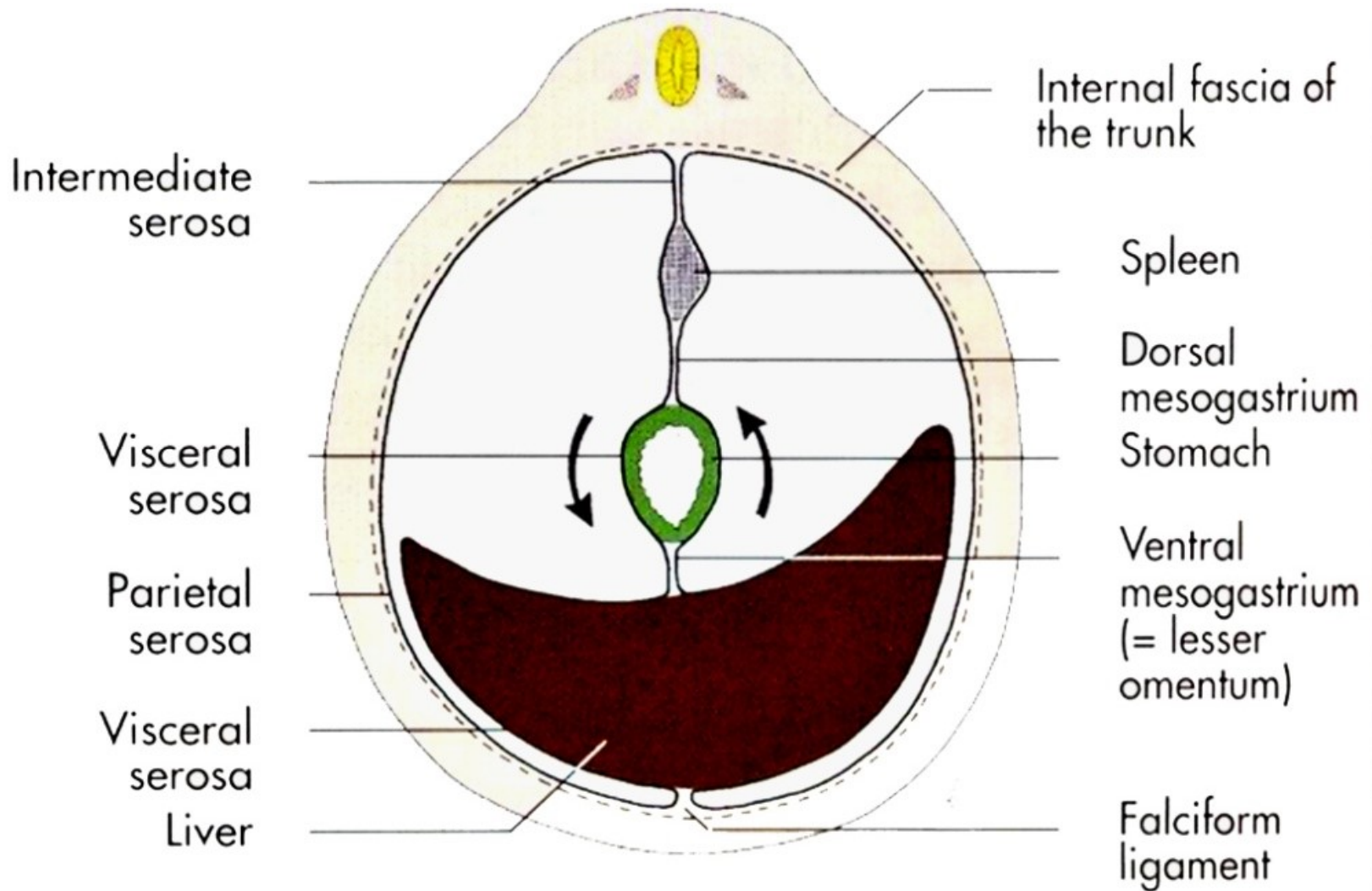


## **PERITONEUM**

- Peritoneum is the serous membrane which lines the abdominal cavity and a part of pelvic cavity and the organs contained in them
- In the male, it is completely closed one. In the female there are two small openings in it, and these are abdominal openings of the oviducts
- The peritoneum, which covers the parietes, is called parietal peritoneum, which is reflected over the contained organs, the visceral layer of peritoneum
- The peritoneal cavity is a potential space formed between two layers, parietal and visceral, which are normally in contact with each other
- It contains a thin film of serous fluid that acts as a lubricant. Though the peritoneal cavity as a whole is single, it is divisible into two sacs
- The greater sac is exposed when the inferior wall of the abdomen is cut through
- The lesser sac forms only diverticulum of the greater sac, which envelops the intestines
- The two sacs are continuous with each other through the foramen of Winslow or epiploic foramen



- The peritoneum gets reflected on the organs contained in the cavity to form their outermost covering
