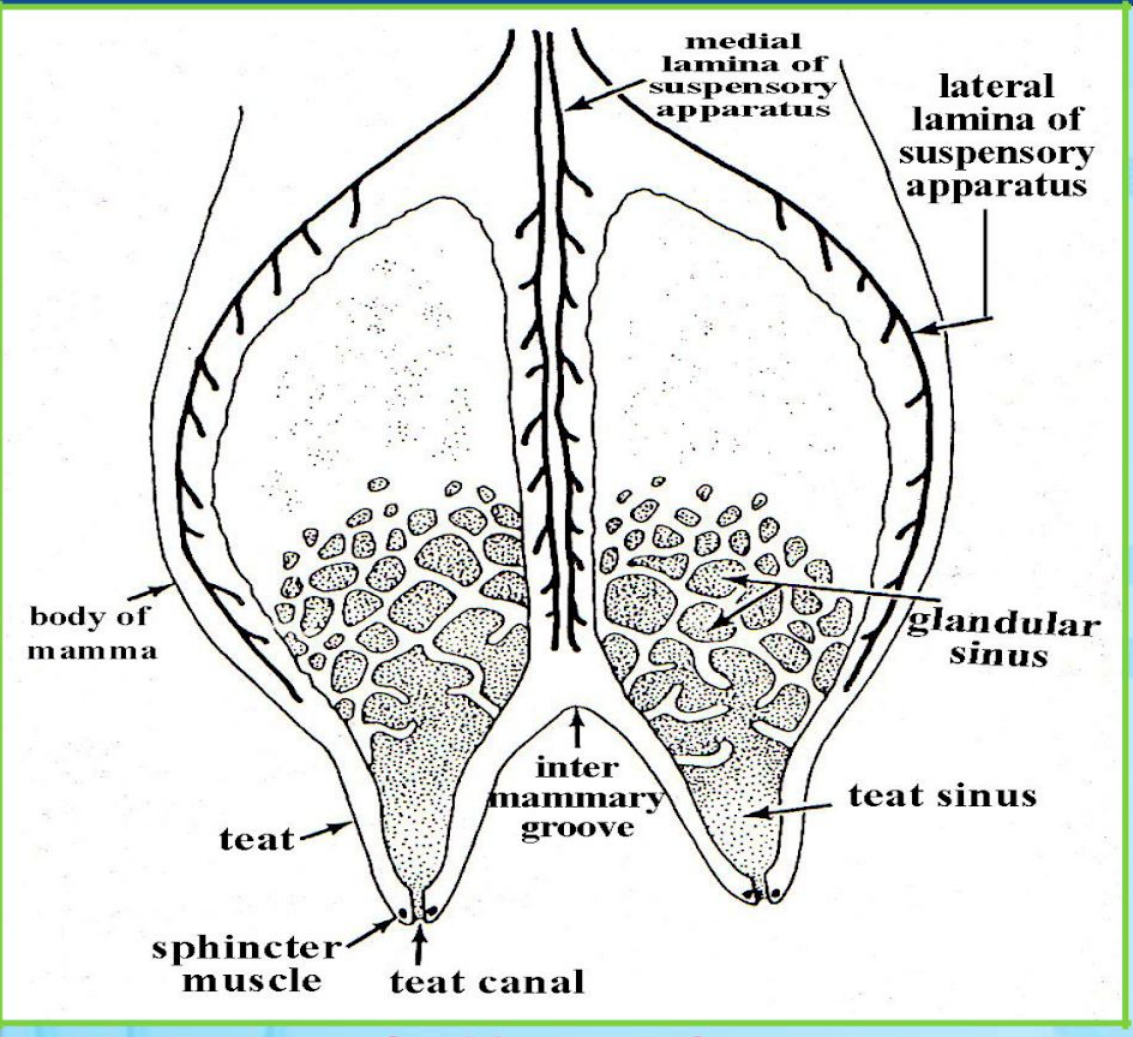
- **The mammary gland** is a bilaterally symmetrical organ which is suspended ventrally on the body wall.

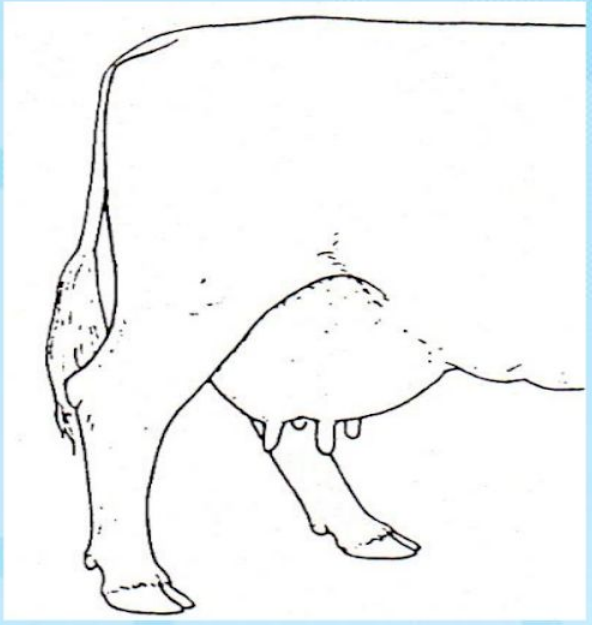
Half of it lies on the right and the other half on the left of the ventral midline.

