

Female Reproductive System-2

Dr. Charushila D. Shinde

Associate Professor
MBBS,MD
MGM Medical College
Navi Mumbai

UTERUS



- ▶ **It is hallow, thick walled & muscular organ.**
 - ▶ **It is child bearing organ in female.**
 - ▶ **It provides suitable site and environment for fertilized embryo.**
 - ▶ **It's muscular wall adopts the growth of foetus and also provides expulsion of it during child birth**
 - ▶ **It is situated in lesser pelvis between rectum and urinary bladder.**
- 

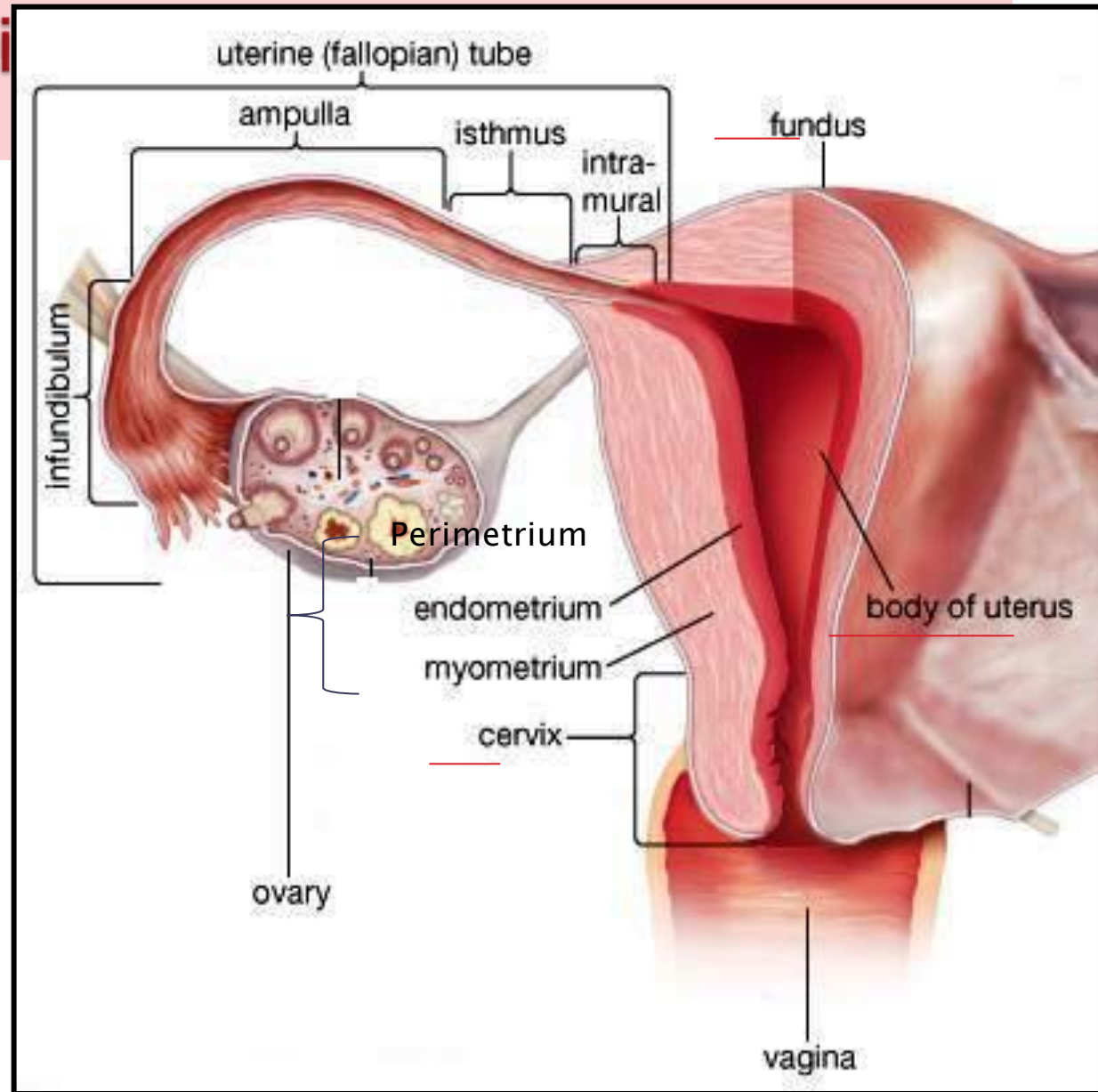
Parts / Divisi

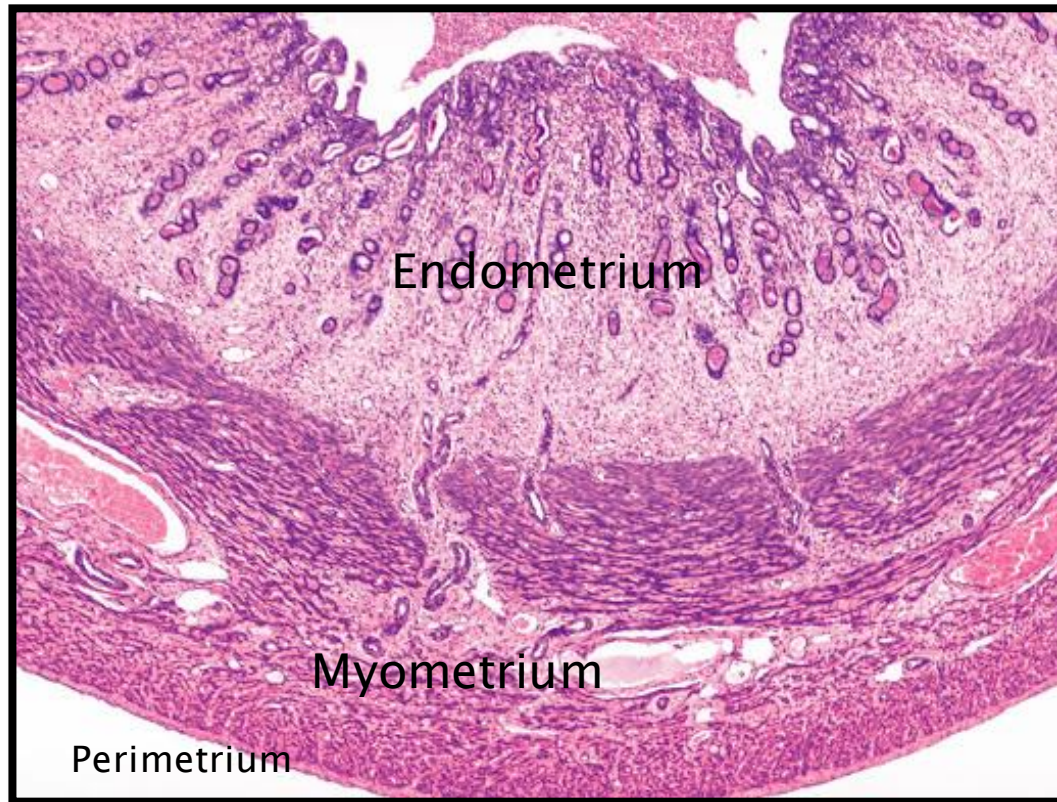
Parts-

- ▶ Fundus
- ▶ Body
- ▶ Cervix

Layers-

- ▶ Perimetrium
- ▶ Myometrium
- ▶ Endometrium





Perimetrium–

- ▶ It is the outermost layer of serosa or adventitia.
- ▶ The part of the uterus covered by peritoneum has serosa, and the remaining part has adventitia

Myometrium

- ▶ Underlying the stratum basale there is a muscular layer, the myometrium, which is the thickest layer of the uterine wall.
 - ▶ The smooth muscle bundles are arranged in various directions.
 - ▶ The myometrium consists of three ill-defined layers. The middle layer is the thickest with rich blood supply - hence called stratum vasculare.
- 

Myometrium

- ▶ Blood vessels are present in between the smooth muscle bundles.
- ▶ During pregnancy, the enlargement of the uterus is primarily due to hypertrophy and hyperplasia of uterine smooth muscles.