- It then extends into a number of folds, which extend between the various organs or connect them to the walls
- These folds serve to hold the organ in position and also to enclose the vessels and nerves passing through them. They are as follows,
  - A double fold passing from the stomach to the other viscera is an **omentum** E.g.. greater omentum
  - A double fold that attaches the intestine to the dorsal abdominal wall is **mesentery** E.g.. common mesentery of ox and dog
  - A double fold, which attaches viscera other than parts of the digestive tube to the walls, is **ligament**, E.g.., ligament of liver
  - Omentum and mesentery transmit blood vessels and nerves to the organ whereas a ligament does not, except the broad ligament of the uterus



**Schematic presentation of the dorsal and ventral mesenteries in early embryonic development**

Dorsal mesogastrium  
(= greater omentum)

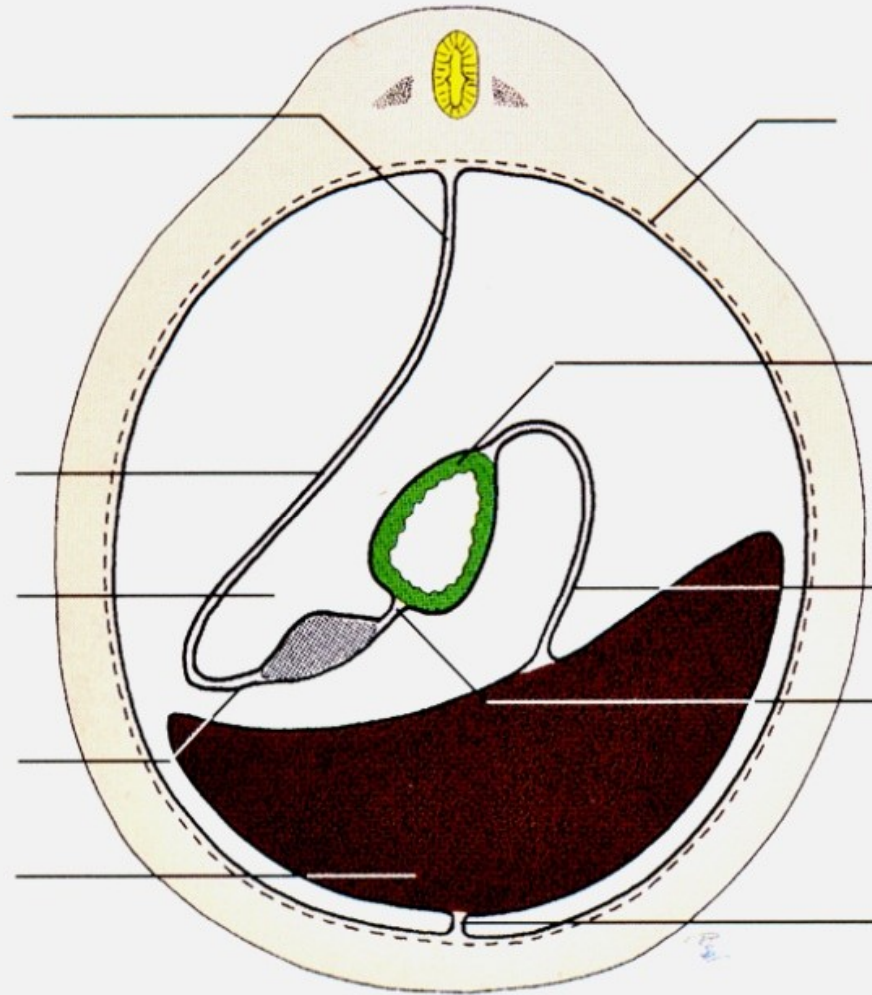
**Omental bursa**

Visceral serosa

Caudal omental recess

Parietal serosa

Liver



Internal fascia of the trunk

Stomach

Ventral mesogastrium  
(= lesser omentum)

