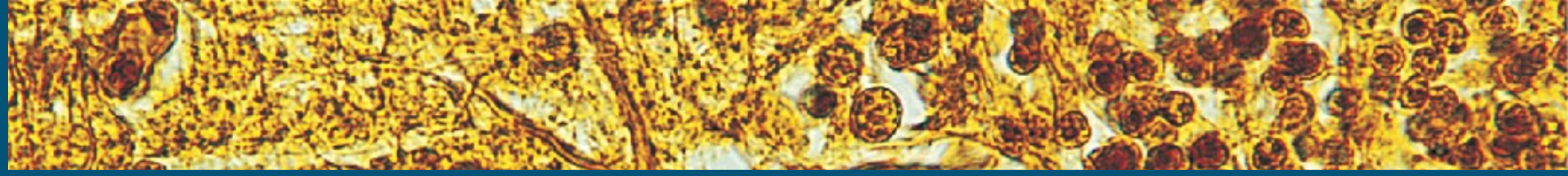


The Histology of Female Genital System

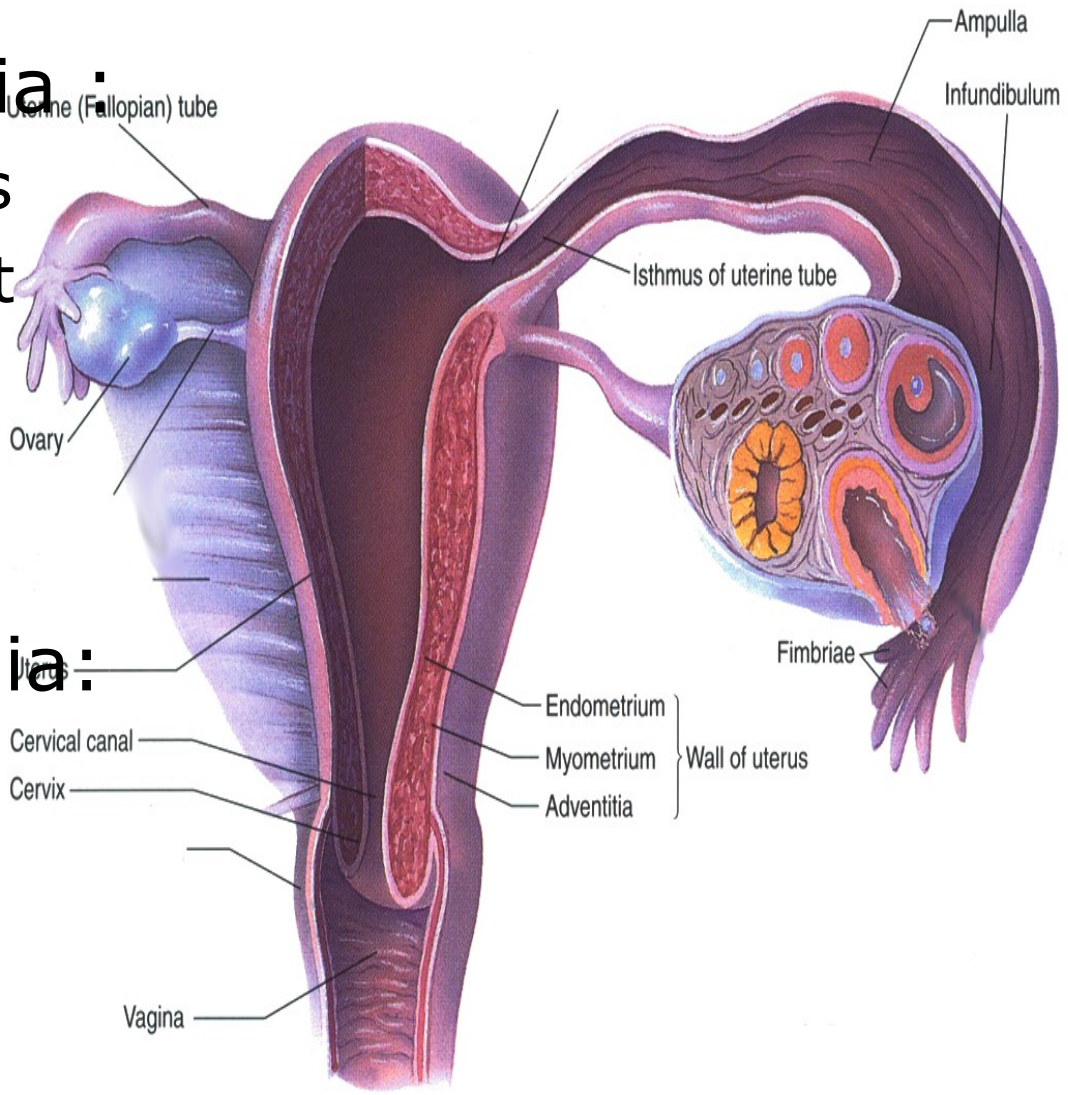
I Wayan Sugiritama
http://medical-histology.blogspot.com

