

UGS Lecture – 7
)2021(

Intratesticular ducts

Straight tubules

Each tubule is lined by simple cuboidal epithelium supported by a dense connective tissue sheath.

Rete testis

- It is lined by a simple cuboidal epithelium with surface microvilli and a single cilium, supported by highly vascular connective tissue containing myoid cells.**
- Contraction of these myoid cells helps to mix spermatozoa and move them towards efferent ducts.**

Efferent Ducts

- The lining epithelium of these tubules composed of groups of non-ciliated cuboidal cells alternating with tall columnar ciliated cells.**
- The non-ciliated cells absorb much of the fluid secreted by seminiferous tubules.**
- The basal lamina of the epithelium is surrounded by a thin layer of circularly oriented smooth muscle cells, which aids the movement of spermatozoa towards the epididymis.**

- **Ciliary action in the rete testis and efferent ducts propels the still non-motile spermatozoa towards the epididymis.**

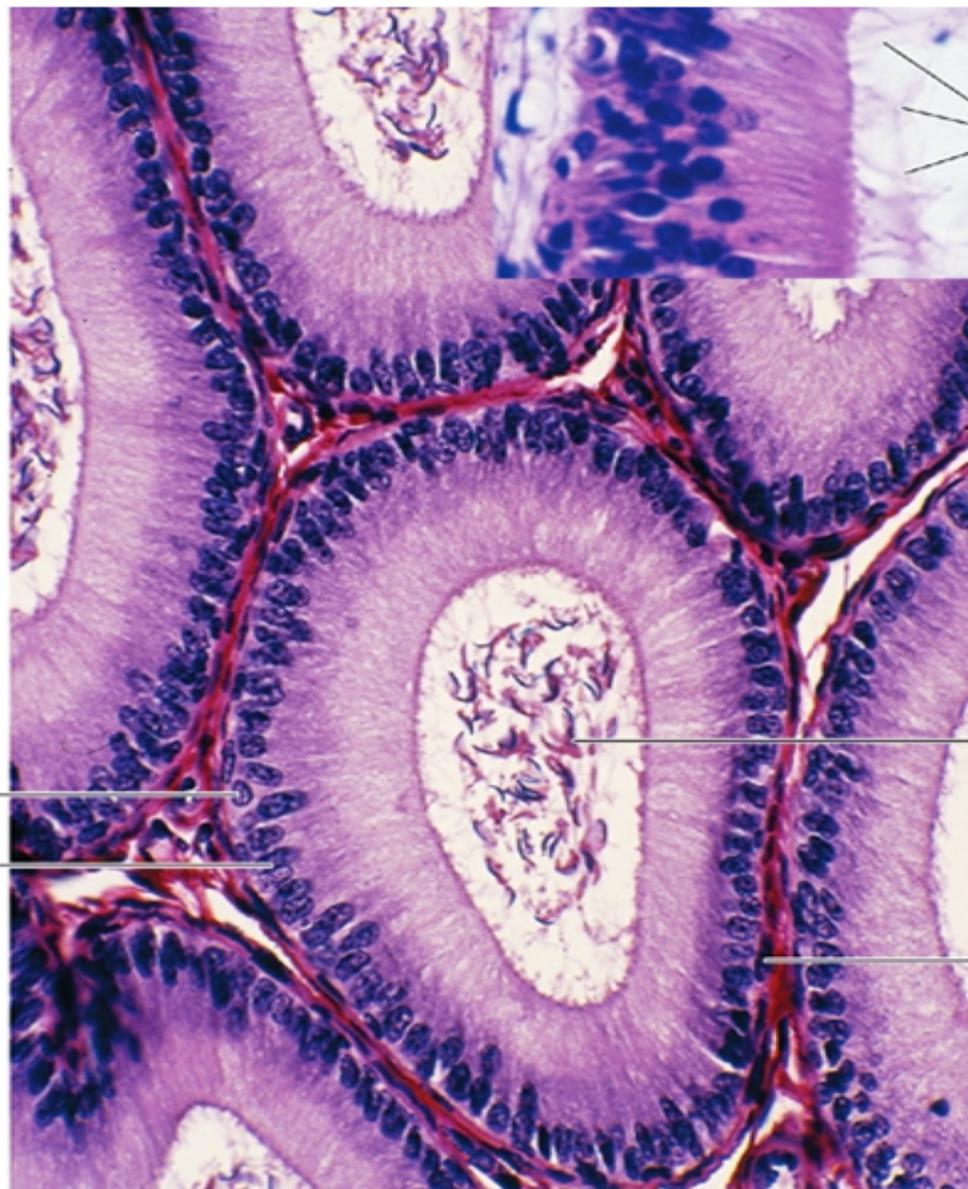
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Excretory Genital Ducts

A. Ductus Epididymis:

- The epithelial lining exhibits a gradual transition from a tall pseudostratified columnar epithelium at head, to a shorter pseudostratified form at tail.
- The principal cells are the main cells. Few basal cells, and intraepithelial leukocytes are seen.
- The principal cells bear numerous very long and branched microvilli on their luminal surface, called stereocilia, which are thought to be involved in absorption of an excess of fluid accompanying spermatozoa from testis.

- **The ultrastructure of these cells strongly suggests an additional secretory function, but nature of epididymal secretory products, if any, remains unknown.**
- **The basal lamina of epithelium is surrounded by smooth muscle cells, whose peristaltic contractions help to move sperm along the duct, and by loose connective tissue rich in blood capillaries.**
- **The muscular wall increases from a single circular layer, to three layers organized in the same manner as in the vas deferens.**



Microvilli

Basal cell

Columnar cell

Spermatozoa

Connective tissue with smooth muscle

Transverse Section Through the Epididymis

B. Ductus (Vas) Deferens

- It is lined by pseudostratified columnar epithelium similar to that of epididymis; the mucosa presents longitudinal folds.**
- The lamina propria is a layer of connective tissue rich in elastic fibers, and the thick muscular layer consists of longitudinal inner and outer layers separated by a thick intermediate circular layer.**