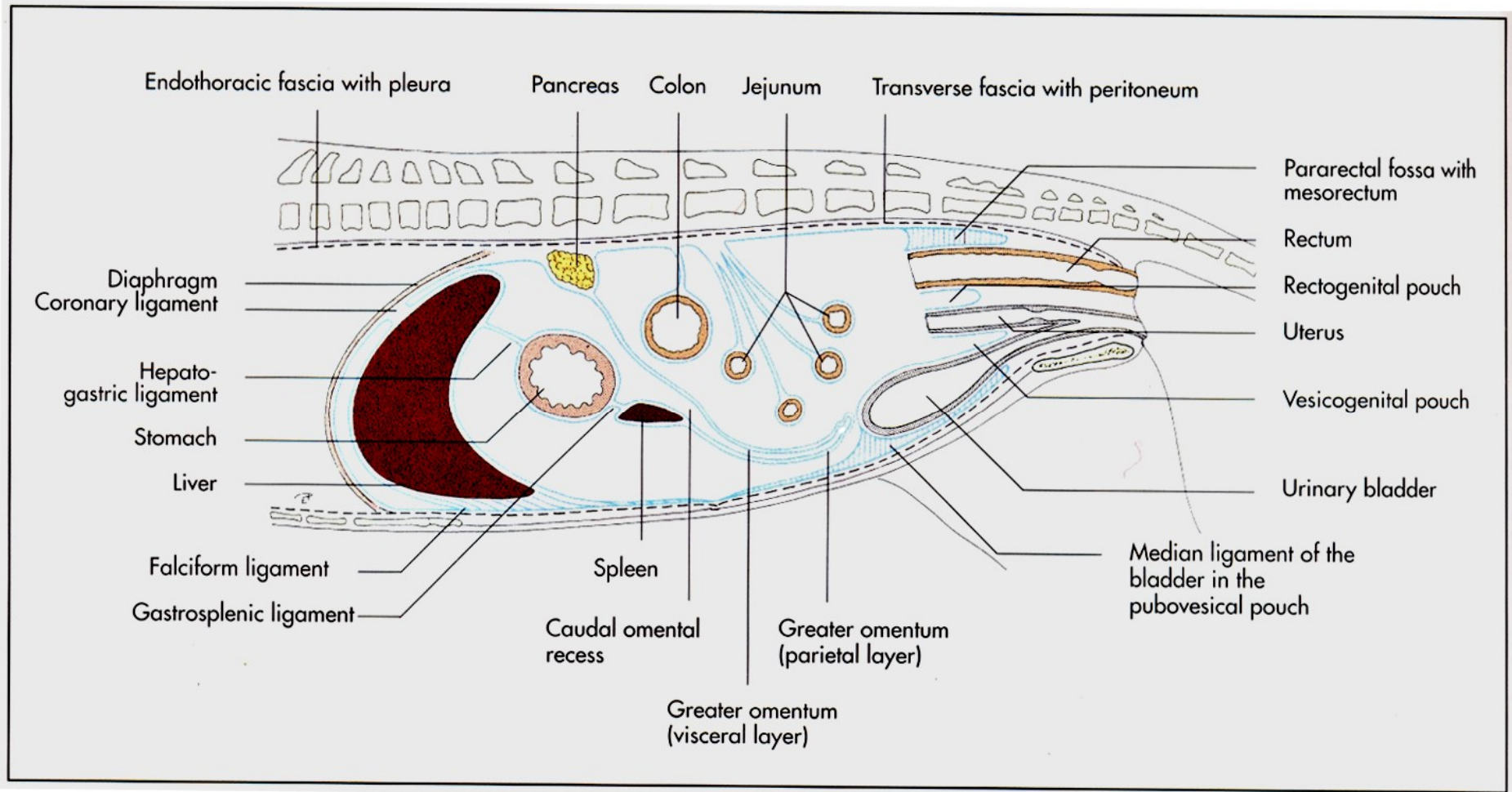
Gastrosplenic ligament

Falciform ligament

Schematic presentation of the dorsal and ventral epigastric mesenteries in late embryonic development

