Female Reproductive System

Red: important.
Black: in male|female slides.
Gray: notes|extra.

Editing file

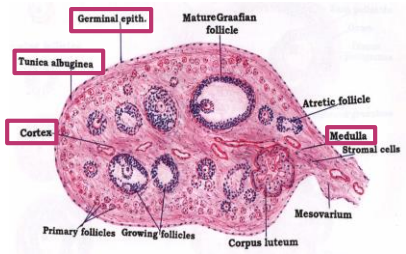
➢ OBJECTIVES

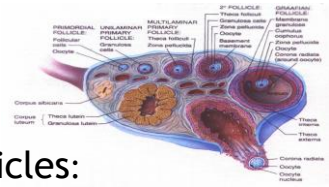
- Describe the histological structure and fate of ovarian follicles.
- Describe the histological structure of:
  - Ovary.
  - Oviducts (Fallopian tubes).
  - Uterus.
  - Vagina.
  - Resting and lactating mammary gland.

➢ Ovaries

Ovary is primary reproductive organ

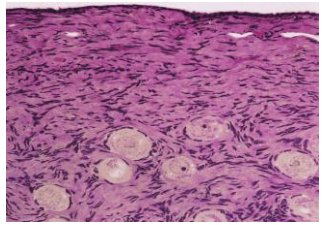
- **Adult ovary:**
  - **Germinal epithelium**: outer layer of flat cells.
  - **Tunica albuginea**: dense C.T layer.
  - **Outer cortex**: ovarian follicles and interstitial cells.
  - **Inner medulla**: highly vascular loose C.T.

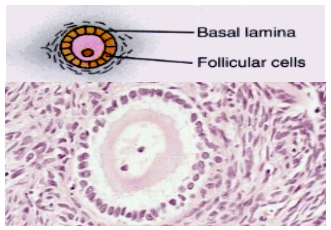


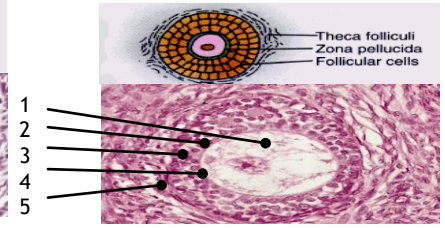


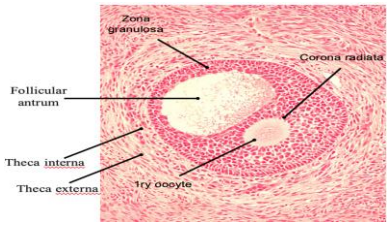
- **Ovarian Follicles:** The cortex of the ovary in adults contains the following types (stages) of follicles:

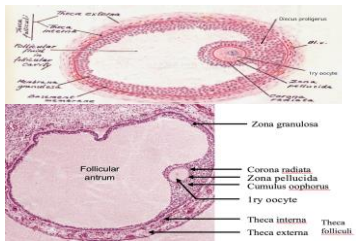
Primordial Follicles	Primary Follicles		Secondary (Antral) Follicles	Mature (Graafian) Follicle
• The only follicles present before puberty. • The earliest and most numerous stage. • Located superficially under the tunica albuginea. • Each is formed of a primary oocyte (25 µm), surrounded by a single layer of flat follicular cells.	They develop from the primordial follicles, at puberty under the effect of FSH.		• Multilaminar primary follicles become secondary follicles when a complete antrum filled with liquor folliculi is formed. • 1ry oocyte is larger & pushed to one side. • Theca folliculi differentiates into theca interna and theca externa.	• Large, thin walled • Wide follicular antrum • Large 1ry oocyte • Zona pellucida • Corona radiata • Cumulus oophorus • Zona granulosa • Basement membrane • Theca folliculi: theca interna & theca externa
	Unilaminar Primary Follicles	**Multilaminar Primary Follicles**		
	Are similar to primordial follicles, but: • The primary oocyte is larger (40 µm). • The follicular cells are cuboidal in shape.	1. 1ry oocyte larger 2. corona radiata 3. granulosa cells 4. zona pellucida 5. theca folliculi 6. follicular fluid (liquor folliculi)		







