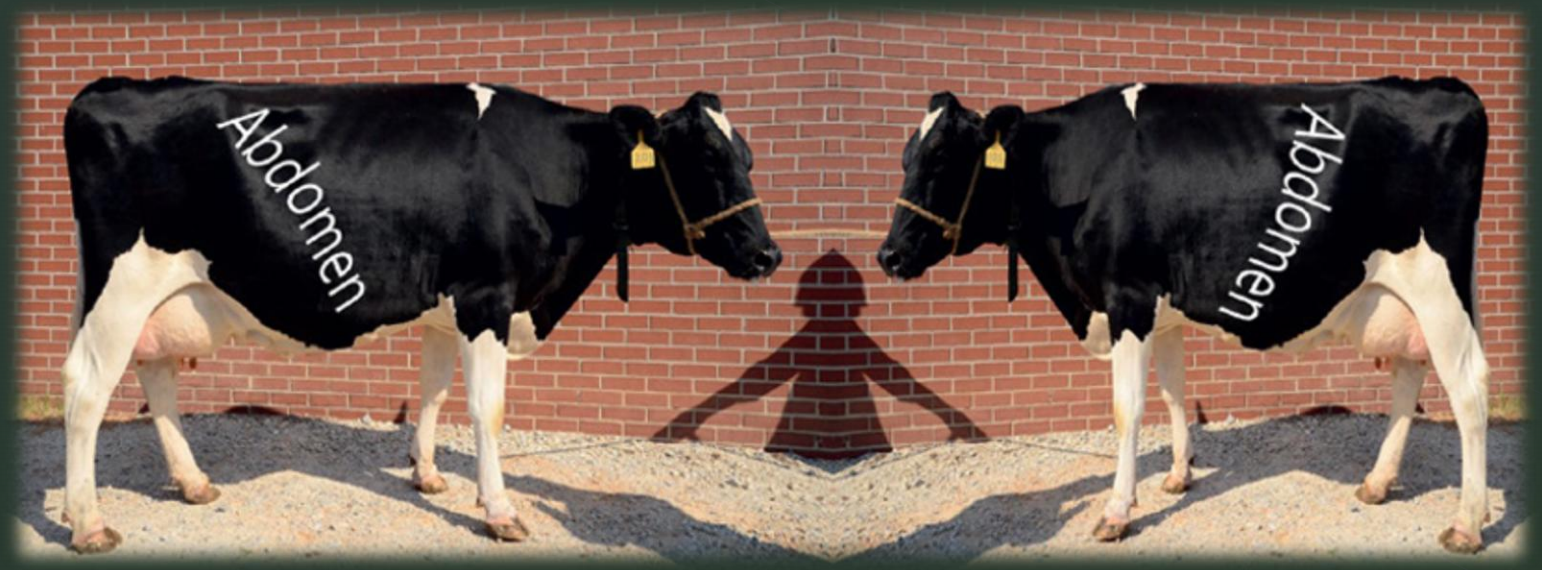
Rum.

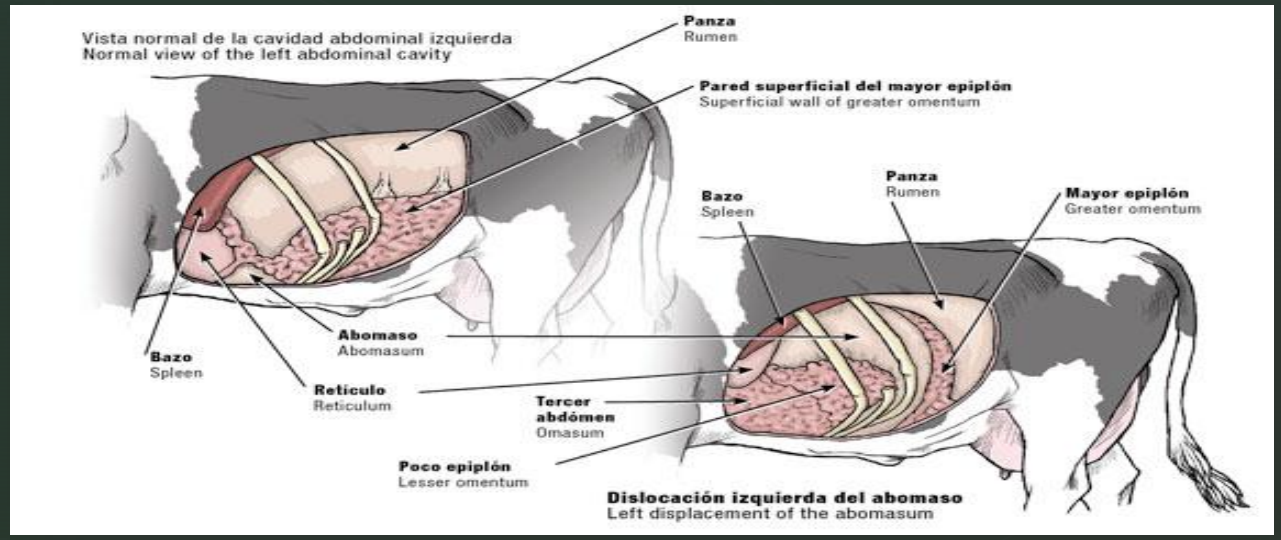
The Abdomen



The abdominal cavity in ruminants holds significant clinical importance due to its unique anatomy and functions.

Clinically, understanding the abdominal cavity in ruminants is essential for diagnosing and treating various gastrointestinal disorders. Veterinarians need to be familiar with the normal topography of the abdomen, the localization of internal and external structures and organs, and the specific functions of each compartment of the stomach. For instance, the omasum, with its thicker wall and absence of contractions, offers diagnostic insights through ultrasound imaging.

Moreover, the abdominal cavity in ruminants is a common site for surgical interventions, such as rumenotomy and exploratory procedures. Knowledge of the abdominal anatomy is crucial for selecting appropriate surgical approaches and ensuring successful outcomes. Understanding the abdominal cavity's structures and functions allows veterinarians to address issues like abomasal displacement, hardware disease, and other gastrointestinal disorders effectively.



The digestive system in ruminants plays a crucial role in their overall health and productivity. Ruminants, have a unique digestive system with four compartments that enable them to efficiently digest fibrous plant material. This specialized system allows ruminants to extract nutrients from roughage and convert it into energy through a process of fermentation and microbial action in the rumen. The microorganisms in the digestive tract of ruminants aid in breaking down cellulose and hemicelluloses, which are components of plant material that are otherwise indigestible to many animals. This fermentation process not only provides energy for the animals but also influences their physiological parameters, production rates, and overall health status.

Moreover, the microbiome in the digestive system of ruminants acts as a protective barrier and plays a significant role in the development of immune responses. Recent studies have even highlighted a two-way communication between the gastrointestinal microflora and the central nervous system, emphasizing the importance of a healthy digestive system for overall well-being and performance in ruminants.

The most common diseases of the digestive system in ruminants include a range of infectious and noninfectious conditions that affect their gastrointestinal tract. These diseases are prevalent among small ruminants and can have significant impacts on their health. Some key diseases highlighted in the search results are:

- Ruminal Acidosis: This disorder is a well-known rumination disorder characterized by significant changes in the rumen due to the ingestion of rapidly fermentable sugars and starches. It is commonly referred to as "grain overload" and can lead to severe ruminal fermentation changes.

- Traumatic Reticulo-peritonitis: Also known as hardware disease, this condition is more commonly reported in cattle but can affect small ruminants. It results from the ingestion of foreign bodies that damage the reticulorumen lining, leading to secondary infections

- Indigestions: This disorder occurs when ruminants are fed an abnormal diet, leading to decreased appetite, abnormal rumen pH, and changes in rumen motility. It can be diagnosed based on multiple affected animals and exclusion of other causes of forestomach dysfunction

- Hemorrhagic Bowel Syndrome: This syndrome primarily affects mature lactating dairy cows and is characterized by high mortality rates, with affected animals often dying within 48 hours. It is associated with high fermentable carbohydrate content in the diet and management practices aimed at high milk production

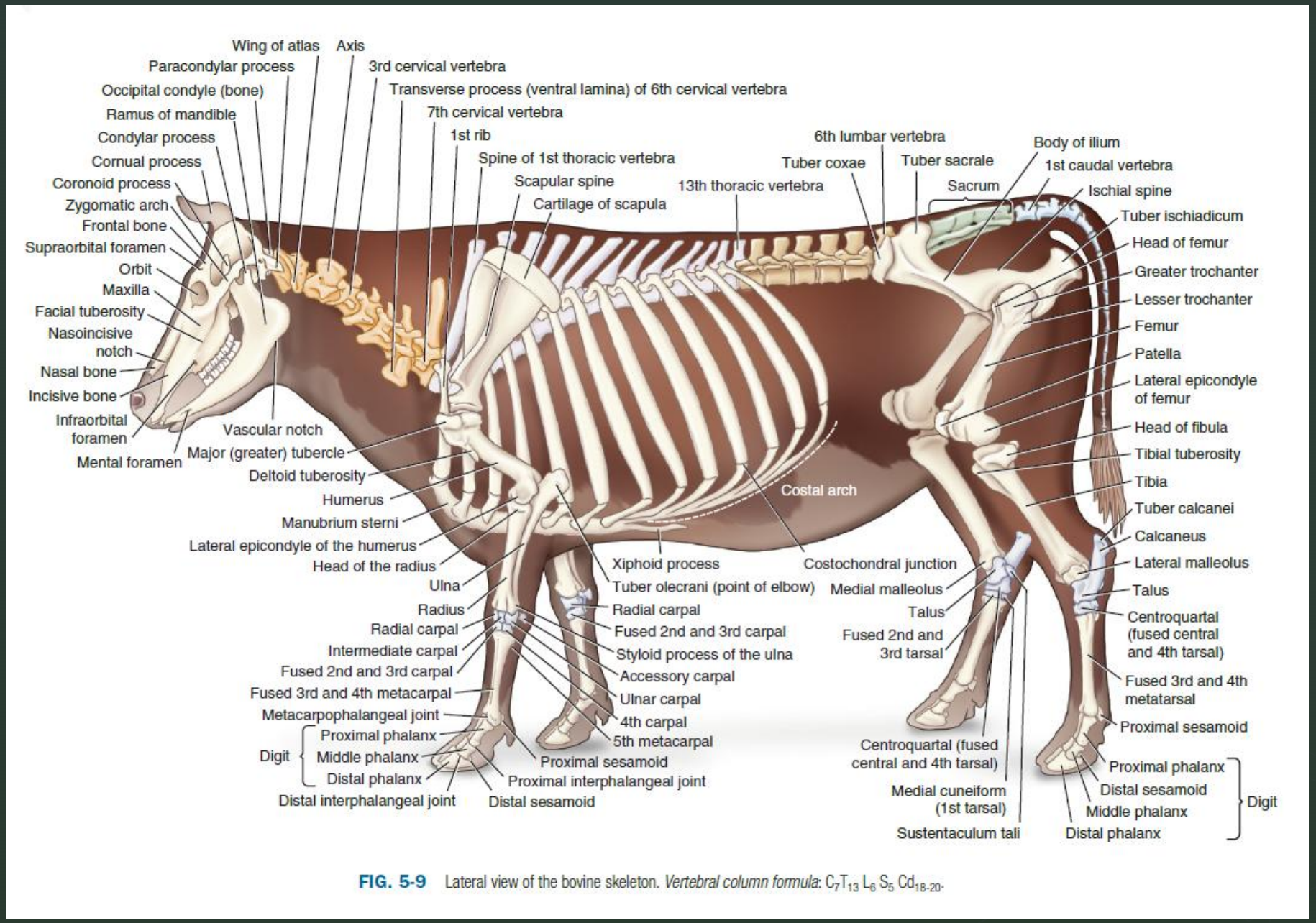


FIG. 5-9 Lateral view of the bovine skeleton. *Vertebral column formula*: $C_7T_{13}L_6S_5Cd_{18-20}$.

Lumbar Vertebrae

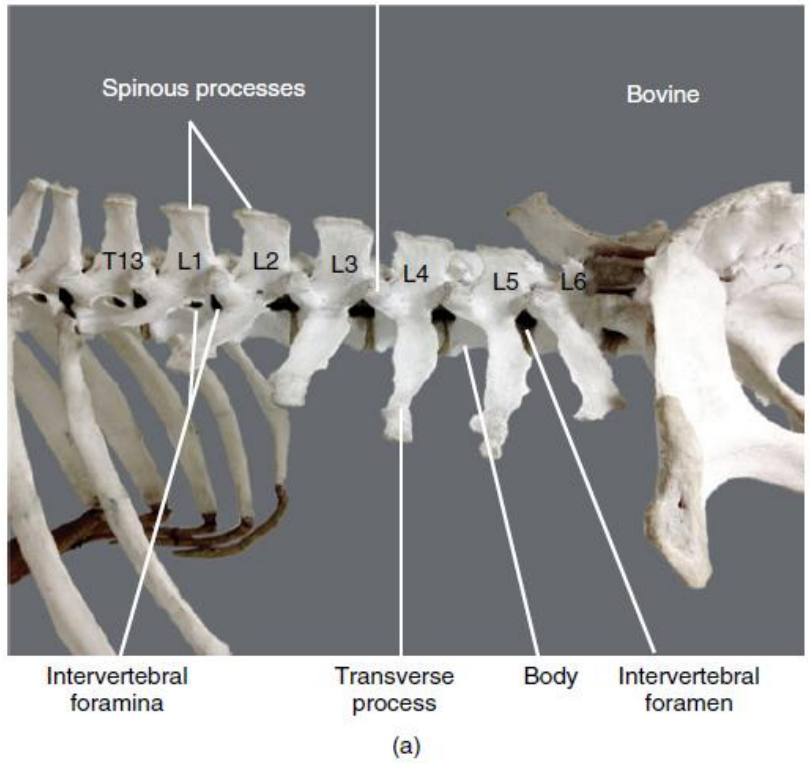
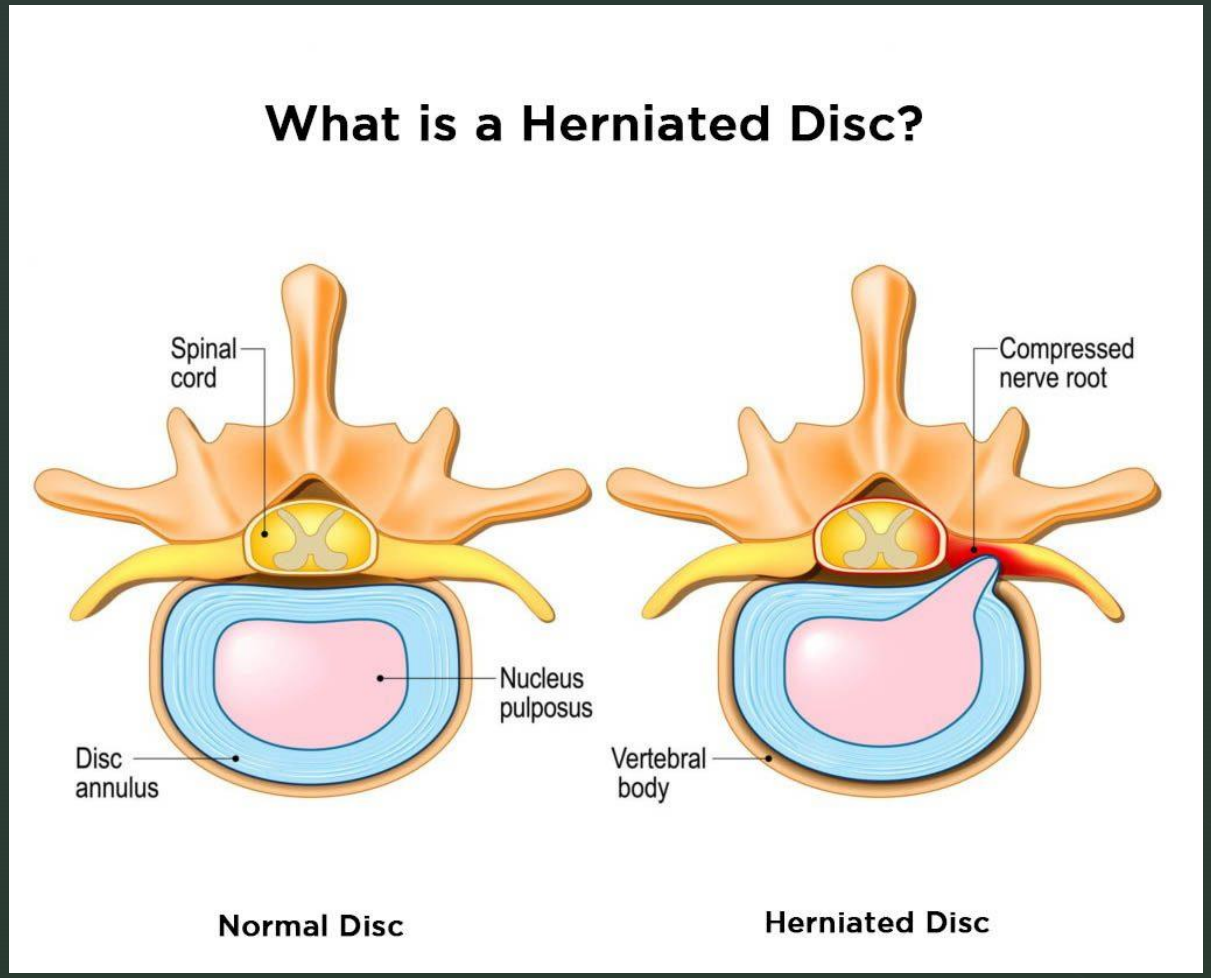


Figure 3.1 (a) Bovine skeleton showing articulated caudal thoracic and L1–L6 lumbar vertebrae. Note the long transverse processes of the lumbar vertebrae compared, for example, to T12–T13 thoracic vertebrae. Note that the intervertebral foramen between L1 and L2 is divided by a small bone into two foramina. Two intervertebral foramina may be present in some parts of the lumbar region. (b) Typical bovine lumbar vertebra: lateral, cranial, and caudal views. The cranial articular processes are deep and face dorsomedially. The caudal articular processes are cylindrical in shape and fit into the groove (articular surfaces) of the cranial articular processes of the caudally located vertebra. On the lateral view, note the formation of a complete intervertebral foramen on this lumbar vertebra. * Body of vertebra.

- The number of lumbar vertebrae varies in small ruminants between five and seven (L1–L5–7). Goats typically have six or seven lumbar vertebrae, four pelvic (sacral), and between four and eight caudal (coccygeal) vertebrae. Cattle have six lumbar vertebrae, five sacral, and a variable number of caudal (tail)vertebrae (~18–20 vertebrae).

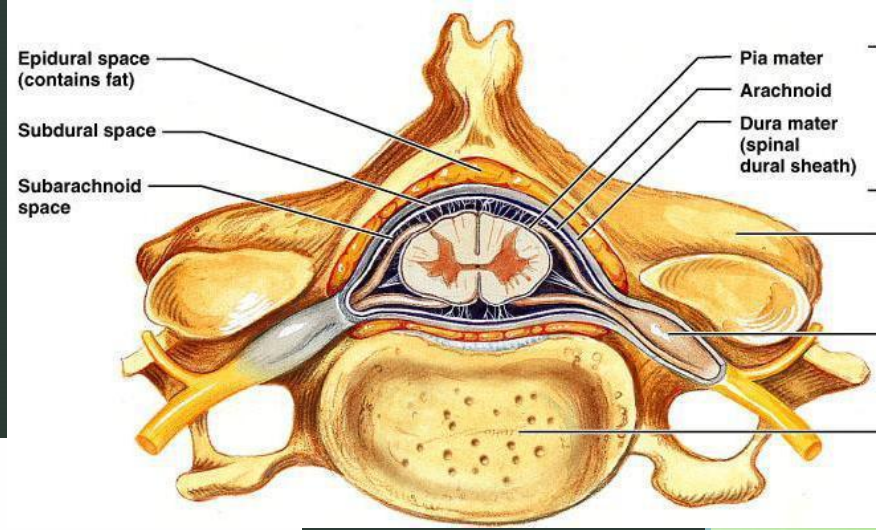


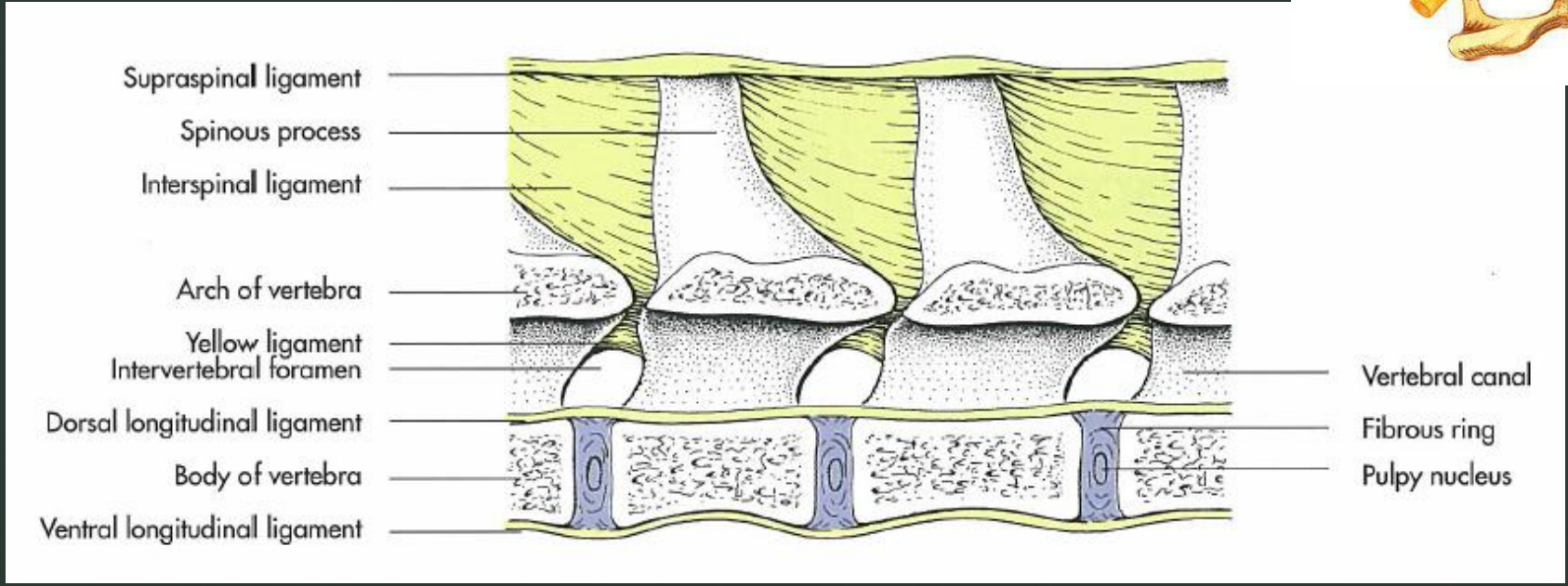
Disk hernia in cow

- **Trauma: Sudden injuries or trauma can lead to disc herniation.**
- **Degenerative Changes: Age-related wear and tear on the discs may predispose cows to herniation.**
- **Genetic Factors: Some breeds may be more susceptible due to hereditary predispositions.**

Think of the intervertebral disc as a “jelly donut” where the soft jelly material at the center of the donut represents the nucleus pulposus and the outer dough represents the anulus fibrosus. The nucleus pulposus is the material that oozes out in disc herniation (rupture).

Ligaments of Lumbar Vertebrae





The yellow ligament is pierced or punctured in caudal epidural anesthesia. This procedure involves the injection of local anesthetic into the epidural space through the yellow ligament in the cranial lumbar region between L1 and L2 (flank anesthesia), at the lumbosacral region between L6 and S1 vertebrae (lumbosacral block), or at the tail region between Cd1 and Cd2 vertebrae (tail block). The epidural space is a fat-filled potential space above the dura mater and below the periosteum lining the vertebral canal. Epidural anesthesia is especially performed under clinical conditions associated with dystocia or injuries related to the udder or female and male external genitalia.

