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The Female Reproductive System

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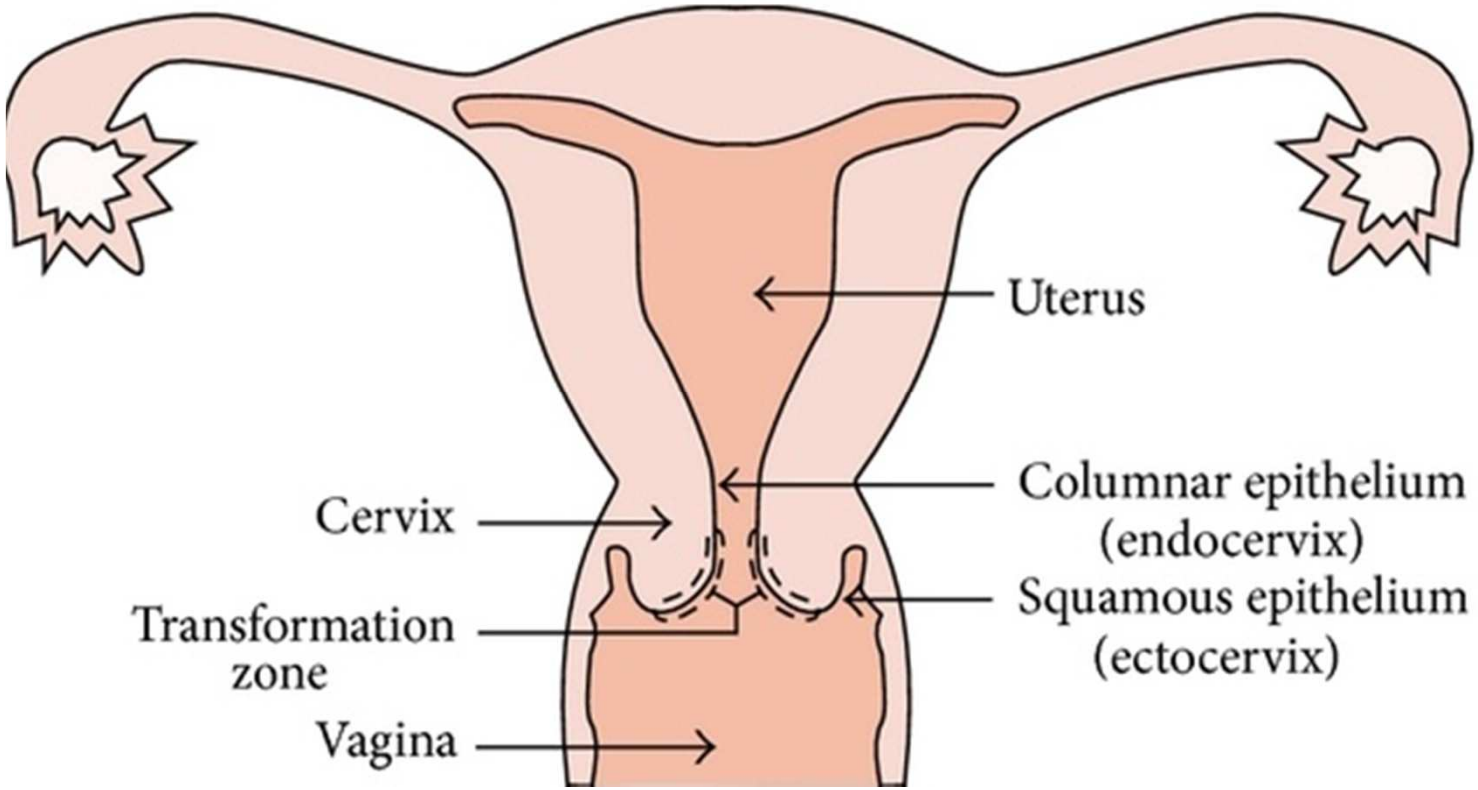
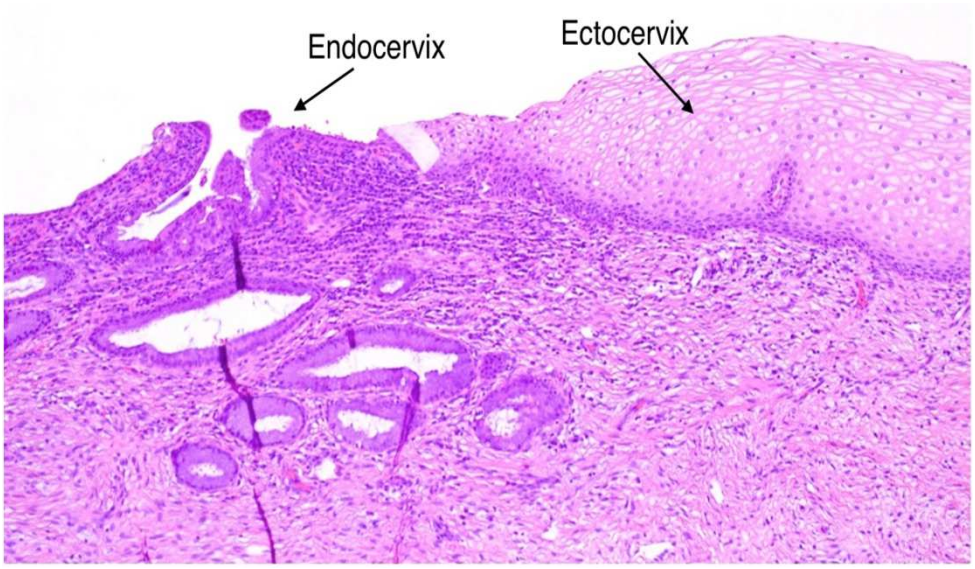
The cervix