Mucosa

Longitudinal smooth muscle layer

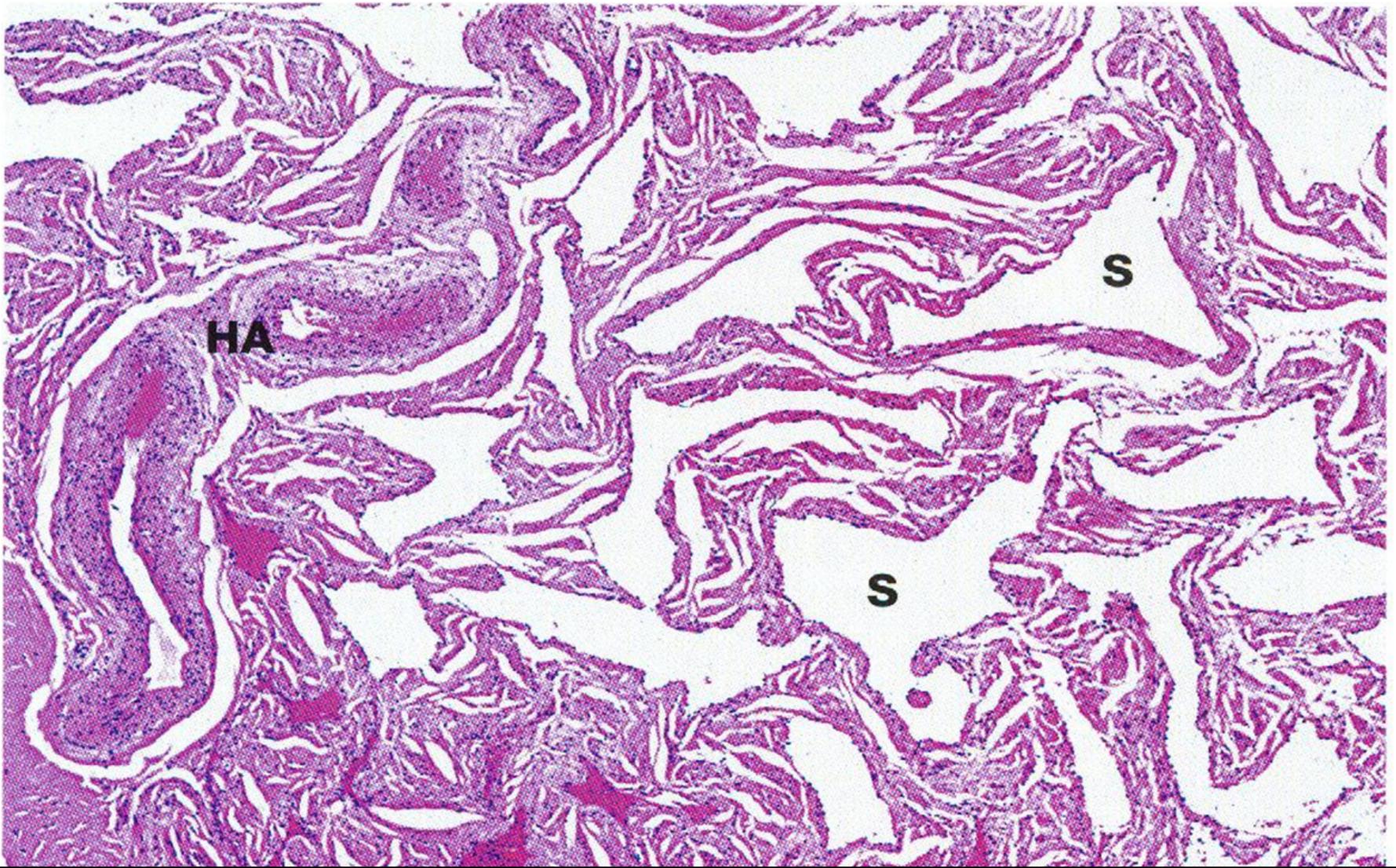
Circular smooth muscle layer

Transverse Section Through the Vas Deferens
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Penis

- The three cylindrical masses are composed of erectile tissue consists of a large number of venous spaces (sinuses) lined with endothelial cells and separated by trabeculae of connective tissue fibers contains few smooth muscle fibers.
- The sinuses are supplied by numerous anastomosing thick-walled arteries and arterioles called helicine arteries, which are branches of deep arteries of penis.
- Blood drains from the sinuses via veins which lie immediately beneath the tunica albuginea.

- **The deep arteries of the penis also provide several nutritive arteries which supply oxygen and nutrients to the trabeculae.**
- **During erection, dilatation of the helicine arteries, mediated by parasympathetic nervous system, results in engorgement of vascular arteries, which enlarged, compressing and restricting venous outflow.**
- **This process is enhanced by relaxation of smooth muscle cells in the trabeculae.**
- **After ejaculation and orgasm, the parasympathetic activity declines, and the penis returns to its flaccid state.**

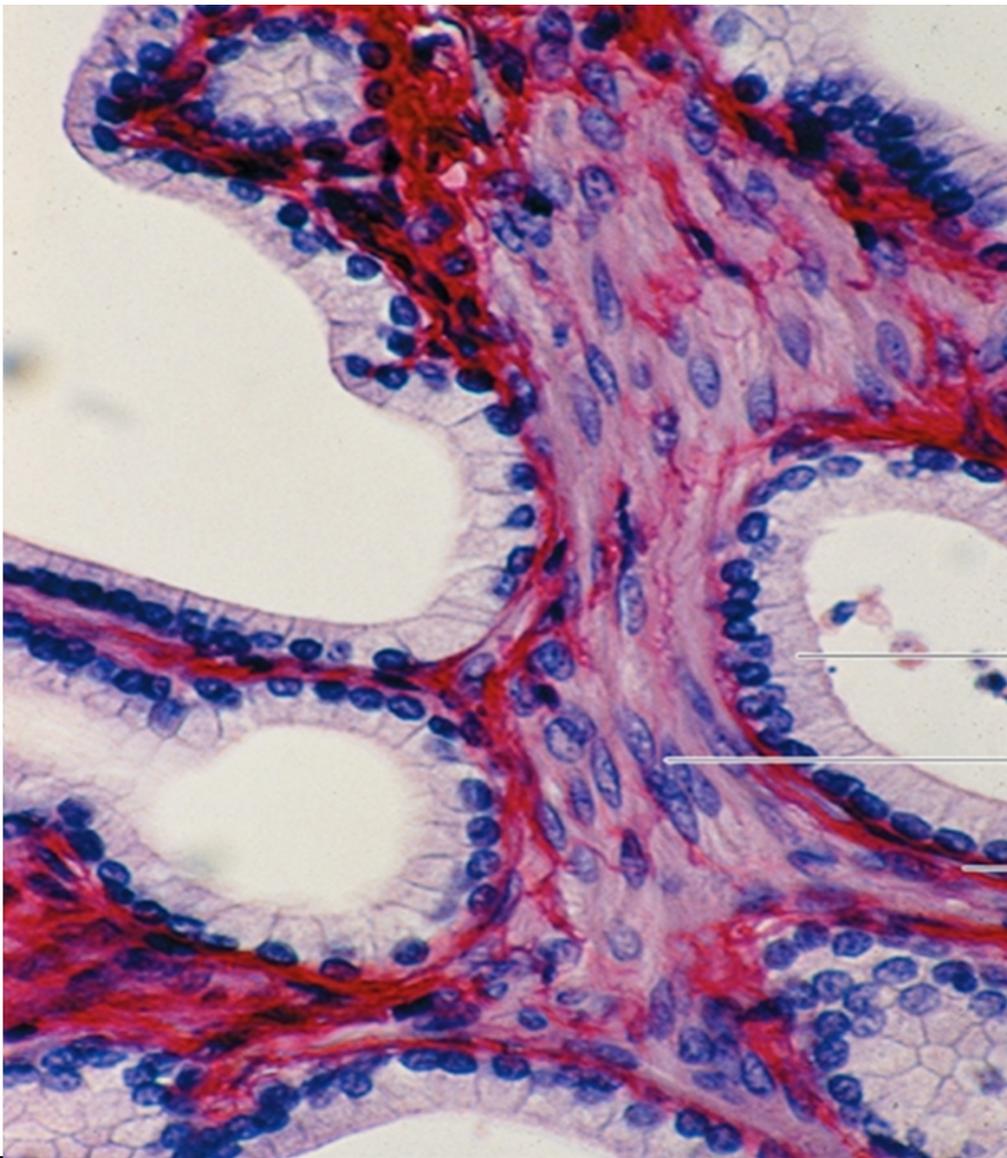


Section Through the Erectile Tissue of the Penis. Note the venous sinuses (S), and the Helicine arteries (HA).