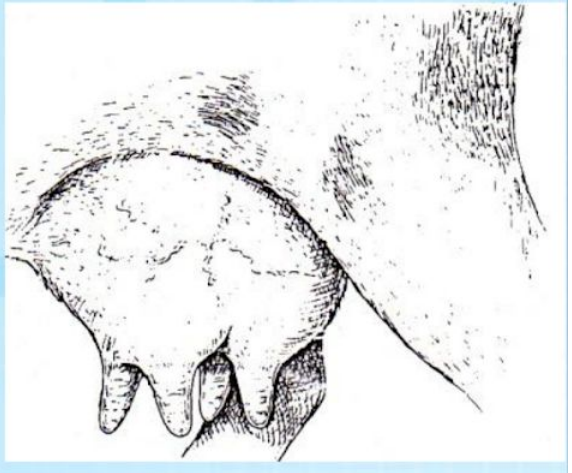
•There are two mammary complex on each side, in cow; but one on eat side in doe.

•In the ruminants, there is only one cavity system in each mammary complex i.e. the teat has one teat orifice, one teat canal and one sinus.



Caudal mamma of cow





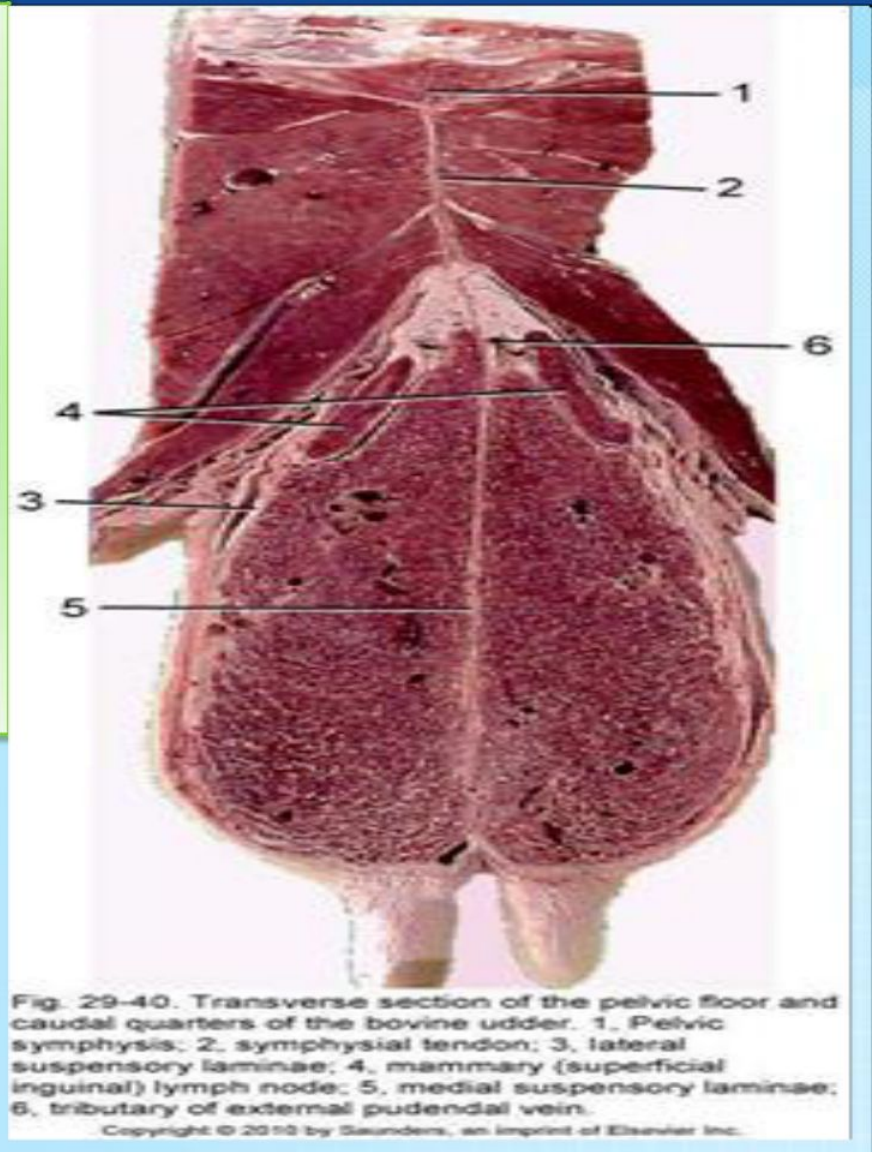


Fig. 29-40. Transverse section of the pelvic floor and caudal quarters of the bovine udder. 1, Pelvic symphysis; 2, symphysial tendon; 3, lateral suspensory laminae; 4, mammary (superficial inguinal) lymph node; 5, medial suspensory laminae; 6, tributary of external pudendal vein.

Each gland is composed of

- Glandular tissue
- Interstitial connective tissue
- Blood vessels and lymph vessels
- Nerves
- Rich fat tissue

- **Glandular tissue** is organized into lobules (each lobule consisting of about 200 alveoli)

- Milk drains into an intralobular duct that joins others to form a larger interlobular duct

- Interlobular ducts lead into a system of lactiferous ducts (convey milk to the lactiferous sinus which is a large cavity)

Duct system of the four quarters is independent of each other having no connection in cow

- **Lactiferous sinus:** Continues into the teat and is incompletely subdivided into:

- **Gland sinus:** Has several chambers and wise diameter

- **Teat sinus:** Continued as the papillary duct /teat canal

- Opens at the tip of the teat where it is surrounded by smooth muscle sphincter

- **Teat**

- projecting part of the mammary gland containing part of the Lactiferous sinus

•Teat canal/papillary duct/streak canal

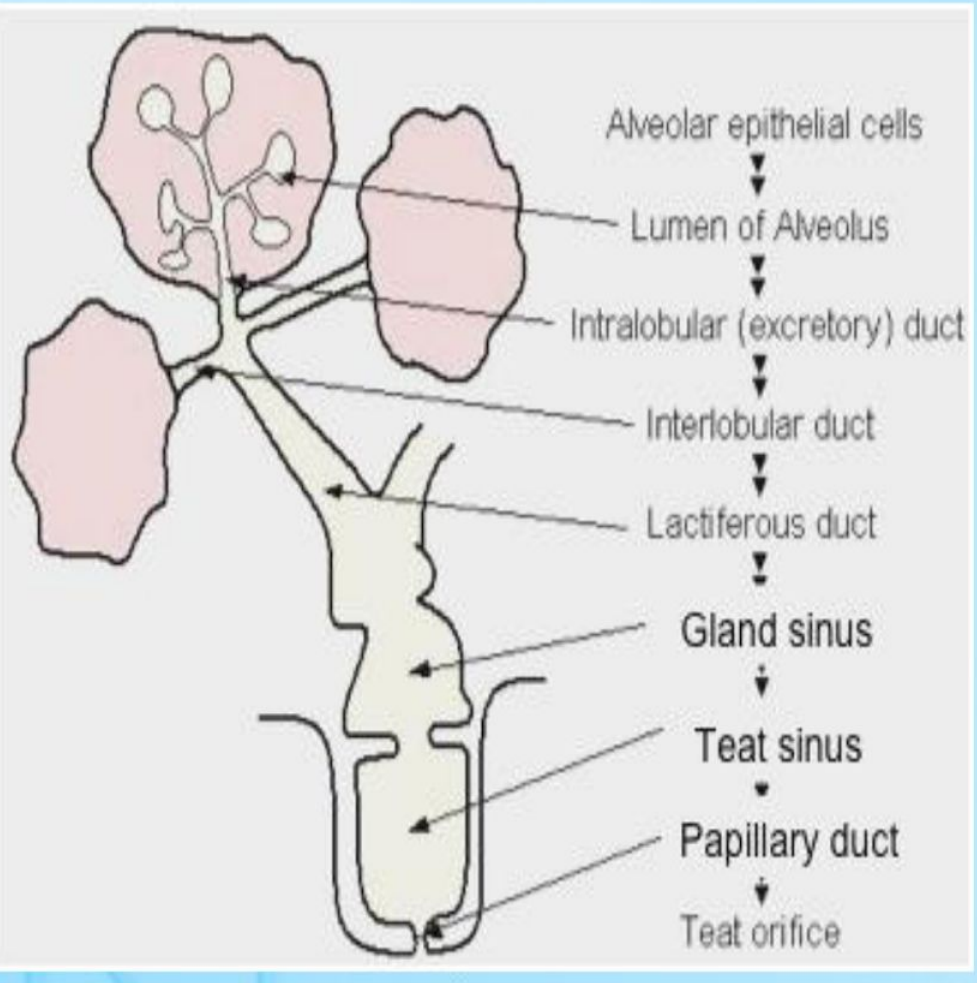
•– leading from the teat sinus to the teat opening

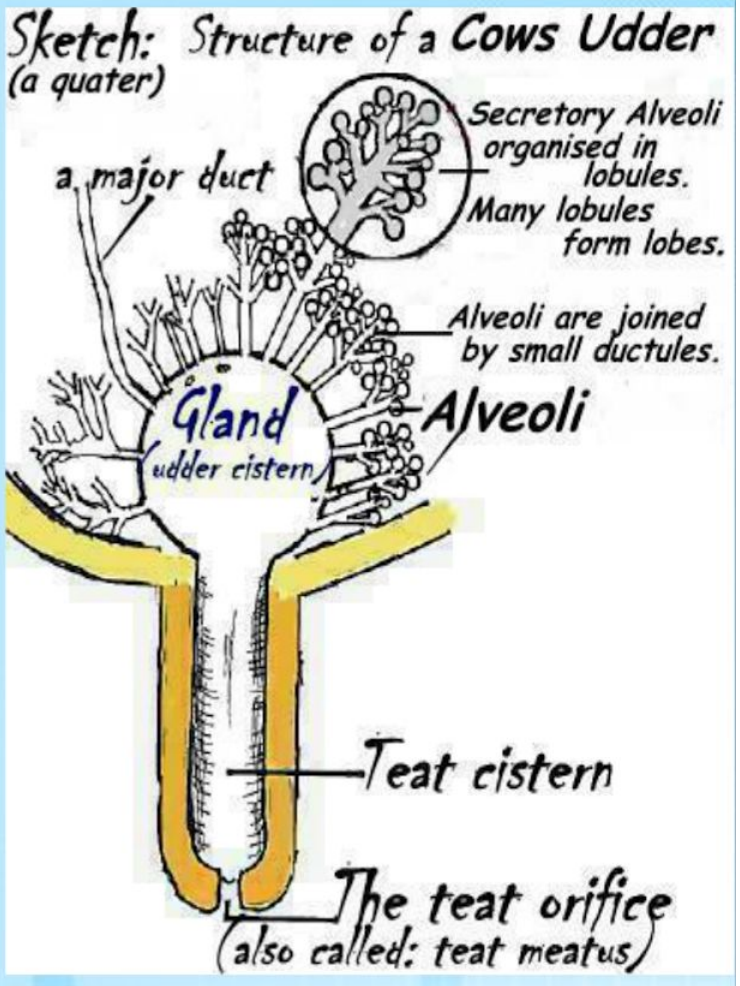
– Lining cells produce a sebaceous plug in the teat canal

•Teat opening

– Opening of the teat canal

– Sphincter muscle present around the teat opening that prevent milk flow except during sucking or milking