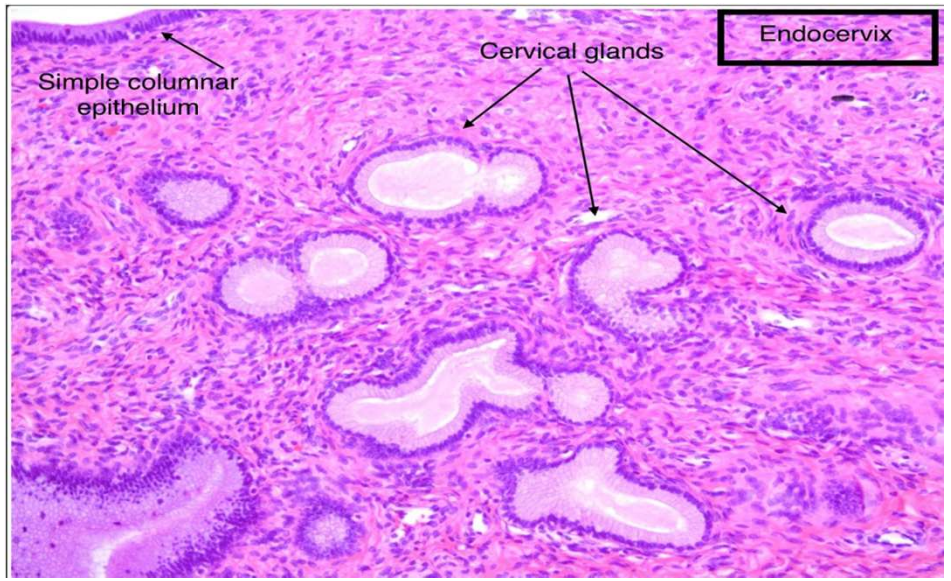
. It is the lower cylindrical part of the uterus and it differs histologically from the rest of the uterus.



. The **Endocervical** mucosa:
is a simple columnar epithelium on a thick lamina propria with large branched mucous secreting cervical glands,

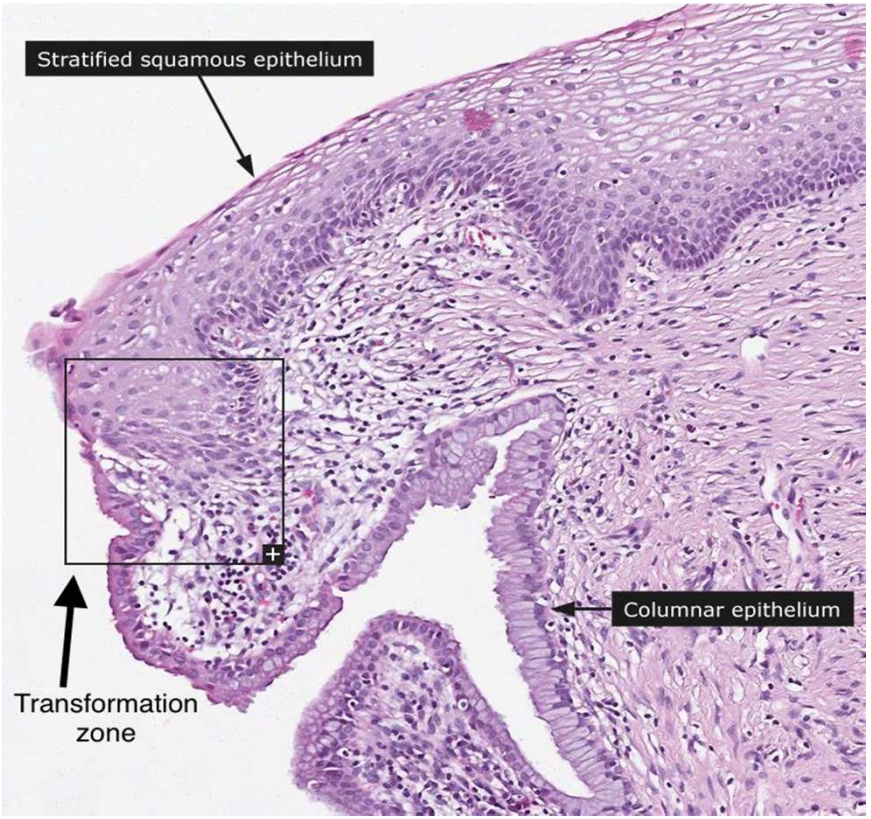


.It lacks the spiral arteries , does not change in thickness (2-3mm) and not shed during menstruation.



. The cervical region around the external os is covered by the **Exocervical** mucosa with non keratinized stratified squamous epithelium.

. The junction between the squamous epithelium and the mucous secreting columnar epithelium is called the **transformation zone**.



. Under the effect of **progesterone** , the cervical mucosa changes cyclically and play an important role in fertilization and early pregnancy.

- At **ovulation** : a watery abundant mucous facilitate sperm movement.
-During the **luteal** phase: the mucous is more viscous and hinders the passage of sperms.
-During **pregnancy**: the mucous is highly viscous and acts as a plug sealing the cervical canal.