Accessory Genital Glands

A. Seminal Vesicle

- Consists of highly tortuous tubes about 15 cm long.**
- Each tubule has a folded mucosa, which is lined with cuboidal or pseudostratified columnar epithelium rich in brown lipofuscin granules.**
- These granules have the ultrastructural characteristics similar to those found in protein-synthesizing cells.**



Epithelium

Smooth muscle

Lamina propria

Section Through the Seminal Vesicle

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B. The prostate

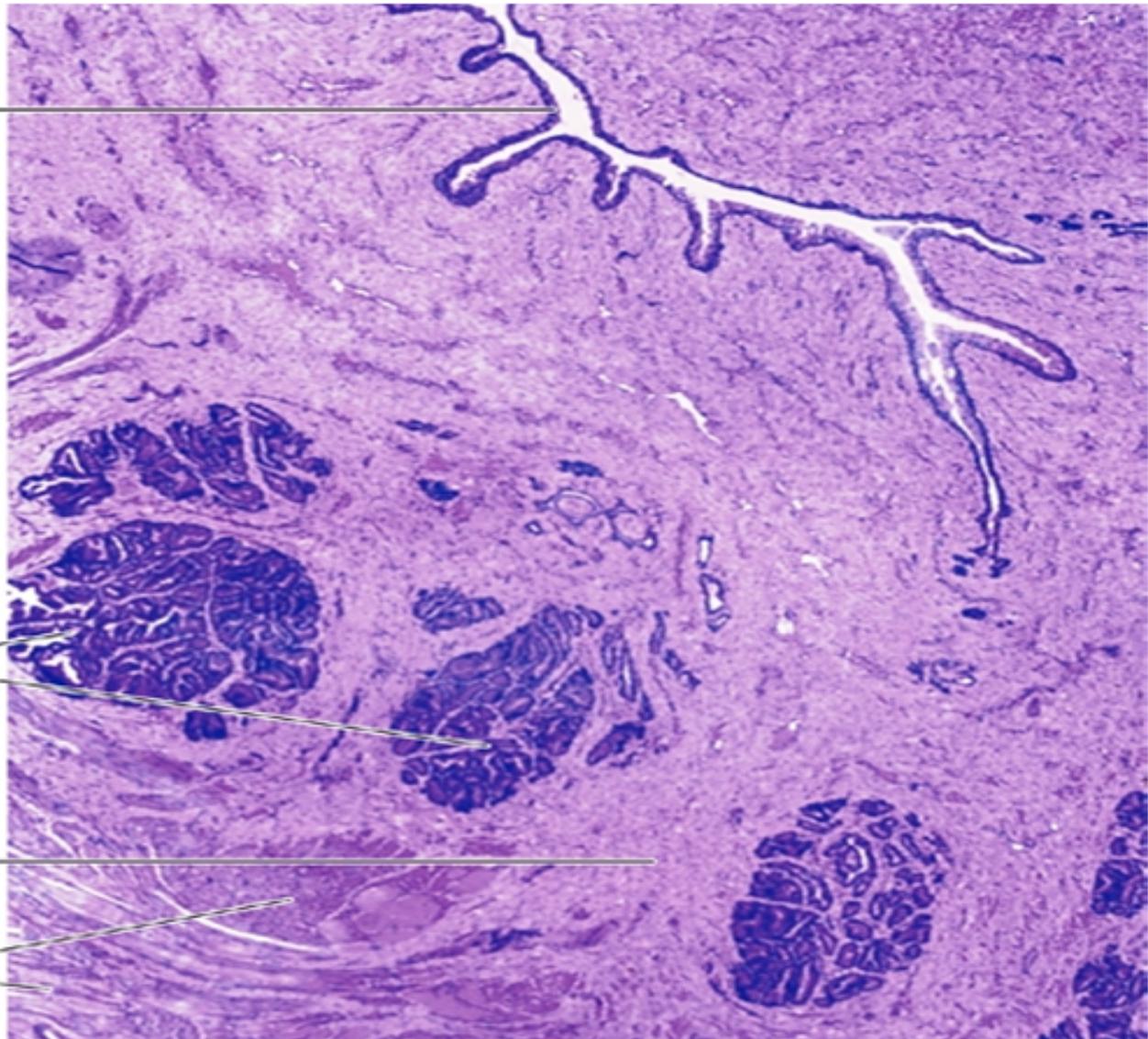
- It consists of 30 – 50 branched tubulo-acinar glands embedded in a fibromuscular stroma (collagenous stroma and smooth muscle fibers).**
- The tubulo-acinar glands are formed by cuboidal or columnar pseudostratified epithelium.**
- These secretory cells are characterized by a prominent round basal nuclei and pale staining cytoplasm.**

**Prostatic
urethra**

Glands

Connective tissue

**Smooth
muscle**



Section Through the Prostate Gland 15

The prostate has three zones:

- 1. The central zone: Occupies 25% of the glands volume.**
- 2. The peripheral zone: Occupies 70% of the gland volume; it is the major site for prostatic cancer.**
- 3. The transition zone: Occupies 5% of the gland volume.**

It is of medical importance, because it is the site at which most benign prostatic hyperplasia originates.

External Components of Female Reproductive System

1. Vulva

Includes mons pubis, labia majora and minora, clitoris, vestibule of vagina, vestibular bulb, greater and lesser vestibular glands, and paraurethral glands:

a. Mons Pubis

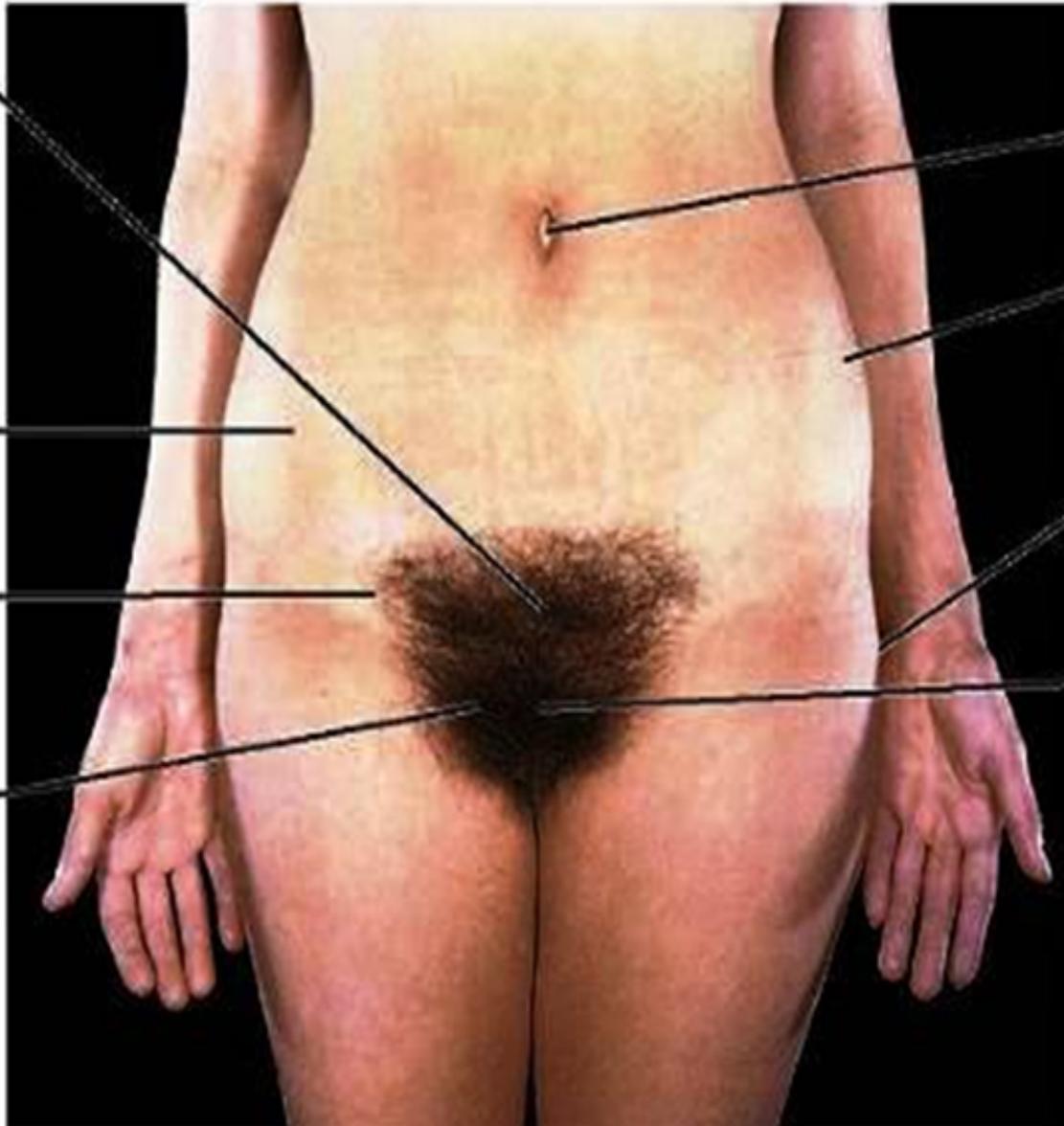
- Rounded eminence found, in both sex anterior to pubic symphysis, pubic tubercle, and superior pubic rami.**
- Formed by a collection of subcutaneous adipose connective tissue.**