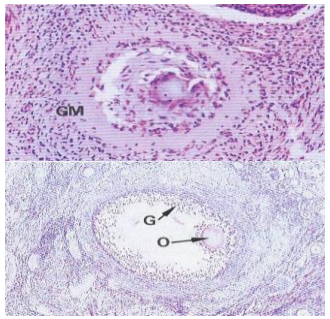




➢ Ovaries

- **Atretic Follicles:**

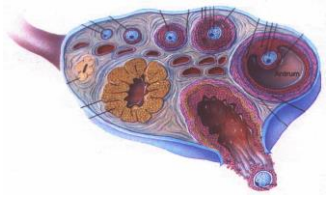
  During growth of the ovarian follicles, many of them do not reach maturation and they degenerate, and are finally replaced completely by fibrous tissue and are called **atretic follicles** or **corpora atretica.**

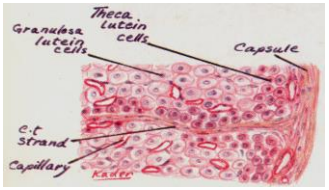


- **Corpus Luteum & Corpus Albicans:**

Corpus Luteum

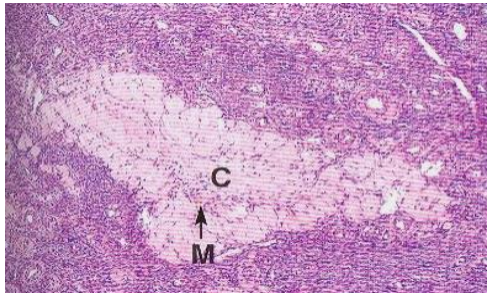
- Ovulation occurs at day 14 of the cycle, under the effect of LH.
- The follicle collapses and forms a corpus luteum.
- zona granulosa → granulosa lutein cells.
- Theca interna → theca lutein cells.
- Bleeding may occur → corpus haemorrhagicum.
- Fertilization → corpus luteum of pregnancy.
- No fertilization → corpus luteum of menstruation.
- At the end → corpus albicans.
- Corpus luteum of menstruation lasts about 10 days
- Corpus luteum of pregnancy persists for six months.
- Fate of corpus luteum: formation of a white degenerated fibrous body, corpus albicans.
- **Function of corpus luteum:**
  - Granulosa lutein cells: secrete progesterone
  - Theca lutein cells: secrete estrogen.





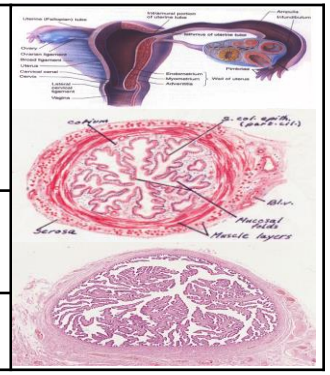
Corpus Albicans

- white degenerated fibrous body formed by involution of corpus luteum (degenerated corpus luteum).
- Secretory cells of corpus luteum degenerate and are phagocytosed by macrophages.

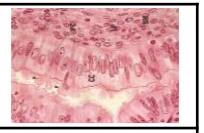


➢ Oviducts (Fallopian Tubes)

Mucosa	• Highly folded. • Epithelium: Simple columnar partially ciliated. • Corium of C.T.
Musculosa	• Inner circular. • Outer longitudinal.
Serosa	



Ciliated cells	• Non-secretory. • Cilia beat toward uterus.
Non-ciliated cells	• Thinner, also called peg cells. • Secretory cells. • Apices bulge above ciliated cells. • Their apices contain nutritive material to nourish gametes.