4.The vagina

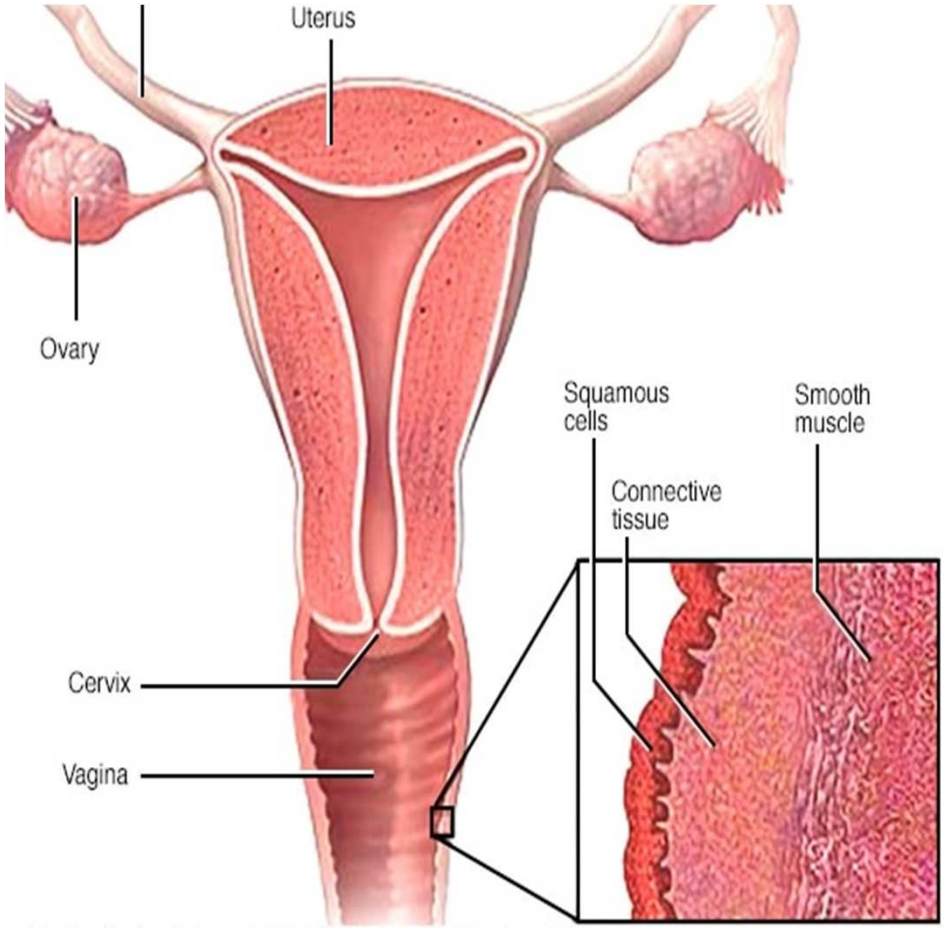
. It is a fibro muscular tube that lacks glands.

.It consist of three layers:

1.Mucosa .

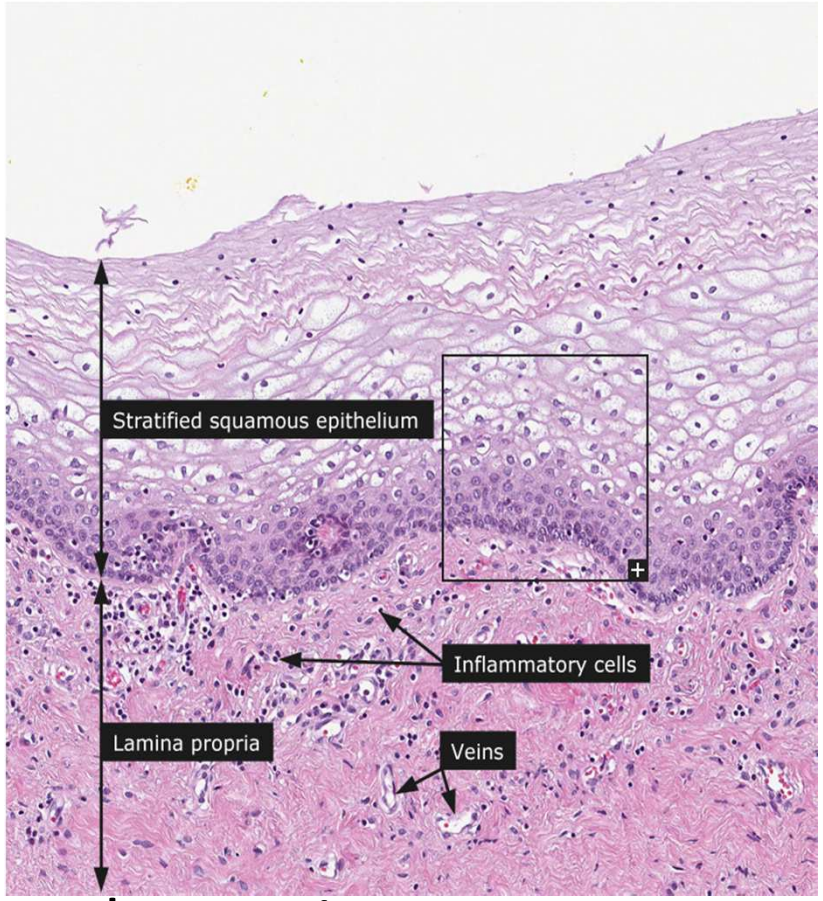
2.Muscular wall .

3.Adventitia.



The **mucosa** : the lining epithelium is **non keratinized stratified squamous** epithelium.

.Under the influence of **estrogen** the lining epithelium synthesize and accumulate **glycogen** , which is converted to lactic acid by the bacteria causing a low PH within the vagina that helps the protection against pathogenic microorganisms.