At parturition, the hormone oxytocin induces powerful contractions of the uterine muscles to expel the foetus

Endometrium

- ▶ Endometrium is the mucosal layer.
 - ▶ It shows 2 zones
 - ▶ **The stratum functionale** – Wide, superficial layer, which constitutes about 80% of the endometrial thickness and is shed during menstruation
It is further divided as-st.spongiosum & st. compactum.
 - ▶ **The stratum basale** – Narrow, deeper layer, which is not shed during menstruation. The basal part of the endometrial glands is present in this layer.
- 

Endometrium

- ▶ **These zones shows 3 Layers** –
 - ▶ **Epithelium** – Simple columnar. It invaginates into the underlying lamina propria as long, tubular uterine glands.
 - ▶ **Uterine glands** – Are usually straight superficially but may be branched in deeper regions, thus in the slide many cut sections of the glands are seen.
 - ▶ **Lamina propria** – Thick connective tissue layer.
 - ▶ The endometrium undergoes cyclical changes during the menstrual cycle.
- 

Cyclical changes in myometrium–

- ▶ In the reproductive age group, the microscopic features of the stratum functionale undergo regular cyclical changes during the menstrual cycle.
- ▶ The changes are mainly seen in the thickness of the endometrium, the length and coiling of the arteries and the glands.
- ▶ The regular 28-day cycle has **three phases-**
 - menstrual
 - proliferative
 - secretory

Menstrual phase–

- ▶ **Days** - This phase lasts from day 1 to day 4 or 5 of the menstrual cycle.
- ▶ **Hormonal influence** - Decline in the progesterone level, due to degeneration of corpus luteum.
- ▶ The entire stratum functionale is shed. The menstrual fluid containing the necrotic tissue of stratum functionale and blood is discharged through the vagina.
- ▶ The straight arteries of the stratum basale do not undergo constriction during this phase, and hence no ischaemic changes occur in stratum basale and it is not shed.

Proliferative phase–

- ▶ **Days** - From the 4th or 5th day to 14th day of the 28 day menstrual cycle.
- ▶ **Hormonal influence** - Oestrogen, secreted from the developing ovarian follicles.
- ▶ The stratum functionale, which was shed during the menstrual phase, regenerates from stratum basale. The thickness of stratum functionale increases.
- ▶ The glands are straight, and they increase in length.
- ▶ The spiral arteries increase in length, but do not extend beyond basal two-thirds of the endometrium.

Secretory phase–

- ▶ **Days** - This phase lasts from day 15 to day 28.
- ▶ **Hormonal influence** - Progesterone secreted by the corpus luteum.
- ▶ Thickness of the endometrium increases further, and it almost doubles that in the previous phase.
- ▶ Glands enlarge and become highly coiled, characterized by ‘**saw-tooth appearance**’ in sections. Their lumens are filled with secretions.
- ▶ The spiral arteries become more coiled, and they grow in length and extend into the superficial region of the stratum functionale.

Menstrual phase–

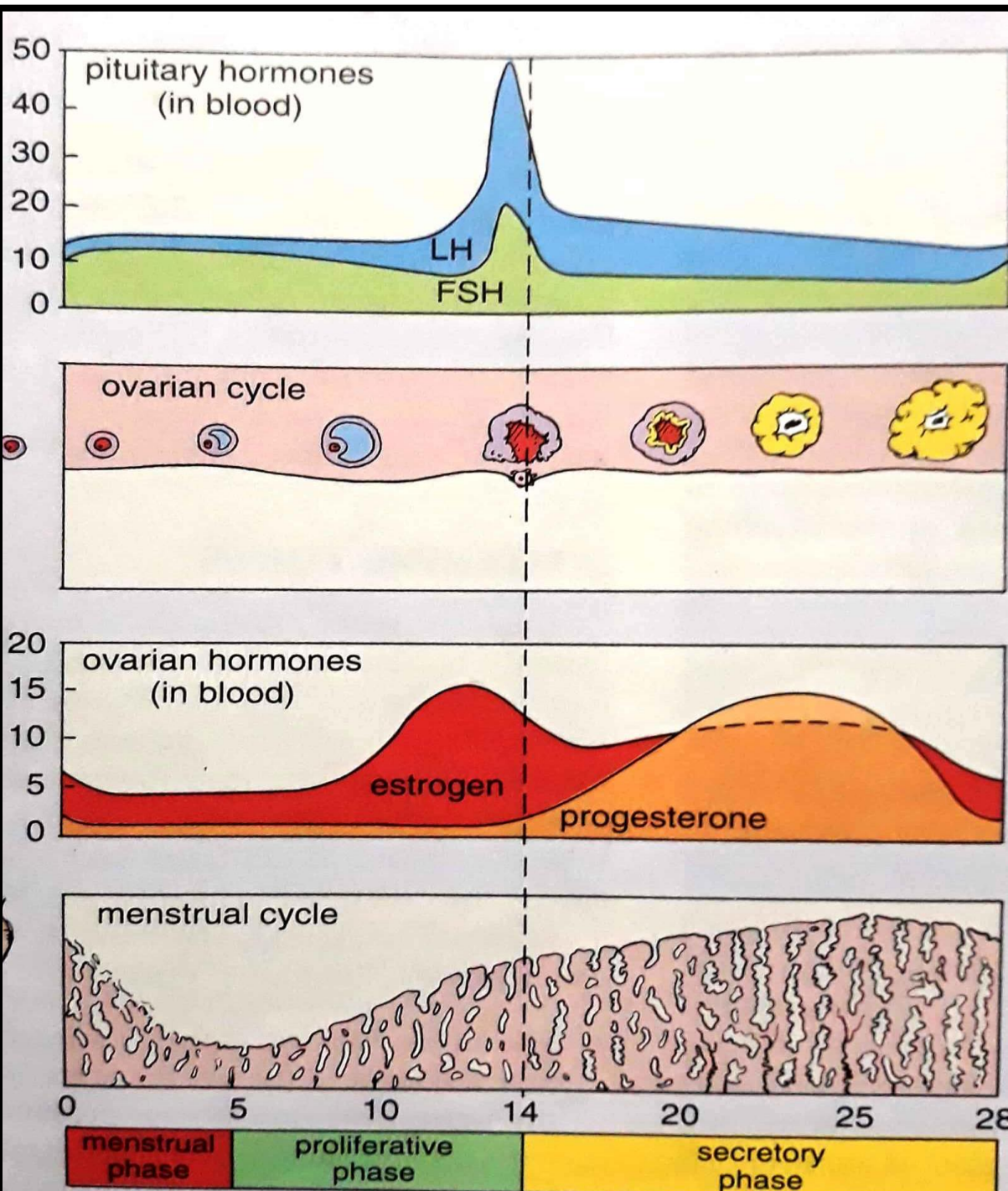
- ▶ **Days** - This phase lasts from day 1 to day 4 or 5 of the menstrual cycle.
- ▶ **Hormonal influence** - Decline in the progesterone level, due to degeneration of corpus luteum.
- ▶ The entire stratum functionale is shed. The menstrual fluid containing the necrotic tissue of stratum functionale and blood is discharged through the vagina.
- ▶ .

Proliferative phase–

- ▶ **Days** - From the 4th or 5th day to 14th day of the 28 day menstrual cycle.
- ▶ **Hormonal influence** - Oestrogen, secreted from the developing ovarian follicles.
- ▶ The stratum functionale, which was shed during the menstrual phase, regenerates from stratum basale. The thickness of stratum functionale increases.
- ▶ The glands are straight, and they increase in length.
- ▶ The spiral arteries increase in length, but do not extend beyond basal two-thirds of the endometrium.

Secretory phase–

- ▶ **Days** - This phase lasts from day 14 to day 28.
- ▶ **Hormonal influence** - Progesterone secreted by the corpus luteum.
- ▶ Thickness of the endometrium increases further, and it almost doubles that in the previous phase.
- ▶ Glands enlarge and become highly coiled, characterized by ‘saw-tooth appearance’ in sections. Their lumens are filled with secretions.
- ▶ The spiral arteries become more coiled, and they grow in length and extend into the superficial region of the stratum functionale