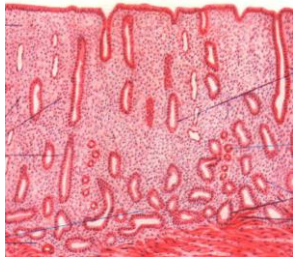
➢ Uterus

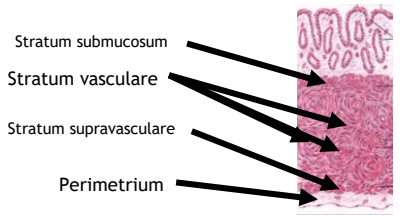
I-Fundus & Body

Endometrium (mucosa)	• **Epithelium:** simple columnar partially ciliated.
	• **Corium:** C.T + interstitial cells
	  • Endometrial glands: simple tubular. Uterine gland
	  • Stromal cells.
	  • Blood vessels.
	  • Leucocytes.
	  • Reticular fibers.

Myometrium (musculosa)	• 3 ill-defined smooth muscle layers:
	  ○ **Stratum submucosum**: longitudinal.
	  ○ **Stratum vasculare:** circular smooth muscle fibres in figure of 8 arrangement around large blood vessels.
	  ○ **Stratum supravasculare:** longitudinal.

Perimetrium (serosa)	• Formed of simple squamous epithelium (mesothelium) and sub-epithelial C.T.

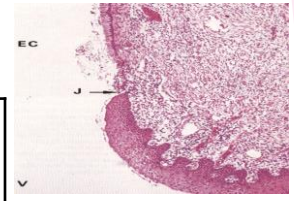


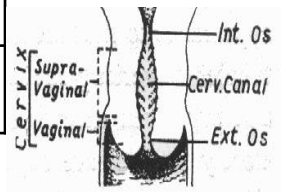


➢ Uterus

II-Uterine Cervix

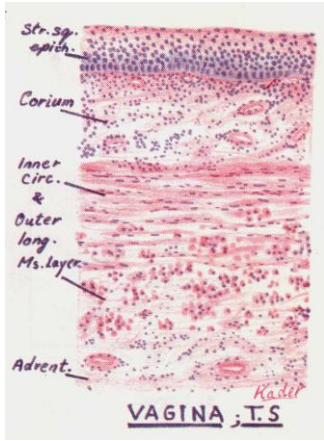
Mucosa	• **Epithelium:** simple columnar in the cervical canal, but it changes to stratified squamous epith. (non-keratinized) at the external os. • **Corium**: CT containing tubulo-alveolar glands.
Substance of the cervix	• dense fibrous tissue with few smooth muscle fibers.





➢ Vagina

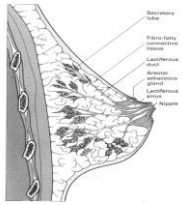
Mucosa	• shows transverse folds and is made of: Vagina does not contain gland • **Epithelium**: stratified squamous epithelium non-keratinized, rich in glycogen. • **Corium**: of dense C.T., very rich in blood vessels, elastic fibres and leucocytes.
Musculosa	formed of interlacing inner circular and outer longitudinal layers of smooth muscle fibres.
Adventitia	• formed of loose C.T.



Note: The Sources of vaginal wetness are secretion of the uterus and blood vessels of vaginal mucosa

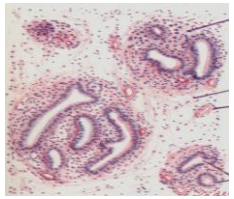
➢ Mammary Gland

- At puberty they enlarge by accumulation of fat, but contain only a duct system.
- Secretory units appear only during pregnancy and are functioning only during lactation.