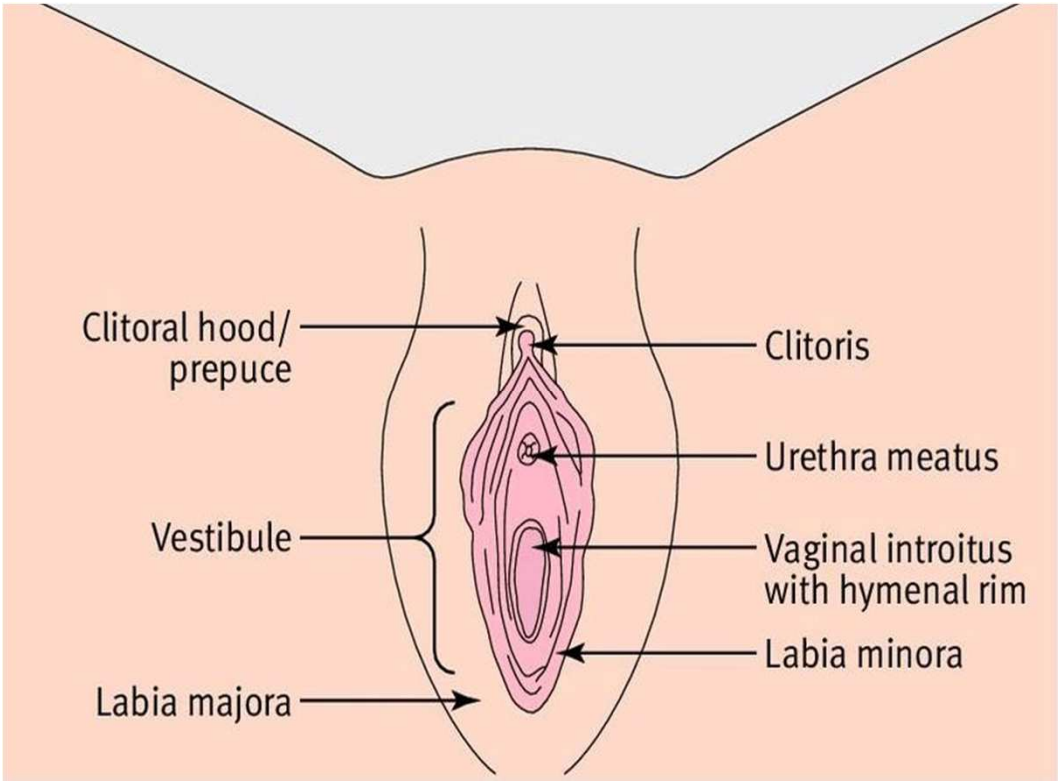
.The **muscular** wall is of two distinct layers: inner circular and a thicker outer longitudinal layer.

. **Adventitia**: dense connective tissue rich in elastic fibers giving strength and elasticity to the vaginal wall.

5. External genitilia (Vulva)

. It include several structures, all covered by stratified squamous epithelium:

1. Vestibule
2. labia minora
3. labia majora
4. Clitoris

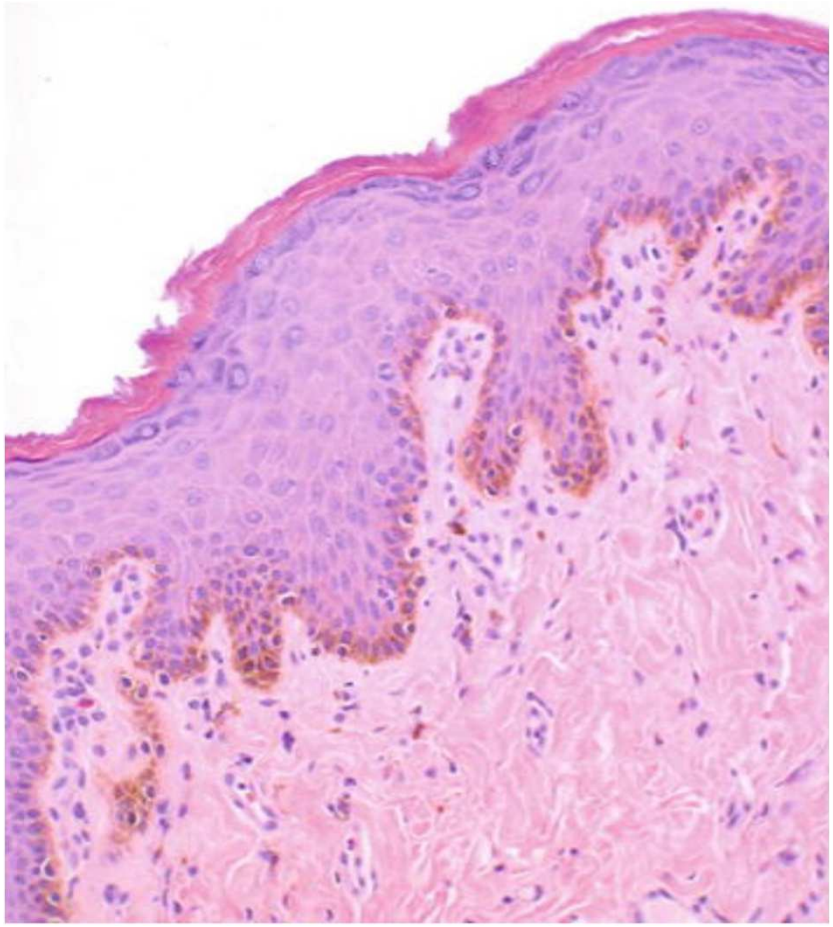


. **Vestibule**: a space whose wall include glands.

. Paired **labia minora**: folds of skin lacking hair follicles but has numerous sebaceous glands .

.Paired **labia majora**.

. **Clitoris** : an errectile structure similar to the penis with paired corpora cavernosa.