mons pubis showing
female distribution
of pubic hair

anterior superior
iliac spine

site of inguinal
ligament

pubic tubercle



umbilicus

iliac crest

greater trochanter
of femur

symphysis pubis

b. Labia Majora

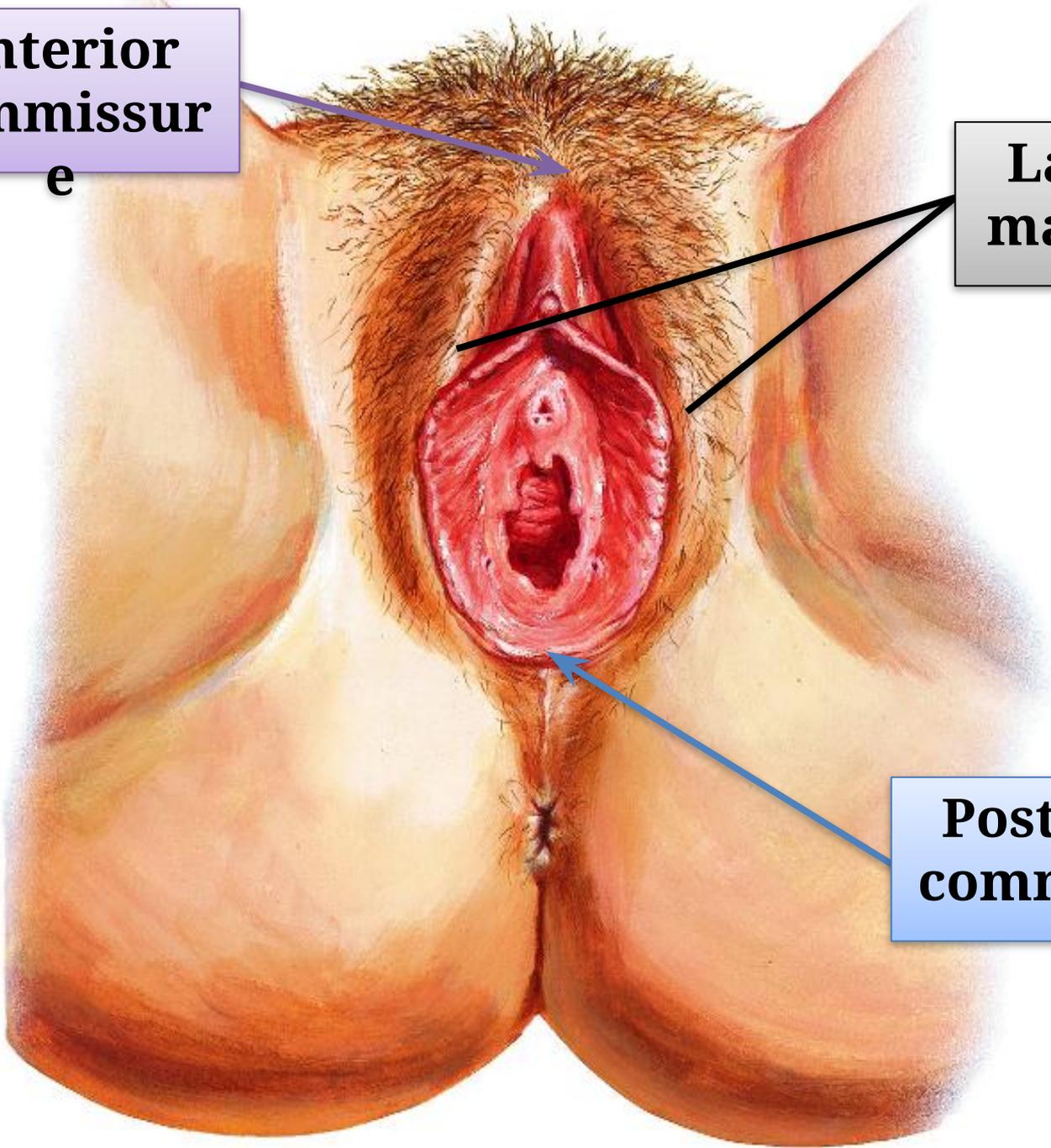
- **Are two prominent, thick hair-bearing folds of skin, which pass backwards from mons pubis.**
- **Each has a core filled with subcutaneous fat containing smooth muscle and termination of round ligament of uterus.**
- **They are homologue of male scrotum, and the labial muscle fibers are homologue of dartos muscle of scrotum.**
- **The external aspect of the labia in adult are covered with pigmented skin containing many sebaceous and sweat glands and are covered with coarse, curly hair.**

- **The internal aspect of labia is smooth, pink, and hairless.**
- **They are thicker anteriorly where they join to form anterior commissure.**
- **Posteriorly, they merge to form posterior commissure, which usually disappears after first vaginal birth.**