Abdominal Muscles

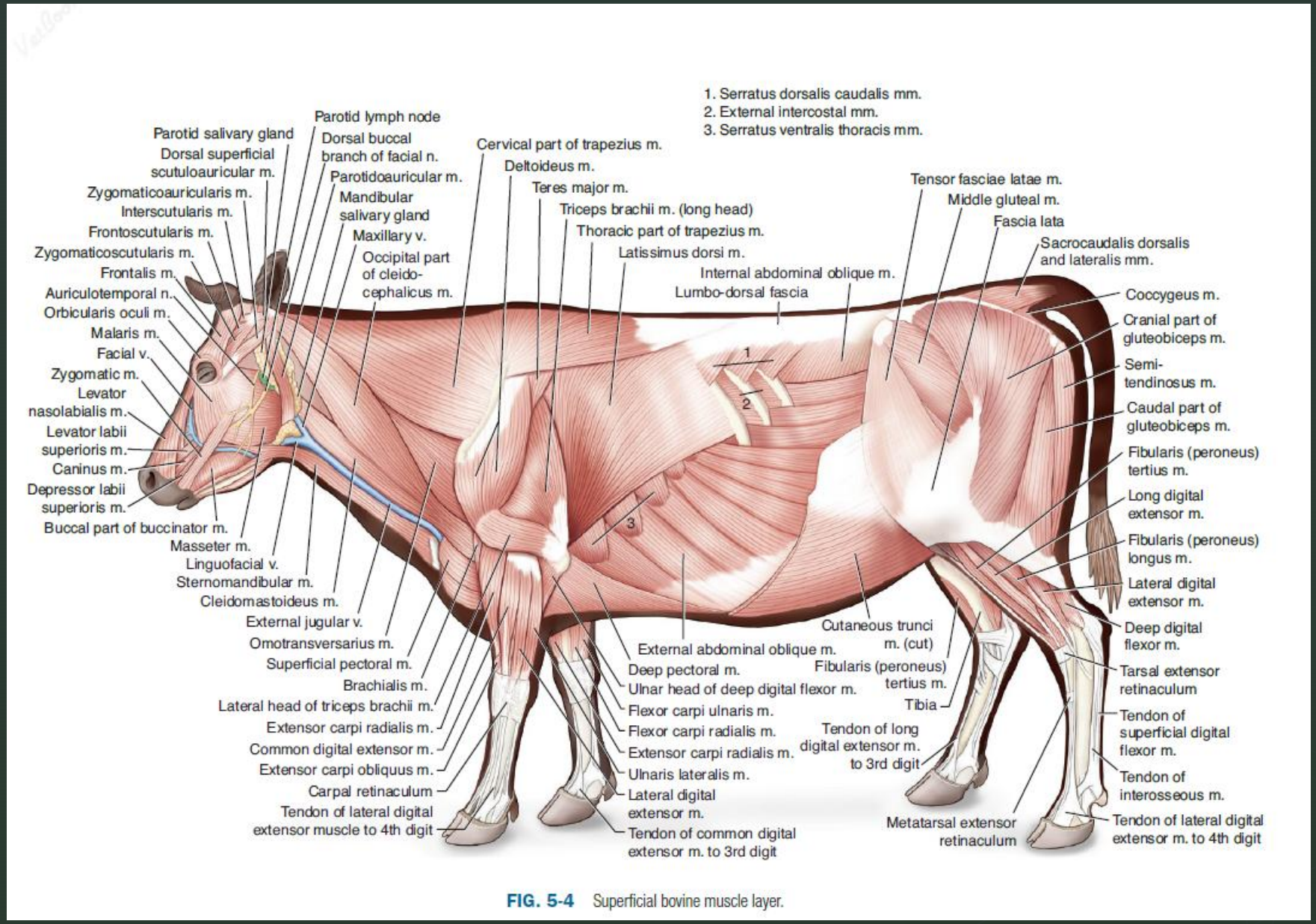
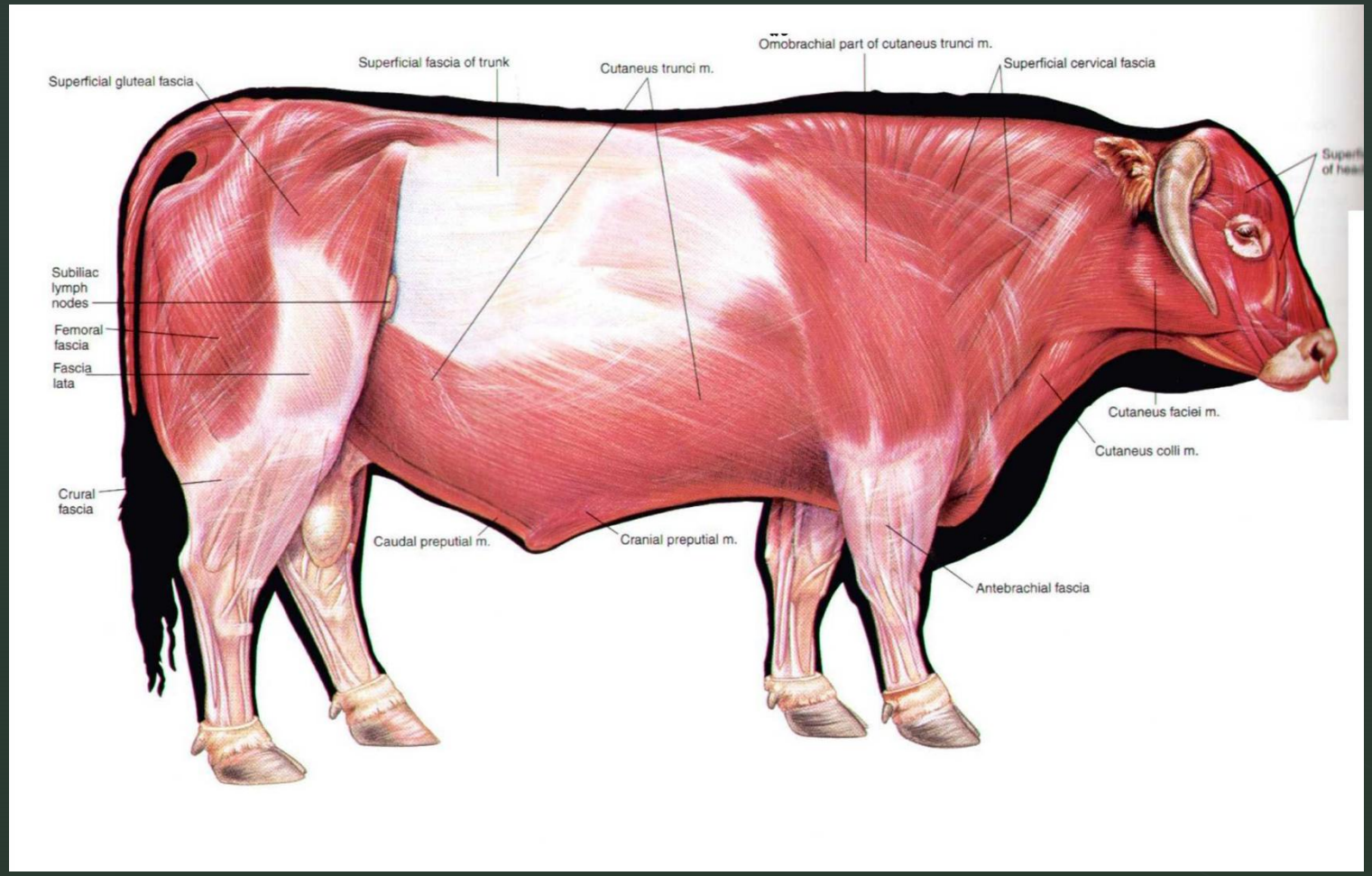
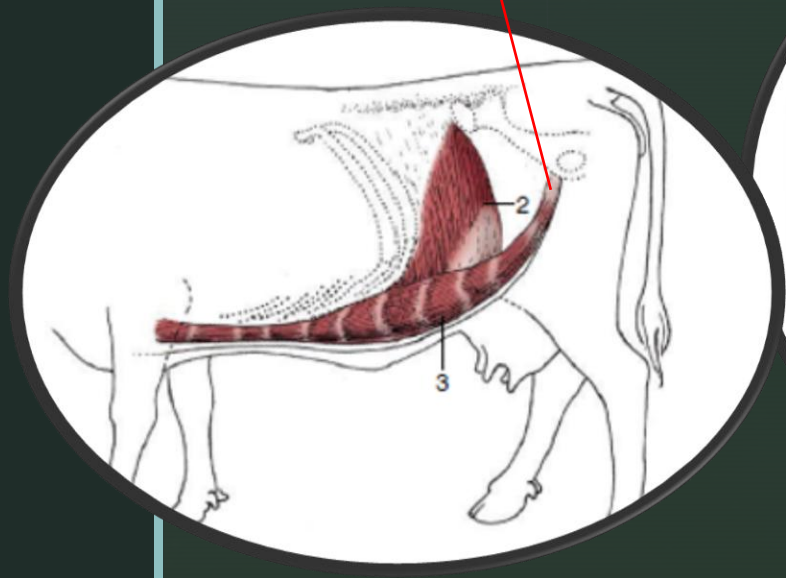


FIG. 5-4 Superficial bovine muscle layer.

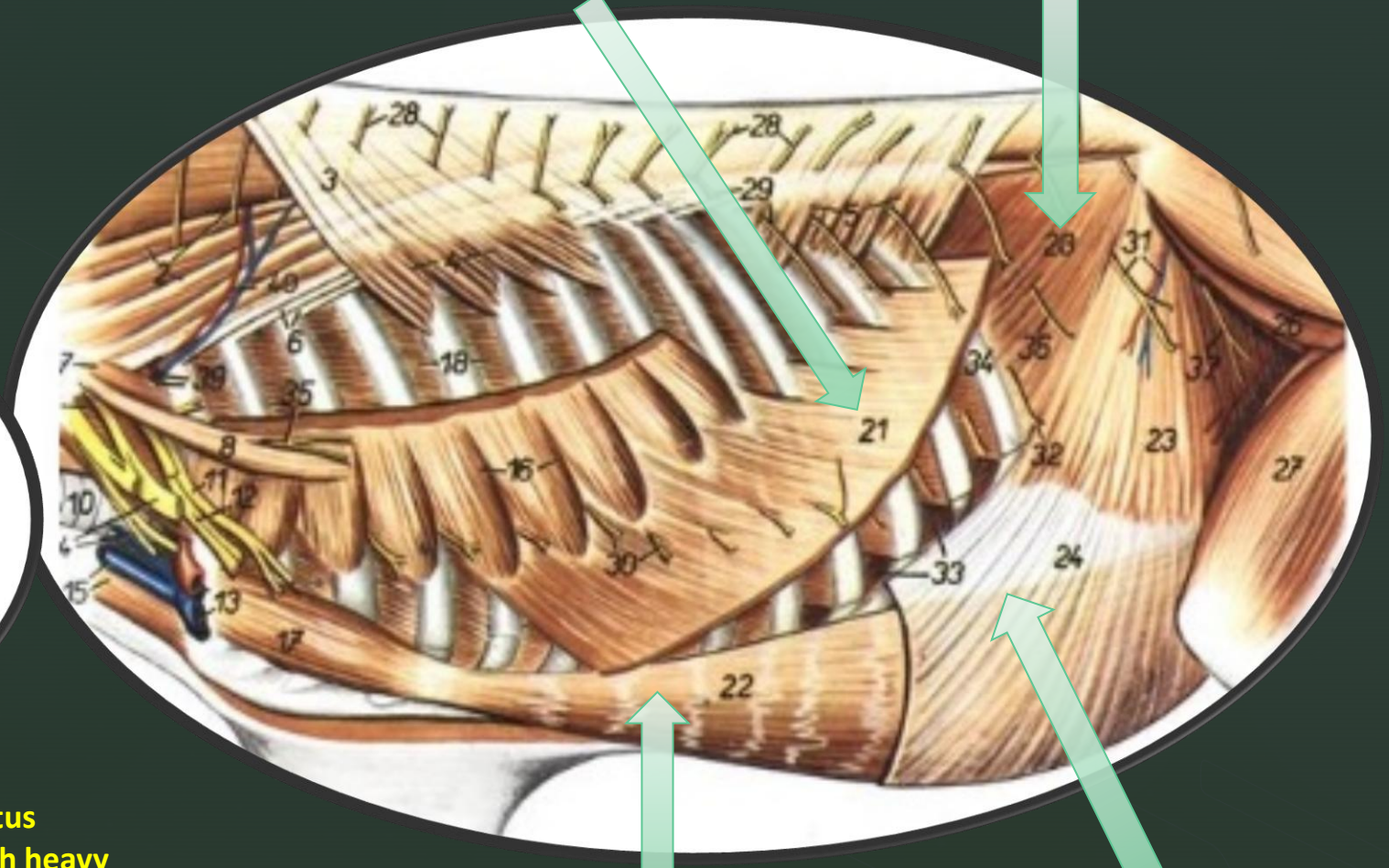

Omobrachial part of cutaneus trunci m.
Superficial fascia of trunk
Cutaneus trunci m.
Superficial cervical fascia
Superficial gluteal fascia
Subiliac lymph nodes
Femoral fascia
Fascia lata
Cutaneus faciei m.
Cutaneus colli m.
Crural fascia
Caudal preputial m.
Cranial preputial m.
Antebrachial fascia

prepubic tendon



External abdominal oblique M.

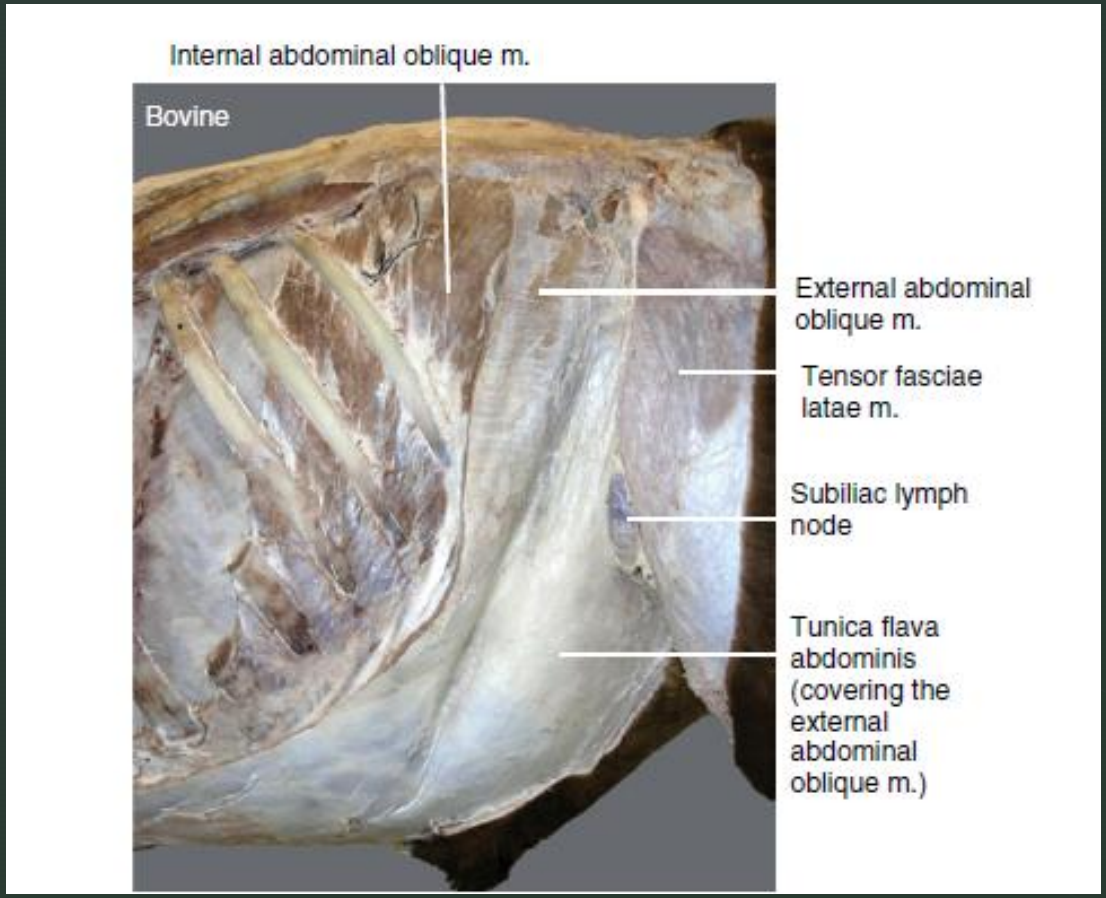
Transverse abdominal M.

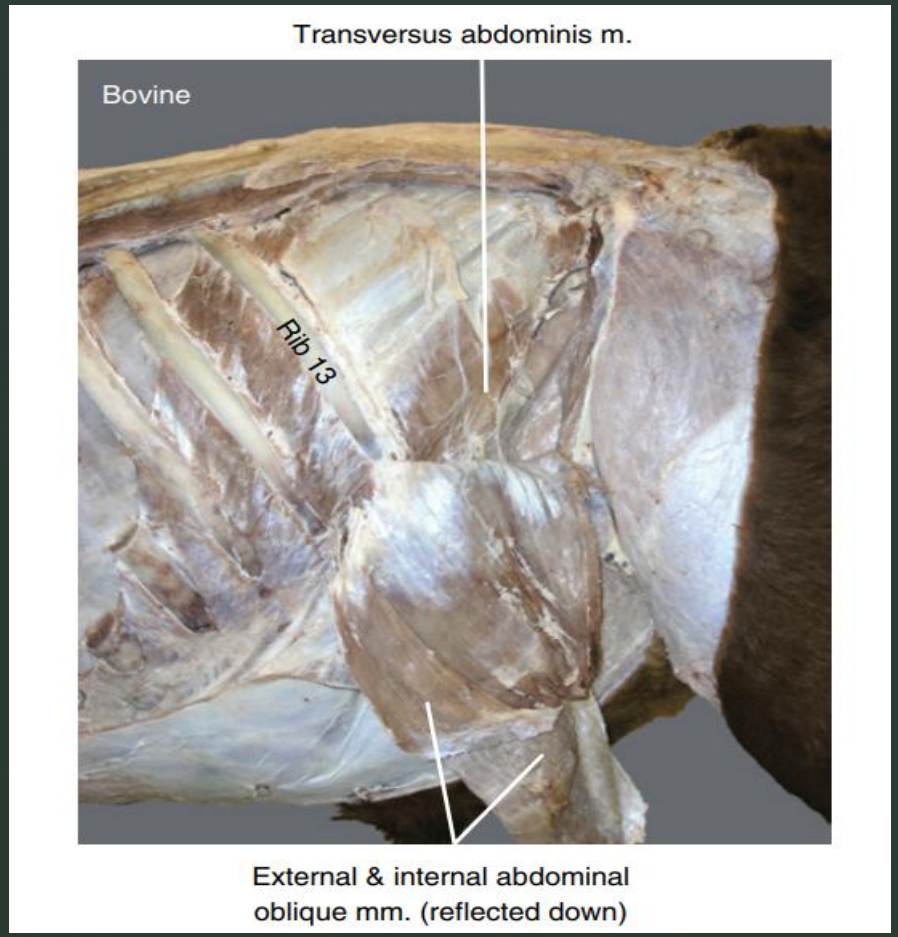


Rupture of the prepubic tendon (Rectus abdominalis) is reported in cows with heavy belly weight, resulting from twin pregnancy, which is an undesirable and rare situation.

Rectus abdominalis

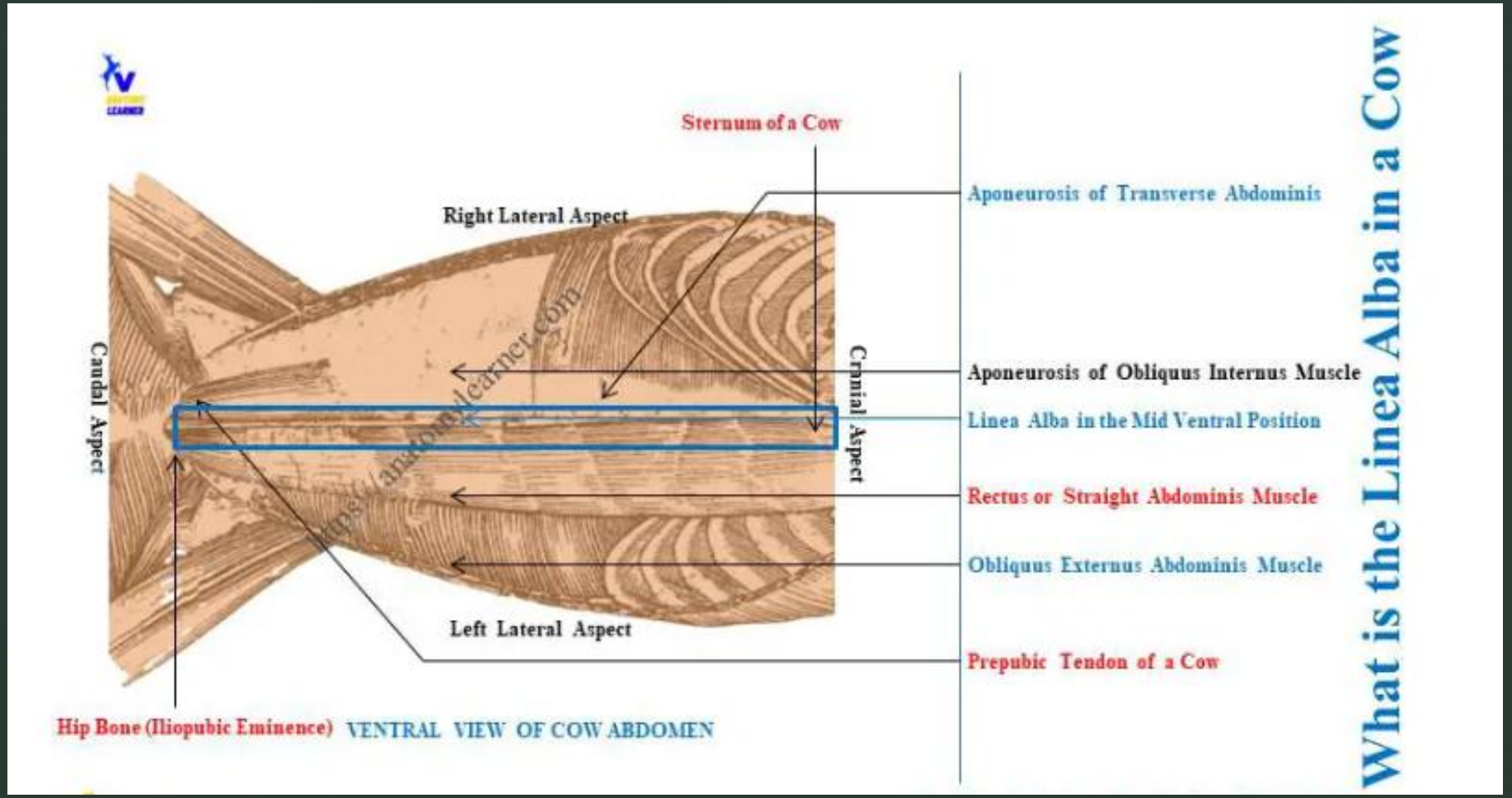
Internal abdominal oblique M.





External & internal abdominal oblique mm. (reflected down)

You should know the layers and directions of the muscle fibers of the abdominal muscles as this information is important in abdominal surgery through the flank region. Surgical incision techniques that follow the direction of abdominal muscle fibers minimize damage to them. This approach in turns minimizes postoperative surgical complications. The abdominal muscles are responsible for the abdominal press that helps with forced expiration, defecation, urination, and parturition.