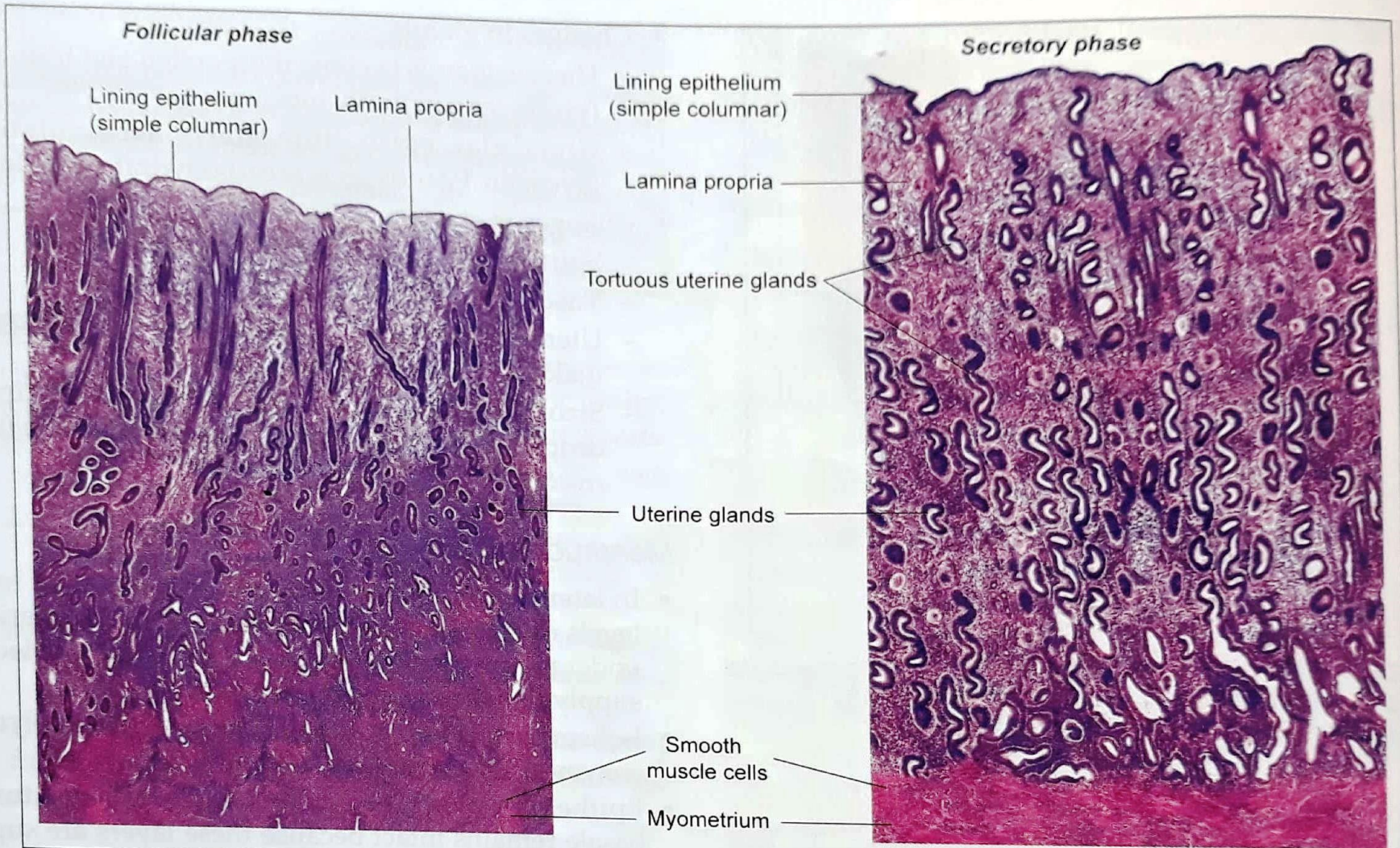


Fig. 23.15: Photomicrograph. Histology of uterus (follicular phase on left and secretory phase on right)



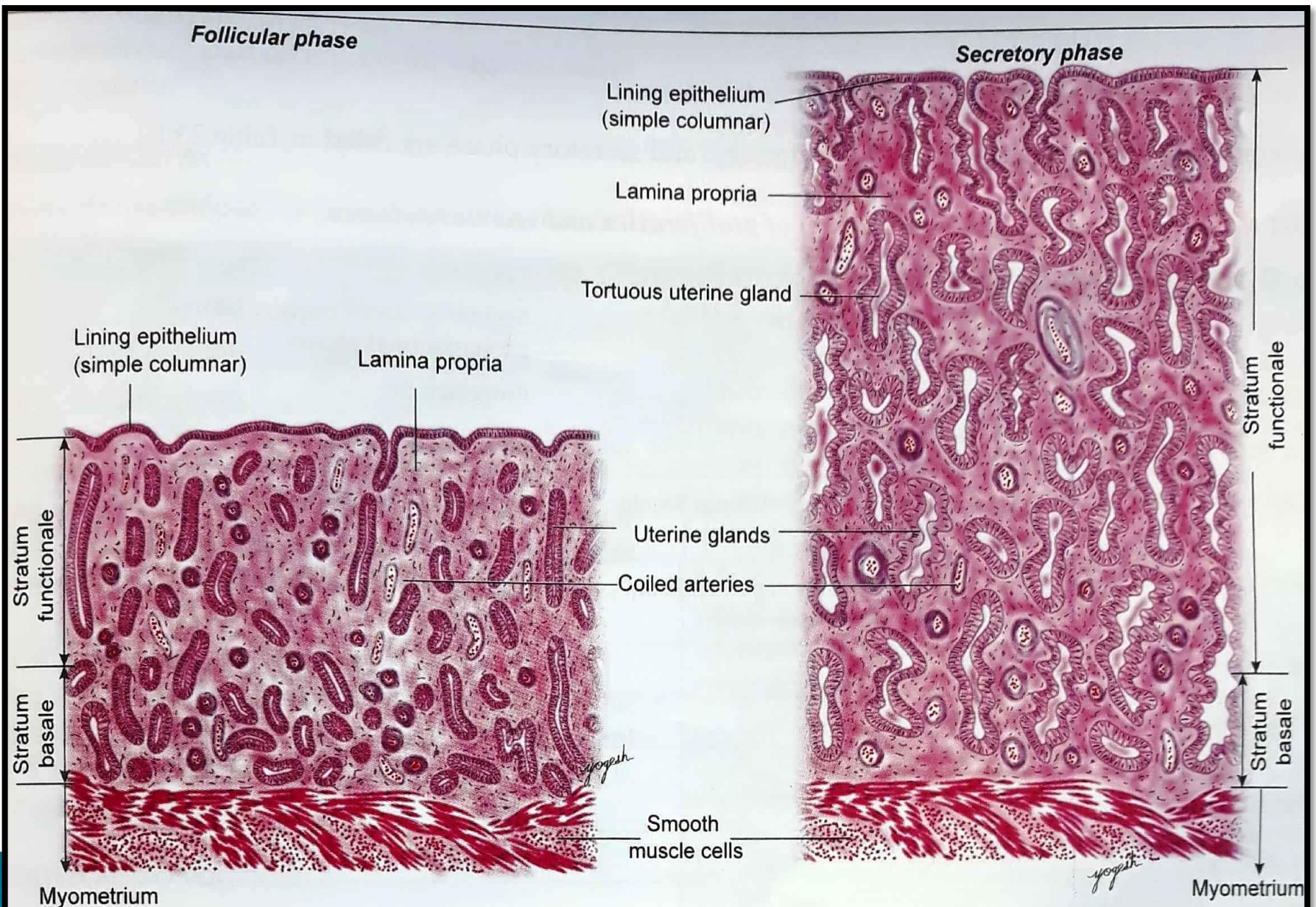


Fig. 23.14: Histology of uterus (follicular phase on left and secretory phase on right).

Uterus in different phases:

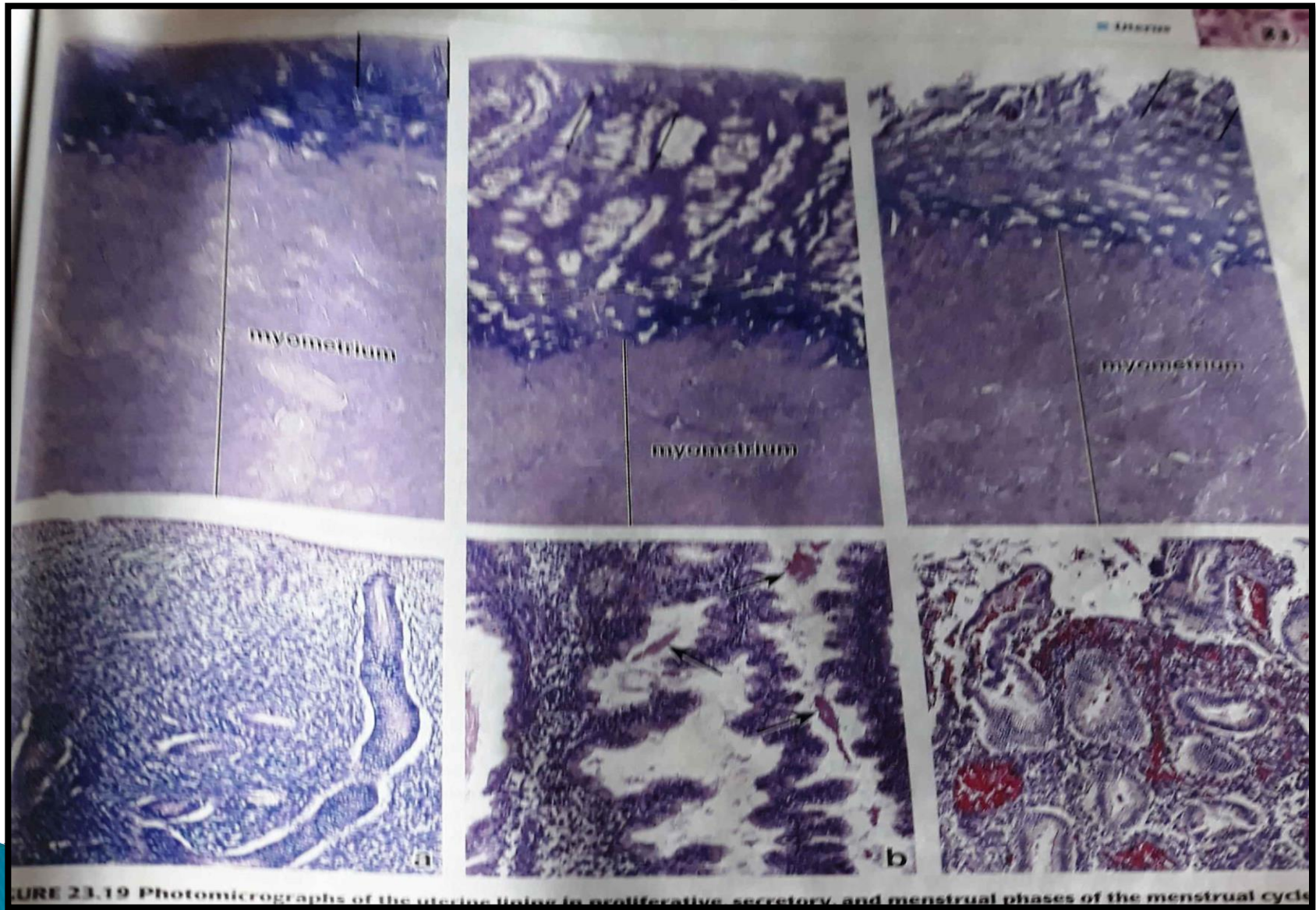


FIGURE 23.19 Photomicrographs of the uterine lining in proliferative, secretory, and menstrual phases of the menstrual cycle

Menstrual phase

Secretory phase

Proliferative phase

Cervix of uterus–

- ▶ Cervix has 2 parts – supravaginal and vaginal
- ▶ Cervical canal/ endocervix –
 - is narrow canal lined by mucus secreting simple columnar epithelium.
 - Epithelium rest on lamina propria
 - Cervical glands-branched tubular mucus glands. These glands secrete- cervical mucus that is rich in lysosomes
- ▶ Ectocervix - the portion of cervix that projects into vagina is covered with stratified squamous epithelium.

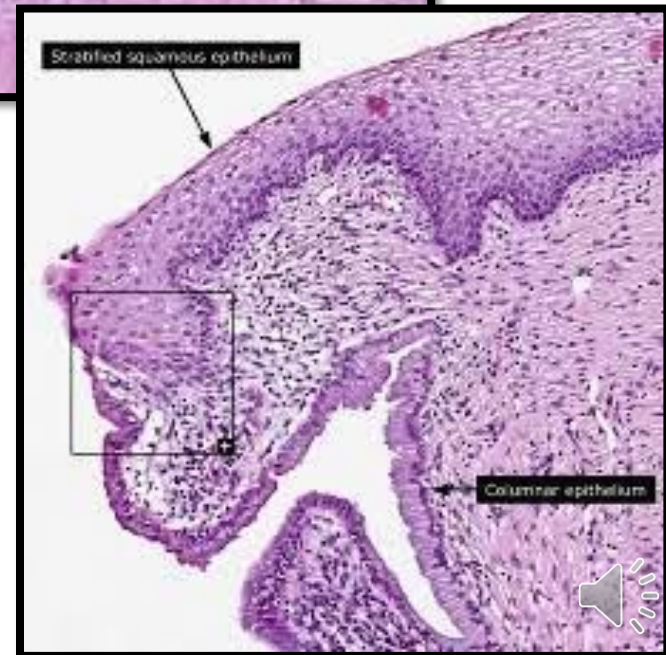
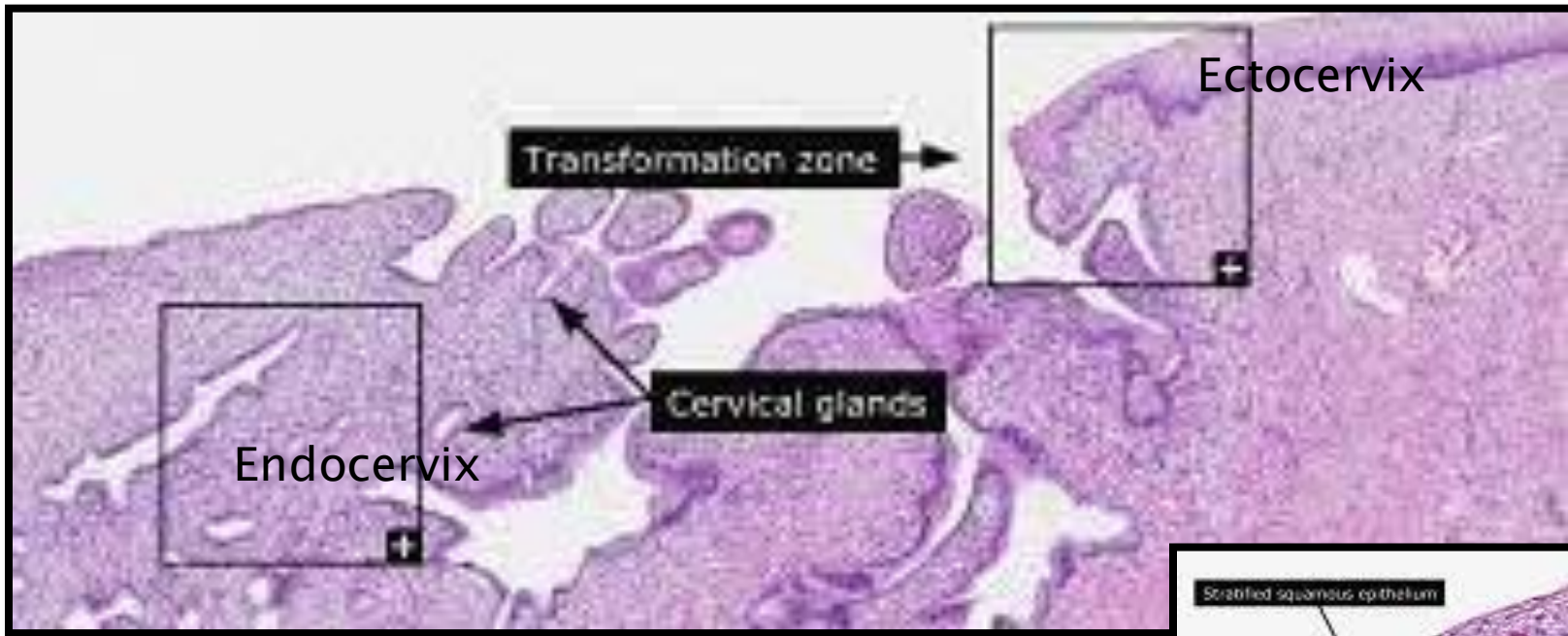
Cervix of uterus–

- ▶ An abrupt transition between the 2 epithelia of endo and ectocervix occurs in the transformation zone
- ▶ Transformation zone is located just outside the external os in a reproductive age group.

Muscle coat- mucosa /endo cervix-rest om fibroelastic tissue& smooth muscle fibres. Muscle fibres are less in quantity.

Fibroelastic component is essential for stretching during labour.

cervix



- ▶ Cervical epithelial cells are constantly shed of into vagina.

- ▶ PAP smear-

cervical cells ate collected & stained & observed for routine screening & diagnosis of cervical cancers.

Placenta:

Placenta is a feto-maternal organ required for the survival of the fetus.