## PELVIC CAVITY

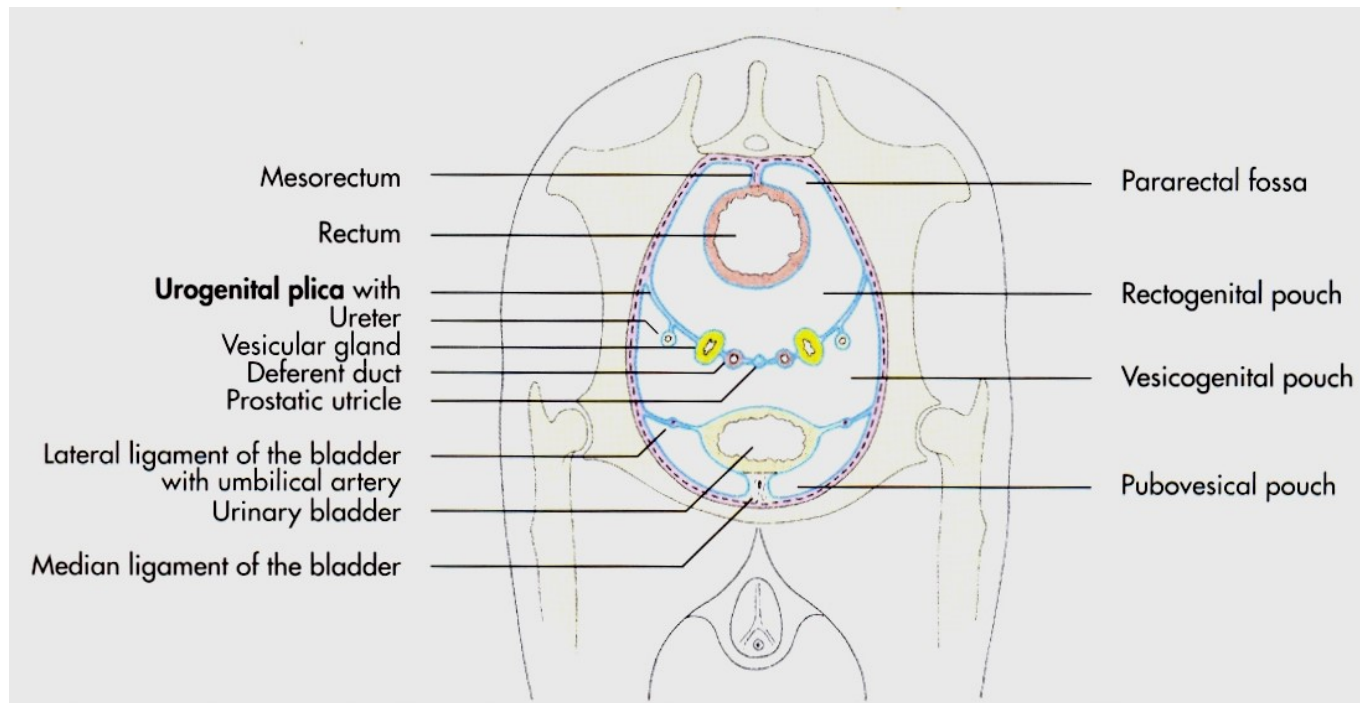
- The pelvis is the smallest of the three body cavities
- It is continuous in front with the abdominal cavity, the line of demarcation being the terminal line or the pelvic inlet
- The sacrum and the first 3 coccygeal vertebrae form the roof. The pubis and ischium furnish the floor
- The lateral walls are formed by parts of the ilium and the sacro-sciatic ligaments
- This cavity contains rectum, parts of internal genital and urinary organs, vessels and nerves, muscles and some fetal remnants
- The pelvic peritoneum is continuous with that of the abdomen
- It lines the cavity for a variable distance backward and is then reflected on the viscera and from one organ to another
- Thus there is an cranial peritoneal and a caudal retroperitoneal part of the cavity