What is the Linea Alba in a Cow
Sternum of a Cow
Right Lateral Aspect
Caudal Aspect
Cranial Aspect
Left Lateral Aspect
Hip Bone (Iliopubic Eminence)
VENTRAL VIEW OF COW ABDOMEN
Aponeurosis of Transverse Abdominis
Aponeurosis of Obliquus Internus Muscle
Linea Alba in the Mid Ventral Position
Rectus or Straight Abdominis Muscle
Obliquus Externus Abdominis Muscle
Prepubic Tendon of a Cow

Paralumbar Fossa

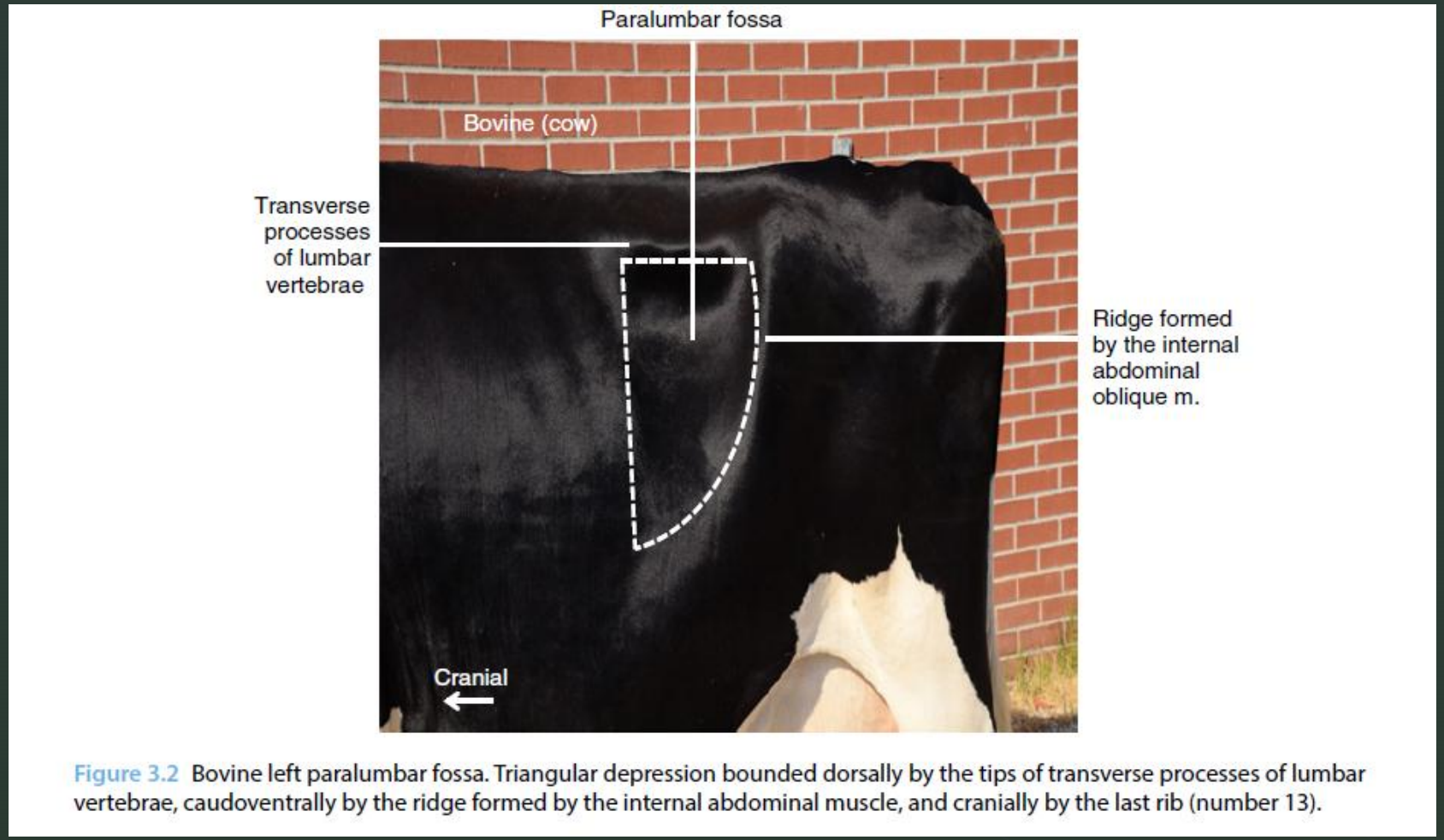
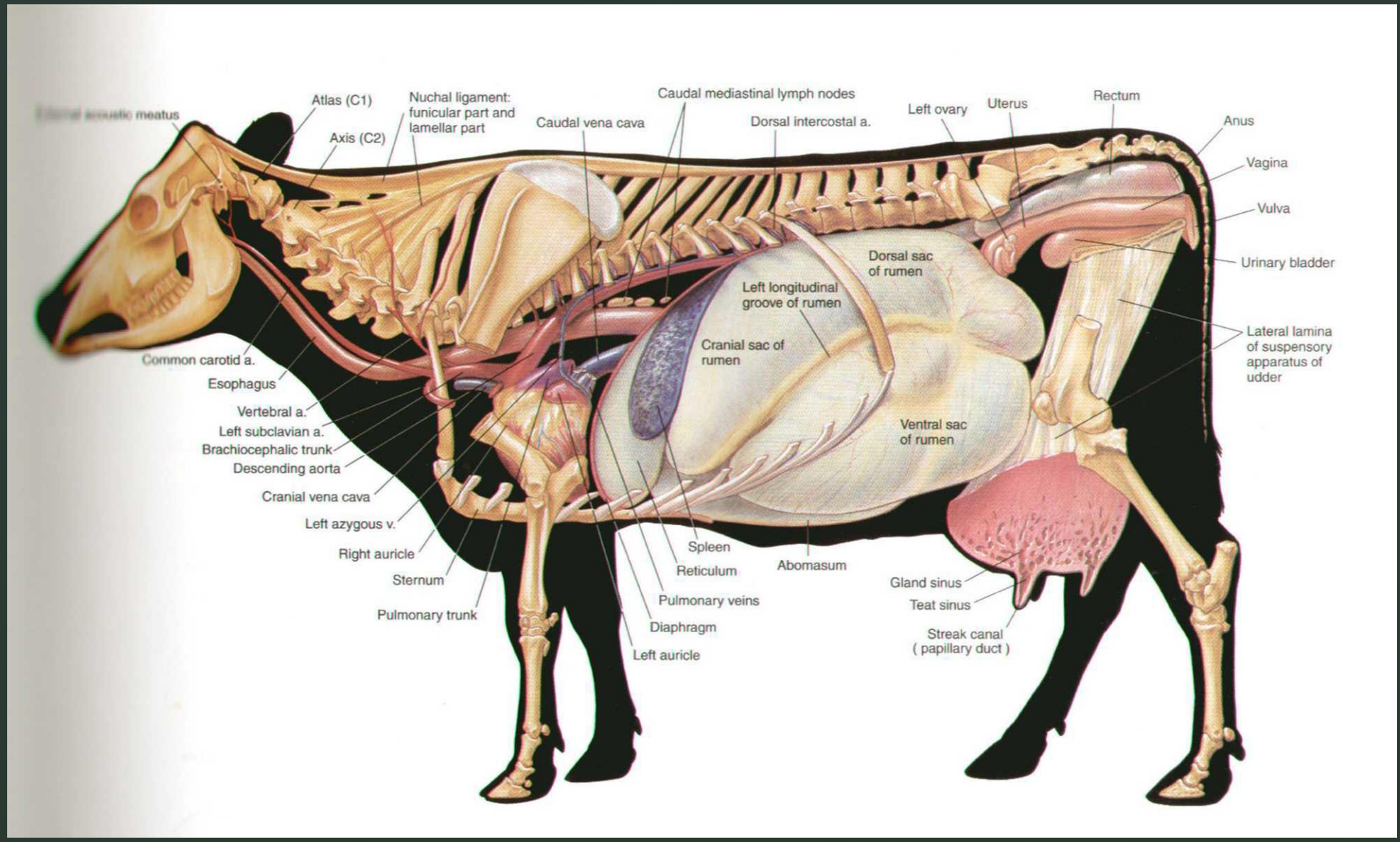


Figure 3.2 Bovine left paralumbar fossa. Triangular depression bounded dorsally by the tips of transverse processes of lumbar vertebrae, caudoventrally by the ridge formed by the internal abdominal muscle, and cranially by the last rib (number 13).

The paralumbar fossa is clinically important in anesthesia of the flank as it is commonly incised to enter the rumen on the left flank (e.g., in rumen cannulation procedure, removal of foreign body), or to access the cecum by incising the skin on the right dorsal flank region. Rumen cannulation, for example, allows for insertion of fistula for long-term studies that require regular rumen sampling.


External acoustic meatus
Atlas (C1)
Axis (C2)
Nuchal ligament: funicular part and lamellar part
Caudal vena cava
Caudal mediastinal lymph nodes
Dorsal intercostal a.
Left ovary
Uterus
Rectum
Anus
Vagina
Vulva
Urinary bladder
Lateral lamina of suspensory apparatus of udder
Dorsal sac of rumen
Left longitudinal groove of rumen
Cranial sac of rumen
Ventral sac of rumen
Common carotid a.
Esophagus
Vertebral a.
Left subclavian a.
Brachiocephalic trunk
Descending aorta
Cranial vena cava
Left azygous v.
Right auricle
Sternum
Pulmonary trunk
Left auricle
Diaphragm
Pulmonary veins
Spleen
Reticulum
Abomasum
Gland sinus
Teat sinus
Streak canal (papillary duct)

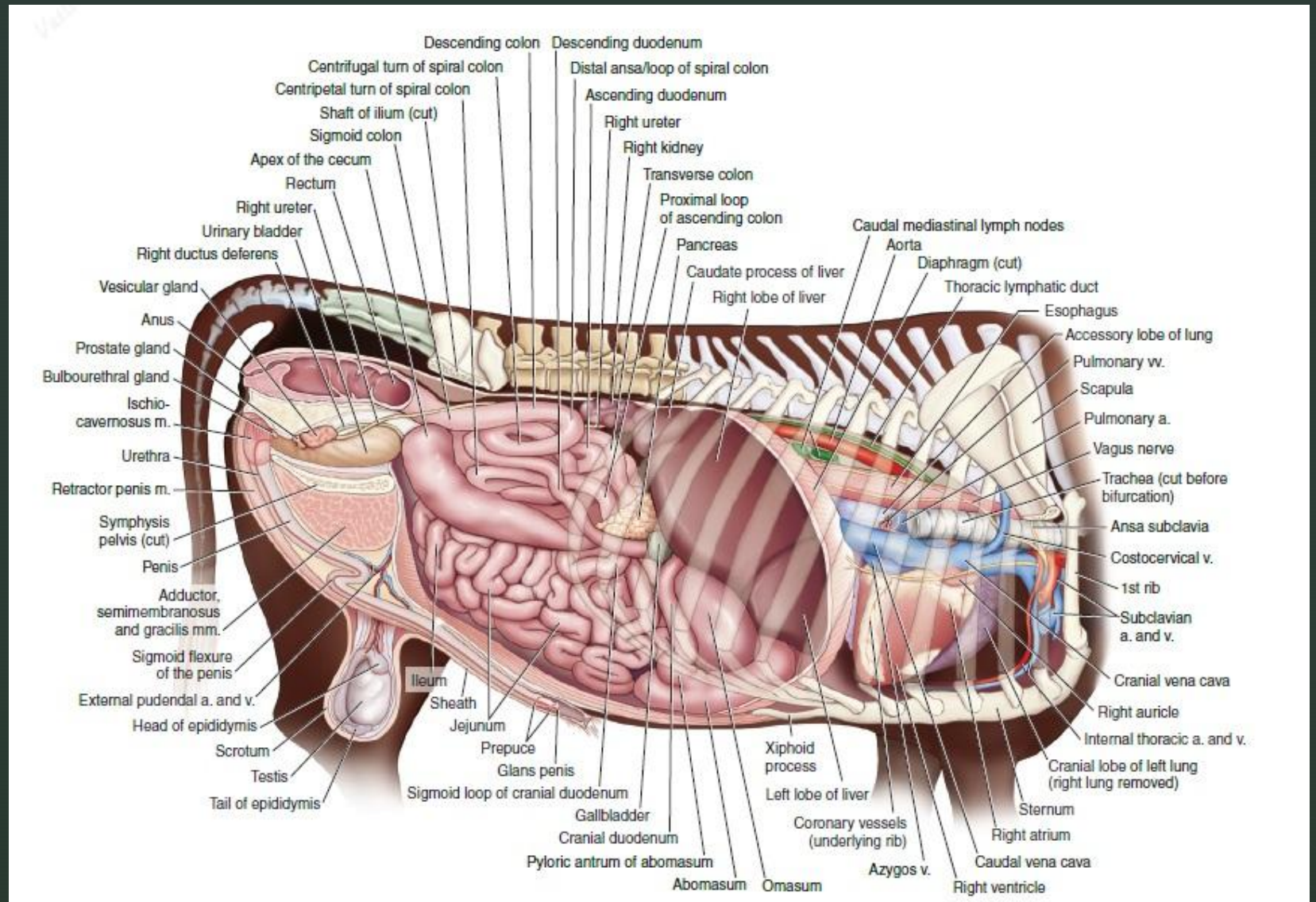
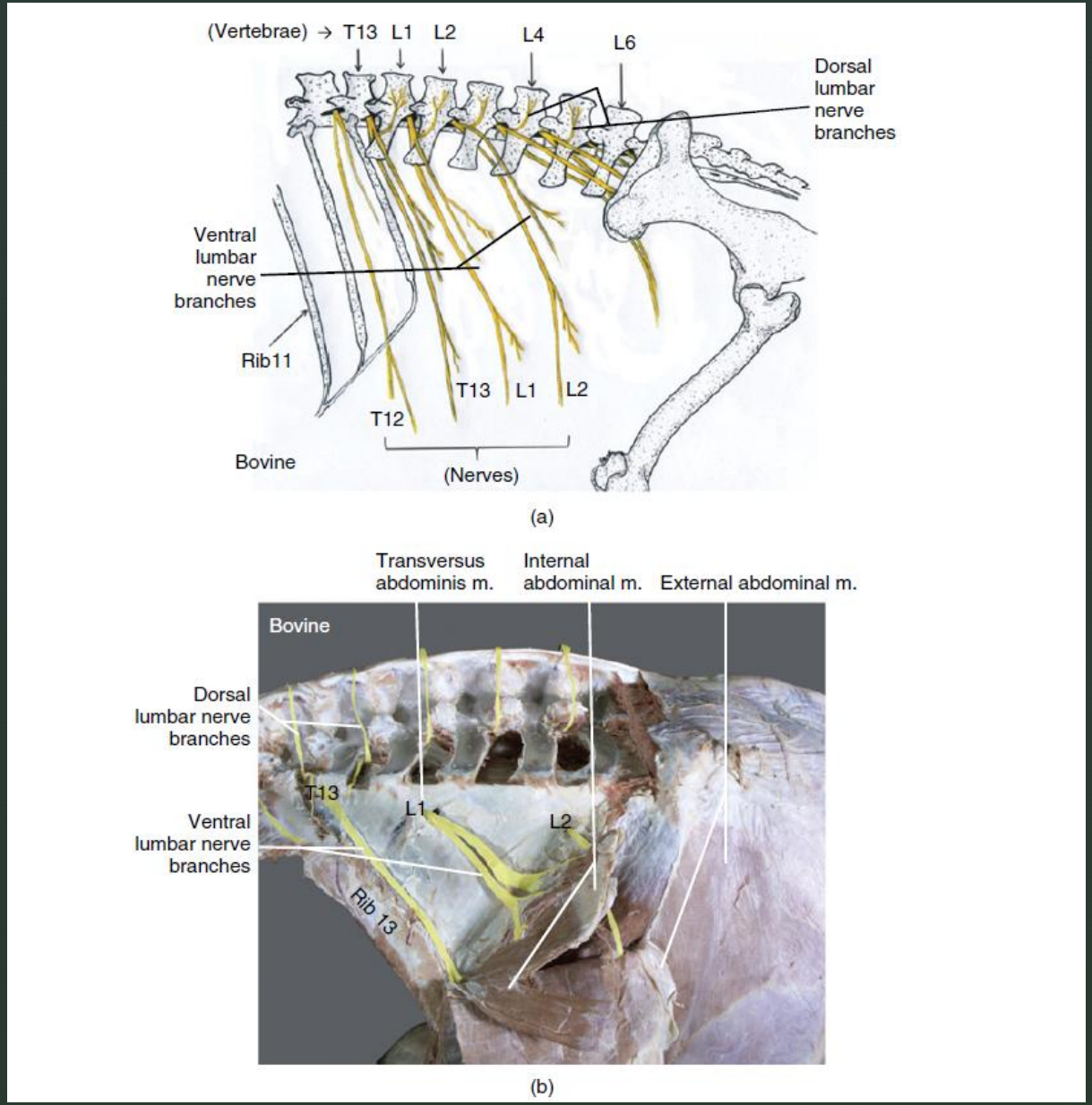
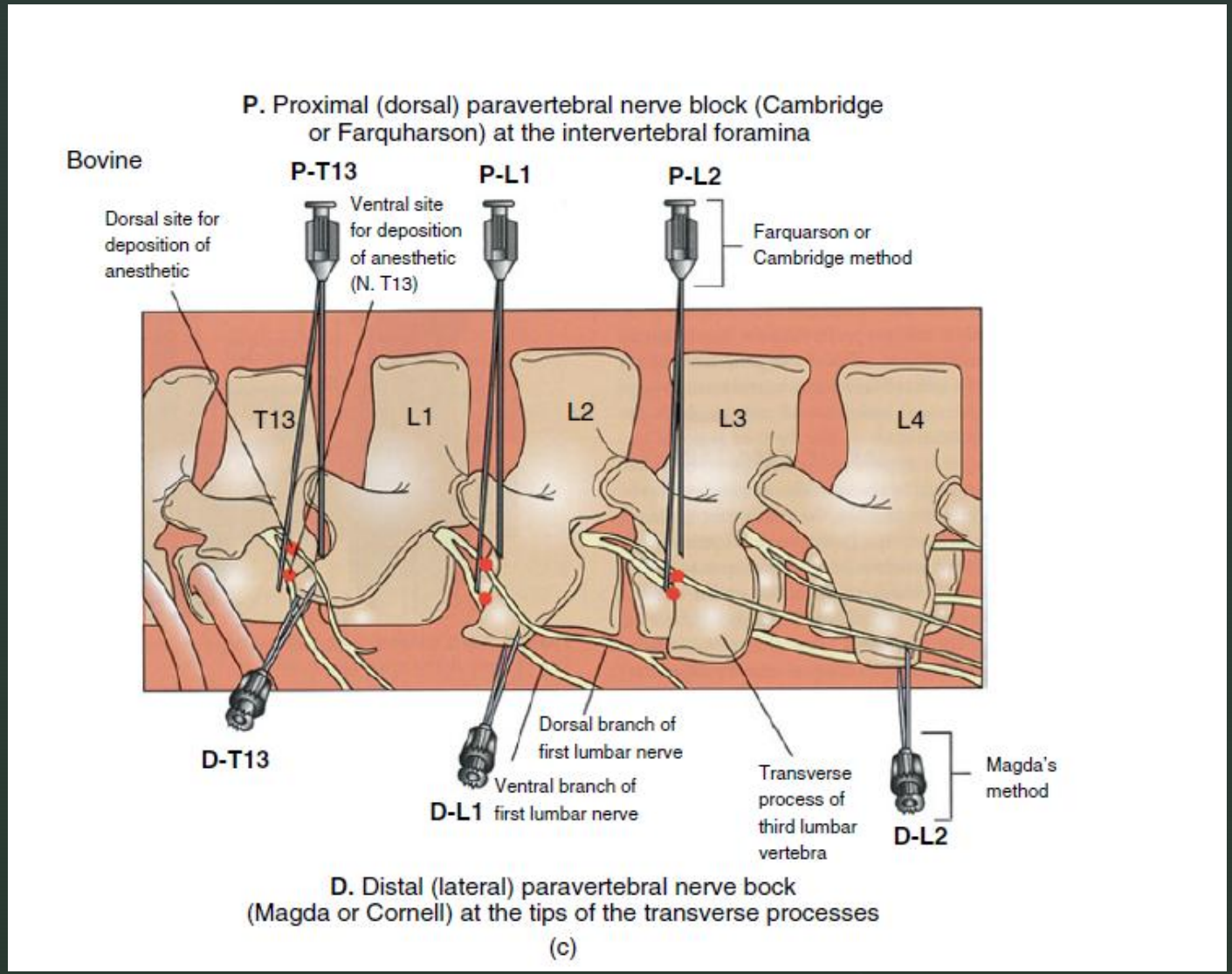


FIG. 5-7 Right view of the bovine thoracic and abdominal cavities and pelvis (male).



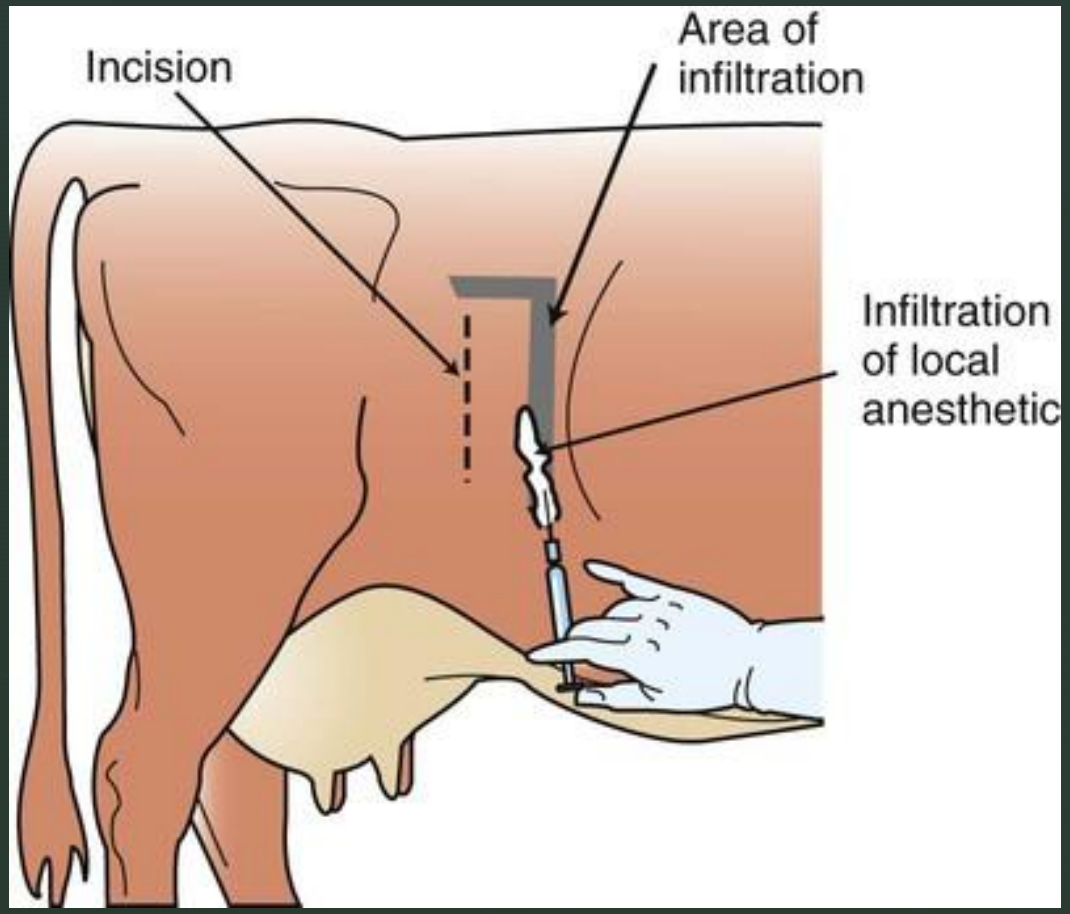
Spinal nerves of the left lateral flank in a goat. T13 (costoabdominal), L1 (iliohypogastric), and L2 (ilioinguinal) are blocked in flank anesthesia.



Needle placement for anesthesia of the flank using **proximal (P)** or **distal (D) paravertebral nerve blocks in cattle**. In the proximal paravertebral nerve block, the dorsal and ventral nerve roots of T13, L1, and L2 spinal nerves are blocked close to where they emerge from their respective intervertebral foramina. In the distal paravertebral nerve block, ventral and dorsal rami of T13, L1, and L2 are blocked at the distal ends of the transverse processes of L1, L2, and L4, respectively. Because of variations in the pathways of spinal nerves, L2 branches should be blocked at tips of the transverse processes of both L3 and L4 vertebrae.

Inverted L-block or line block: the anesthetic agent is injected along a line parallel with the transverse processes of the lumbar vertebrae and along the caudal border of the last rib. The line block is technically less challenging than the paravertebral anesthesia, which could be more difficult in obese and heavily muscles cattle. In addition, the scoliosis that may develop in the proximal paravertebral block could make closure of the skin much more difficult.

scoliosis



Left flank surgery: Because the rumen dominates the left abdomen, left flank exploratory surgery is not performed. Procedures typically done on the left include rumenotomy and C-section.

Right flank surgery: Right flank surgery can be performed for abdominal exploration following an abnormal sign on ultrasound. Several organs can be accessed on the right. These include the kidneys, abomasum, liver, duodenum, cecum, and small intestine.

- Congenital abnormalities are more common in calves in addition to urachal remnants, umbilical infections with adhesions, volvulus and intussusceptions. Interestingly, intussusceptions in calves occur throughout the intestinal tract and are proposed to develop because calves have less mesenteric fat compared to adults. General anesthesia is preferred for exploratory surgery using a right flank approach.