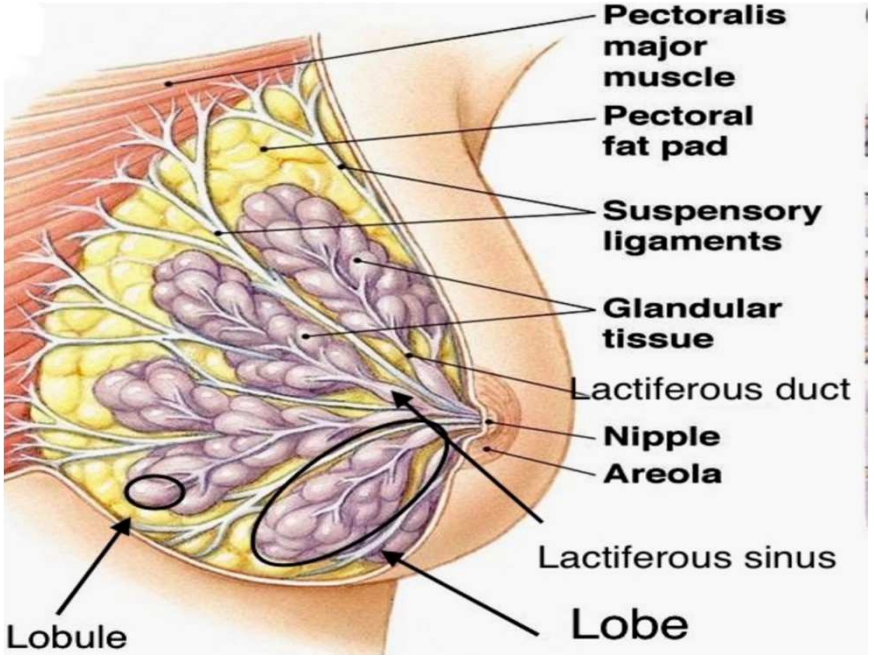


The mucosa of these structure abunduntly supplied with sensory nerves and tactile receptors.

The mammary gland

The mammary glands are a specialized accessory glands of the skin(modified sweat glands) .

.Each mammary gland consists of **15-25 lobes** of a compound tubuloalveolar type whose function is to secret milk.

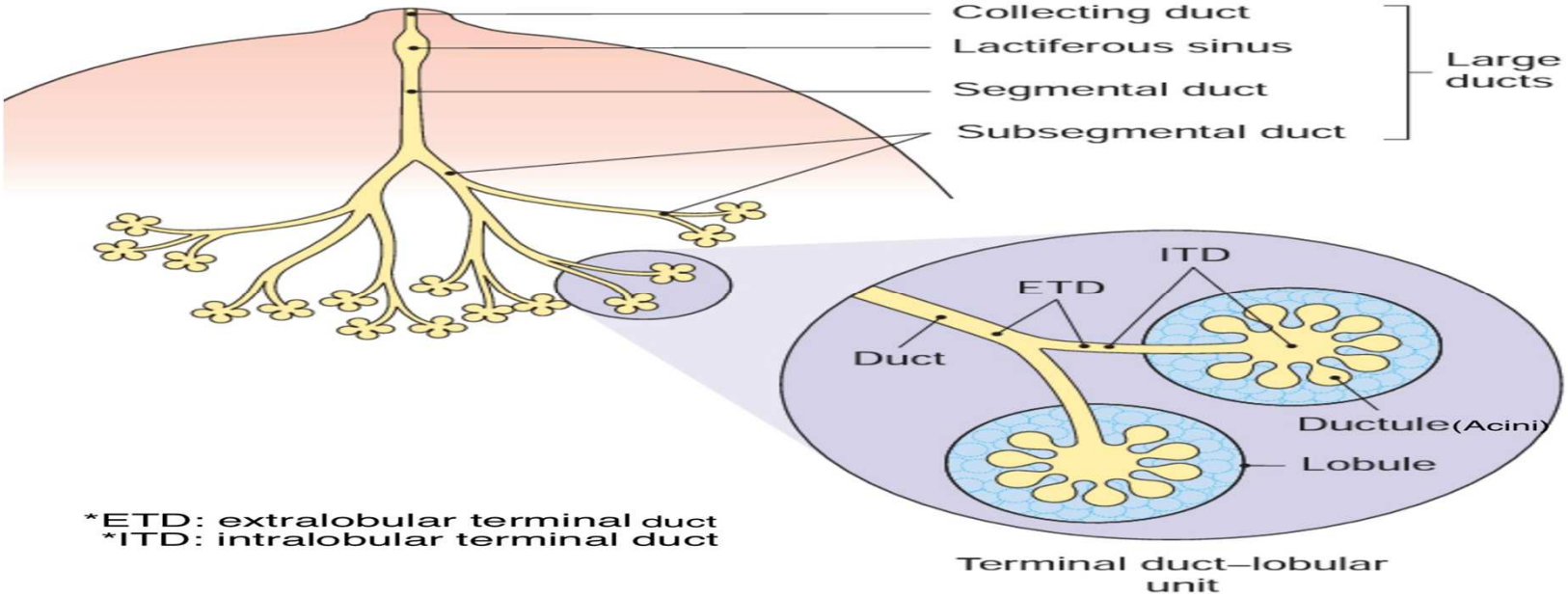


.Each lobe is separated from the others by dense **connective tissue** with much **adipose tissue** .