**Anterior
commissur
e**

**Labia
majora**

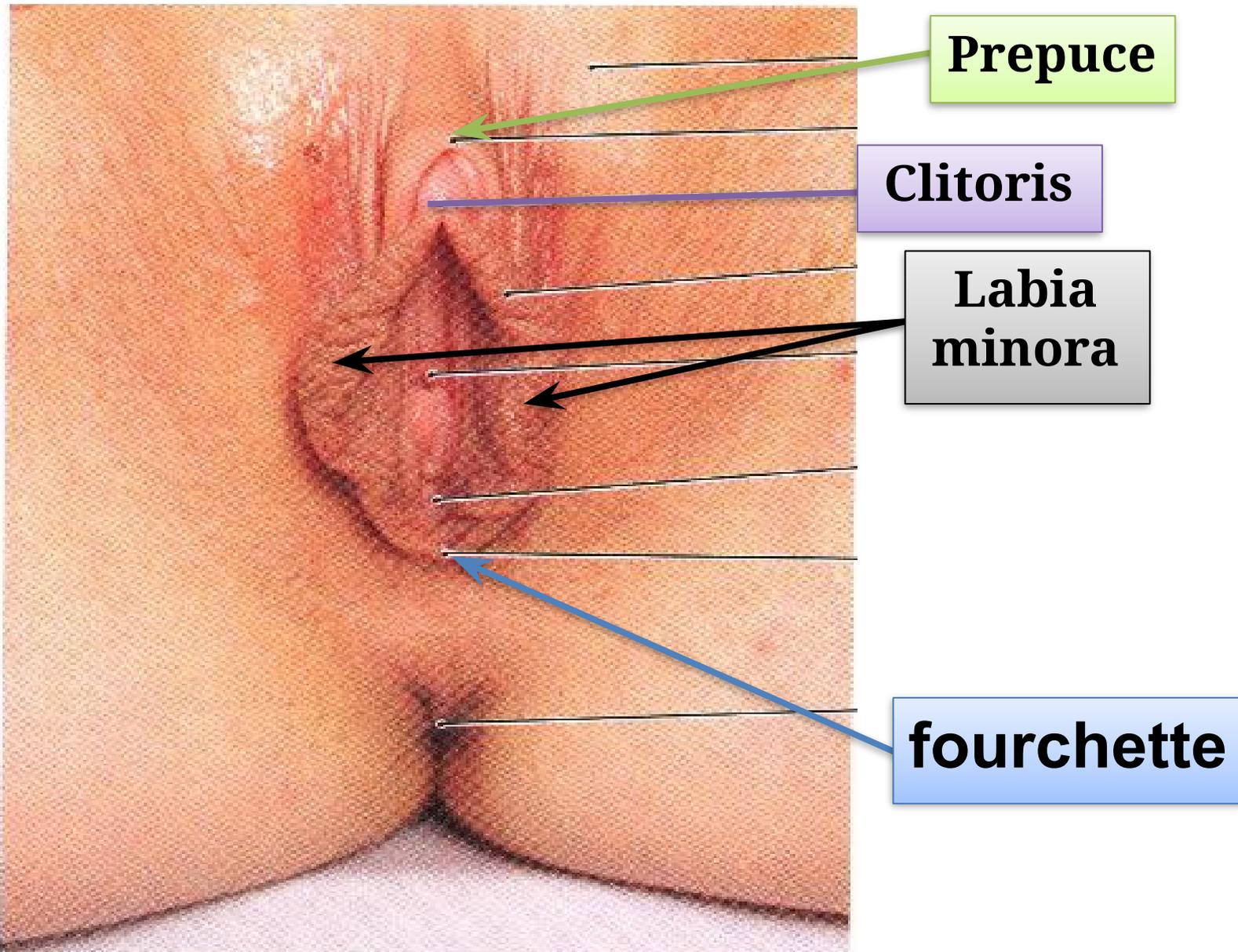
**Posterior
commissur
e**



c. Labia Minora

- **These are two smaller, hairless folds of soft skin that lie between labia majora.**
- **Their anterior ends split to enclose clitoris, forming two folds an anterior, prepuce and a posterior, frenulum.**
- **Their posterior ends are united to form fourchette.**
- **The external surface has a keratinizing stratified squamous epidermis and scattered sebaceous glands which open directly onto skin surface rather than into necks of hair follicles as they do in hair-bearing skin.**

- The inner aspect of the labia minora has a thinner epidermis and keratin layer.



d. Vestibule

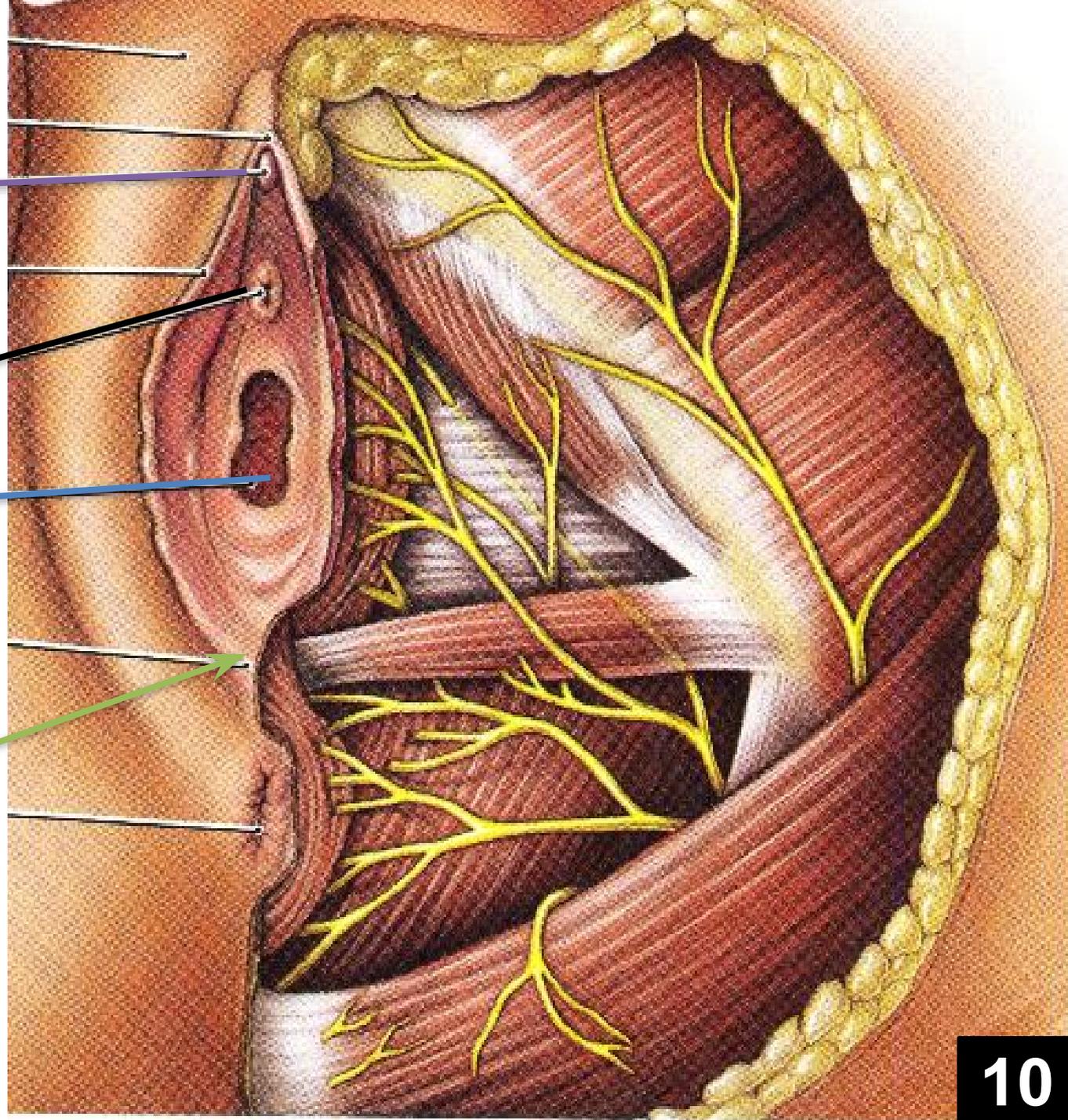
- It is a smooth triangular cleft, bounded at its apex by clitoris, laterally by the labia minora, and at its base by fourchette.**
- It exhibits two orifices, external urethral orifice, which lies 2.5 cm behind glans of clitoris, and vaginal orifices, which lies immediately behind external urethral orifice.**
- The orifices of ducts of greater vestibular glands are two small orifices, one on each side, lies in groove between hymen and posterior part of labia minora.**