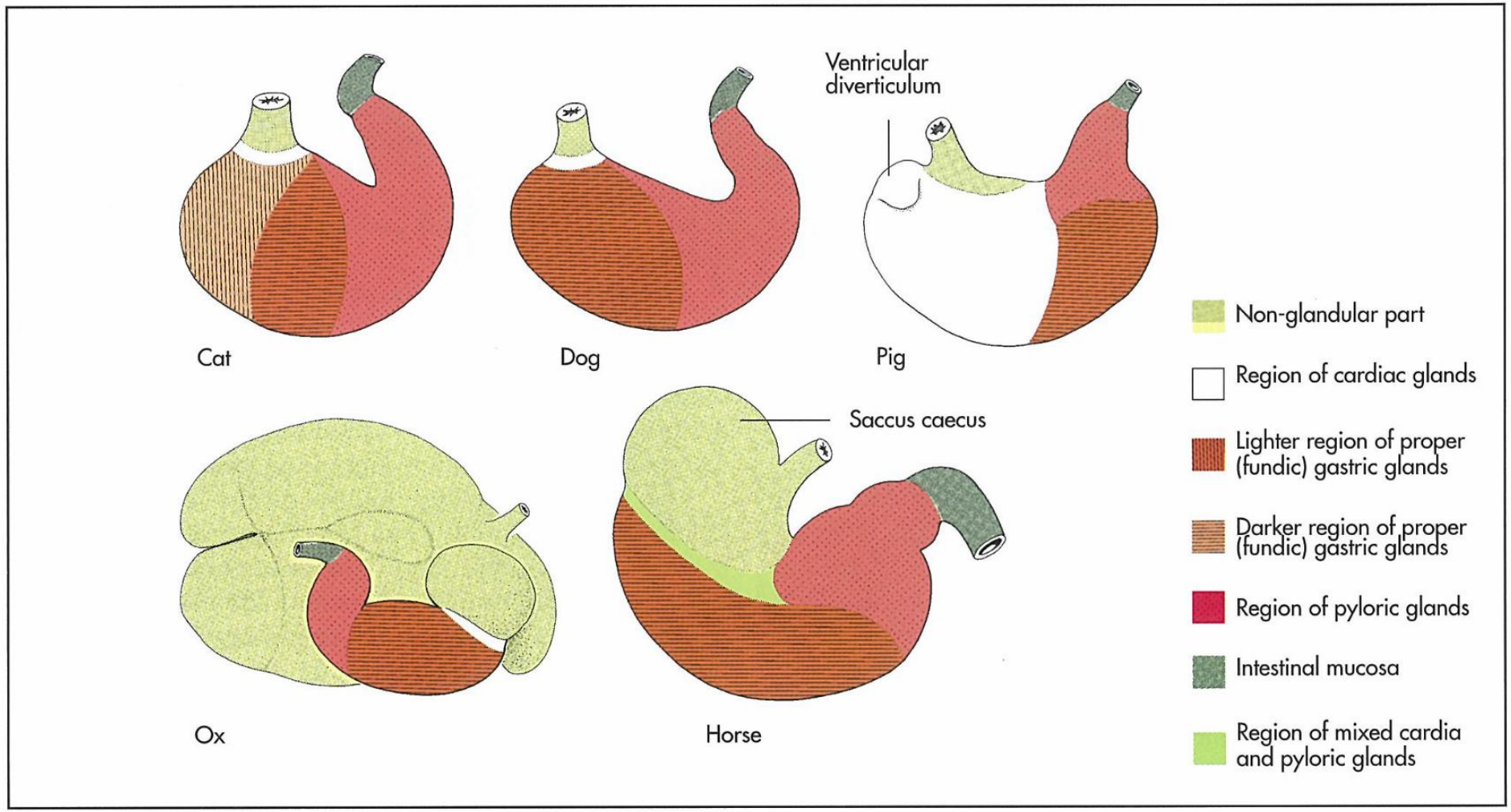


Fig 7-49. Distribution of the gastric mucosa in the domestic mammals, schematic (Liebich, 2004).

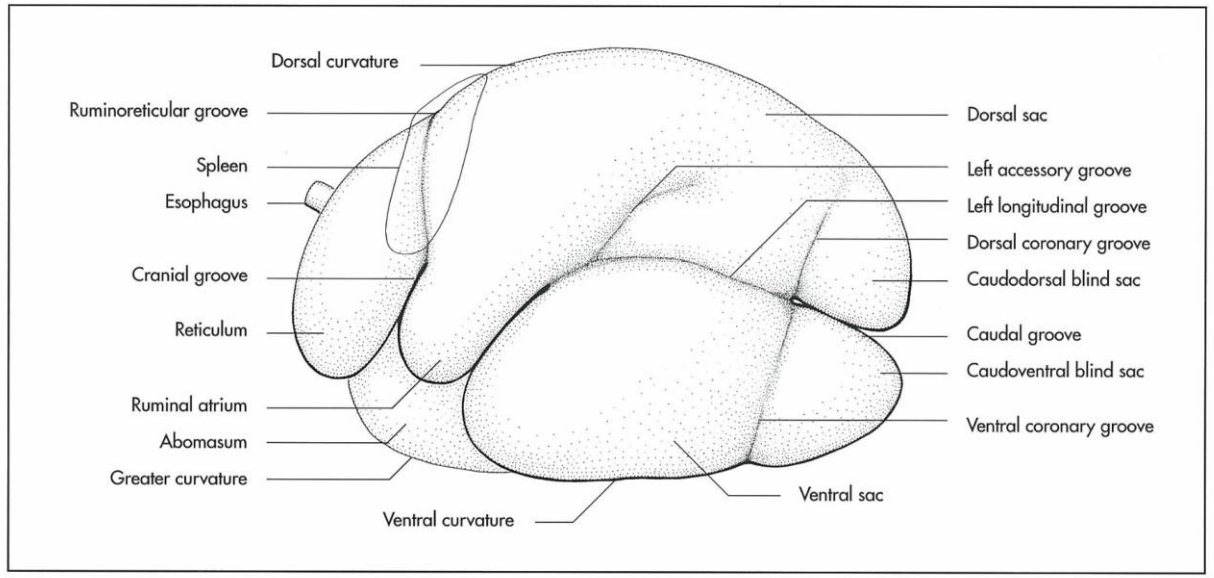


Fig 7-65. Compartments of the stomach of the ox, left lateral aspect, schematic (Schaller, 1992).

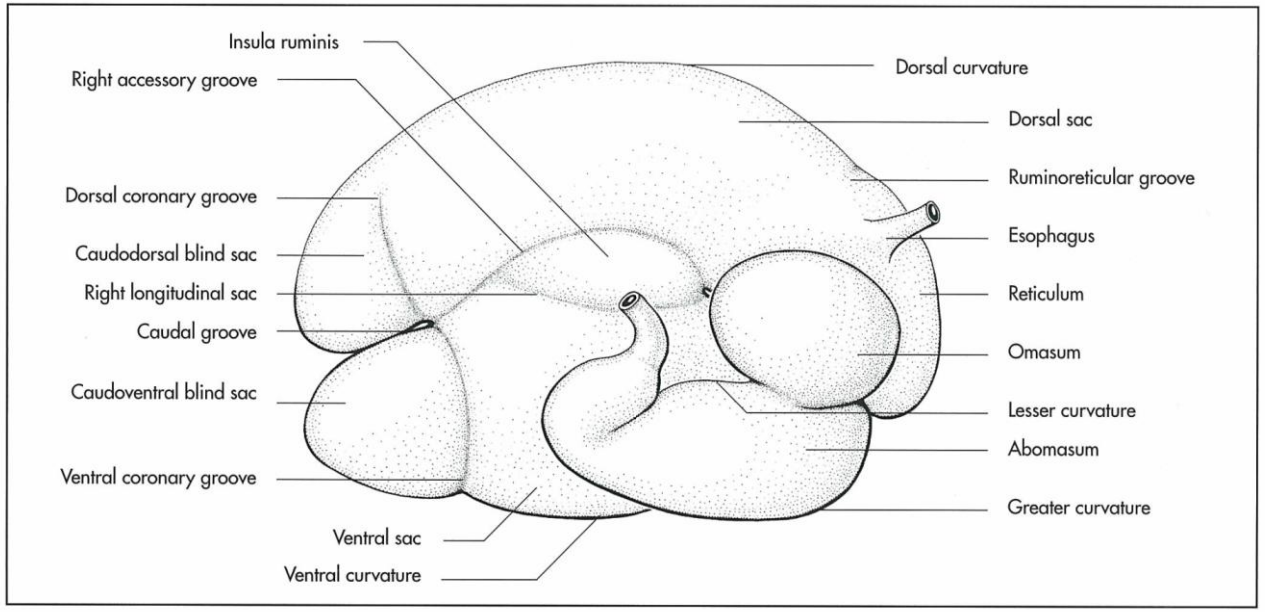
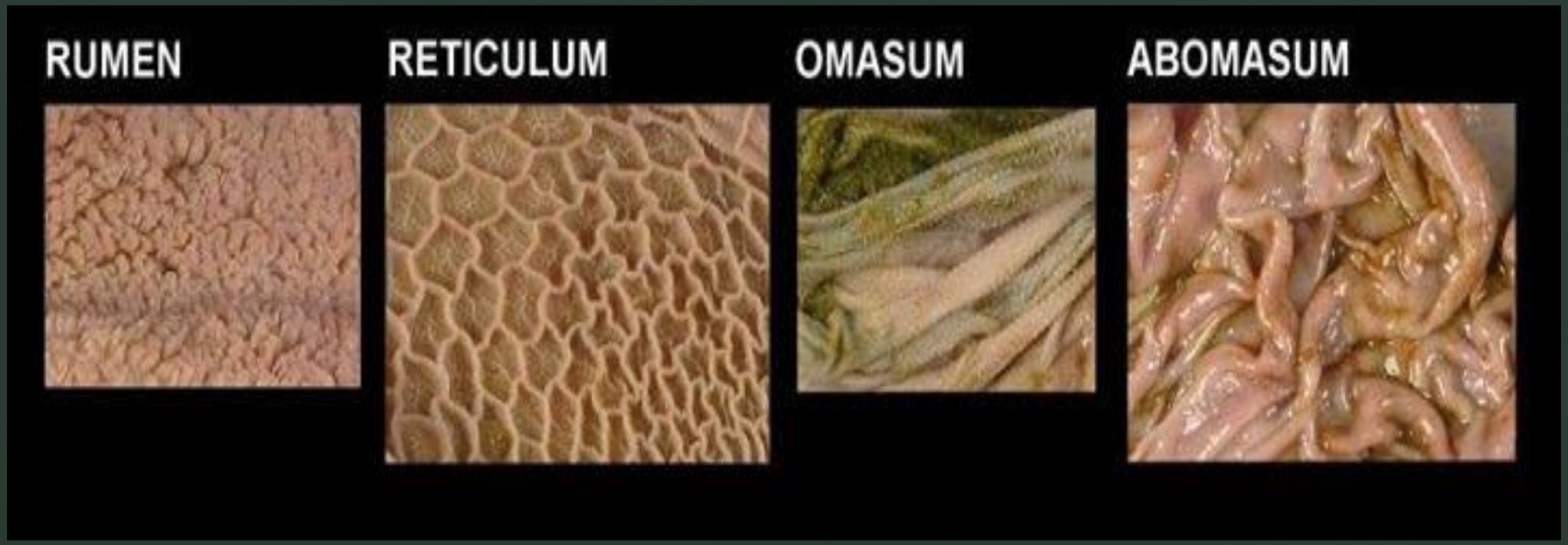
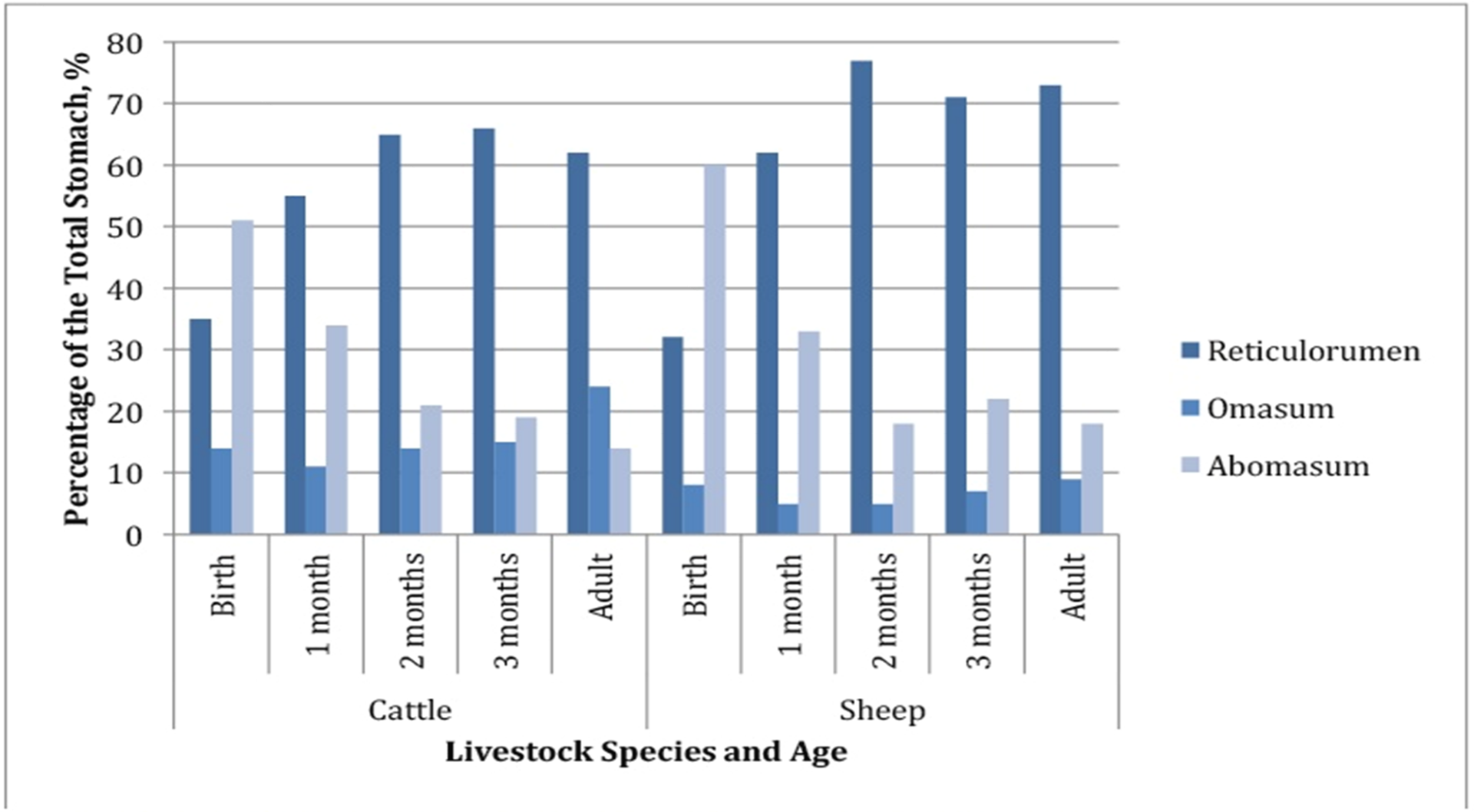


Fig 7-66. Compartments of the stomach of the ox, right lateral aspect, schematic (Schaller, 1992).


RUMEN
RETICULUM
OMASUM
ABOMASUM



Relative proportions of stomach compartments in cattle and sheep at various ages.

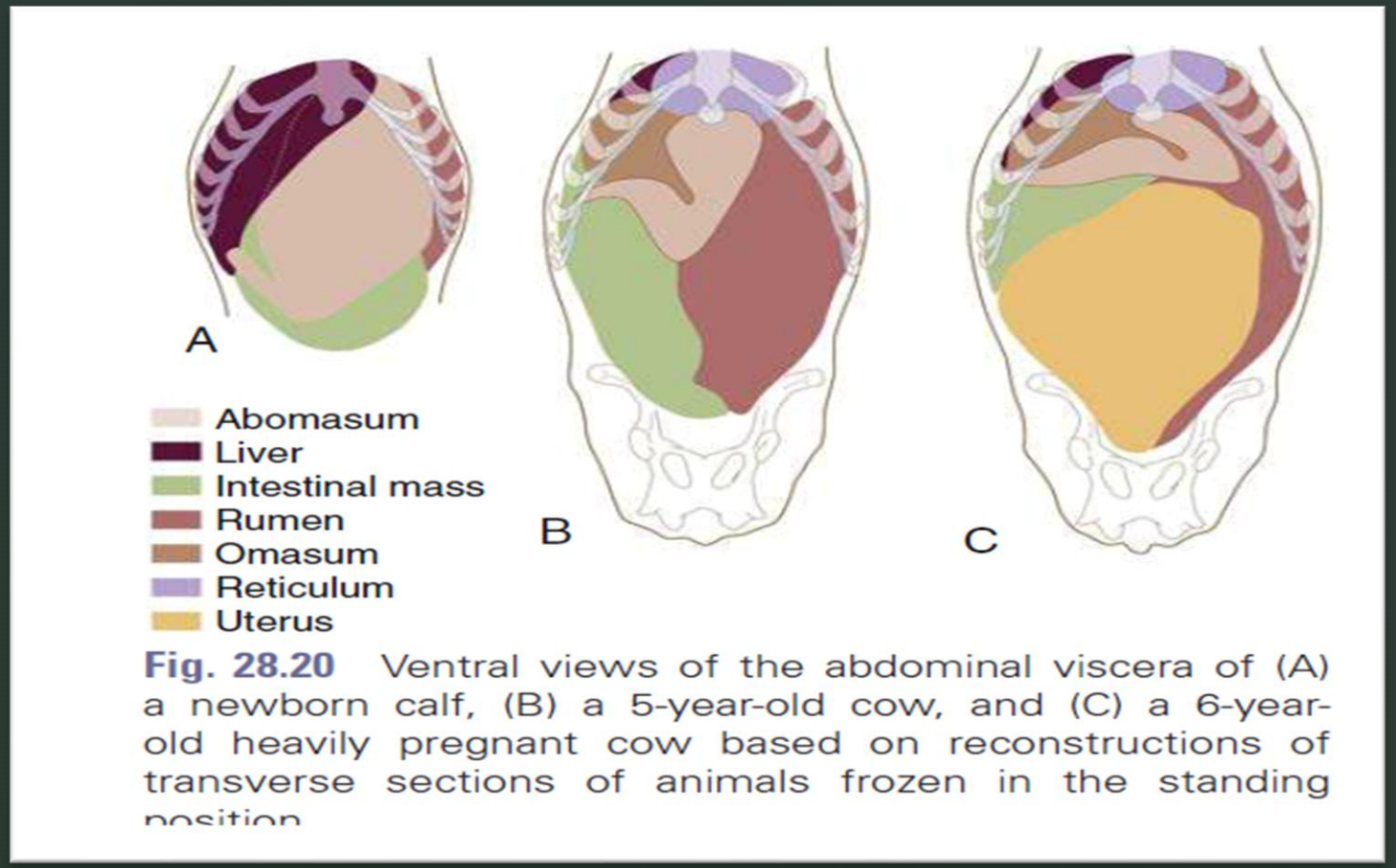
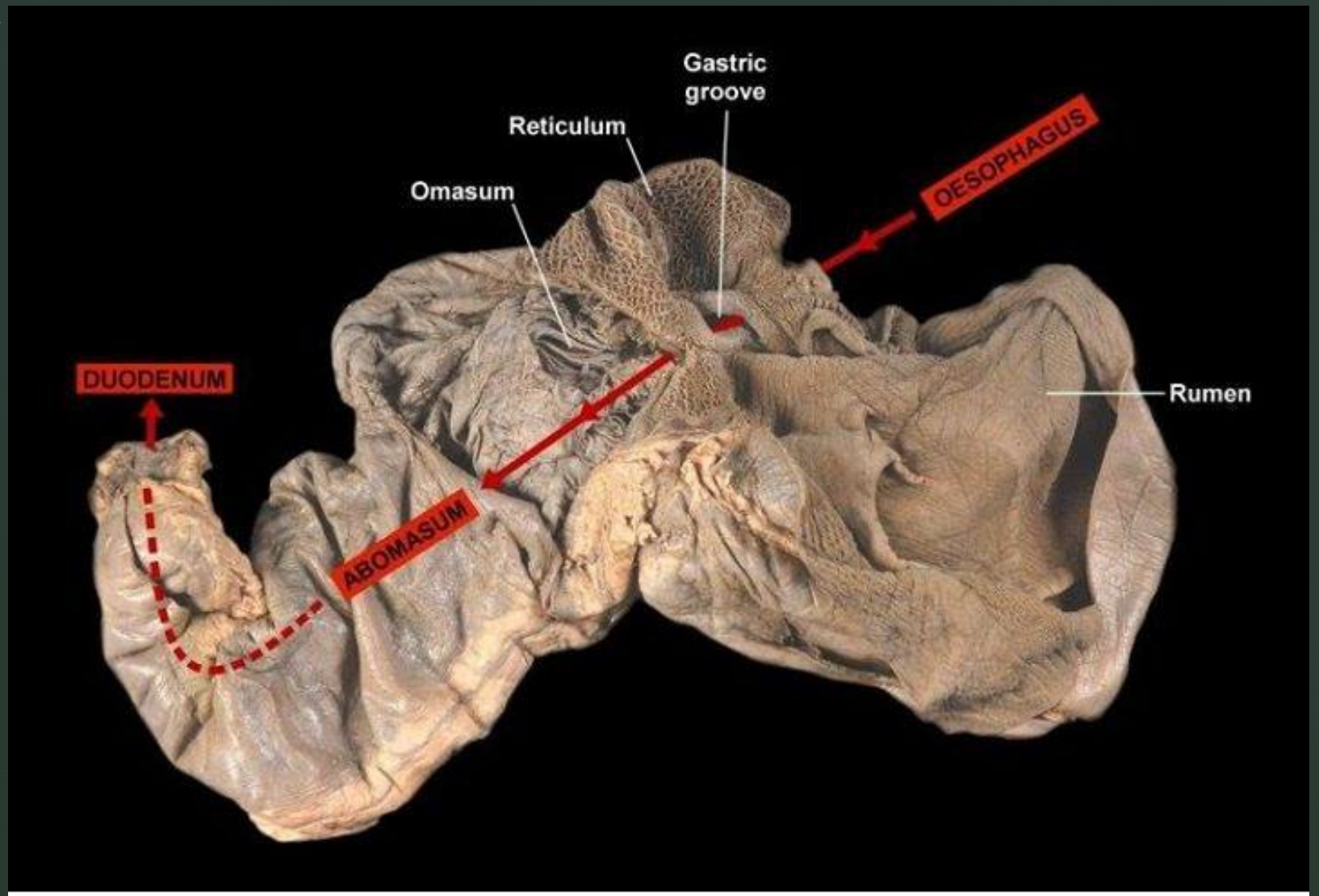


Fig. 28.20 Ventral views of the abdominal viscera of (A) a newborn calf, (B) a 5-year-old cow, and (C) a 6-year-old heavily pregnant cow based on reconstructions of transverse sections of animals frozen in the standing position

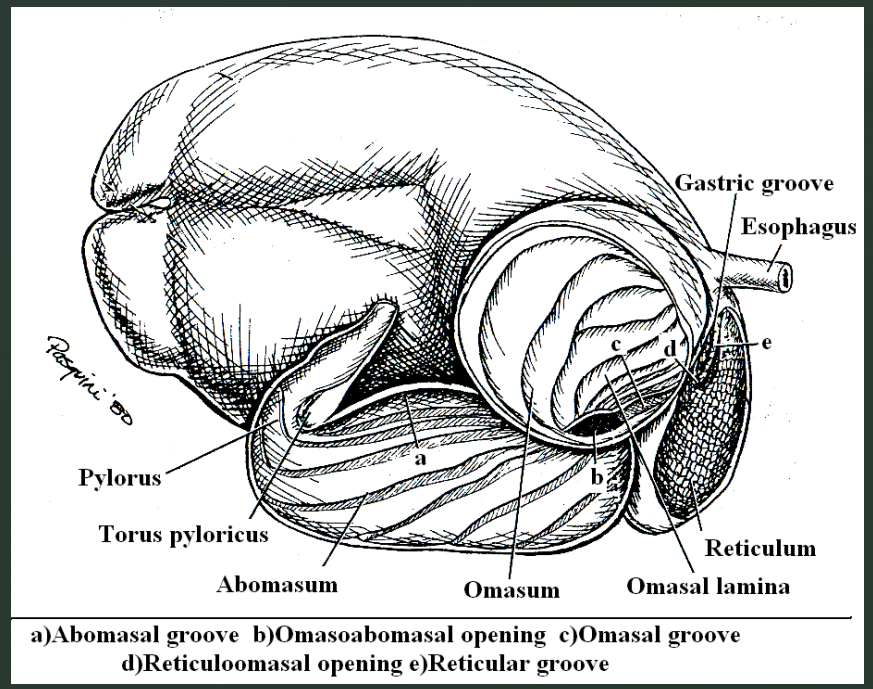
Abomasal length decreases and abomasal width increases during the last 3 months of gestation in response to the progressively developing fetus in the uterus. In addition, the abomasum assumes a position more on the left side of the abdomen during this same time period. In the first 14 days after calving, the uterus returns to its more caudal and right sagittal position, thus allowing the abomasum to return to its normal position.