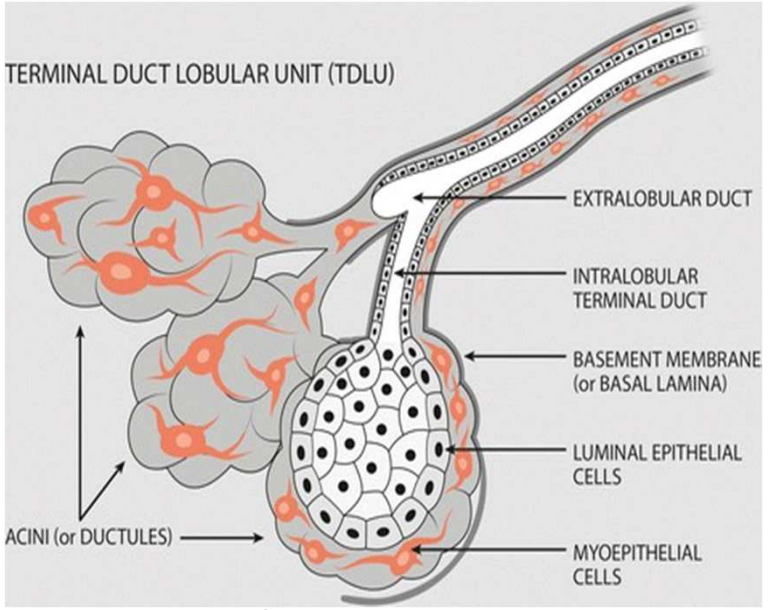
Each lobe is a separate gland and its divided into numerous lobules, sometimes called the terminal duct lobular unit(**TDLU**).

With **intralobular** (surrounds acini within the TDLU) and **interlobular**(surrounds large ducts and TDLUs) connective tissue.

The lobule consist of secretary portion(acini) and an excretory portion(duct system).

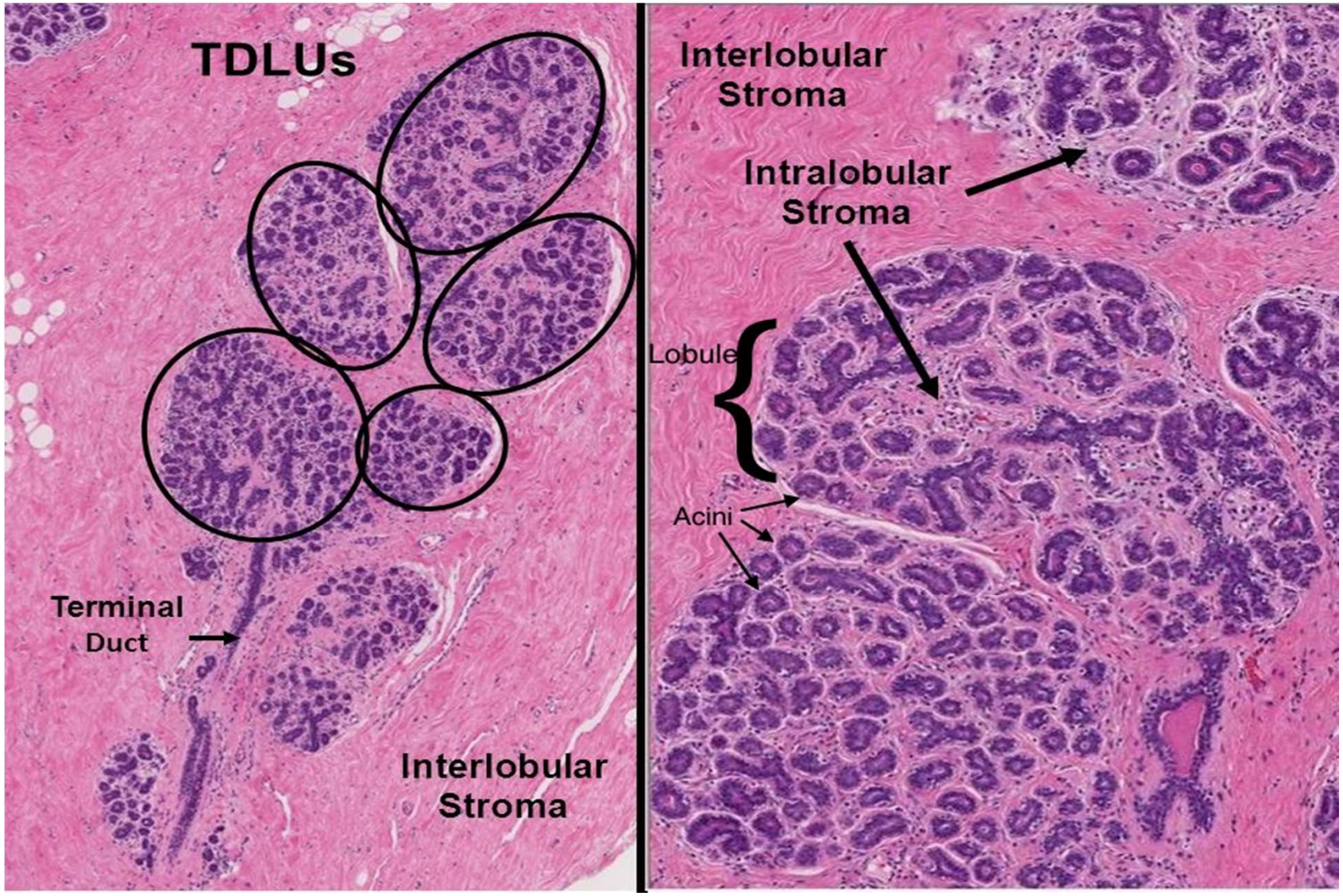


.The **alveoli** are oval-round and lined by simple cuboidal epithelium , between the epithelium and basal lamina are the myoepithelial cells.