**Schematic presentation of peritoneum in the abdominal and pelvic cavity**

In the male the peritoneum is arranged as follows,

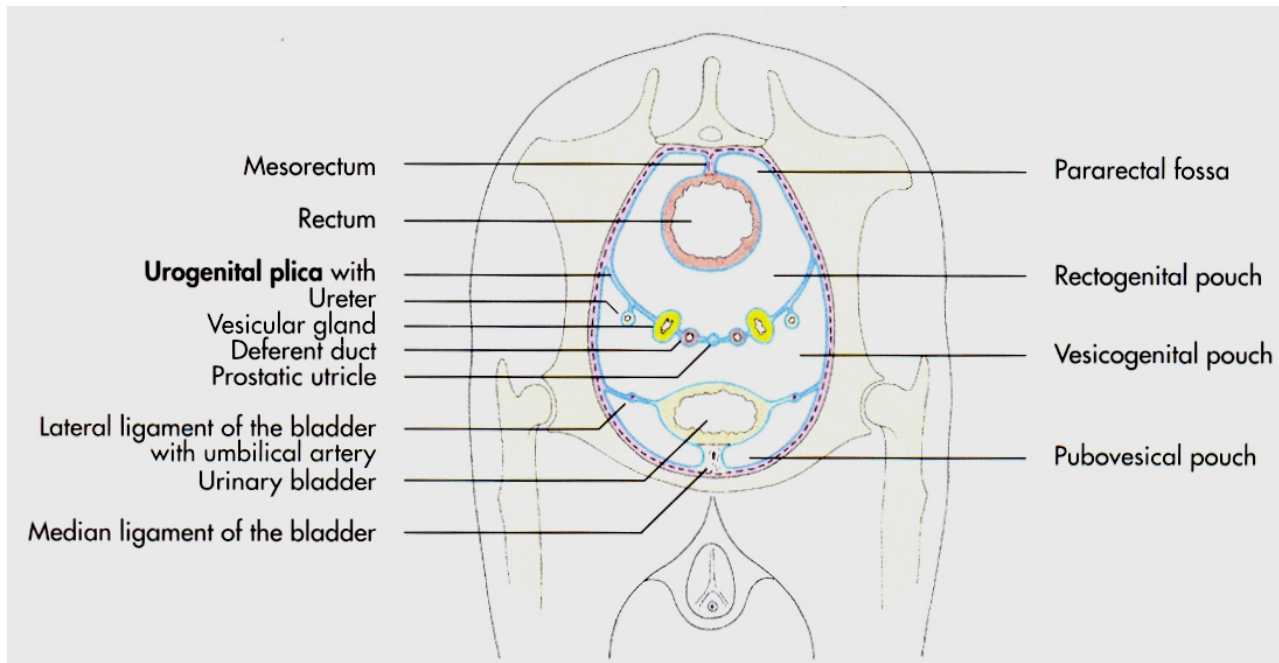
- The peritoneum is reflected from the sacrum to the rectum, forming mesorectum. Between the sacrum and rectum there is a pouch called sacro rectal pouch, which is continuous laterally with the rectogenital pouch
- In male, a transverse fold of peritoneum extends between the inferior face of the rectum and the dorsal surface of the bladder. This is the genital fold, which contains the vas deferens and seminal vesicles