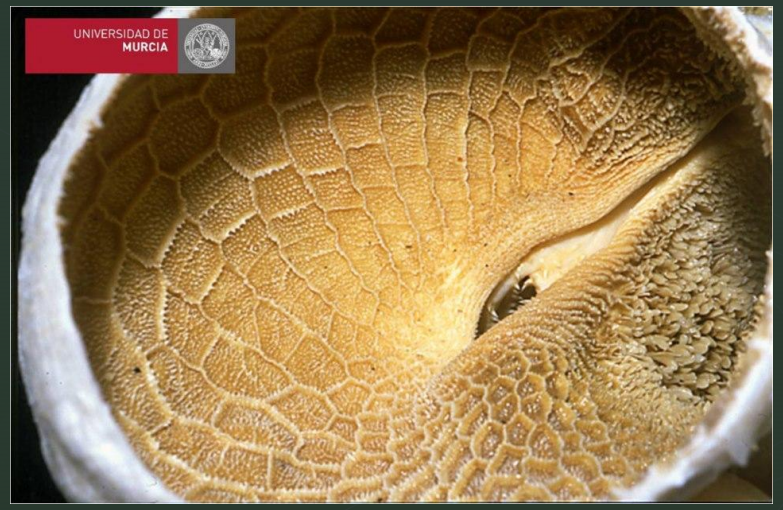
A fixed calf stomach. The red arrow demarcates the route of milk flow i.e. bypassing of the forestomachs to the abomasum via the gastric groove. Note large abomasum relative to rumen in this suckling animal

Gastric groove

The muscular lips of the **reticular groove** and the rest of the **gastric groove** can be stimulated to form a continuous channel by the act of suckling in young calves.
This effect can be mimicked by drugs containing copper and/or nicotine sulfates. These chemicals stimulate the pharyngeal nerve endings that reflexly induce closure of the gastric groove.



a)Abomasal groove b)Omasoabomasal opening c)Omasal groove
d)Reticuloomasal opening e)Reticular groove



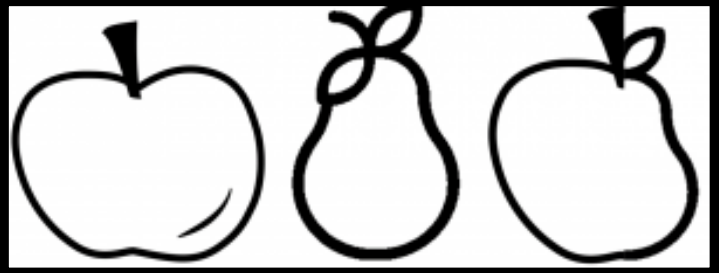
Mechanical extraluminal obstruction of the reticulo-omasal groove by a mass (abscess) and adhesions, such as seen in TRP cases, results in type 2 vagal indigestion (also called omasum transport failure). Motility of the rumen may continue normally, but the ability of the reticulum and omasum to move ingesta into the abomasum is impaired.

Vagal Indigestion

- Not a single disease, but a syndrome of many different causes that can cause abdominal distention
- Classic "papple" shape. Ventral sac more distended than dorsal sac (fluid/ingesta)
- 4 types
  - Type 1: Free gas bloat
  - Type 2: Failure of transport out of rumen (blockage)
  - Type 3: Failure of transport out of abomasum (blockage)
  - Type 4: Indigestion of advanced pregnancy

Table 3
Types of vagal indigestion

Type of Vagal Indigestion	Location of Abdominal Distension	Rumen Contents	Rumen Chloride	Serum Chloride	Serum Bicarbonate
Type 1: Failure of eructation	Dorsal left	Gas	Normal	Normal to mildly decreased	Normal to mildly increased
Type 2: Failure of rumen outflow	Dorsal left, ventral right	Fluid	Normal	Normal to mildly decreased	Normal to mildly increased
Type 3: Failure of abomasal outflow	Dorsal left, ventral right	Fluid	Increased	Moderate to severely decreased	Moderate to severely increased
Type 4: Partial failure of pyloric outflow/ proximal intestinal obstruction	Dorsal left, ventral right	Fluid	Normal to increased	Mild to moderately decreased	Mild to moderately increased



(A) (B)

The peritoneum plays a crucial role in the abdominal cavity of ruminant:

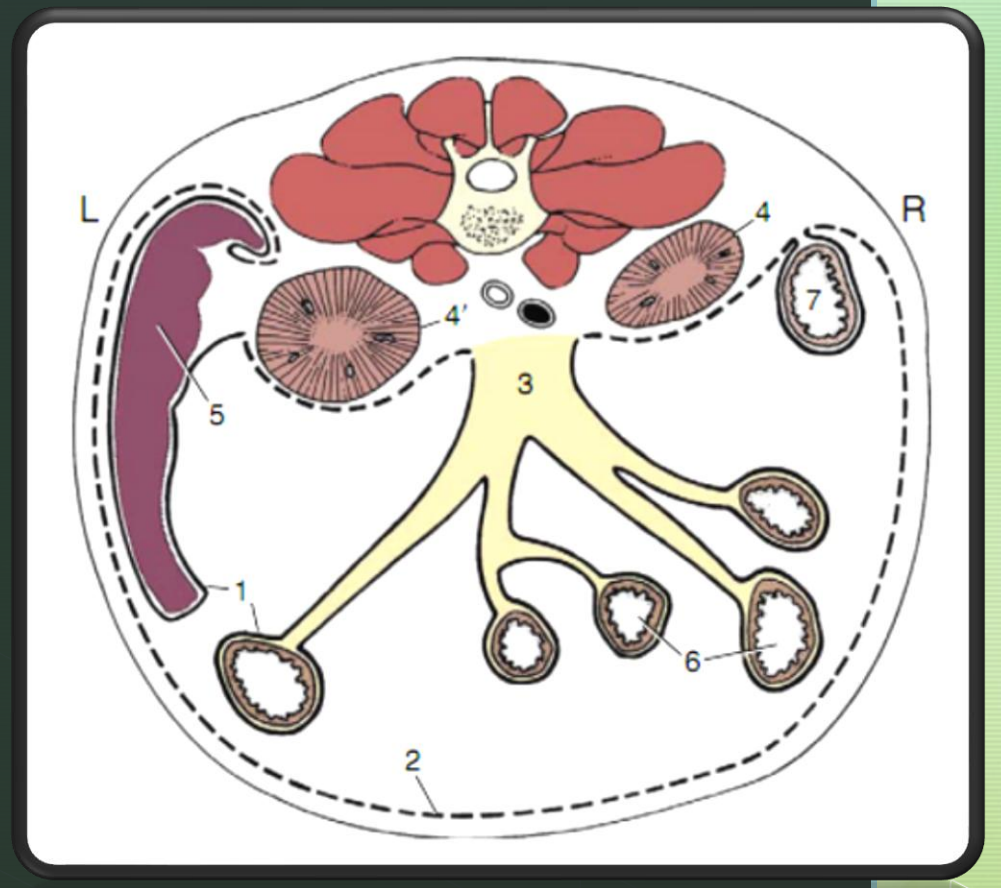
1. Protective barrier: The peritoneum, specifically the parietal peritoneum, lines the inner surface of the abdominal wall and provides a protective barrier against infection and injury.

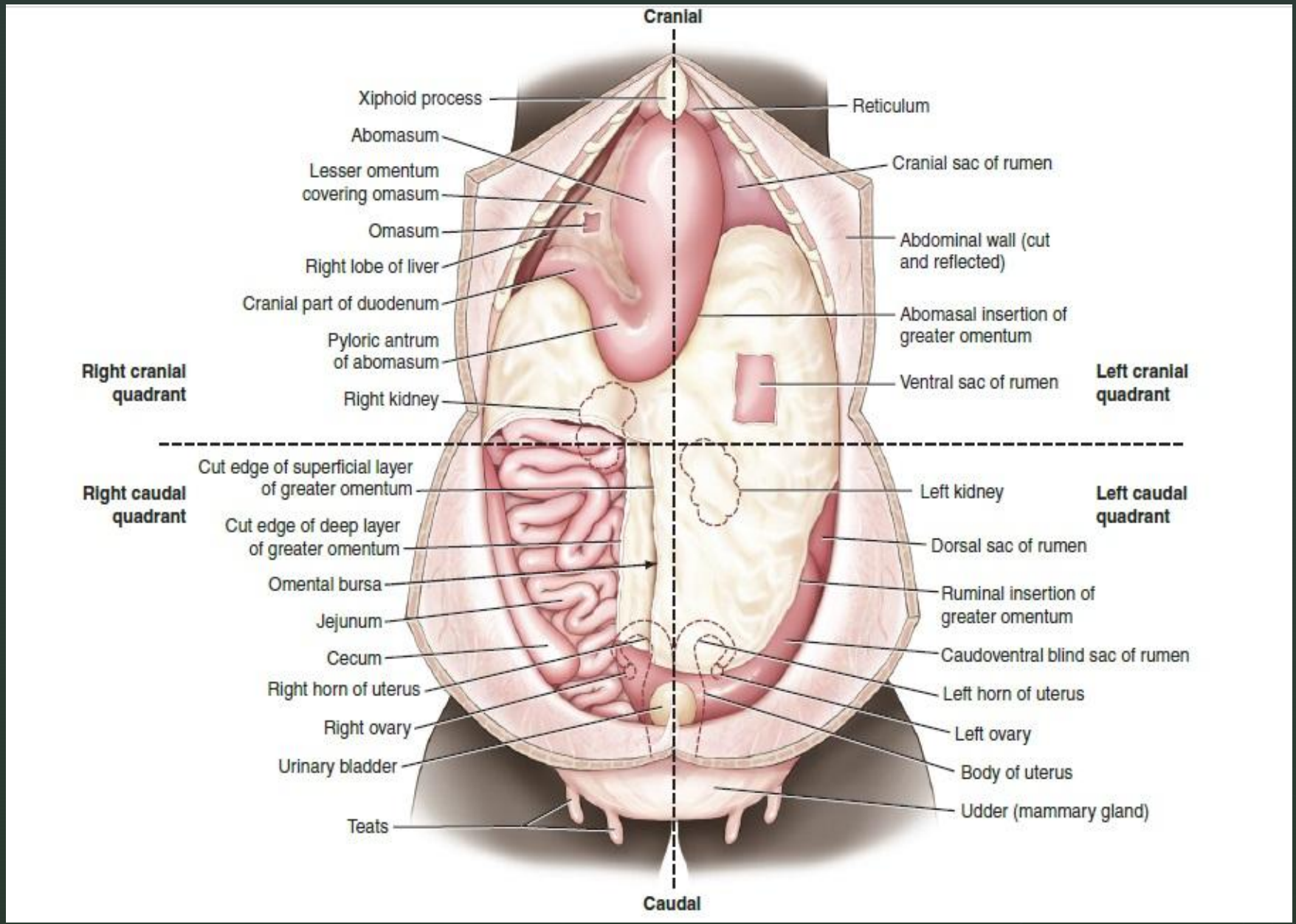
2. Facilitating organ positioning: The connecting peritoneum extends between organs and helps position the abdominal organs, including the large ruminoreticulum, in the abdominal cavity.

3. Fluid dynamics: The peritoneum allows for the exchange of fluids, electrolytes, and inflammatory mediators during conditions like peritonitis. Increased capillary permeability leads to leakage of protein-rich fluid into the peritoneal cavity.

4. Diagnostic value: Analysis of peritoneal fluid can provide valuable diagnostic information, such as differentiating septic from non-septic peritonitis based on parameters like lactate concentration and acute phase proteins.

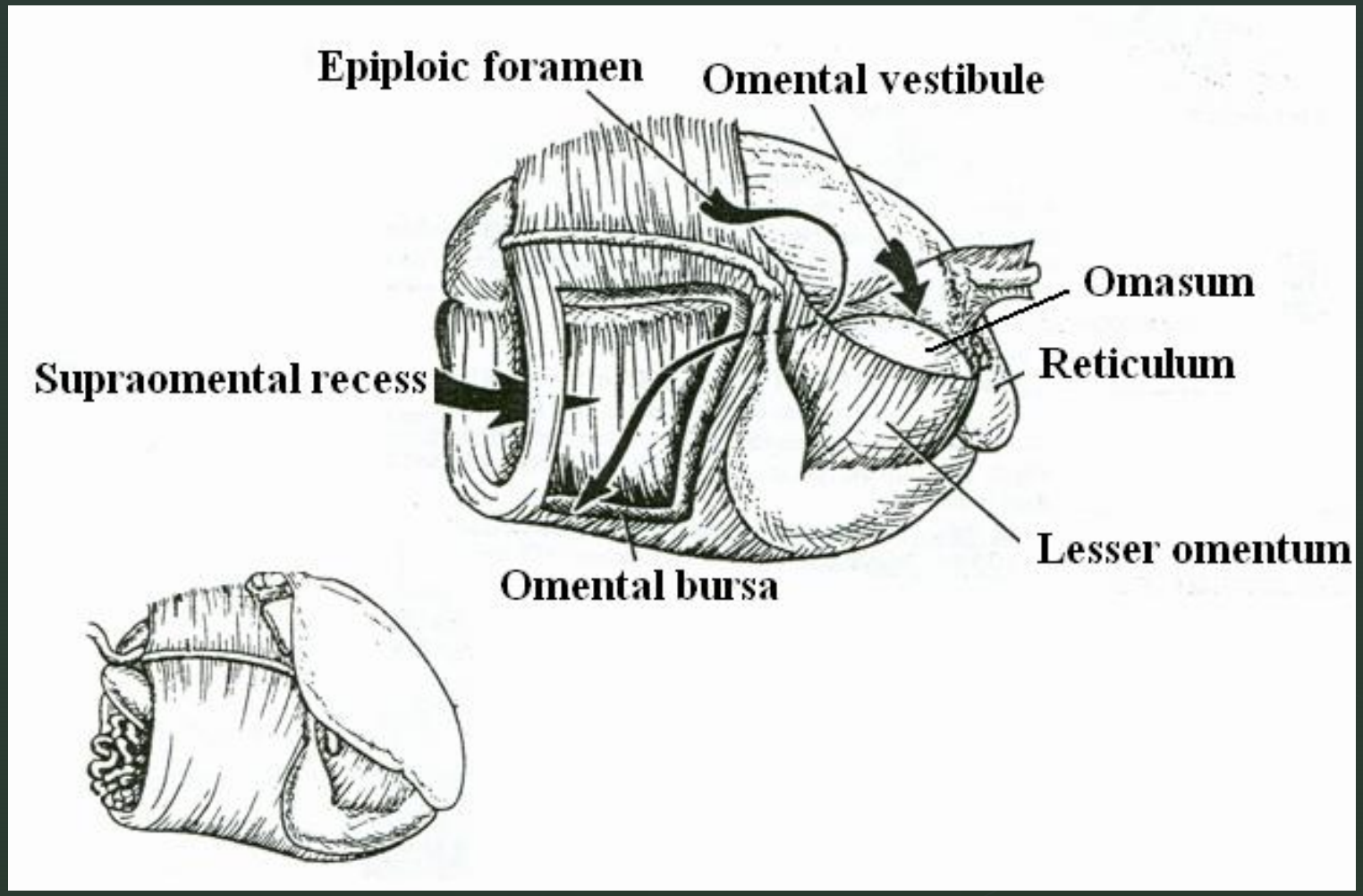
5. Surgical access: The peritoneal cavity provides access for various surgical interventions in ruminants, such as rumenotomy, abomasal displacement procedures, and exploratory laparotomies.

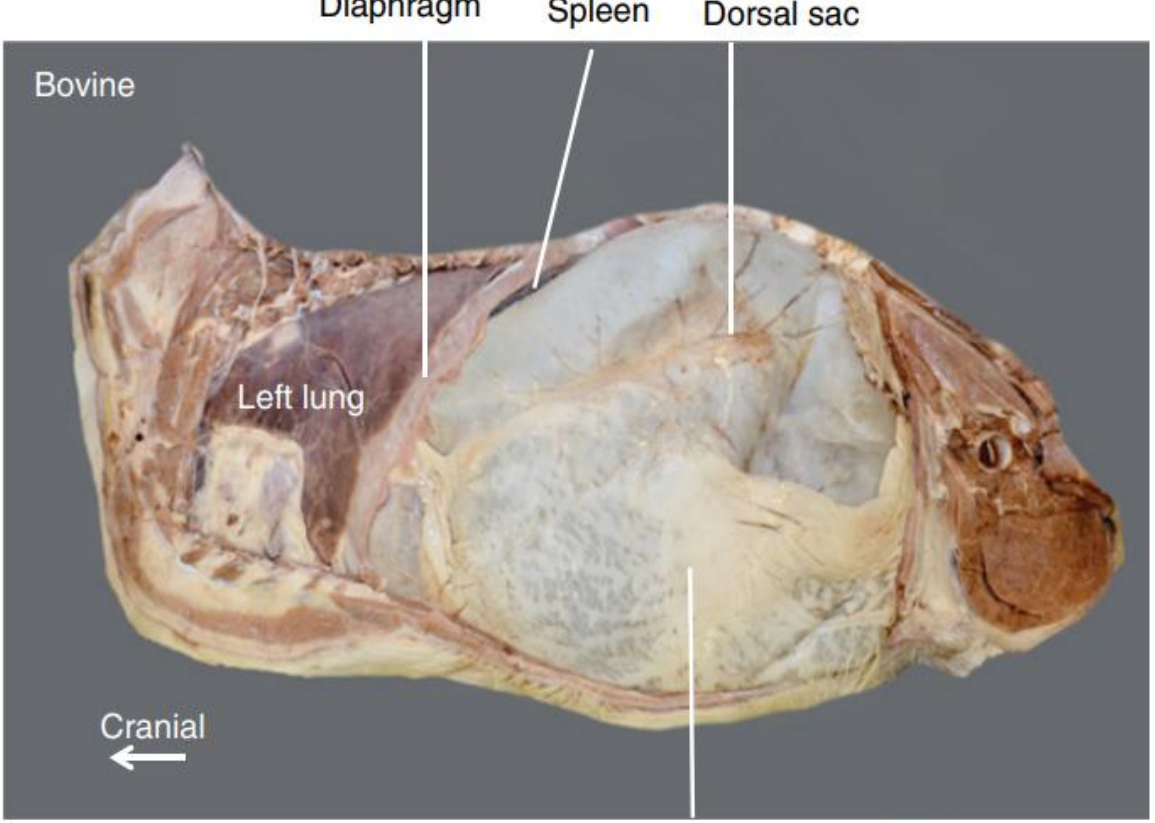



Cranial
Xiphoid process
Abomasum
Lesser omentum covering omasum
Omasum
Right lobe of liver
Cranial part of duodenum
Pyloric antrum of abomasum
Right kidney
Reticulum
Cranial sac of rumen
Abdominal wall (cut and reflected)
Abomasal insertion of greater omentum
Ventral sac of rumen
Right cranial quadrant
Left cranial quadrant
Right caudal quadrant
Left caudal quadrant
Cut edge of superficial layer of greater omentum
Cut edge of deep layer of greater omentum
Omental bursa
Jejunum
Cecum
Right horn of uterus
Right ovary
Urinary bladder
Teats
Left kidney
Dorsal sac of rumen
Ruminal insertion of greater omentum
Caudoventral blind sac of rumen
Left horn of uterus
Left ovary
Body of uterus
Udder (mammary gland)
Caudal

Epiploic foramen

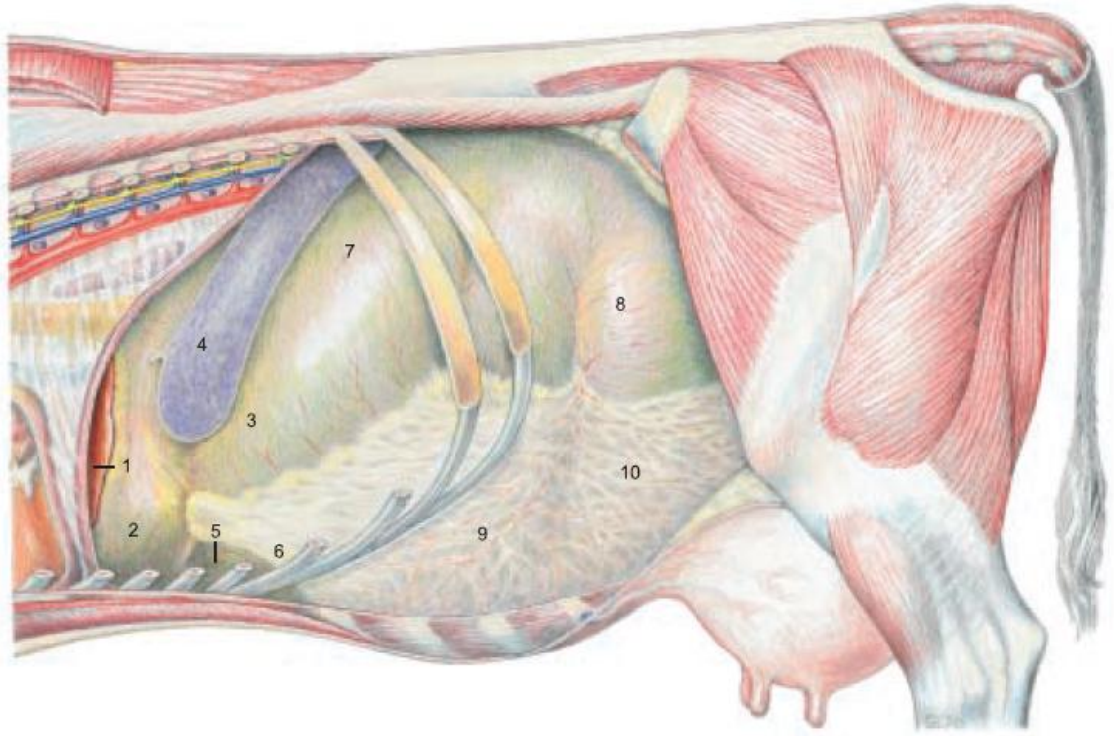
- **It serves as the sole natural communication between the greater sac (the main peritoneal cavity) and the lesser sac (or omental bursa).This anatomical structure is bounded by specific structures: in front by the free border of the lesser; behind by the peritoneum covering the inferior vena cava; above by the peritoneum on the caudate process of the liver; and below by the peritoneum covering the commencement of the duodenum and the hepatic artery. This passage allows for communication between different abdominal spaces in cattle.**