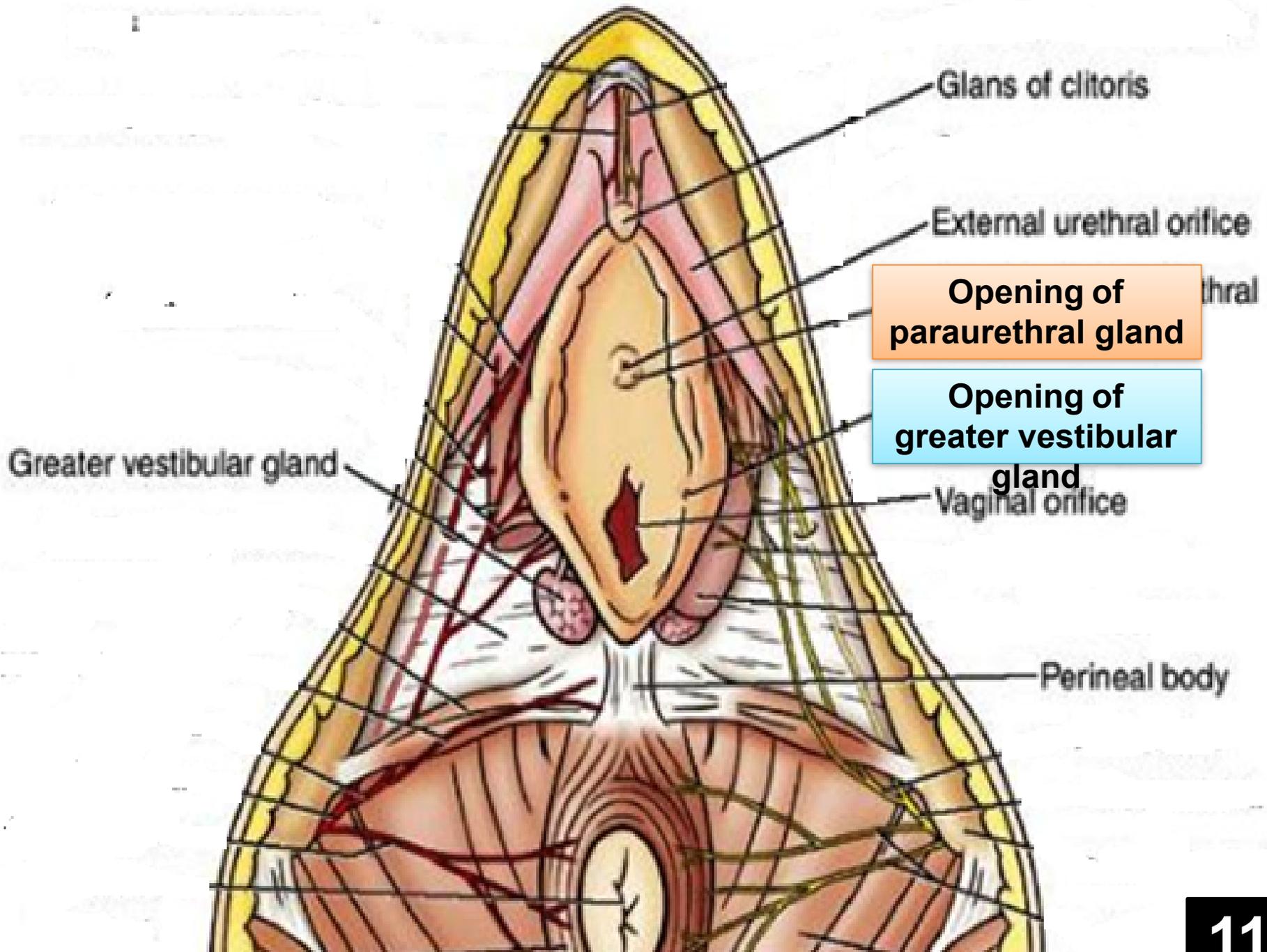
Clitoris

**External
urethral orifice**

Vaginal orifice

fourchette

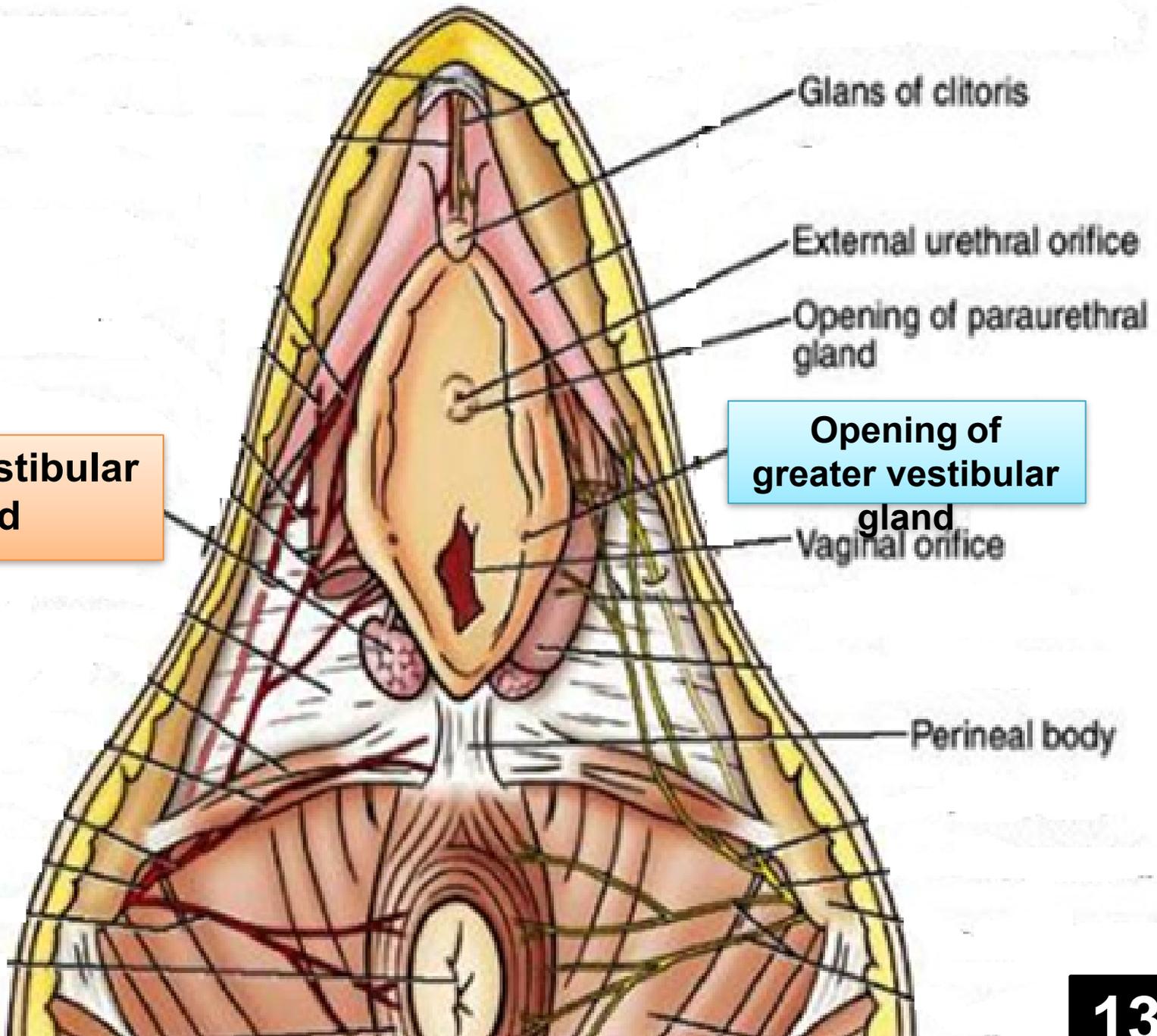




e. Greater vestibular (Bartholin's) glands

- These are a pair of small mucous secreting glands, situated on either side of vagina, under cover of posterior end of bulb of vestibule and labia majora.**
- They are homologous to bulbourethral glands in male.**
- Each gland drains its secretion into vestibule by a small duct, which opens into groove between the labia minora and hymen or its remains.**