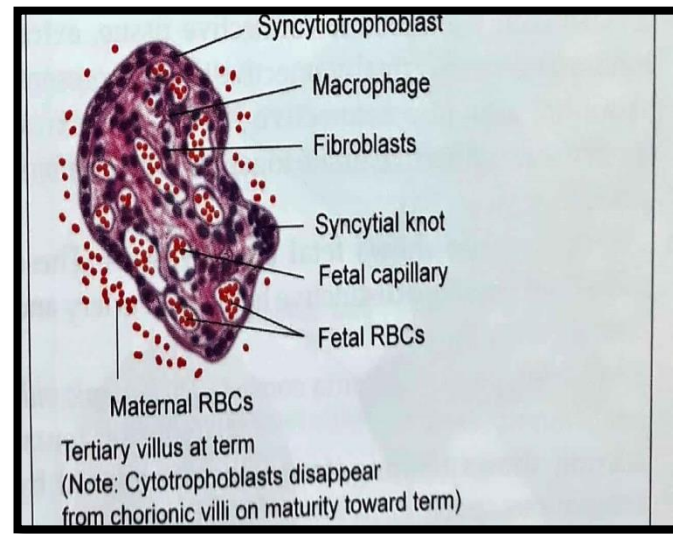
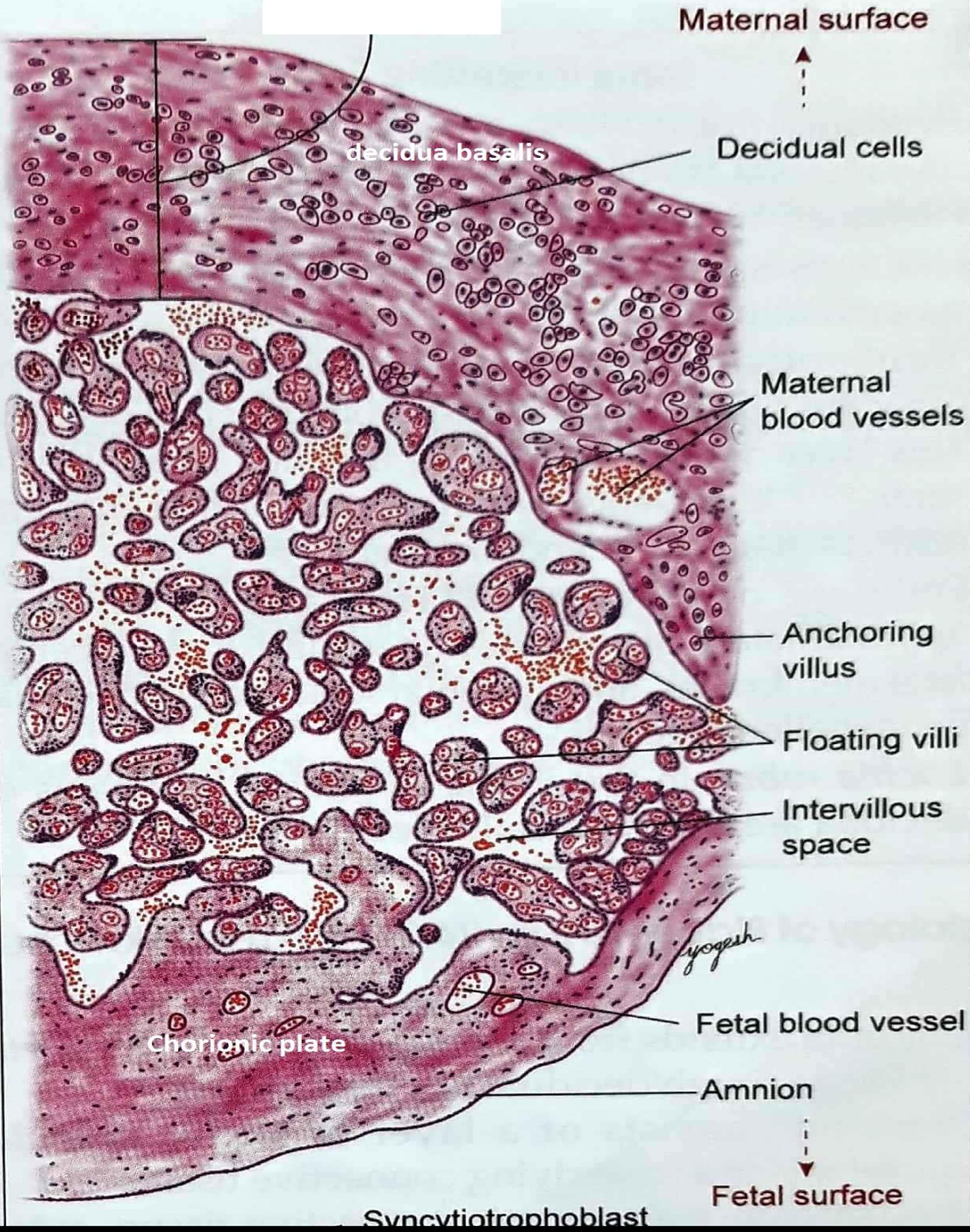
- ▶ **Fetal portion** of placenta is developed from chorion and **maternal portion** is develop from decidua basalis.
 - ▶ Utero-placental circulation begins in a second week(9th day)
- 

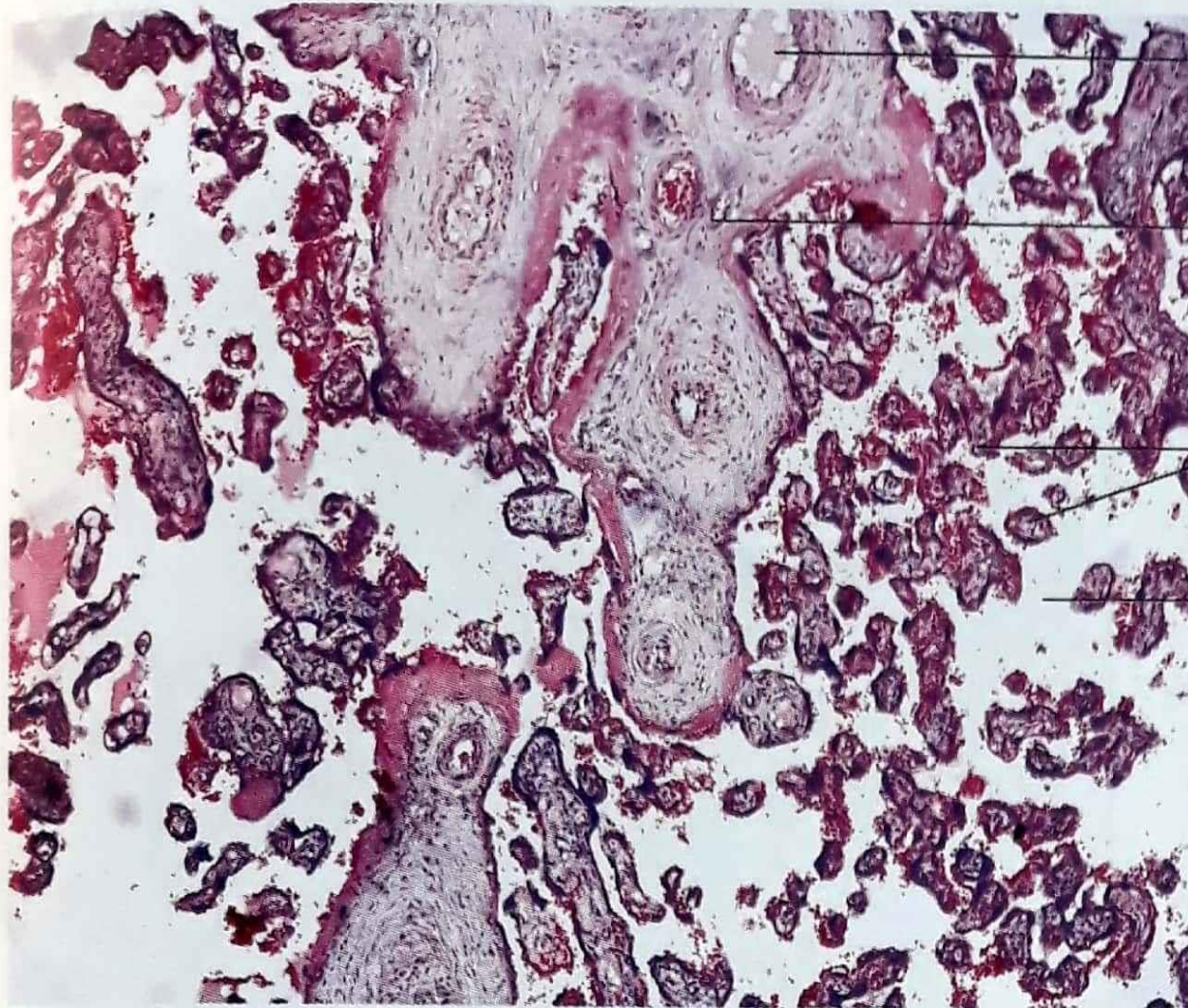
Placenta:

- ▶ Proliferation of cytotrophoblast, growth of chorionic mesoderm and blood vessel development successfully give rise to-
 - Primary chorionic Villi
 - Secondary chorionic Villi
 - Tertiary chorionic Villi
- ▶ Formation of trophoblastic shell around syncytio trophoblast-
- ▶ The trophoblastic shell is interrupted only at a site where maternal vessel communicate with inter villous space.