HISTOLOGY OF FEMALE GENITAL SYSTEM

- Ovaries
- Follicle Growth
- Oviducts
- Uterus
- Menstrual Cycle
- Vagina
- Placenta
- Breast

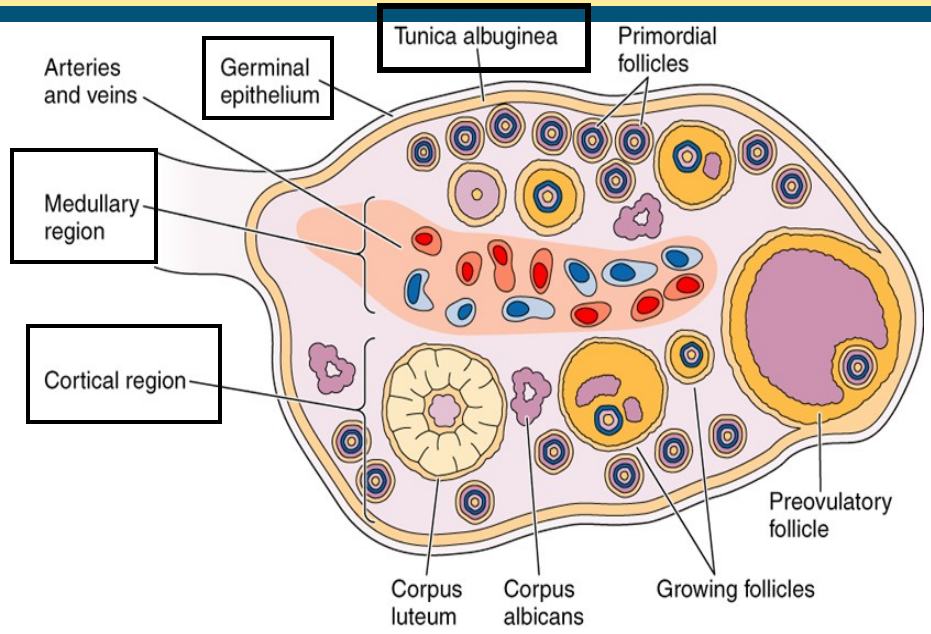
Overview

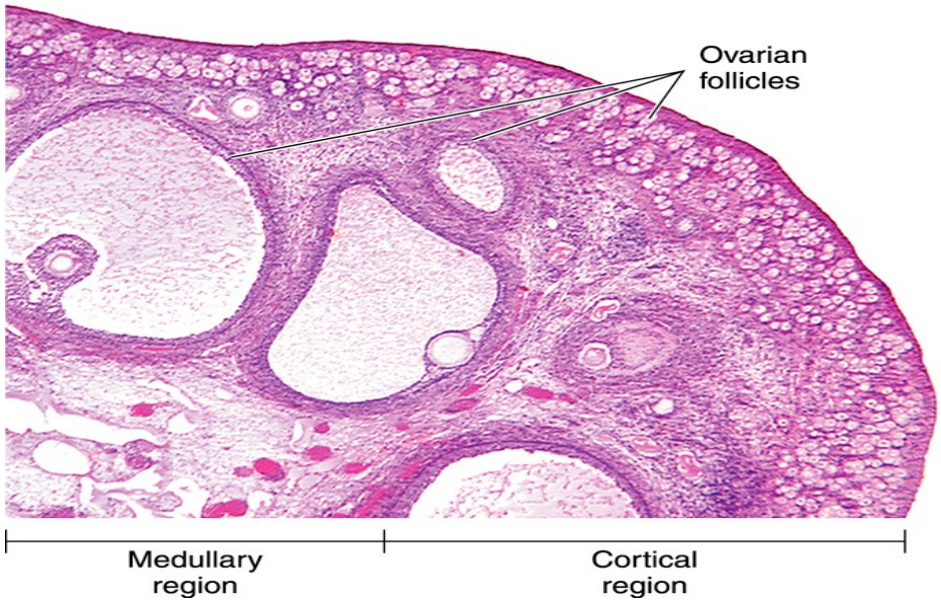
- Internal Genetalia :
  - Paired of Ovaries
  - Paired of Oviduct
  - Uterus
  - Vagina
- External Genetalia:
  - Labia Majora
  - Labia Minora
  - Clitoris