Alveolar epithelial cells
Lumen of Alveolus
Intralobular (excretory) duct
Interlobular duct
Lactiferous duct
Gland sinus
Teat sinus
Papillary duct
Teat orifice


Sketch: Structure of a Cows Udder
(a quater)
Secretory Alveoli organised in lobules.
Many lobules form lobes.
a major duct
Alveoli are joined by small ductules.
Gland
(udder cistern)
Alveoli
Teat cistern
The teat orifice
(also called: teat meatus)

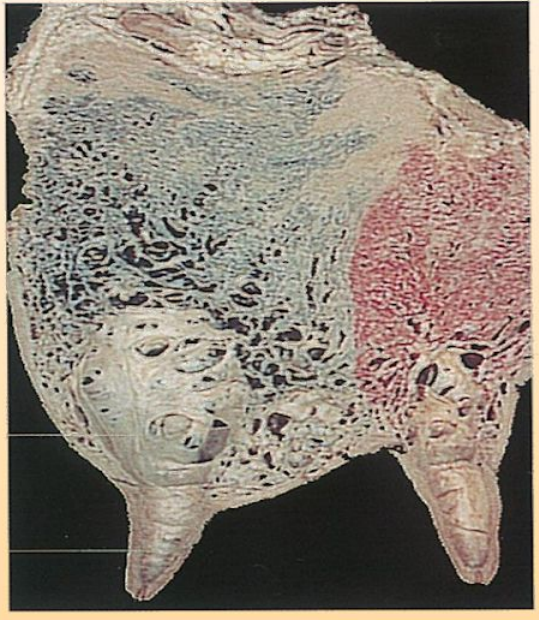


Fig. 18-25. Sagittal section of the glandular tissue of the cranial and caudal quarters of a bovine udder. The different colour indicating the complete separation of the individual quarter.

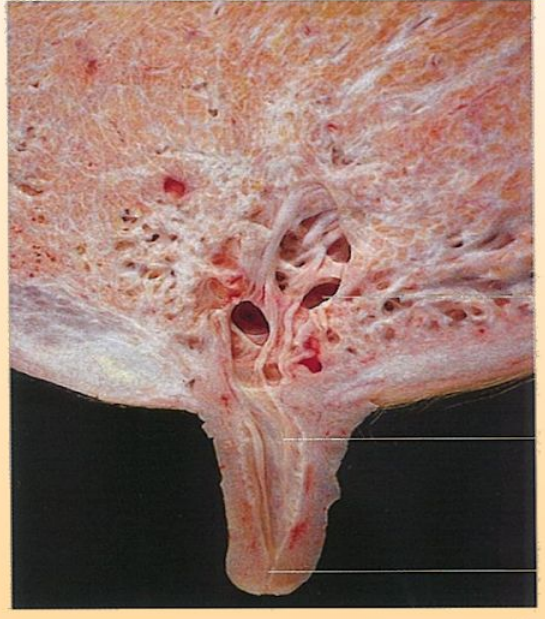


Fig. 18-26. Sagittal section of the teat (papilla mammae) of a cow.

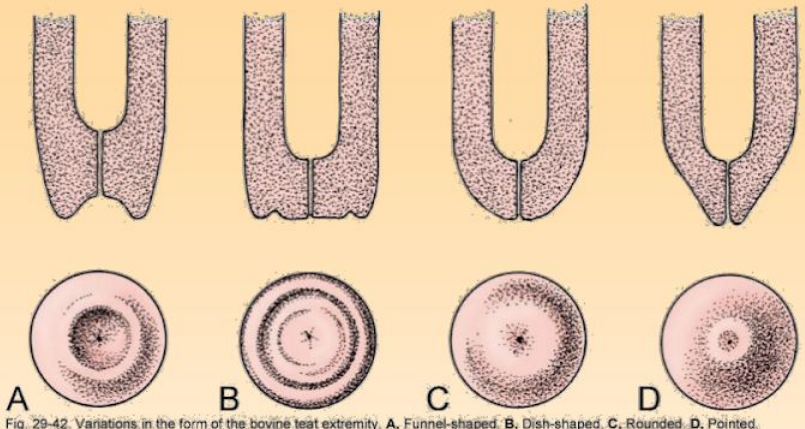


Fig. 29-42. Variations in the form of the bovine teat extremity. **A,** Funnel-shaped. **B,** Dish-shaped. **C,** Rounded. **D,** Pointed.