Greater vestibular gland



f. Lesser vestibular glands

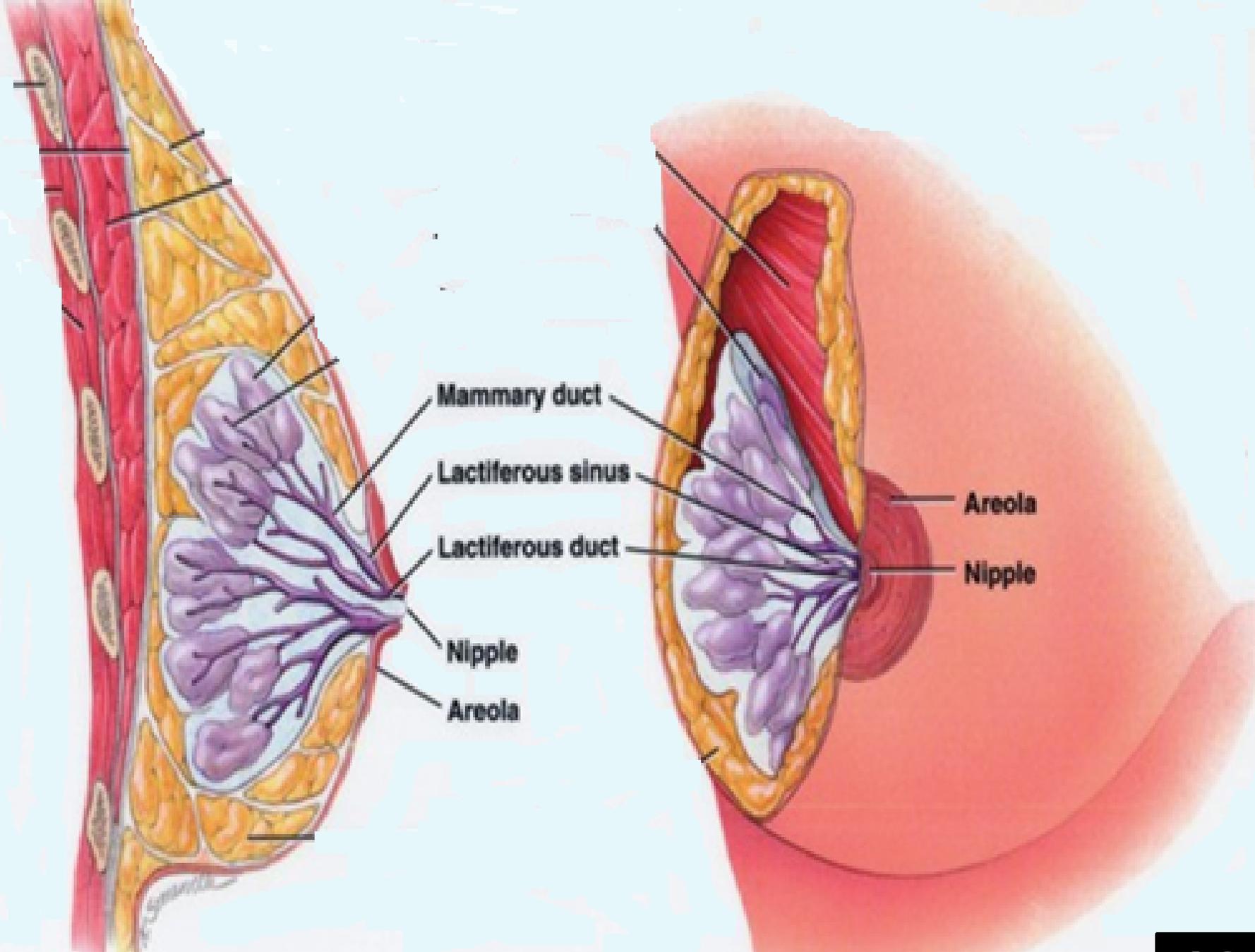
- **They are very small mucous glands situated within mucosa of vestibule.**
- **They have minute opening lying between urethral and vaginal orifice.**

g. Paraurethral glands

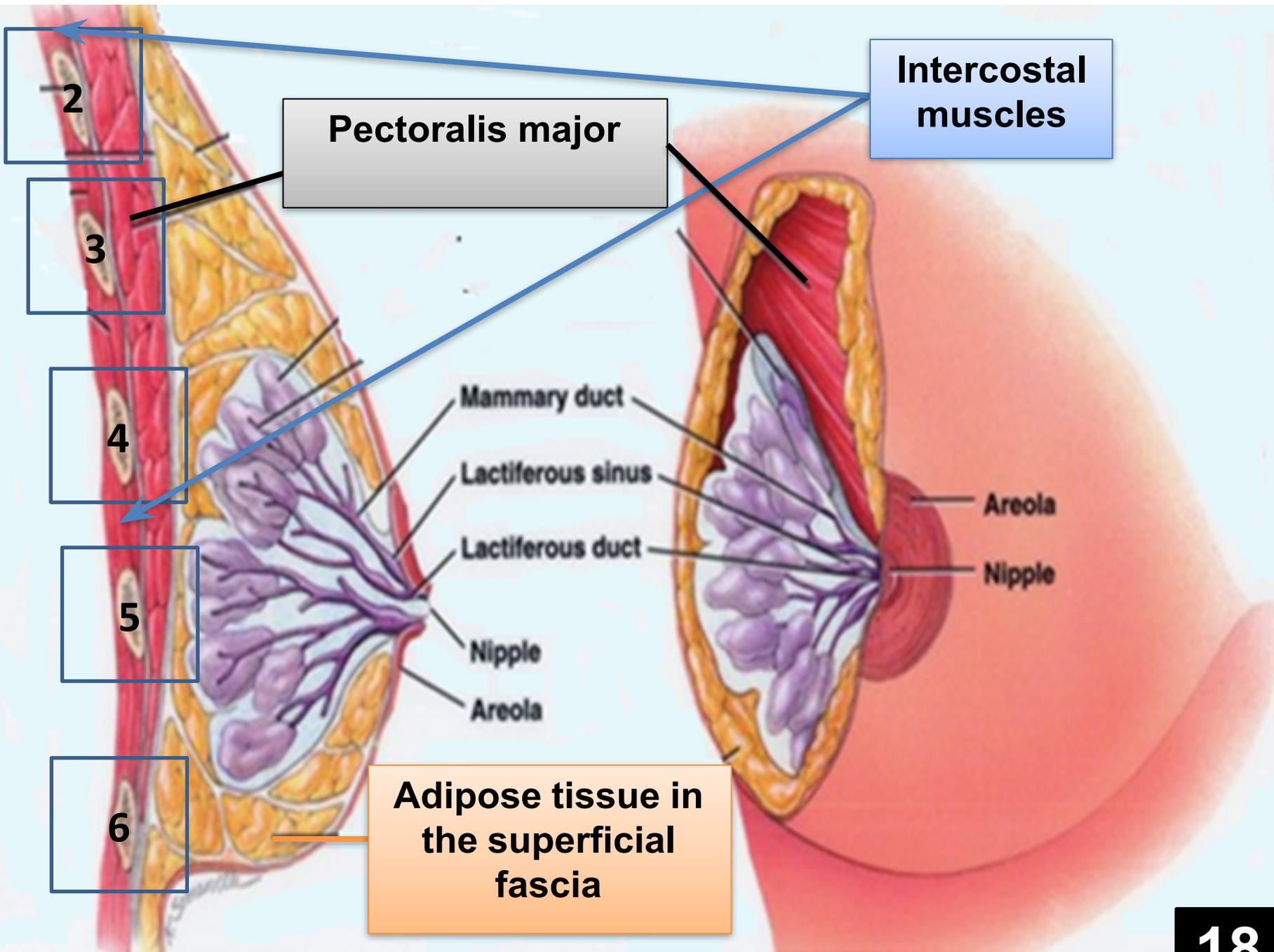
Correspond to prostate in male, open into vestibule on either side of external urethral orifice.