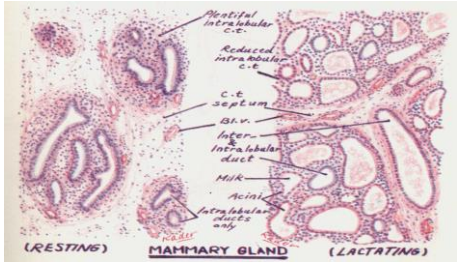
I- Resting Mammary Gland

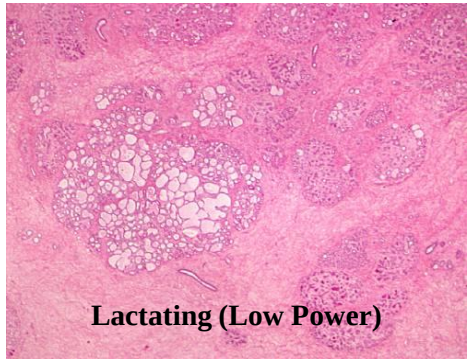
- It is divided into lobes and lobules.
- The **interlobular** C.T. is dense and contains numerous fat cells.
- The **intralobular** C.T. is loose and contains no fat cells.
- Within the lobules, there are widely separated **ducts** lined by simple cuboidal epithelium.
- Ducts collect to form **lactiferous ducts** lined by stratified columnar epithelium and open at the top of the nipple.

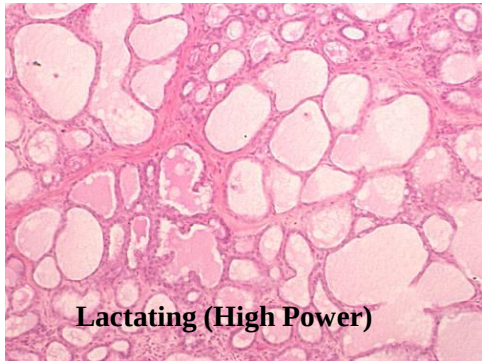


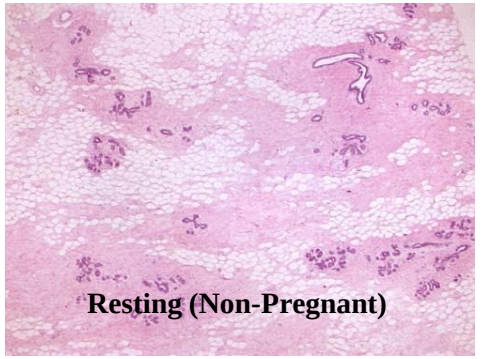
II-Lactating Mammary Gland

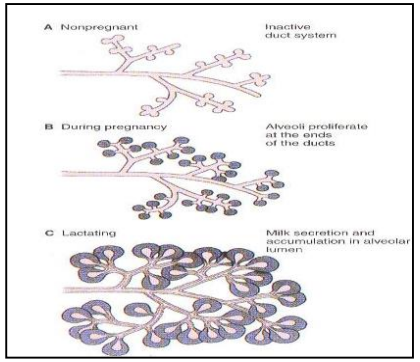
- Interlobular and intralobular C.T. become reduced.
- Lobules are made of ducts and alveoli.
- **Alveoli** are distended with milk and lined by cuboidal or flat cells surrounded by myoepithelial cells.
- **Milk** appears acidophilic with vacuoles of dissolved fat.




Lactating (Low Power)


Lactating (High Power)


Resting (Non-Pregnant)



QUESTIONS:

Q1: Which of the following follicles is present before puberty?
A) Primordial follicles B) Primary follicles C) Secondary follicles D) Mature follicle

Q2: The unilaminar folliclular cells are?
A) Flat B) Cuboidal C) Columnar D) Transitional

Q3: The Primary follicles develop from the primordial follicles under the effect of?
A) FSH B) LH C) CRH D) GH1

Q4: Which of the following cells found in fallopian tubes ?
A) Ciliated cells B) non ciliated cells C)none of them D) a and b

Q5: Which of the following cells found in epithelium of mucosa in cervical canal ?
A) Simple columnar B)stratified squamous C) Simple squamous D) stratified columnar

5. A
4. D
3. A
2. B
1. A

QUESTIONS:

Q6: Which of the following is a feature of ciliated cells ?
A) Secretory cells B) non Secretory C) called peg cells D)have apices bulge

Q7: Which of the following is a lining epithelium of lactiferous ducts?
A) stratified columnar B) stratified cuboidal C) simple columnar D) simple cuboidal

Q8: Secretory units of mammary gland appear only:
A) during childhood B)at puberty C) during lactation D) during pregnancy

Q9: Which of the following is rich in glycogen.
A)Ovary B)uterus C)vagina D)mammary gland

6. B
7. A
8. D
9. C

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HISTOLOGY TEAM 437