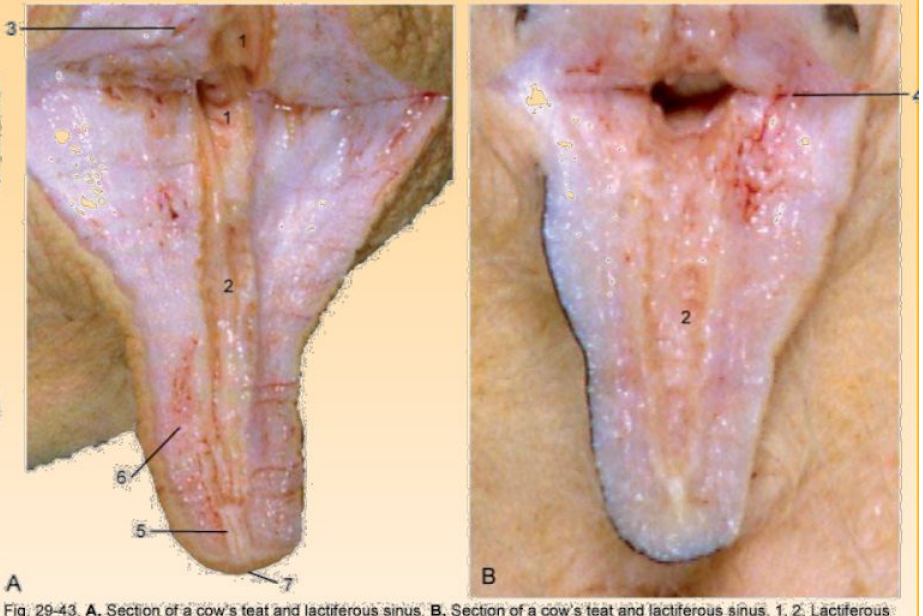


Fig. 29-43. **A,** Section of a cow's teat and lactiferous sinus. **B,** Section of a cow's teat and lactiferous sinus. 1, 2, Lactiferous sinus; 1, gland sinus; 2, teat sinus; 3, openings of lactiferous ducts; 4, submucosal venous ring; 5, papillary duct; 6, venous plexus in teat wall; 7, teat orifice.

• **Udder**

- Hangs from the caudal abdomen and pelvis, thus partly covered laterally by thigh in cows

•**Quarters**

– Four parts of the udder
each associated with one teat

– All are separated from each other

– Intermammary groove is the
sagittal indication of the separation

Structure of the Teat wall

Skin

– Skin is extremely sensitive

– lacks glands

Middle layer

– Connective tissue

– Smooth muscles and many veins (erectile tissue) - congested when the teat is manipulated

Mucosal layer

– Relatively inconspicuous radiation of the longitudinal ridges of teat canal mucosa into teat sinus seen and called as Furstberg's rosette

– Over development cause teat spiders

Annular fold

– A constriction between the glandular and teat sinus.

– Consists of muscular fibers, connective tissue and circular venous channels (venous plexus) - to be considered while amputation of teat/high teat spiders

Suspensory Apparatus of the Udder

- Specialized attachment of the udder (best developed in cow)

- Attaches the udder to the symphysis (sub pelvic) tendon and ventral abdominal wall.

- Consists of 4 primary lamina

a. Medial lamina

– 2 elastic sheets arise from ventral abdominal wall near linea alba and extending ventrally between the 2 haves of the udder

– It stretches as the udder fills and the teat angle laterally than the lateral lamina

b. Lateral lamina

– Sheet of dense CT passing from sub pelvic tendon caudally and abdominal wall cranially over the lateral side of the udder

c. Secondary laminae

– 7-10 sheets connecting the medial and lateral laminae that divide the gland into several lobes

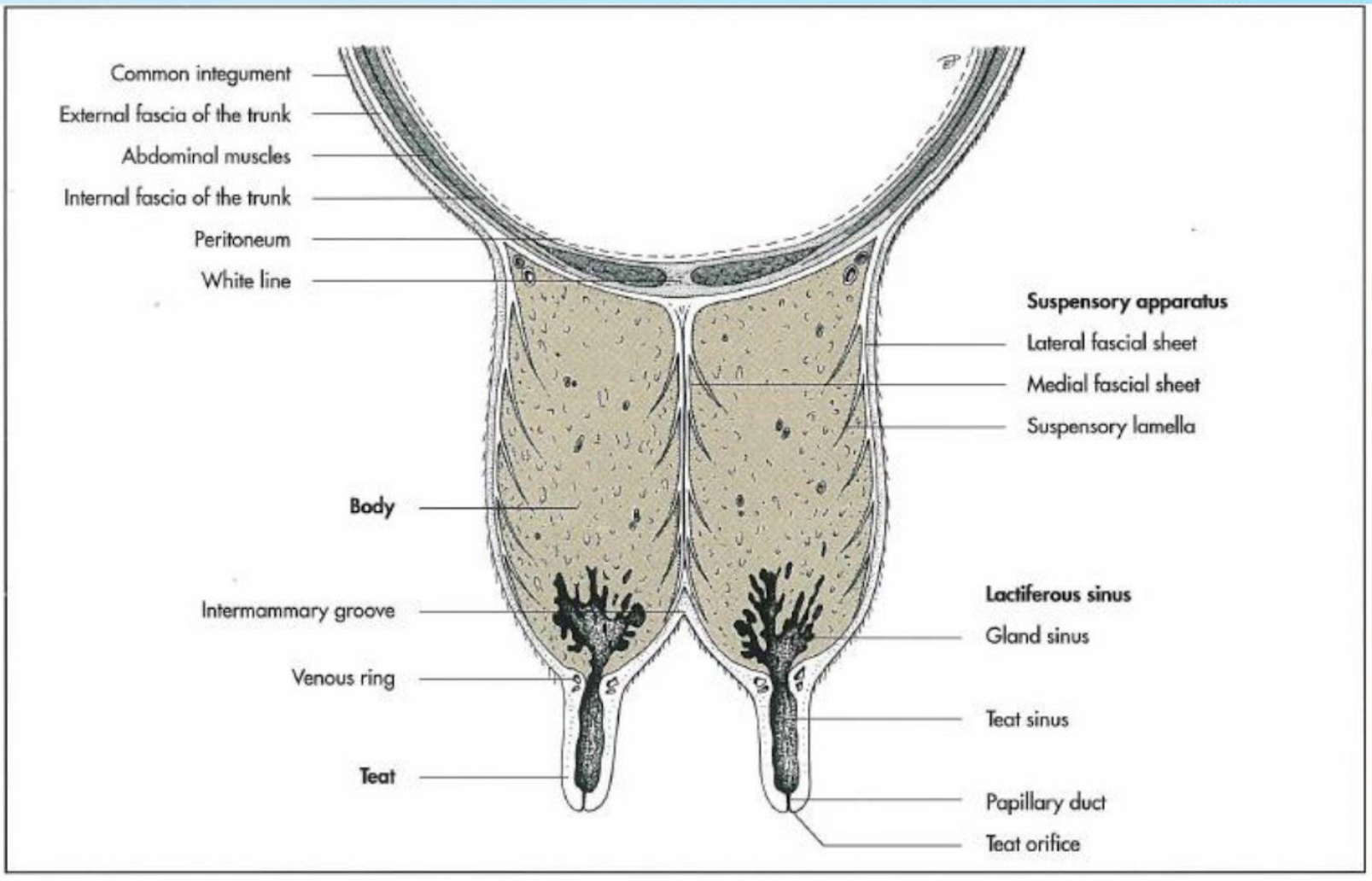


Fig. 18-22. Suspensory apparatus of the udder, schematic (Dyce, Sack and Wensing, 1991).