B. Breasts or Mammary Glands

- The breasts are two modified sweat glands that produce milk instead of sweat.**
- Each breast has one pigmented projection called nipple, which is surrounded by a colored area of skin termed areola.**
- Tiny tubercles on areola are produced by underlying areolar glands.**
- The breast tissue consists of little more than a system of ducts embedded in connective tissue that does not extend beyond margin of areola.**



- **At puberty in female, mammary glands gradually enlarge and assume their hemispherical shape under influence of pituitary, ovarian, and other hormones.**
- **The ducts elongate, but increase in size of glands is mainly from deposition of fat.**
- **The superficial surface of breast is convex.**
- **The deep surface (base) is slightly concave and overlies pectoralis major and to a less degree, serratus anterior and external oblique muscles.**
- **The base extends vertically from 2nd – 6th rib, and horizontally from sternal border to mid-axillary line.**



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Pectoralis major

Intercostal muscles

Adipose tissue in the superficial fascia

Mammary duct

Lactiferous sinus

Lactiferous duct

Nipple

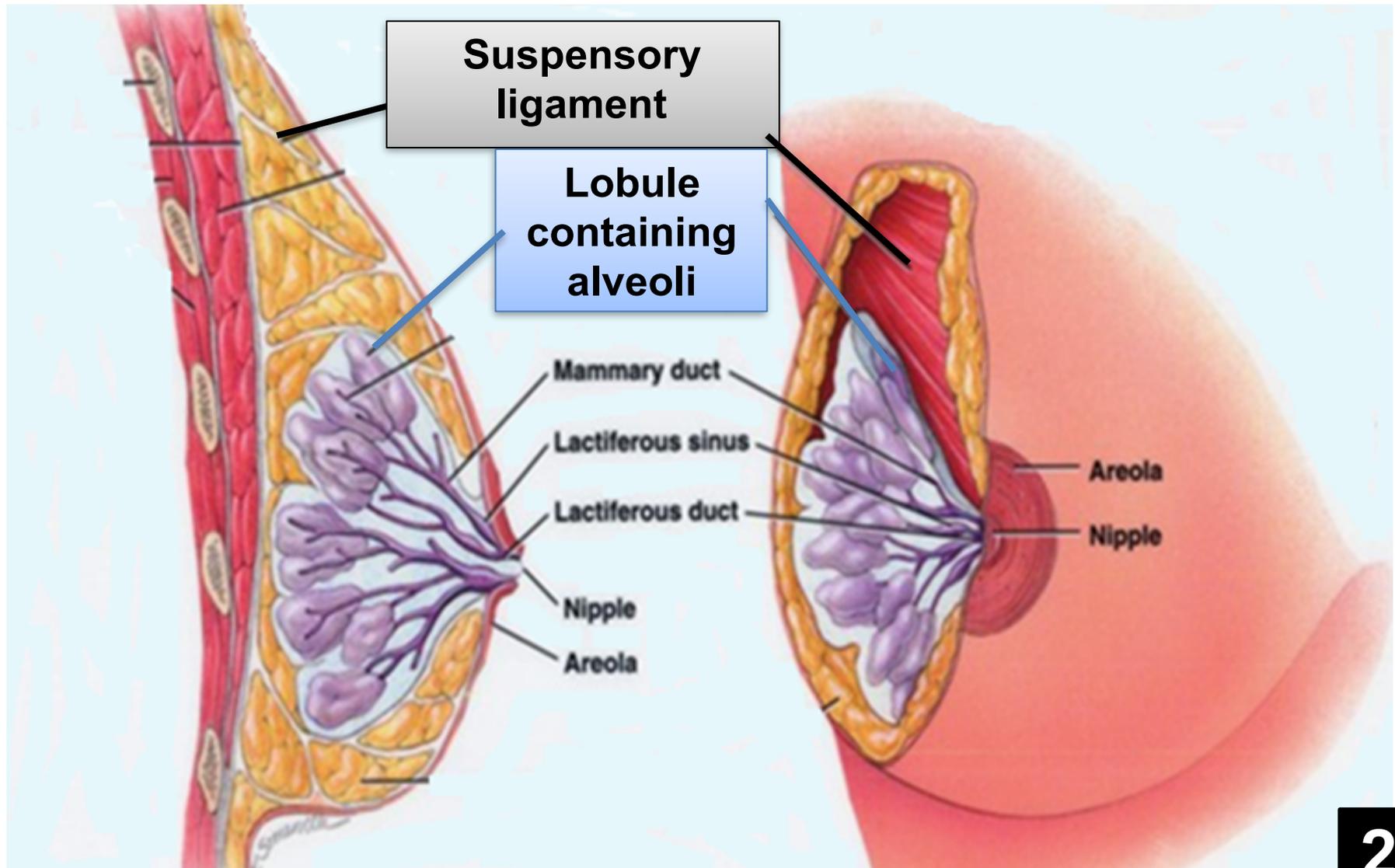
Areola

Areola

Nipple

- **The base is separated from deep fascia covering underlying muscles by an area of loose connective tissue called retromammary space.**
- **The upper outer quadrant is prolonged upward and laterally over lower border of pectoralis major muscle to enter axilla, forming axillary tail.**
- **Each breast consists of 15 – 20 independent units called breast lobes separated by fibrous septa.**
- **Septa in upper part of breast are well developed and they served as suspensory ligaments.**
- **A lobe consists of several ducts that empty into one terminal distal duct, lactiferous ducts, which open onto nipple.**

- Immediately before emerge in nipple, lactiferous duct forms a dilatation called lactiferous sinus.



- **Within each lobe smallest proximal ducts leads to a lobule consisting of multiple alveoli, which are spherical collection of epithelial cells.**
- **Lobules are separated by moderately dense connective (collagen bundles) interlobular tissue.**
- **With the exception of lactiferous sinus, ducts are lined by simple cuboidal epithelium covered by closely packed myoepithelial cells.**
- **The lactiferous sinuses are lined with stratified squamous epithelium at their external openings.**

- **This epithelium very quickly changes to stratified columnar or cuboidal epithelium.**
- **The connective tissue surrounding alveoli contains many lymphocytes and plasma cells.**
- **Plasma cells population increases significantly toward end of pregnancy; it is responsible for secretion of immunoglobulins that confer passive immunity on newborn.**
- **Externally, nipple is covered by keratinized stratified squamous epithelium, rests on a layer of connective tissue rich in smooth muscle fibers, disposed in circles around deeper lactiferous ducts. Contraction of this muscle causes erection of nipple.**

- **The skin of areola is pigmented and contains sebaceous glands that are not associated with hair follicles.**
- **The color of areola darkens during pregnancy, as a result of local accumulation of melanin. After delivery, areola may become lighter in color but rarely returns to its original color.**

- **During pregnancy, under influence of estrogen, progesterone, prolactin, and human placental lactogen hormones, there is a great increase in number of alveoli. Under E/M, a few lipid droplets and secretory vacuoles containing milk proteins can be seen in apical cytoplasm of alveolar cells.**
- **During lactation, the number of secretory vacuoles and lipid droplets greatly increased in apical cytoplasm of alveolar epithelium.**

Blood Supply of Breast

- (1) Perforating arteries: Branches of internal thoracic artery and intercostals arteries.**

- (2) External mammary artery: Branch of lateral thoracic artery, which arises from axillary artery.**

- (3) Pectoral artery: Branch of thoracoacromial artery (branch of axillary artery).**

Veins correspond to arteries.

Lymph Drainage of Breast

- (1) Lateral half of breast: Drains into anterior (pectoral) group of axillary lymph nodes situated just deep to lower border of pectoralis major.**
- (2) Medial half of breast: Drains into internal thoracic group of lymph nodes situated along course of internal thoracic artery.**
- (3) A few lymph vessels: Drain into posterior intercostals lymph nodes situated along course of posterior intercostals arteries.**
- (4) Some vessels: Communicate with lymph vessels of opposite breast and with those of anterior abdominal wall.**