- ▶ Two types of cell recognise in the connective tissue stroma of villi-
 - Mesenchymal cells & hofbauer cells.
- ▶ The hofbauer cells are more common at early placenta
- ▶ The layer of the Placenta from which the Villa project is called chorionic plate.
- ▶ At about four to fifth month of gestation the fetal part of placenta is divided by the placental Septa into 15 to 25 areas called cotyledons.

- ▶ The deciduous basalis forms a compact layer known as a basal plate, which is maternal component of the placenta.
- ▶ Fetal and maternal blood are separated by placental barrier
- ▶ Components of thick & thin placental barrier-





Maternal
blood vessels

Anchoring
villus

Fibroblasts

Floating villi

Intervillous
space

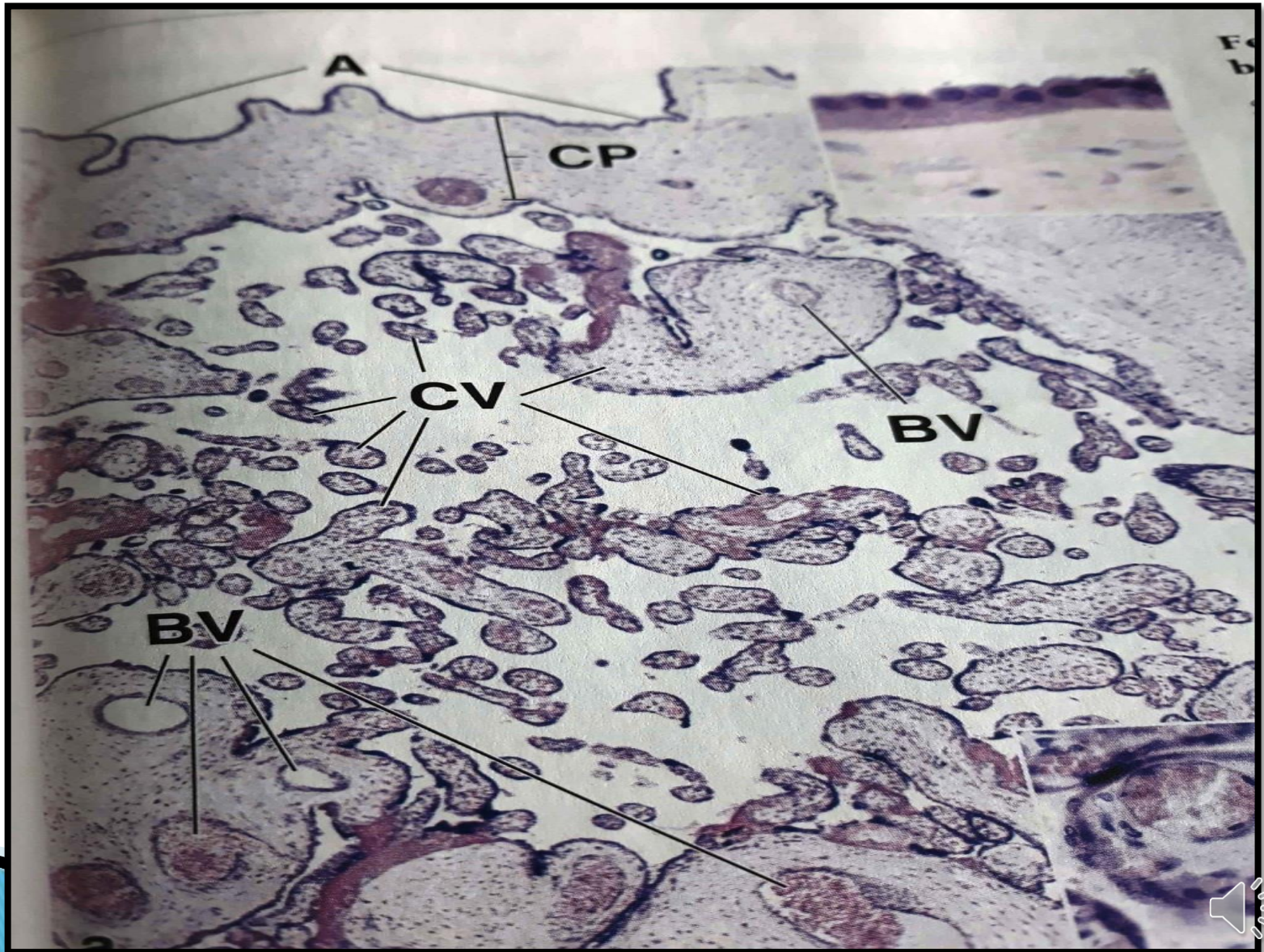
Syncytiotrophoblast

Syncytial knot

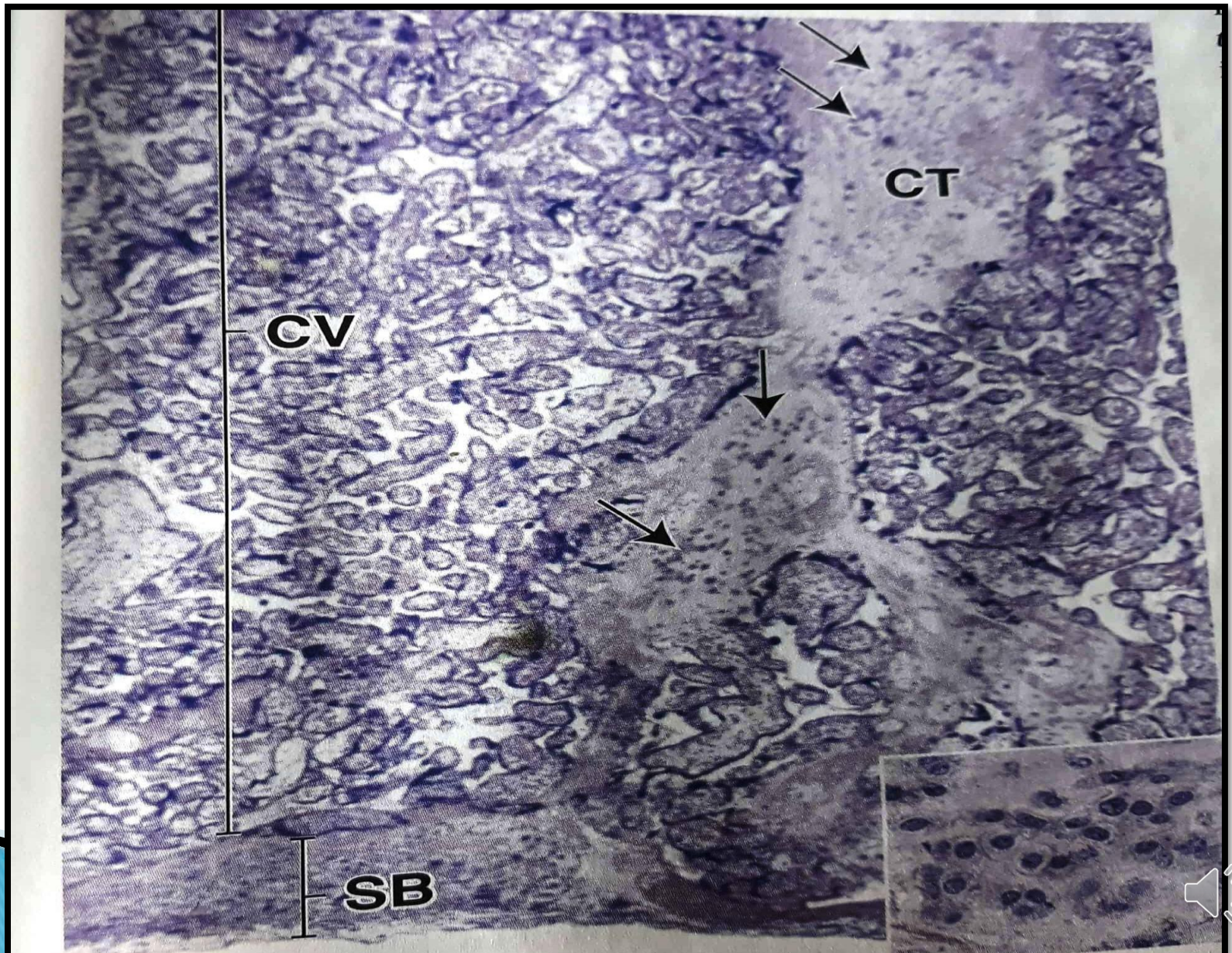
Maternal RBCs



Foetal surface:

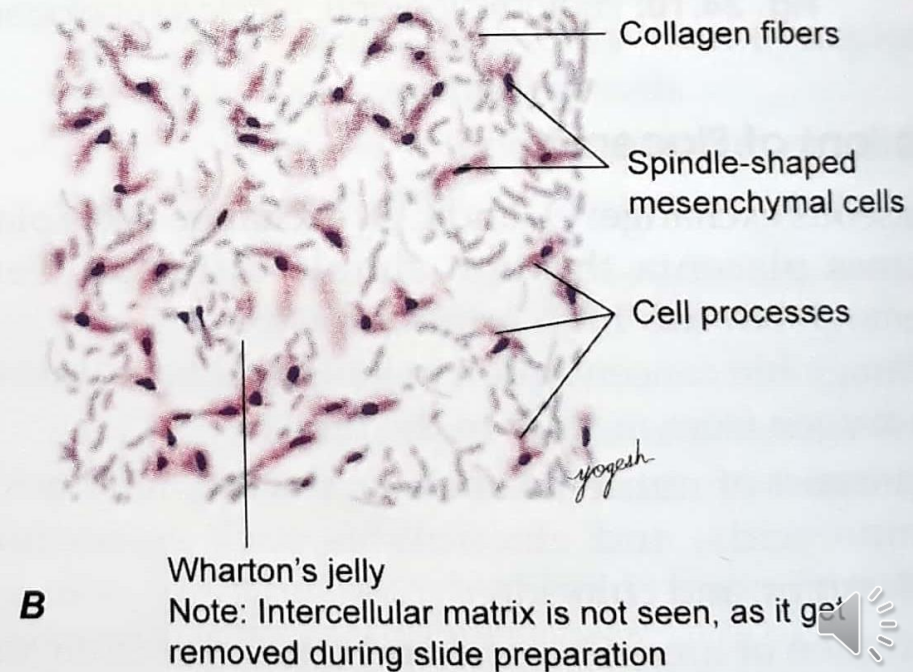
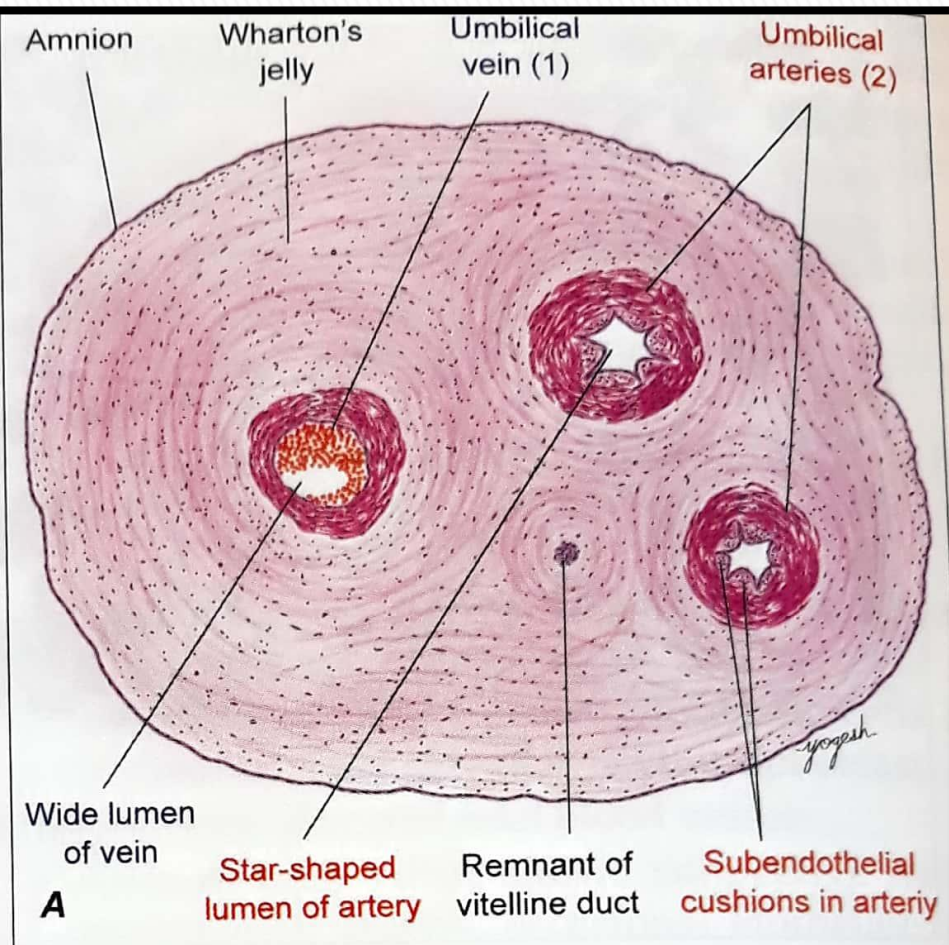


Maternal surface:



Umbilical cord–

- ▶ It connects fetus with placenta.
 - ▶ It is derived from connecting stalk of the embryo.
 - ▶ Cross section of umbilical cord at term shows –
 - Single umbilical vein
 - Two umbilical arteries
 - Wharton's jelly – a mass of gelatinous mucoid connective tissue in which umbilical vessels are embedded
 - Cord is covered by amnion lined by simple cuboidal epithelium
- 



Assignment–

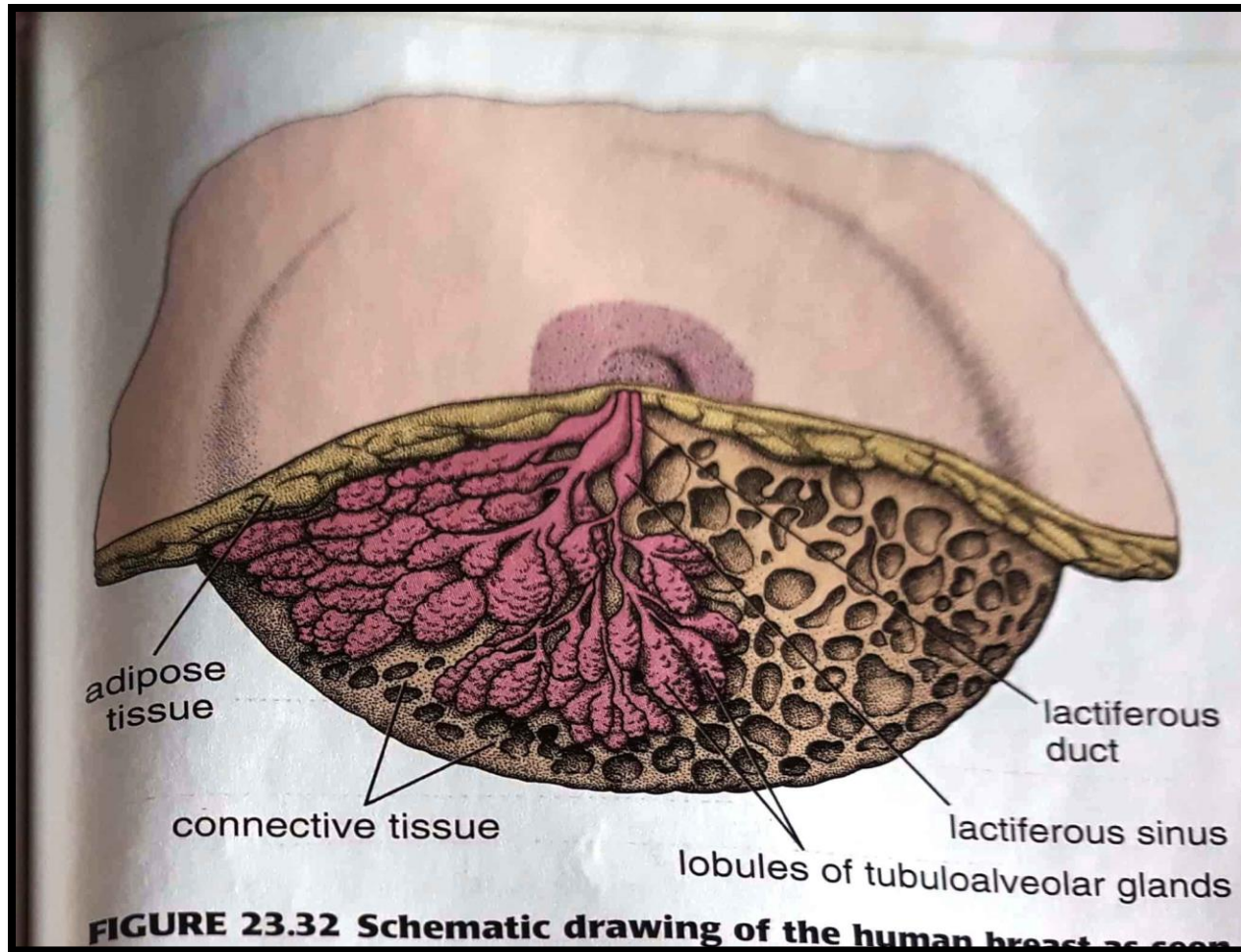
- ▶ Draw & describe microscopic structure of-
Uterus in different phases
Placenta