Blood Supply (Cow)

External Pudendal artery

– Main trunk of udder

– Branched from pudendo - epigastric trunk which arises from the deep femoral artery

– Passes through the inguinal canal along with the satellite vein, lymphatics and nerves

– Forms a sigmoid flexure before dividing into two mammary arteries

– Mammary arteries of the left and right sides interconnect caudal to the medial laminae

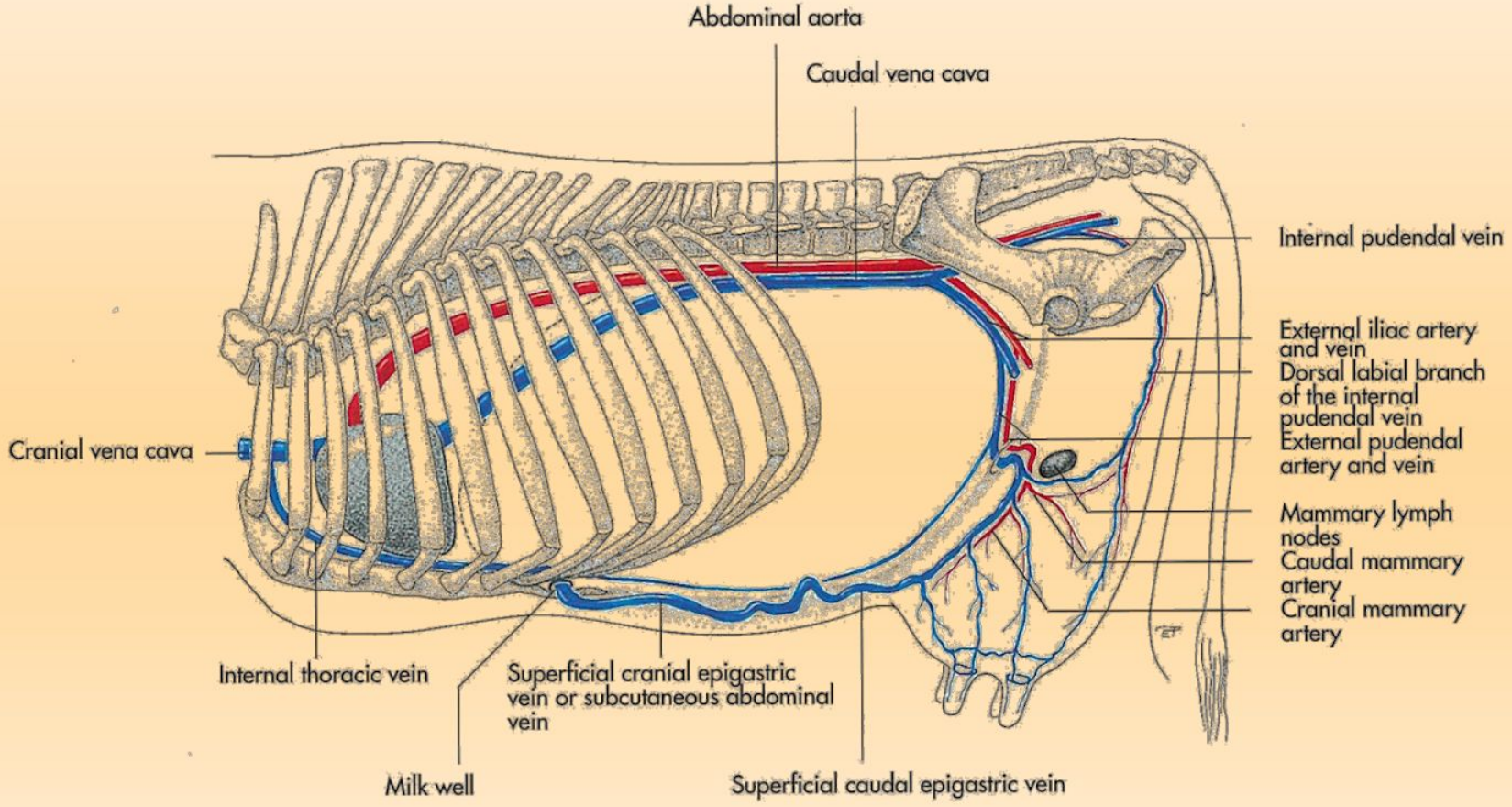
Cranial mammary artery: Larger& Directed cranially and ventrally