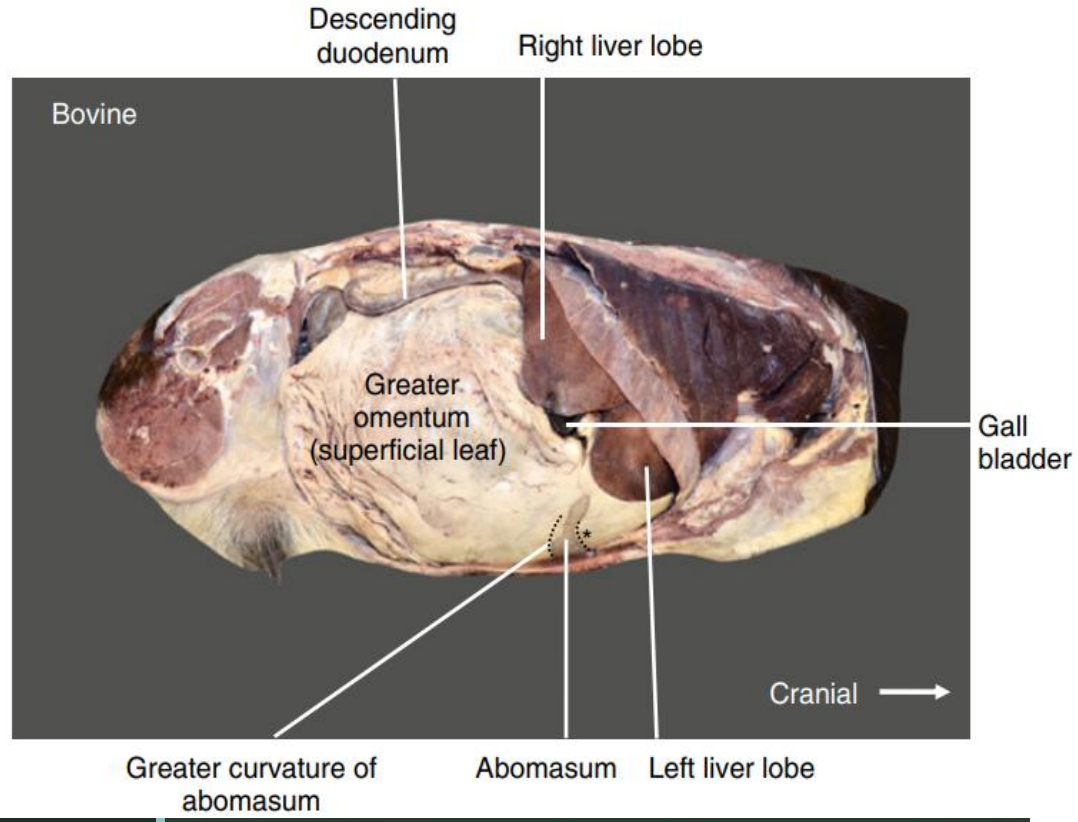
Ventral sac covered by superficial leaf (or layer) of the greater omentum

ide)



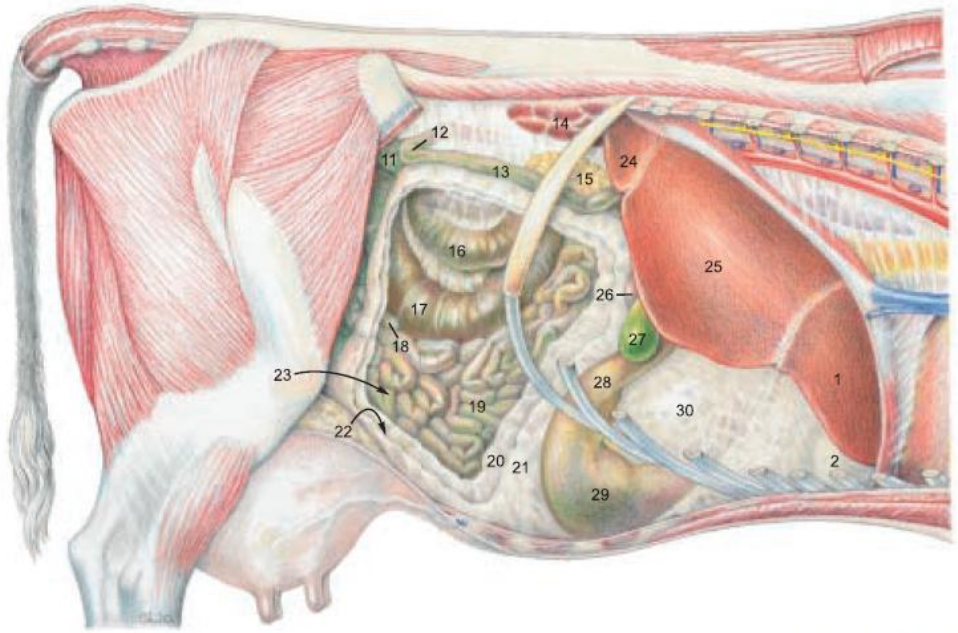
Legend:

1 Left lobe of liver
2 Reticulum
3 Atrium of rumen
4 Spleen
5 Fundus of abomasum
6 Recess of ventral sac of rumen covered by omentum
7 Dorsal sac of rumen
8 Caudodorsal blind sac of rumen
9 Ventral sac of rumen covered by omentum
10 Caudoventral blind sac of rumen covered by omentum
11 Sigmoid part of descending colon
12 Caudal flexure of duodenum
13 Descending duodenum
14 Right kidney
15 Right lobe of pancreas



The supraomental recess helps keep the intestines away from the incision site in right flank laparotomy (right paralumbar celiotomy).
The omentum provides storage sites for visceral abdominal fat. Clinically, the omentum helps in tissue repair when sutured over surgical wounds. It readily adheres to sites of inflammation and provides vascularization and leukocytes for local immune defense.
Omentopexy is a surgical procedure whereby the greater omentum is sutured to the body wall to prevent displacement of organs from their normal position (e.g., left abomasal displacement).

(Right side)



(See pp. 17, 63, 65, 67)

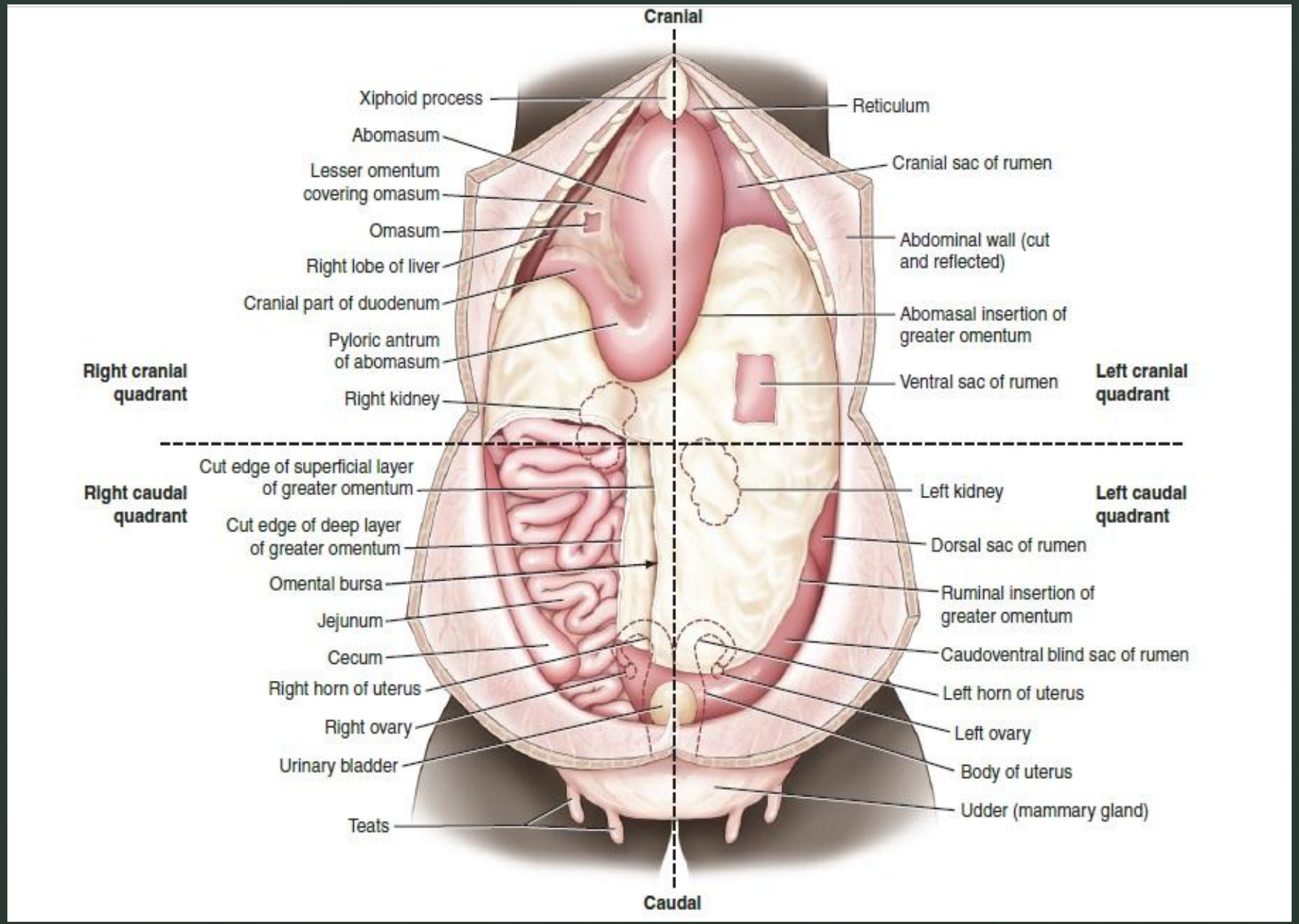
Legend:

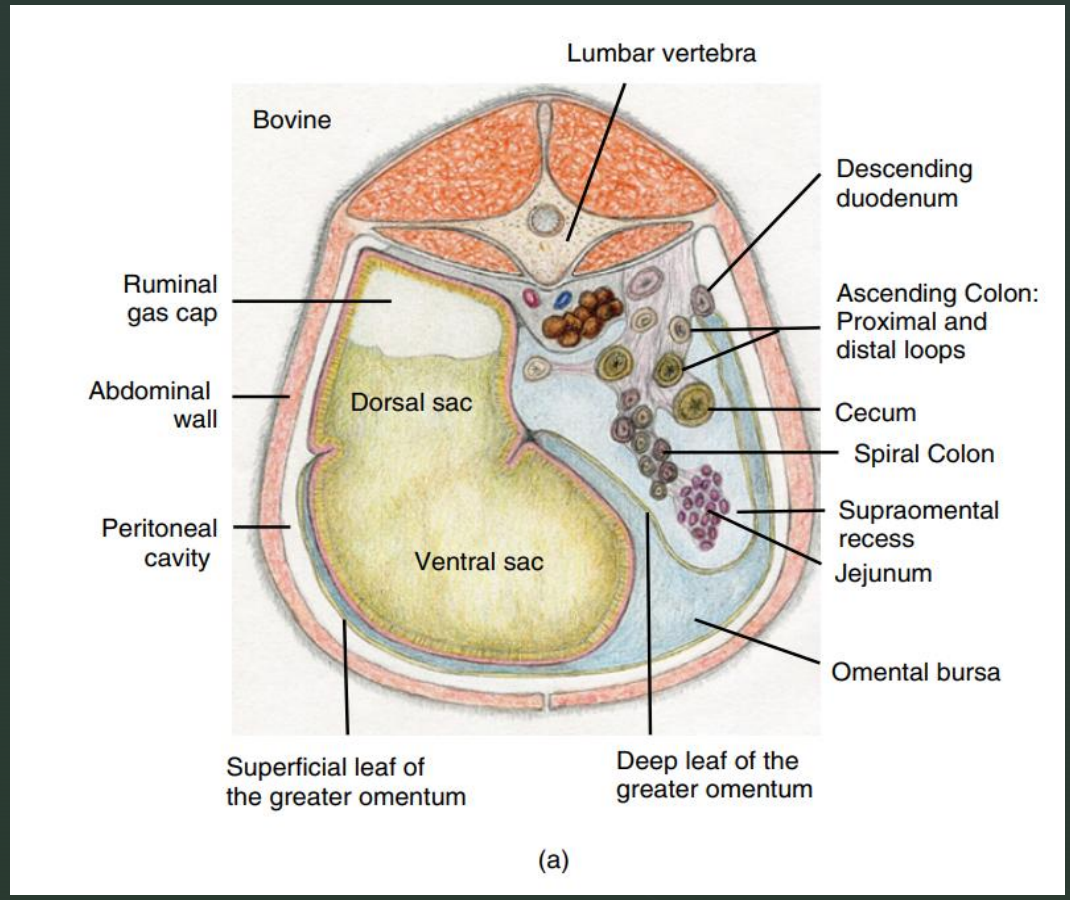
16 Prox. loop of ascending colon
17 Cecum
18 Ileum
19 Jejunum

Greater omentum:
20 Deep wall
21 Supf. wall
22 Caudal recess

23 Supraomental recess
24 Caudate process of liver
25 Right lobe of liver
26 Cranial part of duodenum

27 Gall bladder
28 Pyloric part of abomasum
29 Body of abomasum
30 Omasum covered by lesser omentum

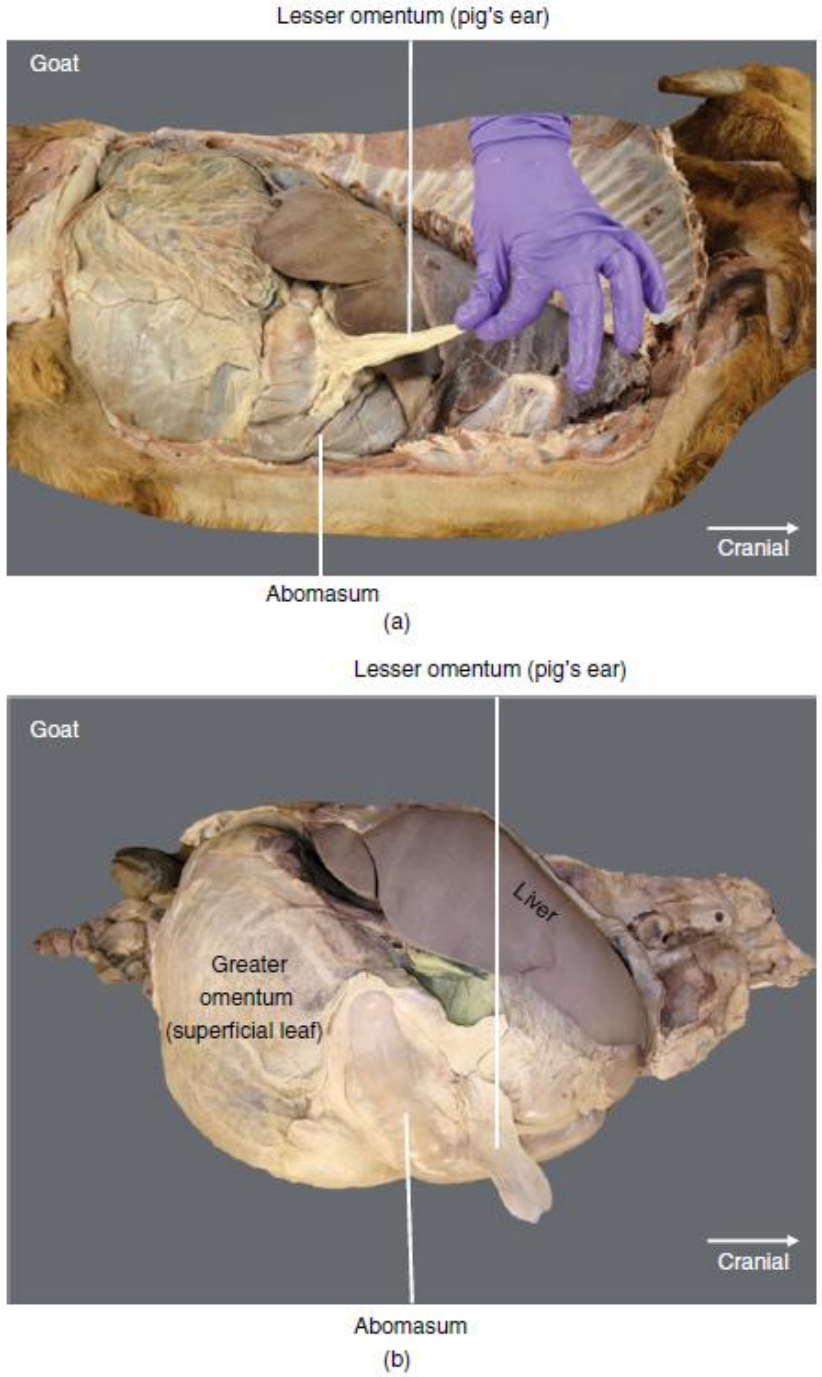

Cranial
Xiphoid process
Abomasum
Lesser omentum covering omasum
Omasum
Right lobe of liver
Cranial part of duodenum
Pyloric antrum of abomasum
Right kidney
Reticulum
Cranial sac of rumen
Abdominal wall (cut and reflected)
Abomasal insertion of greater omentum
Ventral sac of rumen
Right cranial quadrant
Left cranial quadrant
Cut edge of superficial layer of greater omentum
Cut edge of deep layer of greater omentum
Omental bursa
Jejunum
Cecum
Right horn of uterus
Right ovary
Urinary bladder
Teats
Left kidney
Dorsal sac of rumen
Ruminal insertion of greater omentum
Caudoventral blind sac of rumen
Left horn of uterus
Left ovary
Body of uterus
Udder (mammary gland)
Right caudal quadrant
Left caudal quadrant
Caudal



The omentum is known as the policeman of the abdomen!

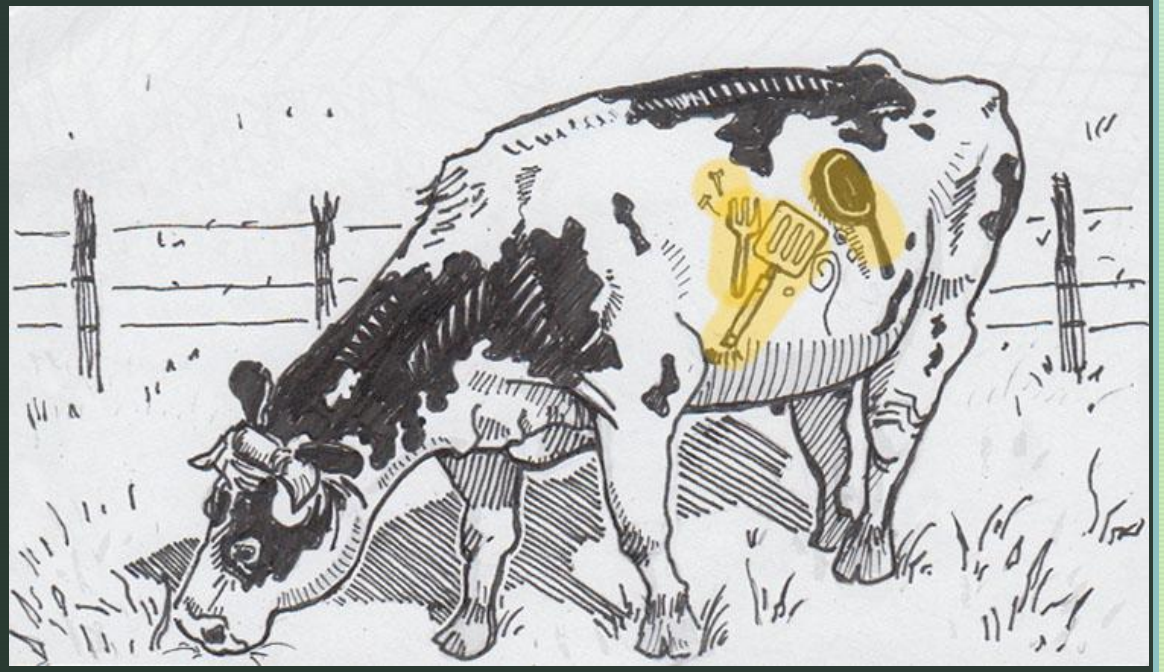
The omentum have a unique ability to promote hemostasis and healing because of their pronounced angiogenic activity and rich leukocyte cellular contents. Because of their ability to adhere to adjacent structures, they are frequently used in abdominal surgery to seal off gastrointestinal defects and promote healing in various types of abdominal surgery.

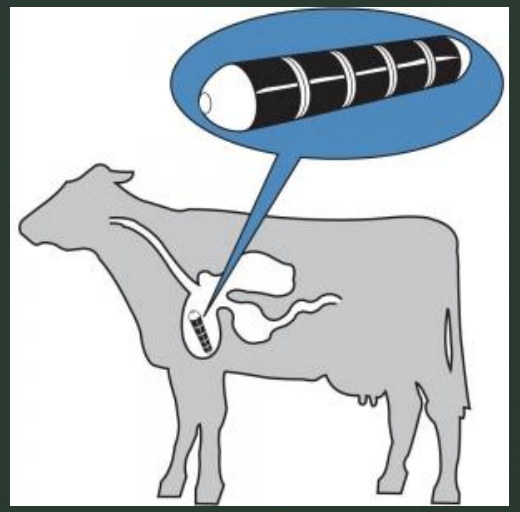
A free slip of the lesser omentum has the appearance of an ear of a pig and is colloquially known as the "**pig's ear**".The pig's ear can be used in omentopexy, and in identifying the abomasum in cases of left abomasal displacement. The "**pig's ear**" in the bovine is usually associated with the greater omentum near the pyloric region. However, the presence of this structure in the bovine can vary and may even be absent.

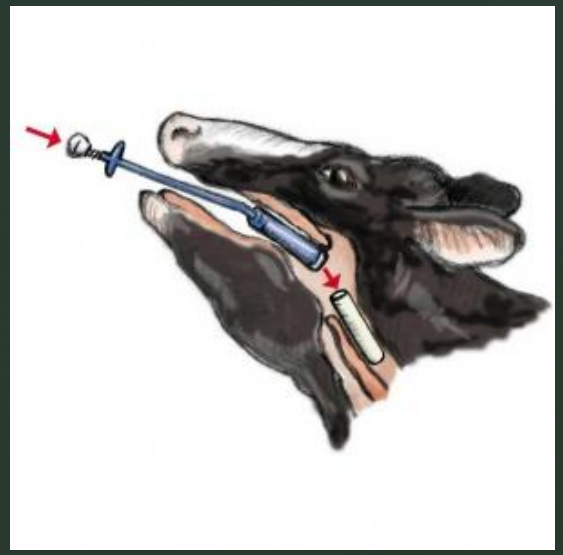


Hardware disease (TRP):

This condition is also known as traumatic reticulopericarditis or traumatic reticuloperitonitis (TRP). Note the close proximity of the reticulum to the diaphragm and heart .Cattle use their tongues to graze and in doing so they may ingest sharp objects such as nails and wires. Metal objects could drop to the bottom of the reticular floor and become lodged within the reticulum. Contraction of the stomach could cause sharp objects to penetrate the wall of the reticulum and diaphragm and reach the heart.