.The **duct** system: the smallest branch of the duct system is found inside the lobule is the intralobular duct , which drains into the interlobular duct , these ducts are joined together to form the main excretory duct(lactiferous duct) , as the this duct runs away from the lobe it becomes dilated forming the lactiferous sinus.

The terminal duct lobular unit



.Each lobe has its own excretory **lactiferous duct**, The lactiferous ducts(each **2-4.5** cm long) emerge in the nipple which has 15-25 pore like openings ,each about **0.5** mm in diameter.

.The lactiferous sinuses are lined by **stratified cuboidal** epithelium , while the lining of the lactiferous ducts and terminal ducts is **simple cuboidal** epithelium with many myoeithelial cells.

.The duct system is embedded in loose vascular connective tissue and a denser less cellular connective tissue separate
the lobes.

.In the **premenstrual** phase of the reproductive cycle, connective tissue of the breast becomes somewhat edematous making the breast slightly larger.

The **areola** (skin surrounding and covering the nipple), contains sebaceous glands and abundant sensory nerves and is continuous with the mucosa of lactiferous sinuses.

.The areola has more melanin than the skin elsewhere on the breast and it darkens further during pregnancy. Connective tissue in the nipple is rich in smooth muscle fibers and produce nipple erection when contract.

Breast development during puberty

.**Before puberty**, the mammary gland in both sexes are composed only of lactiferous sinuses near the nipple, with very small branching ducts emerging from these sinuses.

.In girls **undergoing puberty**, higher levels of estrogen cause the breast to grow as a result of **elongation** of the duct system and **adipocyte** accumulation.

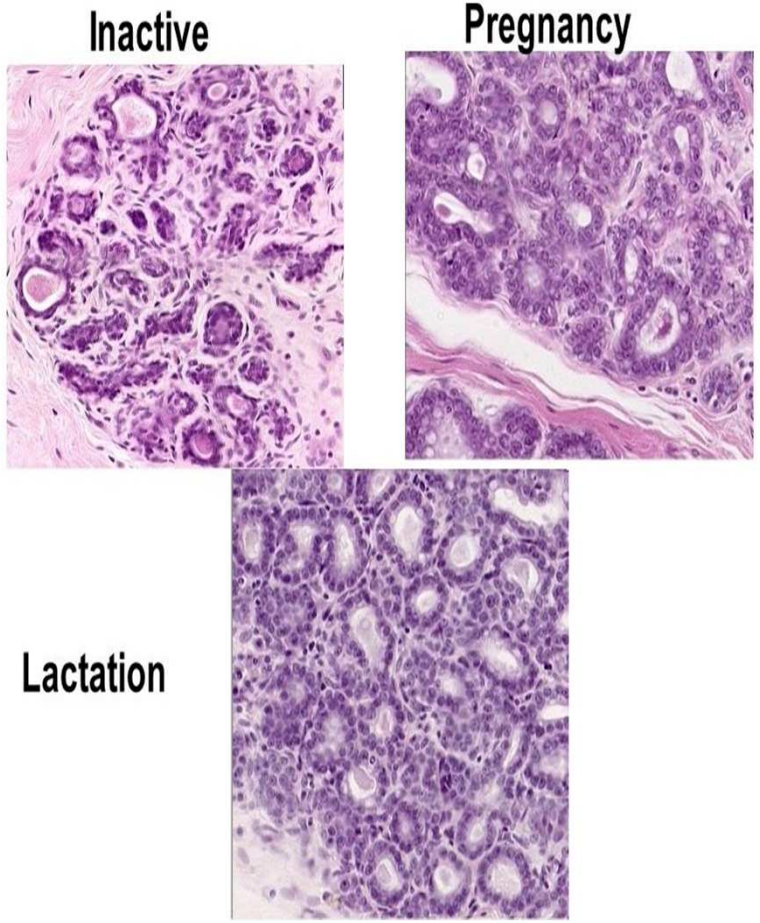
.In nonpregnant adult women each lobe consist of many lobules , also called the terminal duct lobular unit(TDLU). Each lobe has several branching ducts, but the attached secretary units remain small and rudimentary.