Female Reproductive System-3

Dr. Charushila D. Shinde

Associate Professor
MBBS,MD
MGM Medical College
Navi Mumbai

Mammary gland:



Mammary gland–

- ▶ Mammary gland- /breast is a distinguishing feature of mammals.
 - ▶ Modified apocrine sweat glands gland that develop under the influence of sex hormones
 - ▶ The secretory portion of the mammary gland varies with the menstrual cycle
- 

- ▶ Consists of 15 – 20 lobes.
 - ▶ Each **lobe** is a compound tubulo-alveolar gland with its own lactiferous duct, which emerges onto the surface of the nipple.
 - ▶ Each lobe consists of many **lobules**.
 - ▶ **Interlobar stroma** – Connective tissue and fat separating lobes from each other.
 - ▶ **Interlobular connective tissue** is present between lobules.
- 

Inactive mammary gland–

Glandular tissue –

- ▶ The glandular component is sparse and consists of chiefly the ducts.
 - ▶ Lactiferous ducts are lined by stratified squamous epithelium.
 - ▶ The epithelial lining of the duct shows the gradual transformation from stratified squamous to two layer cuboidal cells in the lactiferous Sinus to simple cuboidal or columnar in rest of duct.
- 

Connective tissue –

- ▶ Abundant. Intralobular connective tissue is loose, fine with fibroblasts, lymphocytes, plasma cells and eosinophils.
- ▶ Interlobular connective tissue – dense connective tissue with adipose tissue.

Inactive mammary gland–

- ▶ During menstrual cycle inactive mammary gland undergoes slight cyclic changes.
- ▶ Early in the cycle the duct appears as a cord with little or no lumen.
- ▶ Under oestrogen stimulation, at about the time of ovulation-
 - the secretory cells increase in height
 - lumen appears in the ducts
 - small amount of secretion accumulates , and fluid accumulates in the connective tissue.

Inactive mammary gland:



Active mammary gland–

Mammary gland undergo dramatic proliferation and development during pregnancy.

- ▶ It exhibit number of changes in preparation for lactation.
- ▶ Changes in the granular tissue (increases) accompanied by decrease the amount of connective tissue and adipose tissue.
- ▶ Plasma cells, Lymphocytes, eosinophils infiltrate the fibrous component of the connective tissue.

Active mammary gland–

Often development of glandular tissue is not uniform and variation in the degree of development is seen even within single lobule.

- I. The cells vary in shape from flattened to low columnar.
 - II. Ducts branch
 - III. Alveoli begins to develop
- 

Alveoli –

- ▶ Active alveoli – Low epithelium with milk secretion in the lumen.
- ▶ Milk – Eosinophilic material with vacuoles of dissolved fat droplets.
- ▶ Inactive alveoli – Empty with taller epithelium.
- ▶ Alveoli in intermediate stage of activity – Show cells containing secretions and vacuolated apices.
- ▶ Myoepithelial cells are flattened cells between alveolar cells and their basal lamina. Contraction of these cells helps in milk expression from alveoli.

- ▶ **Ducts –**

- ▶ Ducts also show presence of secretions in their lumina.

- ▶ **Interlobular ducts** – Taller columnar cells.

- ▶ **Lactiferous ducts** – Low pseudostratified columnar epithelium

Active mammary gland–

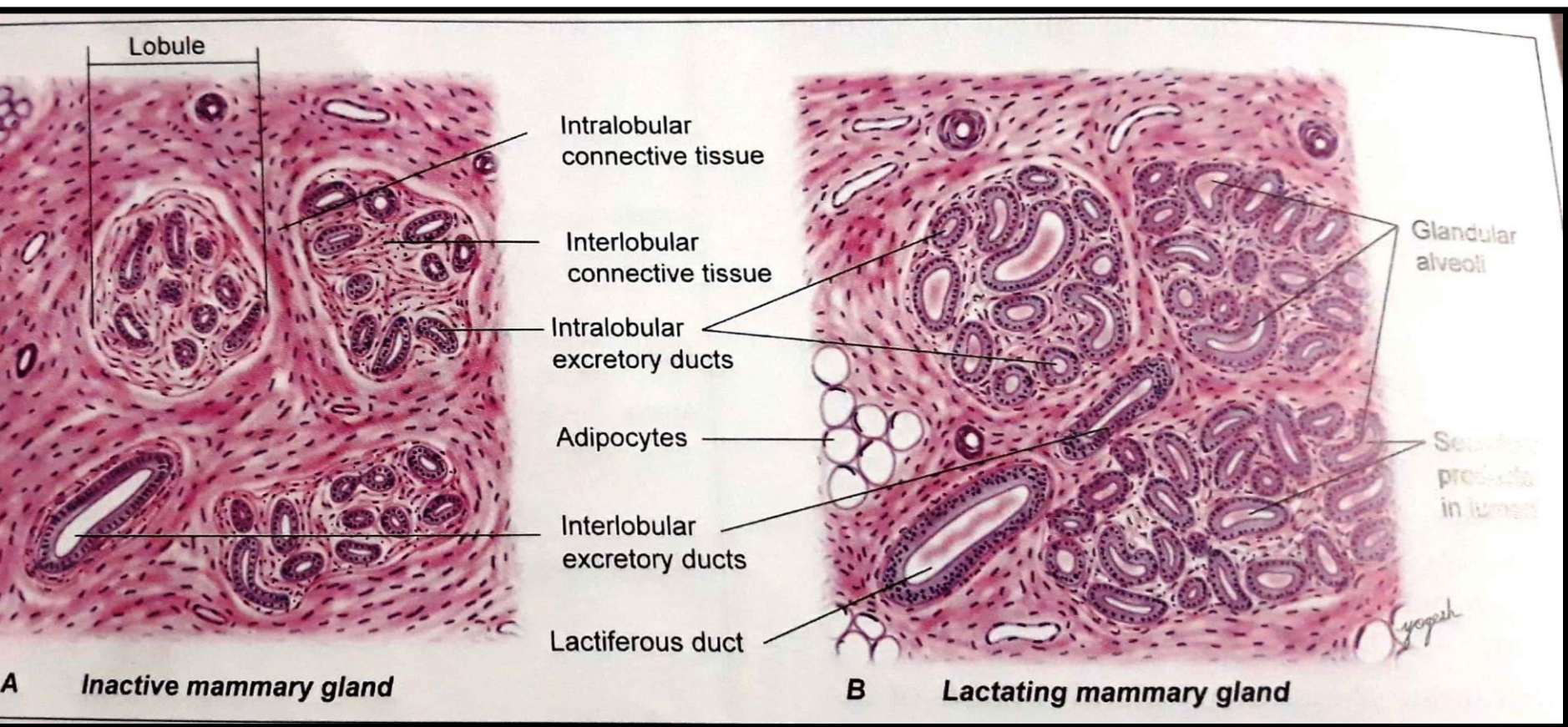
In later stage of pregnancy development becomes more prominent.

- ▶ Stromal proliferation declines
- ▶ Large enlargement of breast occurs through the hypertrophy of secretory cells and accumulation of the secretory products in the alveoli.
- ▶ Both merocrine and apocrine secretion are involved in the production of milk.
- ▶ Merocrine secretion- the protein component of the milk
- ▶ Apocrine secretion- fatty or repeat component of milk

Colostrum-1st immunisation

Active mammary
gland:





Assignment–

- ▶ Draw & describe microscopic structure of mammary gland in different phases.

THANK
YOU