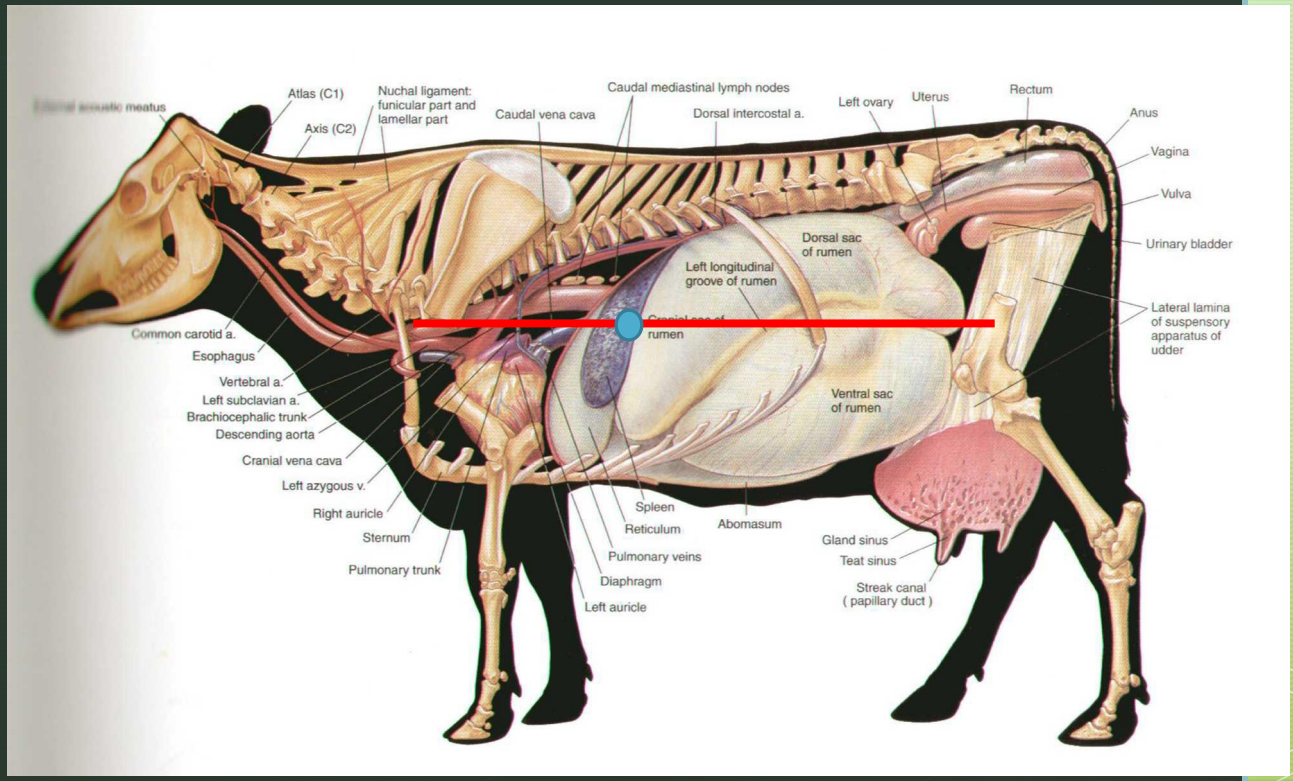


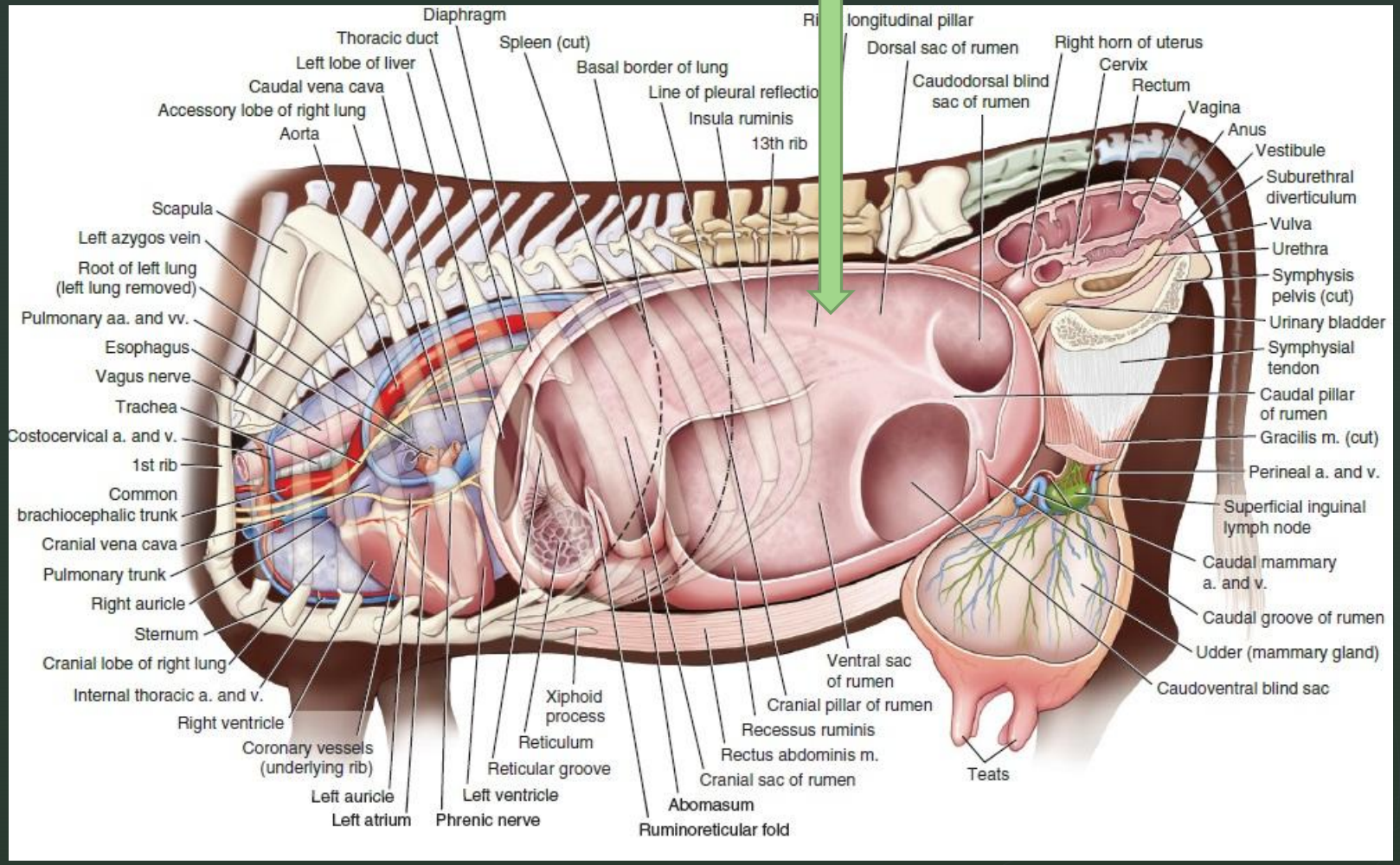


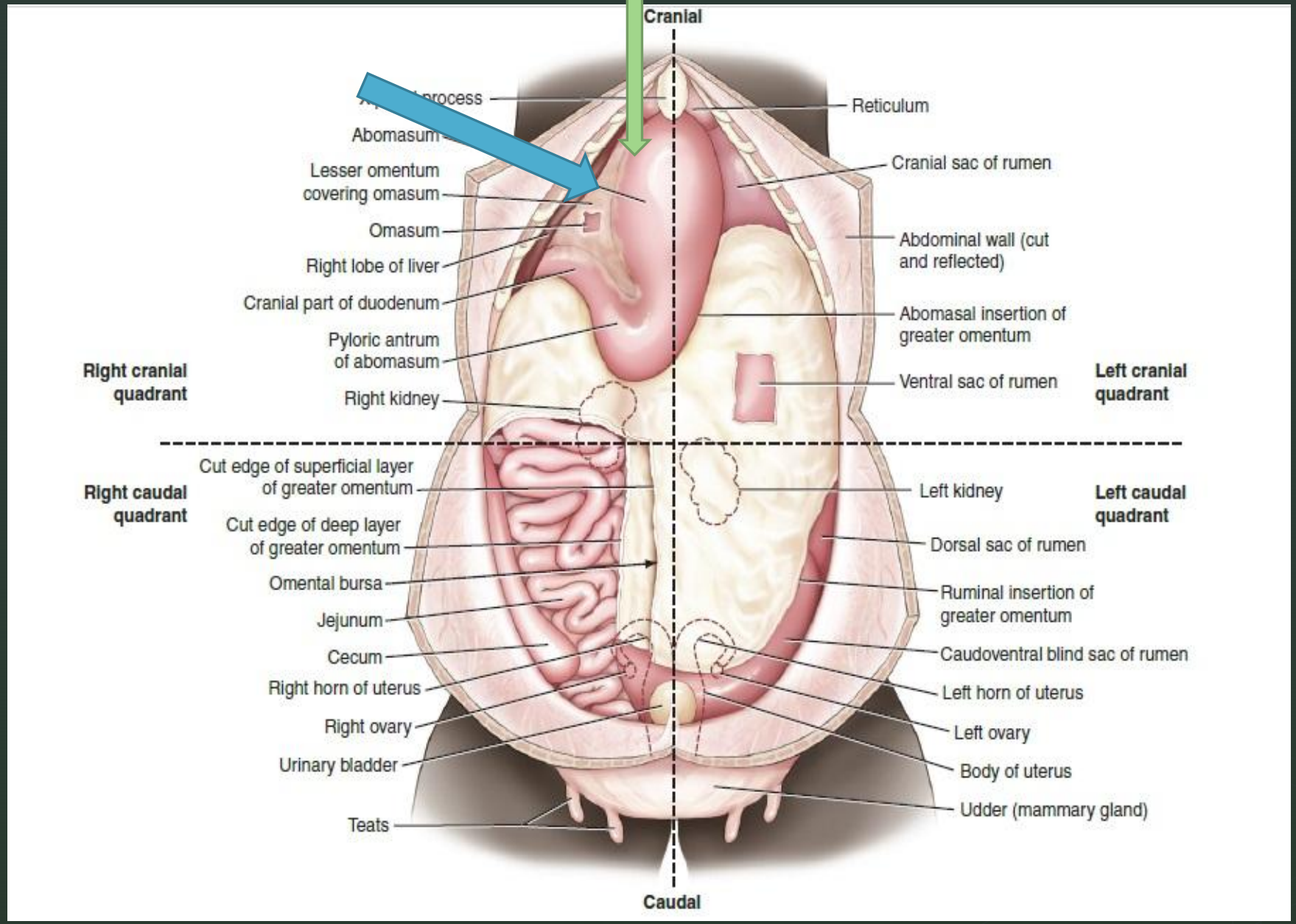


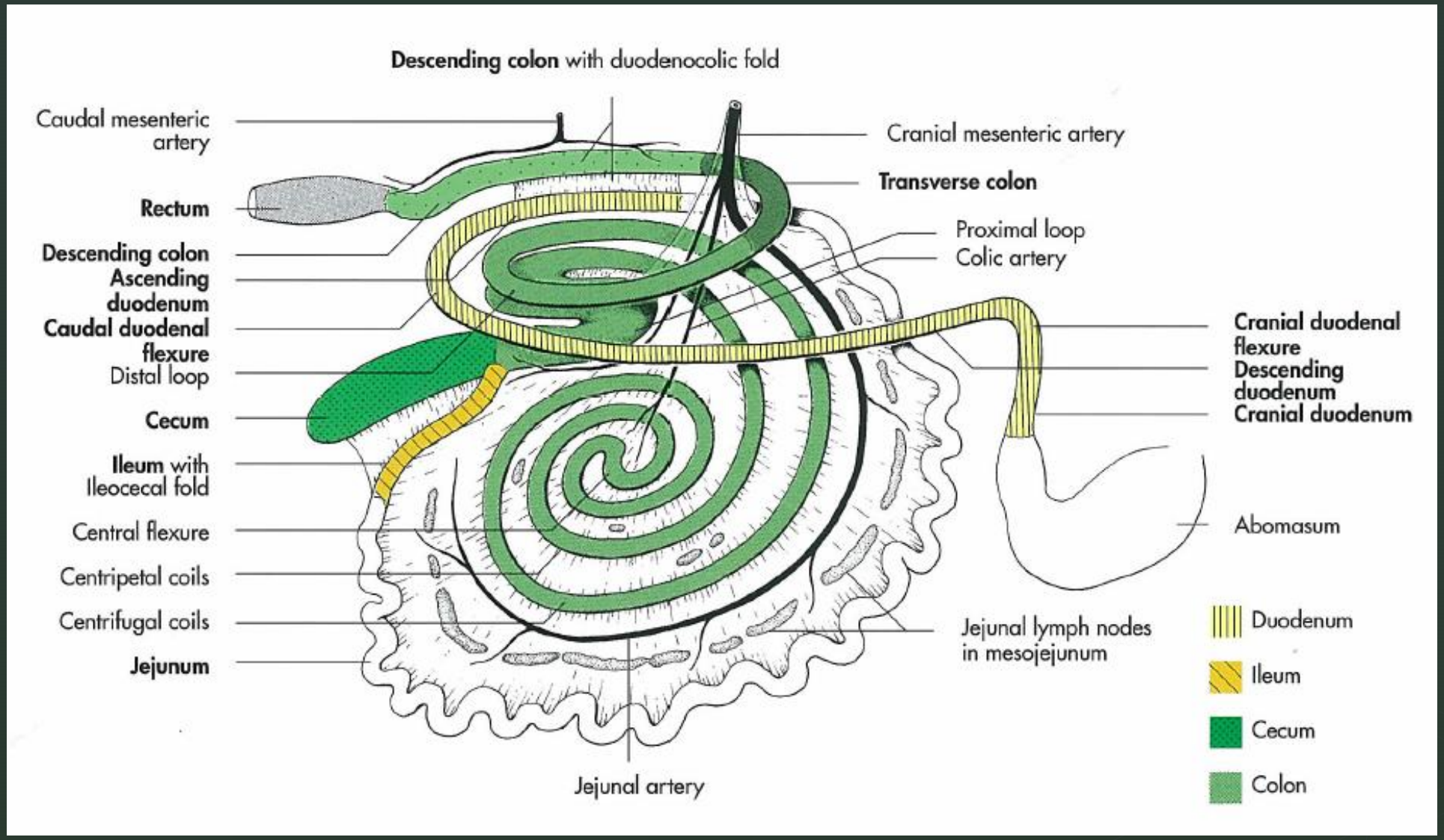
Cardia

In the live animal, the cardia is located at the level of the seventh intercostal space or eighth rib.
This information is useful in determining the length of an esophageal feeder in nursing calves or gastric tube in yearling steers or adult cows.
The distance can be marked on the tube by measuring the distance from the mouth to the seventh intercostal space or point of the shoulder.

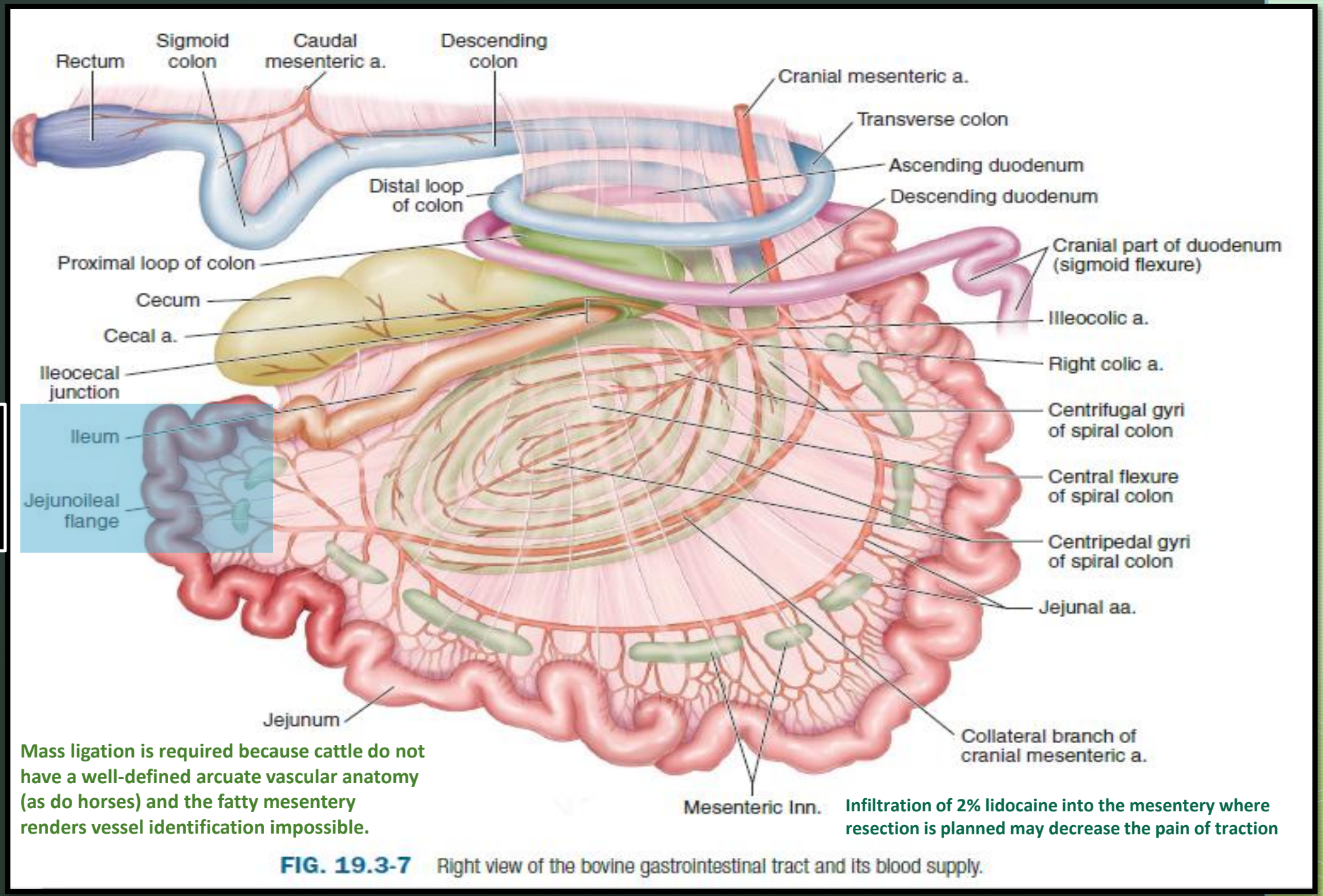



Diaphragm
Thoracic duct
Spleen (cut)
Left lobe of liver
Basal border of lung
Caudal vena cava
Line of pleural reflectio
Accessory lobe of right lung
Insula ruminis
Aorta
13th rib
longitudinal pillar
Dorsal sac of rumen
Right horn of uterus
Caudodorsal blind sac of rumen
Cervix
Rectum
Vagina
Anus
Vestibule
Suburethral diverticulum
Vulva
Urethra
Symphysis pelvis (cut)
Urinary bladder
Symphysial tendon
Caudal pillar of rumen
Gracilis m. (cut)
Perineal a. and v.
Superficial inguinal lymph node
Caudal mammary a. and v.
Caudal groove of rumen
Udder (mammary gland)
Caudoventral blind sac
Teats
Scapula
Left azygos vein
Root of left lung (left lung removed)
Pulmonary aa. and vv.
Esophagus
Vagus nerve
Trachea
Costocervical a. and v.
1st rib
Common brachiocephalic trunk
Cranial vena cava
Pulmonary trunk
Right auricle
Sternum
Cranial lobe of right lung
Internal thoracic a. and v.
Right ventricle
Coronary vessels (underlying rib)
Left auricle
Left atrium
Phrenic nerve
Left ventricle
Reticular groove
Reticulum
Xiphoid process
Abomasum
Ruminoreticular fold
Cranial sac of rumen
Rectus abdominis m.
Recessus ruminis
Cranial pillar of rumen
Ventral sac of rumen


Cranial
Caudal
Right cranial quadrant
Left cranial quadrant
Right caudal quadrant
Left caudal quadrant
Reticulum
Cranial sac of rumen
Abdominal wall (cut and reflected)
Abomasal insertion of greater omentum
Ventral sac of rumen
Left kidney
Dorsal sac of rumen
Ruminal insertion of greater omentum
Caudoventral blind sac of rumen
Left horn of uterus
Left ovary
Body of uterus
Udder (mammary gland)
Abomasum
Lesser omentum covering omasum
Omasum
Right lobe of liver
Cranial part of duodenum
Pyloric antrum of abomasum
Right kidney
Cut edge of superficial layer of greater omentum
Cut edge of deep layer of greater omentum
Omental bursa
Jejunum
Cecum
Right horn of uterus
Right ovary
Urinary bladder
Teats


Descending colon with duodenocolic fold
Caudal mesenteric artery
Rectum
Descending colon
Ascending duodenum
Caudal duodenal flexure
Distal loop
Cecum
Ileum with Ileocecal fold
Central flexure
Centripetal coils
Centrifugal coils
Jejunum
Cranial mesenteric artery
Transverse colon
Proximal loop
Colic artery
Cranial duodenal flexure
Descending duodenum
Cranial duodenum
Abomasum
Jejunal lymph nodes in mesojejunum
Jejunal artery
Duodenum
Ileum
Cecum
Colon

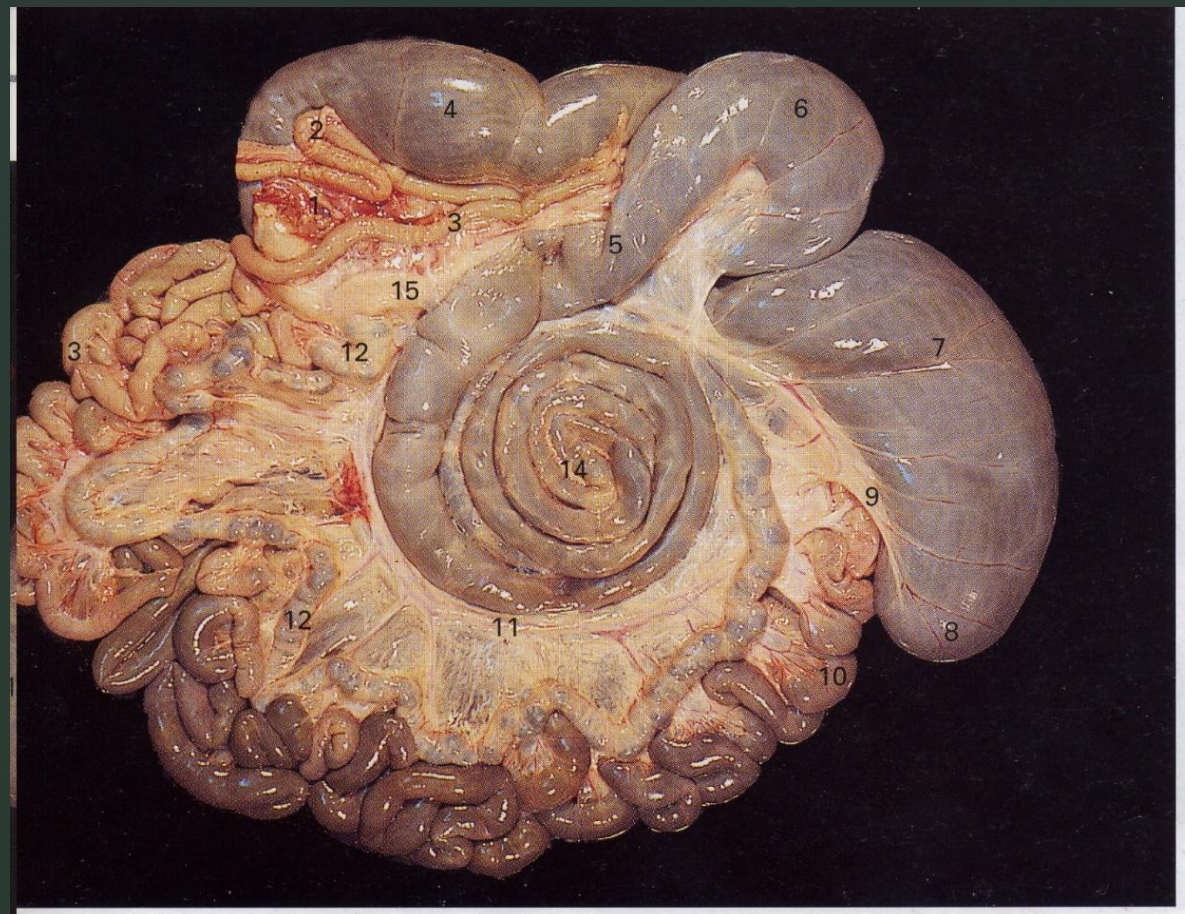
Volvulus of the jejunoileal flange refers to volvulus of the distal jejunum and proximal ileum where the mesentery is longest. It may rotate about its mesentery without involving the remaining small intestine.



Mass ligation is required because cattle do not have a well-defined arcuate vascular anatomy (as do horses) and the fatty mesentery renders vessel identification impossible.

Infiltration of 2% lidocaine into the mesentery where resection is planned may decrease the pain of traction

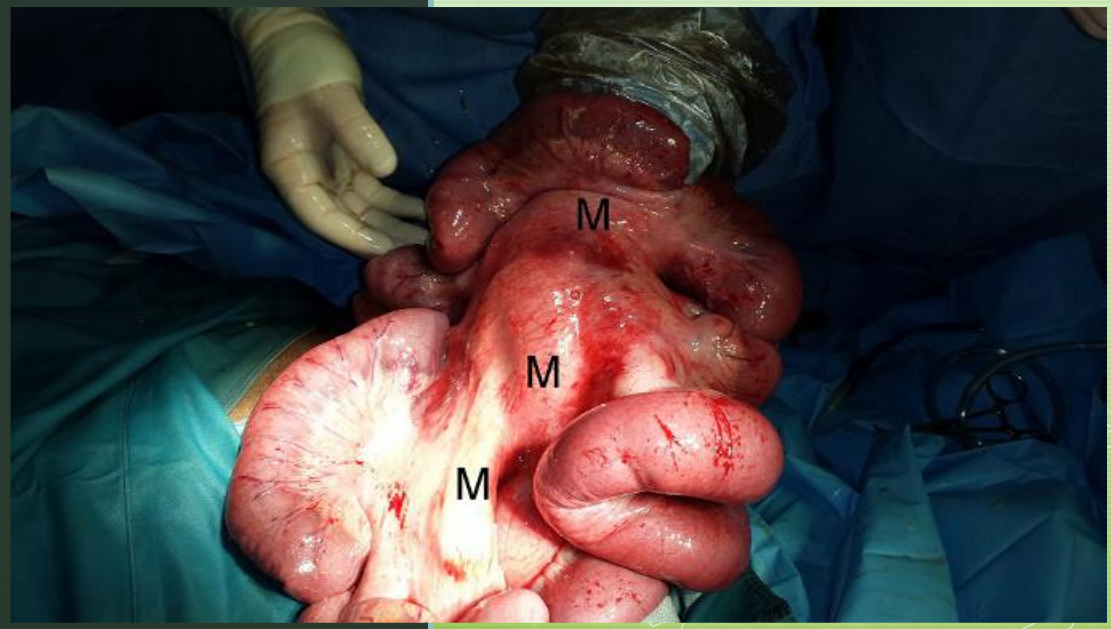
FIG. 19.3-7 Right view of the bovine gastrointestinal tract and its blood supply.