Breasts during pregnancy and lactation

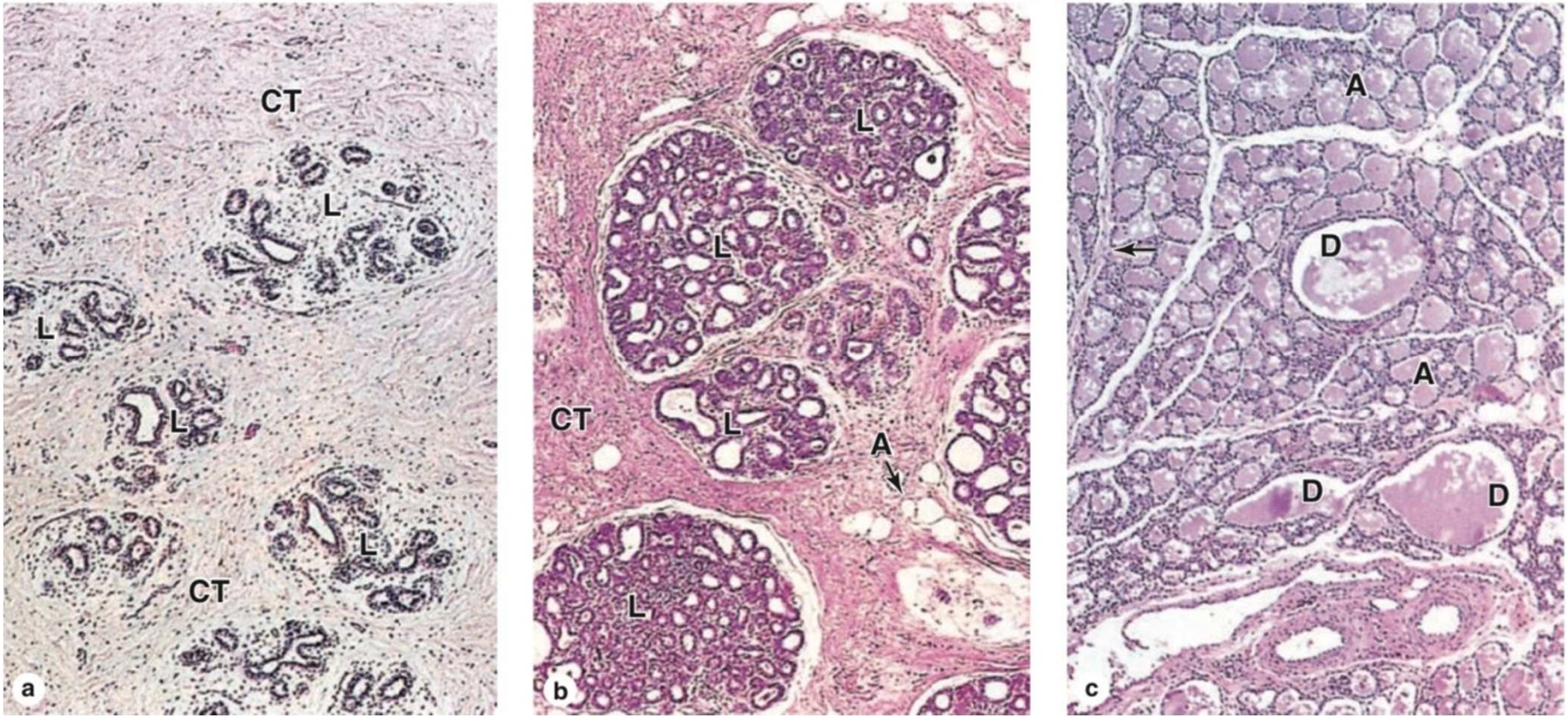
.The alveoli develop completely only during pregnancy, the breast undergo growth under the influence of several hormones, (**estrogen**, **progesterone**, **prolactin**).

.They cause cell proliferation in the alveoli at the end of intralobular ducts.

.The alveoli and duct system grow and develop preparing for lactation, the stroma become less prominent , the loose connective tissue between the lobules is infilterated by lymphocytes and plasma cells.

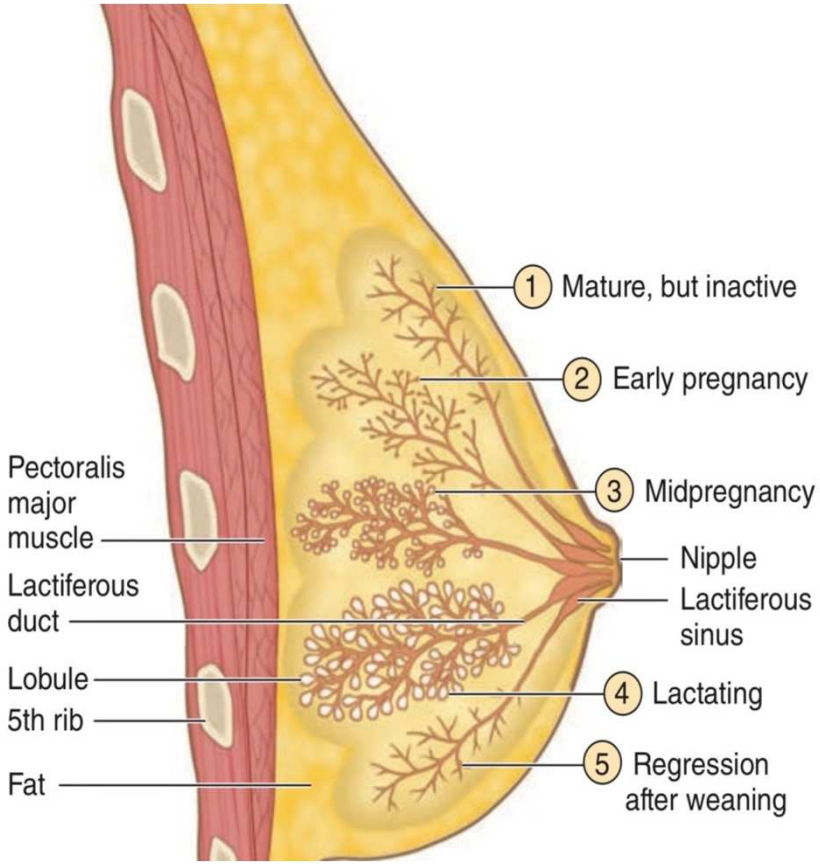


.Later in pregnancy, the alveoli and ducts become dilated and filled with **colostrum** (fluid rich in protein ,immunoglobulin A (IgA) and contain leukocytes and its produced under the influence of prolactin)



A:Inactive breast in adult nonpregnant woman.
B:Active breast during pregnancy
C:Lactating breast

.Following parturition, the alveoli start milk production (**lactation**) stimulated by prolactin from the anterior pituitary gland.
The secreted milk is rich in protein, lipid, lactose, iron and calcium.



.After **weaning** , the alveoli and ducts regress and degenerate by apoptosis and removal of the debris by macrophages returning to prepregnancy inactive state.
.After **menopause**, the alveoli and ducts are reduced further in size with loss of fibroblasts, collagen elastic fibers in the stroma.

Thank you