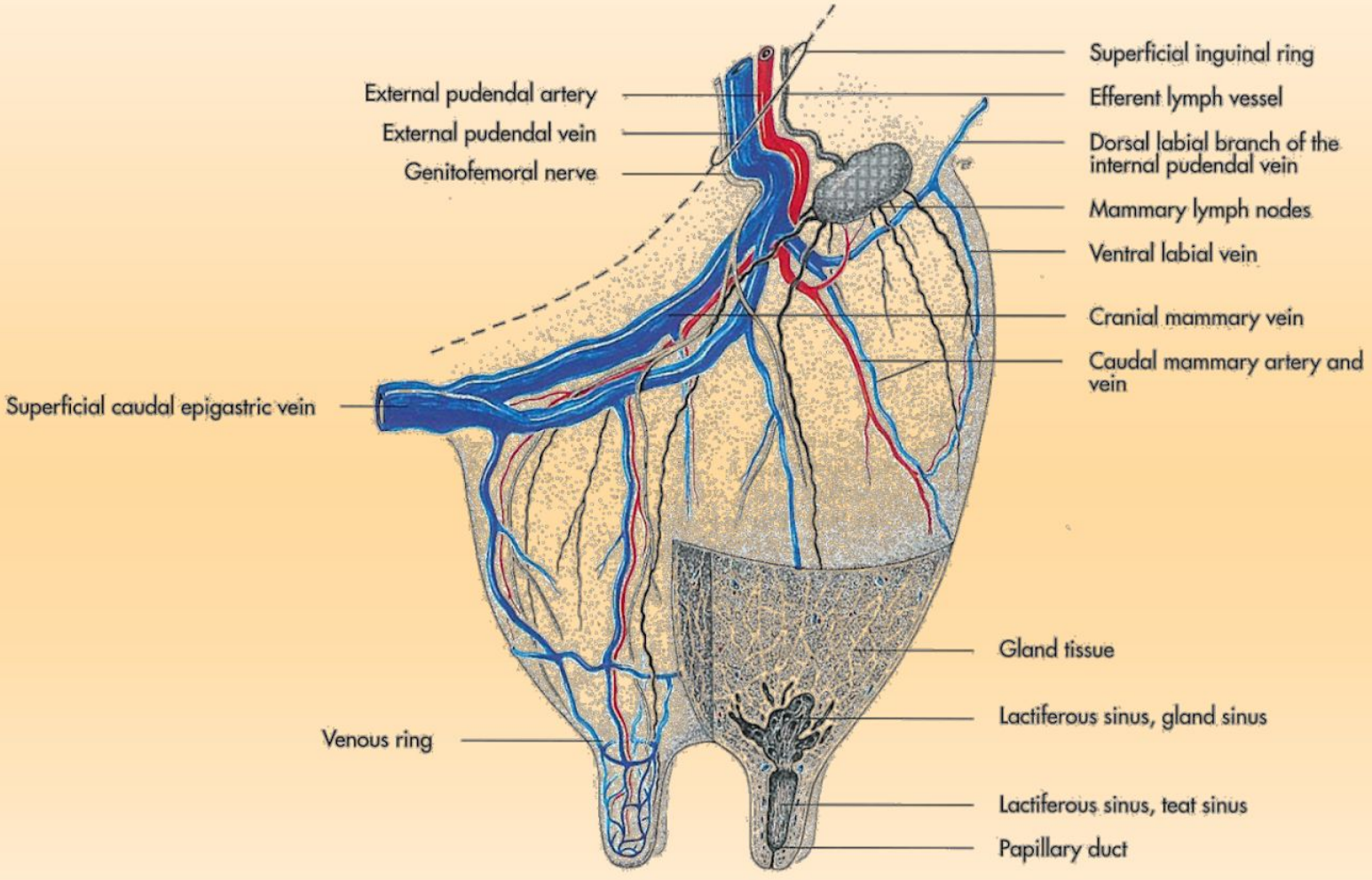
Caudal mammary artery: Smaller, runs to the caudal part of the udder - Sigmoid flexure stretches when udder fills

Ventral perineal artery

– Branch of internal pudendal artery (Small part of the hindquarter and mammary lymph nodes).

The most important blood vessels supplying the bovine udder, schematic




External pudendal artery
External pudendal vein
Genitofemoral nerve
Superficial caudal epigastric vein
Venous ring
Superficial inguinal ring
Efferent lymph vessel
Dorsal labial branch of the internal pudendal vein
Mammary lymph nodes
Ventral labial vein
Cranial mammary vein
Caudal mammary artery and vein
Gland tissue
Lactiferous sinus, gland sinus
Lactiferous sinus, teat sinus
Papillary duct

Lymphatic Drainage of Udder

Drained by:

a. superficial inguinal (Mammary) lymph node

Located at the base of the inguinal part of the mammary gland (are located at the caudoproximal aspect)

Palpable under skin

b. Axillary lymph node will collect lymph from the thoracic and cranial abdominal lymph nodes in dog and sow

Nerve Supply to Udder in Ruminants

a. Iliohypogastric and ilioinguinal nerves (Ventral branches of L1,L2)

– Supply skin of the fore quarters

b. Genitofemoral nerve (L3): Supply skin over middle udder, gland substance and deep part of the teat wall and skin of caudal udder.