286. Left view of the intestinal mass of a sheep. The transverse colon and the descending colon were retained within the abdomen and are not seen in the specimen.

1 Cut root of the mesentery
2 Ascending duodenum
3 Descending duodenum
4 Proximal loop of the ascending colon
5 Beginning of the outermost centripetal coil of the spiral loop
6 Terminal part of the proximal loop of the ascending colon
7 Body of the caecum
8 Apex of the caecum
9 Free edge of the ileocaecal fold
10 Distal part of the jejunum
11 Mesenteric vessels
12 Outermost centrifugal coil of the spiral loop
13 Proximal part of the jejunum
14 Centre of the spiral loop of the ascending colon
15 Beginning of the distar loop of the ascending colon

Excessive accumulations of fat in the mesentery makes intestinal surgery more difficult. The fat may have a protective effect in some cases of volvulus, as it may limit the obstruction of arterial inflow and venous outflow and minimize the severity of strangulation. Intestinal resection is made more complicated by fatty infiltrates because the fat obscures identification of blood vessels and extrudes from cut edges, exacerbating the ill effects of handling the bowel.

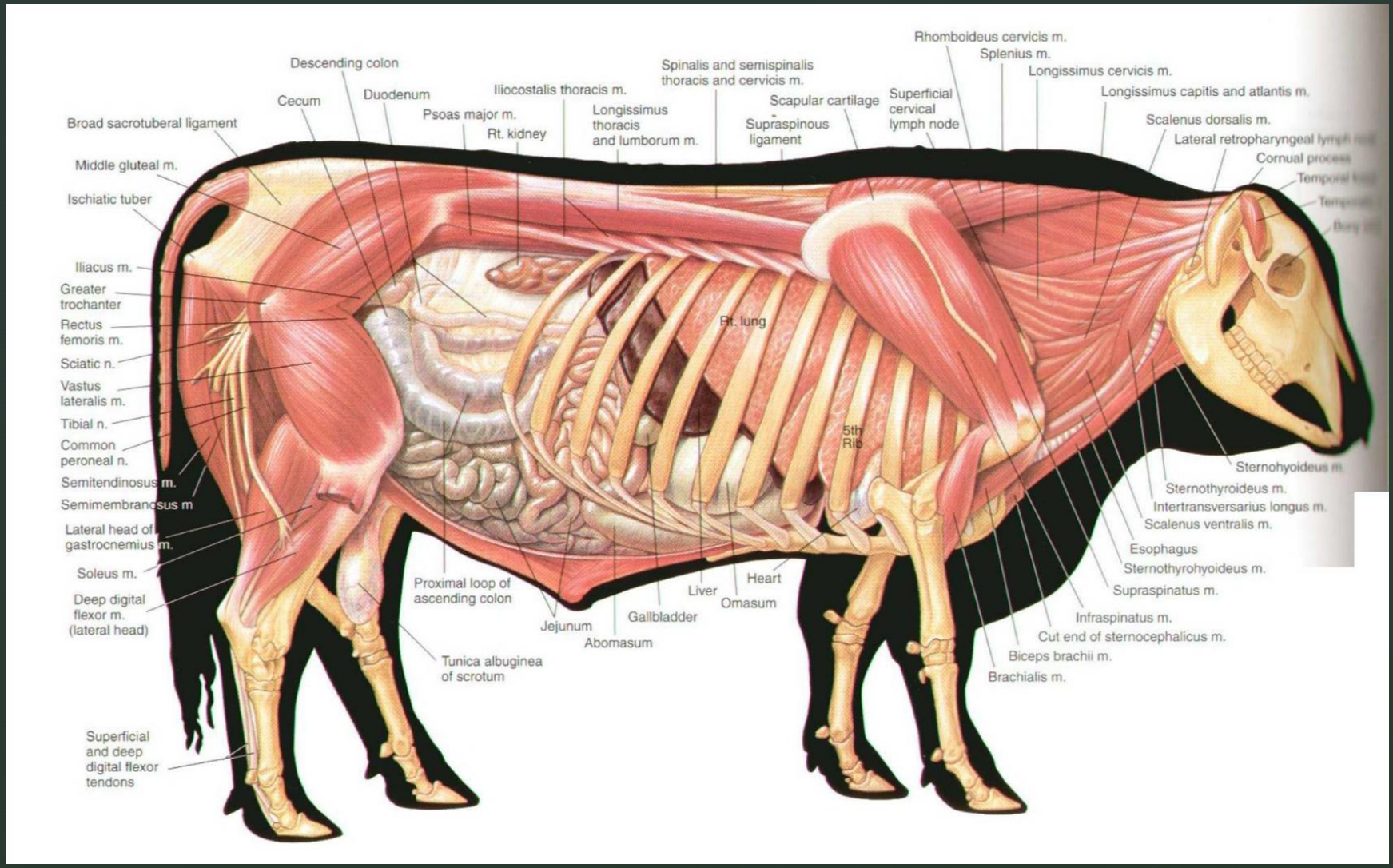


Intra-operative image of partially exteriorized jejunum through a right flank laparotomy incision. The jejunoileal flange is cradled by the surgeon with the long mesentery (*M*). The fatty mesentery in cattle makes recognizing blood vessels difficult.

- Volvulus in cattle intestines, also known as intestinal volvulus, is a condition characterized by twisting of the intestine, which can lead to obstruction and subsequent complications. The twisting can occur in various parts of the intestine, including the small intestine, large intestine, or both. This condition is often associated with other signs of illness such as colic, abdominal pain, and changes in appetite and stool quality

- Ultrasonography can help identify dilated small intestines, reduced or absent small intestinal motility, and fluid in the abdomen, which are common findings in cases of intestinal volvulus

- Treatment for intestinal volvulus in cattle often involves surgical intervention to reduce the twisted intestine and restore blood flow. In some cases, the condition may be managed conservatively with supportive care, such as fluid therapy and pain management, if the animal is not in a critical condition


Rhomboideus cervicis m.
Splenius m.
Longissimus cervicis m.
Longissimus capitis and atlantis m.
Scalenus dorsalis m.
Lateral retropharyngeal lymph node
Cornual process
Temporal fossa
Temporomandibular joint
Bony orbit
Descending colon
Cecum
Duodenum
Iliocostalis thoracis m.
Spinalis and semispinalis thoracis and cervicis m.
Scapular cartilage
Superficial cervical lymph node
Psoas major m.
Rt. kidney
Longissimus thoracis and lumborum m.
Supraspinous ligament
Broad sacrotuberal ligament
Middle gluteal m.
Ischiatic tuber
Iliacus m.
Greater trochanter
Rectus femoris m.
Sciatic n.
Vastus lateralis m.
Tibial n.
Common peroneal n.
Semitendinosus m.
Semimembranosus m
Lateral head of gastrocnemius m.
Soleus m.
Deep digital flexor m. (lateral head)
Rt. lung
5th Rib
Sternohyoideus m.
Sternothyroideus m.
Intertransversarius longus m.
Scalenus ventralis m.
Esophagus
Sternothyrohyoideus m.
Supraspinatus m.
Infraspinatus m.
Cut end of sternocephalicus m.
Biceps brachii m.
Brachialis m.
Proximal loop of ascending colon
Jejunum
Abomasum
Gallbladder
Liver
Omasum
Heart
Tunica albuginea of scrotum
Superficial and deep digital flexor tendons

- Hemorrhagic bowel syndrome is an emerging, often fatal, disease of adult dairy cattle, most often occurring during the first 3–4 months of lactation. It frequently presents as an acute abdomen (colic) needing immediate exploratory surgery; other references in the vernacular are “bloody gut” and “dead gut.” The subserosa of the jejunum is hemorrhagic, and the lumen of the bowel is filled with blood clots.

- The prognosis for survival is poor with a fatality rate > 85%; however, survival is possible with early recognition and intervention. A combination of surgery, to resect unhealthy bowel and anastomose healthy segments of bowel, in conjunction with clot removal and supportive medical care, blood transfusions, crystalloid fluids, anti-inflammatory medications, analgesics, and antimicrobials—has improved the outcome. Hemorrhagic bowel syndrome is a multifactorial disease with many risk factors, including feeding silage, total mixed ration, finely ground corn; high-producing cows in early lactation; and free-choice feeding. Two organisms are implicated in the disease—Clostridium perfringens Type A beta-toxin positive and Aspergillus fumigatus—and both are opportunists due to the combination of factors or can act as primary pathogens.

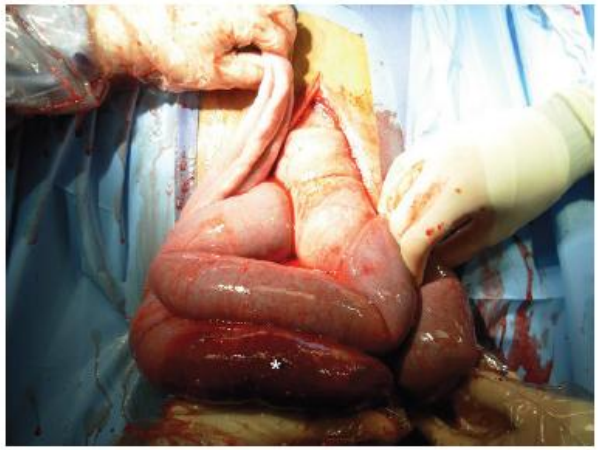
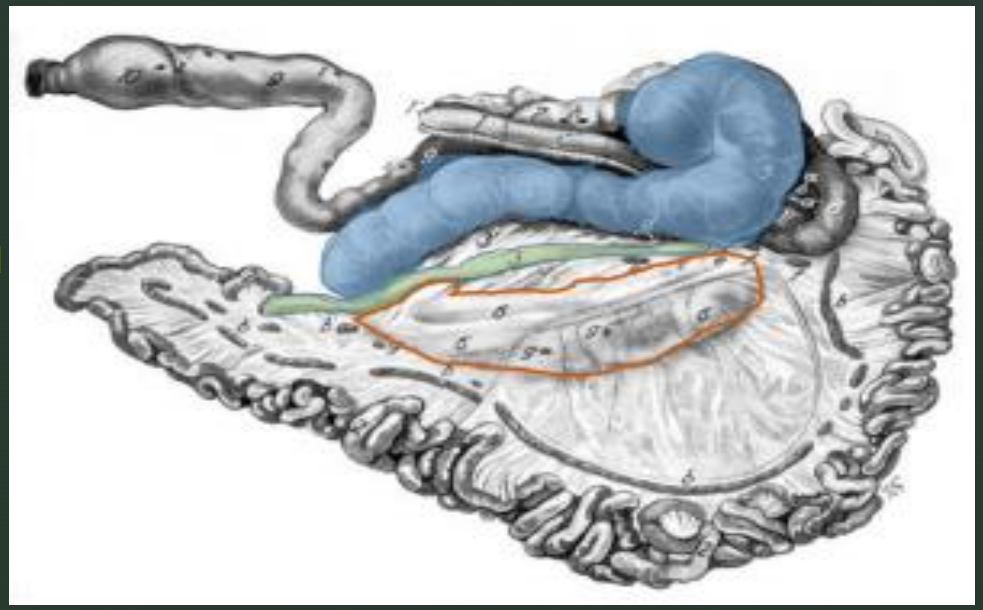


FIG. 19.3-5 Intra-operative image of a standing cow with jejunal hemorrhage syndrome; the jejunum is partially exteriorized. The discolored, reddish segment (*) of the jejunum contains a large organized hematoma obstructing the normal flow of ingesta.

- **In cases of cecal impaction, right flank typhlotomy is typically used. This involves a right mid ventral flank incision, followed by the exteriorization of the impacted cecum. The impacted contents are then retrieved through a 4-5 cm incision on the apex of the cecum, and the incision is closed using absorbable suture material.**
- **The surgical management of cecal dilatation and impaction in cattle is often successful, with a significant number of animals showing good recovery and passing feces after surgery.**

Typhlotomy is performed to quickly remove fermenting contents in cattle with enlarged ceca due to hypocalcemia and poor motility and with cecal displacements and torsions.



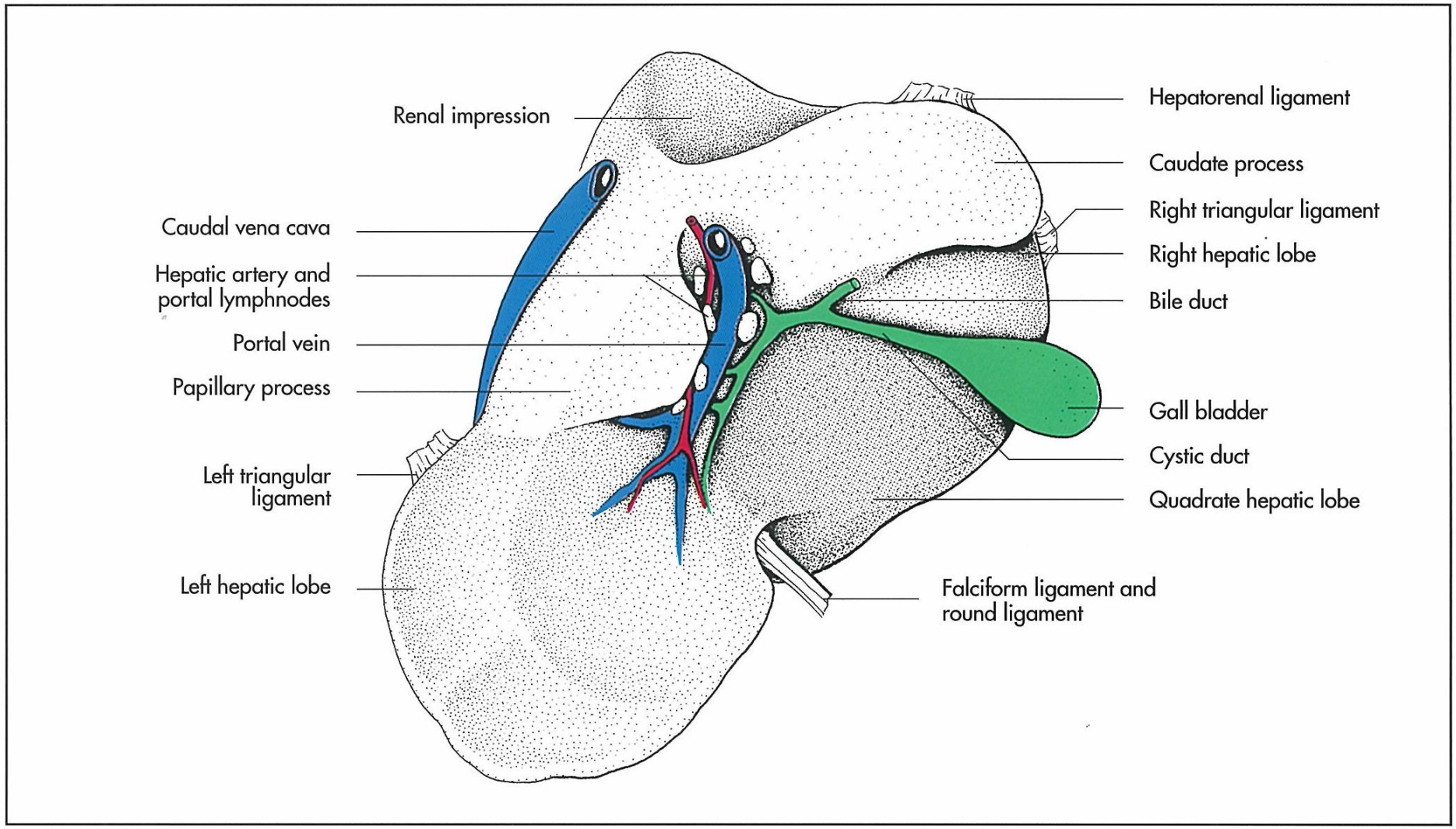


Fig 7-99. Liver of the ox, schematic, visceral surface.

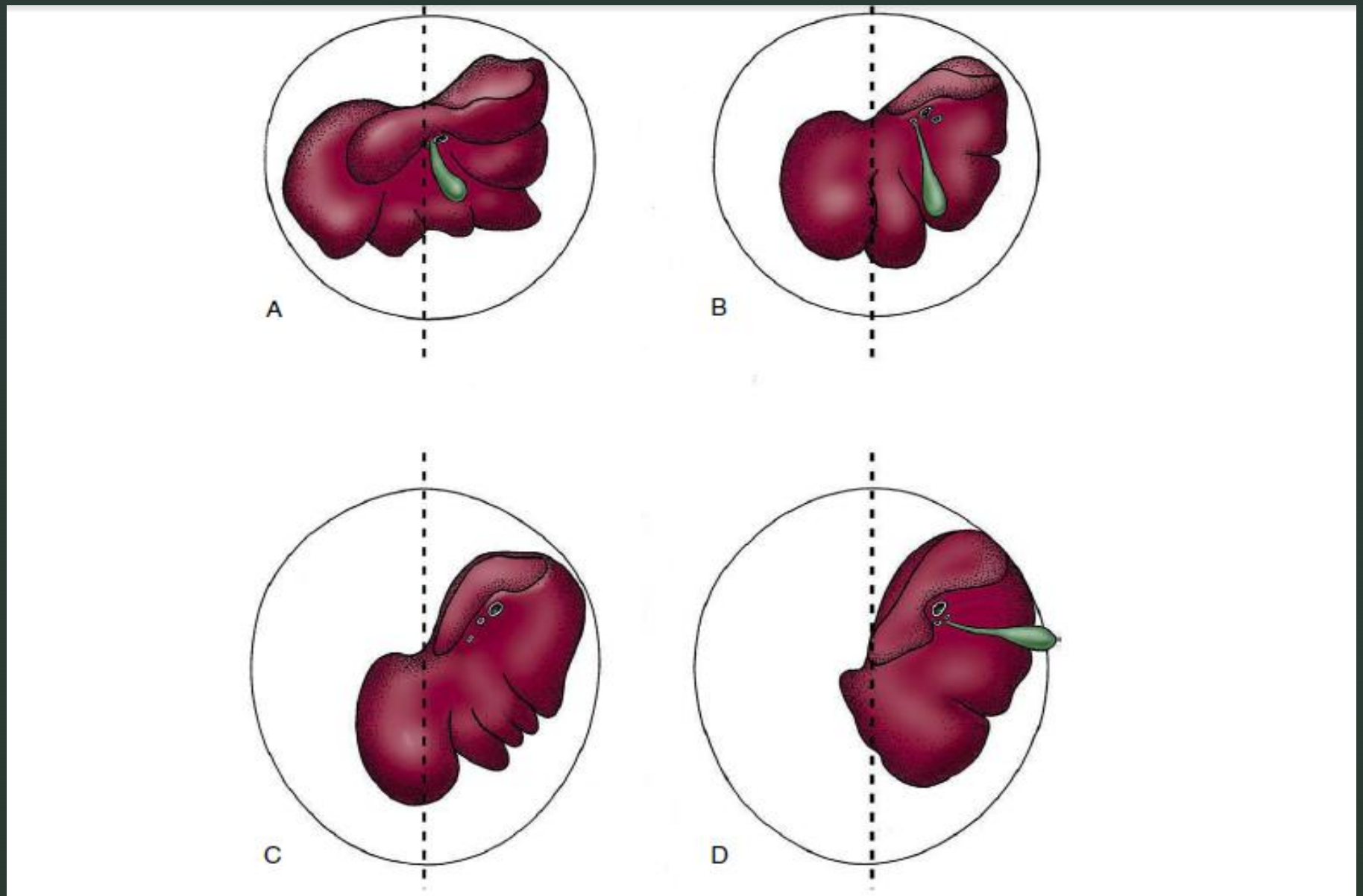


Figure 3–51 Caudal surface of the liver of the dog (**A**), pig (**B**), horse (**C**), and cattle (**D**). The median planes are indicated. The liver is asymmetrical, less so in the dog, more so in the pig and horse, and most in cattle, in which the bulk of the organ is displaced to the right. Note the absence of a gallbladder from the horse liver.

Liver biopsies in cattle are obtained on the right side at the 10th or 11th intercostal space at the level of an imaginary line between the tuber coxae and the olecranon. In clinical practice, liver biopsies are often collected using ultrasound guidance, which allows easy visualization of the liver and avoids puncturing hepatic vessels. Liver abscesses are common in feedlot and dairy cattle. Generally, it is associated with rumen acidosis and can lead to caudal vena cava thrombosis.

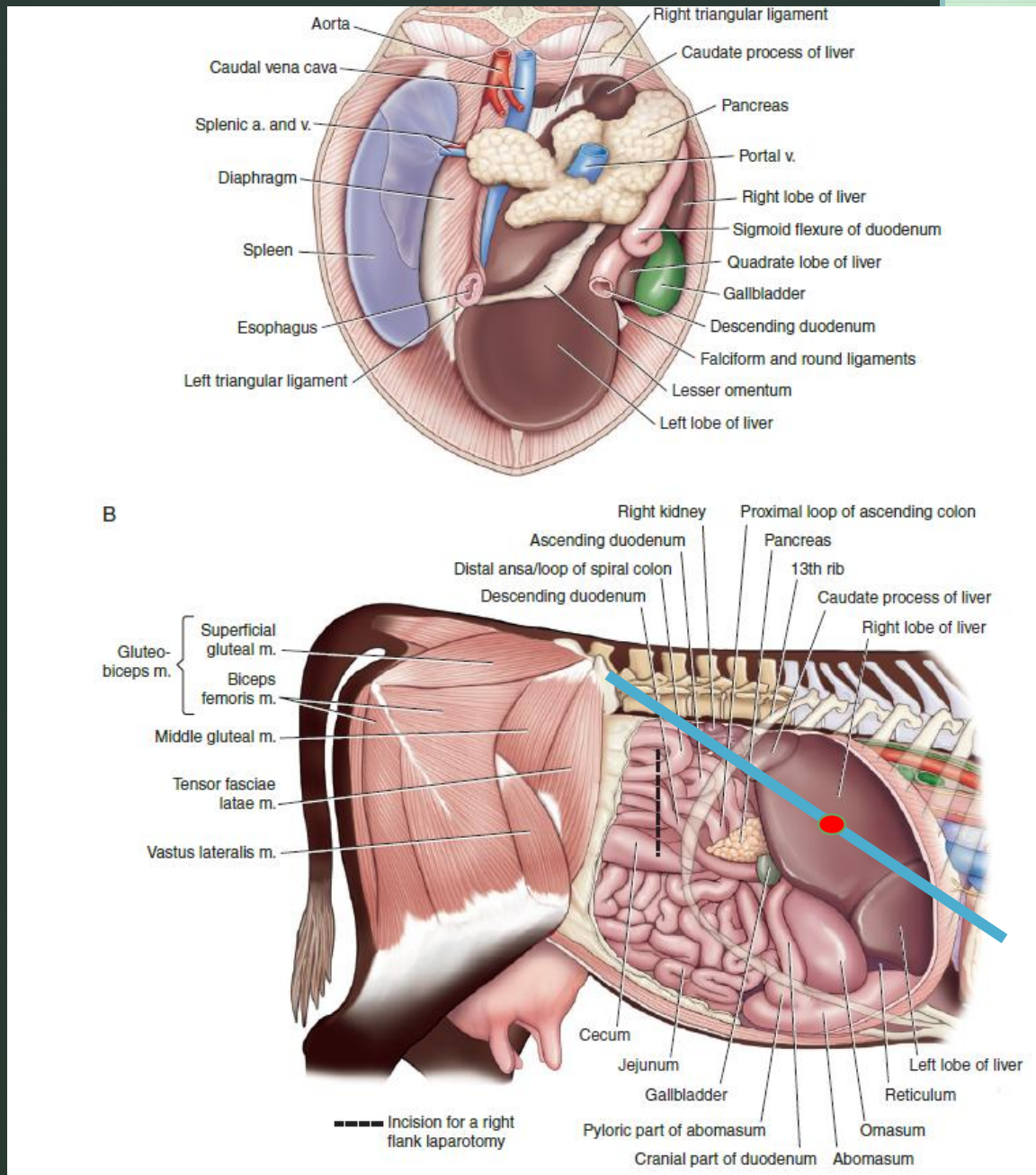


FIG. 19.6-4 The location in situ (A) and anatomy (B) of the liver. (A) Note the hepatic ligaments. (B) The incision for a right flank laparotomy is illustrated (*dashed line*) to highlight its proximity to the liver.


THANK YOU
FOR YOUR
ATTENTION