**Arrangement of peritoneum in pelvic cavity of male**

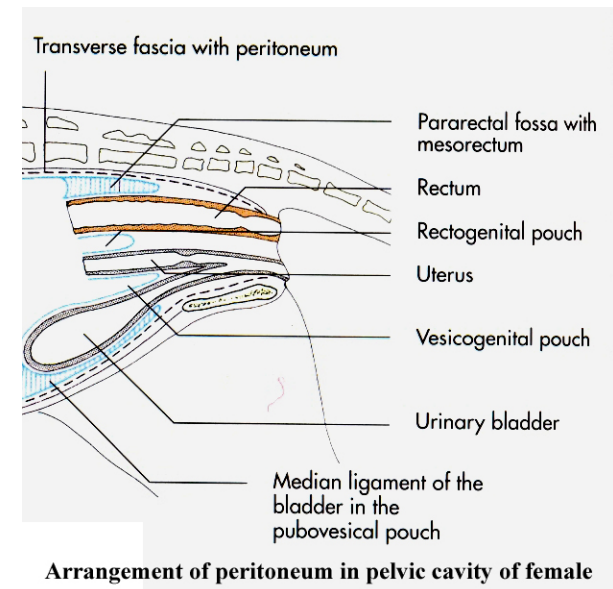
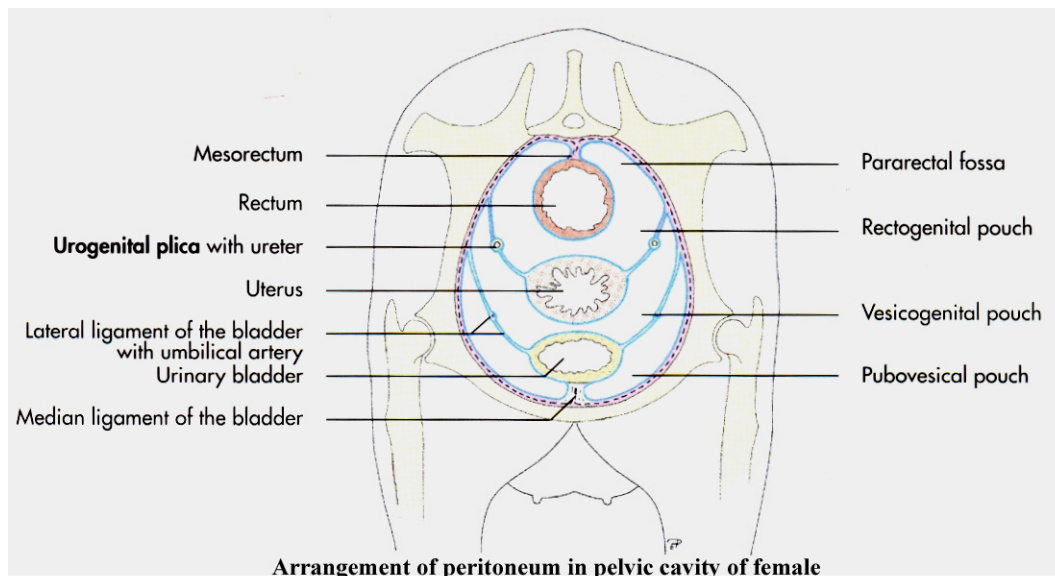


- The ventral layer of this fold is reflected on to the dorsal surface of the bladder. Thus there is a pouch formed between the rectum and the bladder
- Thus a pouch is formed between the rectum and the bladder the recto vesical pouch that is partially subdivided by the genital fold into recto-genital and vesico-genital cavities
- From the bladder, the peritoneum is reflected to the lateral walls of pelvic cavity, forming the lateral umbilical fold or middle ventral ligament of the bladder
- The lateral ligaments contain the so-called round ligament of the bladder, the partially occluded umbilical artery, of the fetus



Arrangement of peritoneum in pelvic cavity of male

- In the female, by the presence of uterus, the genital fold is enlarged to enclose the uterus and a small part of the vagina
- It forms two extensive folds the broad ligaments of the uterus, which attach the organ to the sides of pelvic cavity and upper part of the flanks below the level of tuber coxae
- It thus divides the recto-vesical pouch completely into dorsal and ventral compartments -the recto-genital and vesico-genital pouches
- In the fetus and the newborn these three folds extend to the umbilicus in conformity with the abdominal position of the bladder
- When the bladder becomes pelvic in position, the lateral ligaments conform to the change and end at the vertex of bladder. The median fold may still be traceable to the umbilicus



## **Sheep and Goat**

- As in ox

## **Horse**

- Pelvic cavity is relatively short and broad
- The inlet is less oblique and its transverse diameter is greater than in ox

The peritoneum extends as far back as caudal end of sacrum only and so the retro peritoneal part is more than in