c. Mammary branches of the pudendal nerve (Sacral nn 2-4): Supply

caudal part of the udder

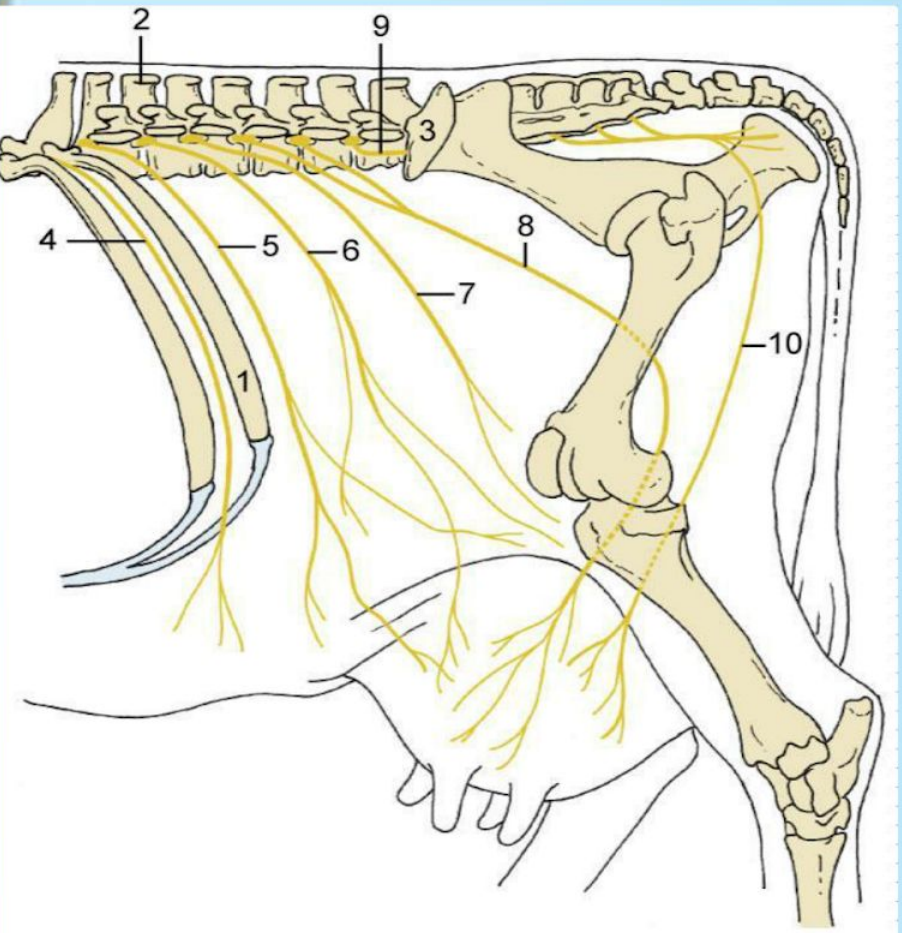


Fig. 28-2. Topography of the nerves to the flank and udder, simplified. The dorsal branches of the spinal nerves to the upper part of the flank are not shown. 1, Last rib; 2, spinous process of L2; 3, coxal tuber; 8, twelfth intercostal n. (T12); 5, T13 (costoabdominal n.); 6, L1 (iliohypogastric n.); 7, L2 (ilioinguinal n.); 8, L3, L4 (genitofemoral n.); 9, L5 (nerve); 10, ventral perineal n.

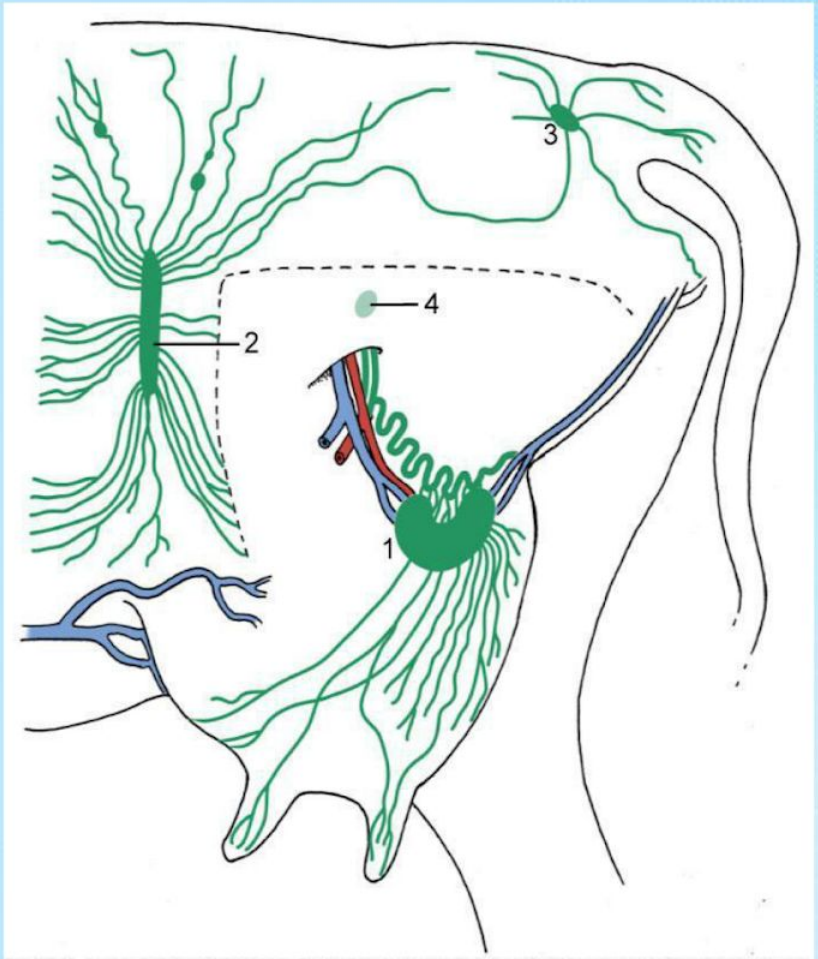


Fig. 29-46. Lymph drainage of the udder. The broken line indicates where the left limb was removed to expose the udder. 1, Mammary (superficial inguinal) lymph node; 2, subiliac lymph node; 3, ischial lymph node; 4, position of deep inguinal (iliofemoral) node.

Doe

- There is one mammary complex on each side,

– Made up of two halves forming pendulous udder

– Each half has one teat, one teat cistern and one gland cistern

23

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