OVARIES

- ✓ GERMINAL EPITH.
  - ✓ Simple Sq.-cuboid Epith.
- ✓ TUNICA ALBUGINEA
  - ✓ Dense connective tissue→ whitish color
- ▪ CORTEX
  - – Stroma that houses **<u>ovarian follicles</u>** in various stages of development
- ▪ MEDULLA
  - – Loose C. Tissue containing vascular bed and nervous





OVARIAN CYCLE

Three phases of ovarian cycle :

- **Follicular phase**
  - Development of primordial F.→Mature F.
  - *Folicular phase of endometrium*
- **Ovulatory phase**
  - Release of oocyte from mature F. and capture by oviducts
- **Luteal phase**
  - Residual follicular cell folds and becomes part of Corpus Luteum (C.L.)
  - *Secretion/luteal phase of endometrium*

FOLLICULAR GROWTH **(Follicular phase)**

WHAT IS OVARIAN FOLLICLES? :

- An oocyte
- Follicular/ granulosa cells

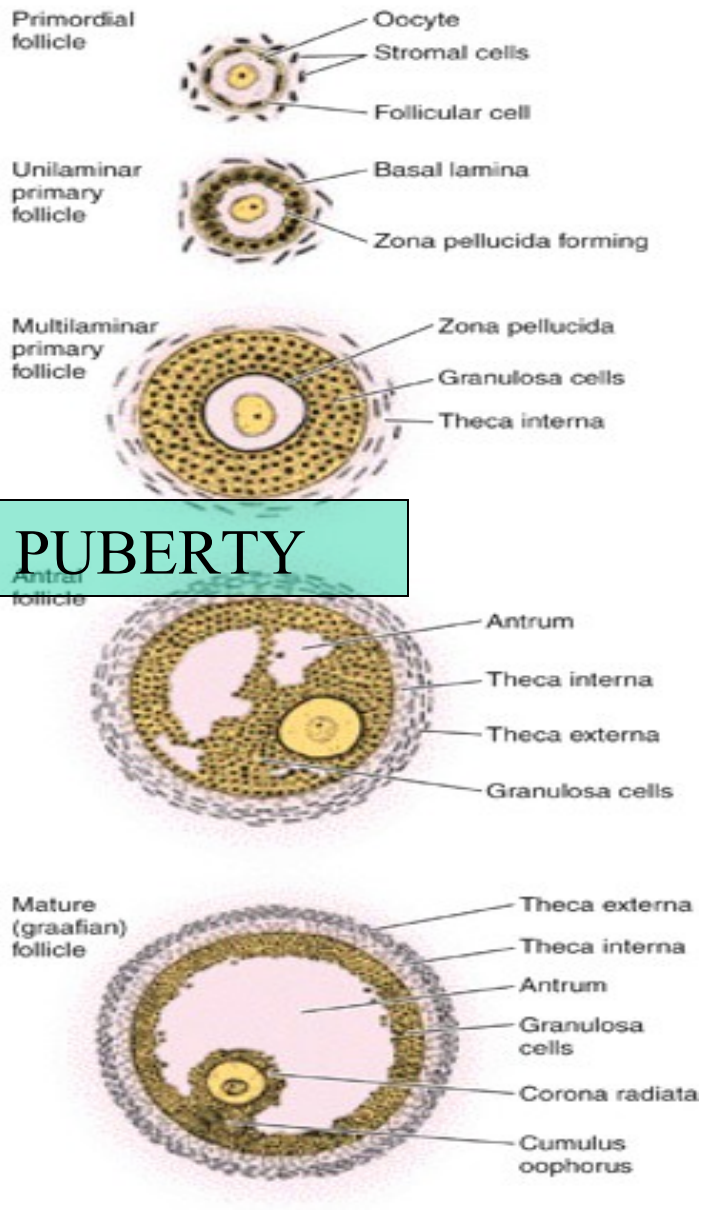
PRIMORDIAL F.
(formed during fetal life)

PUBERTY

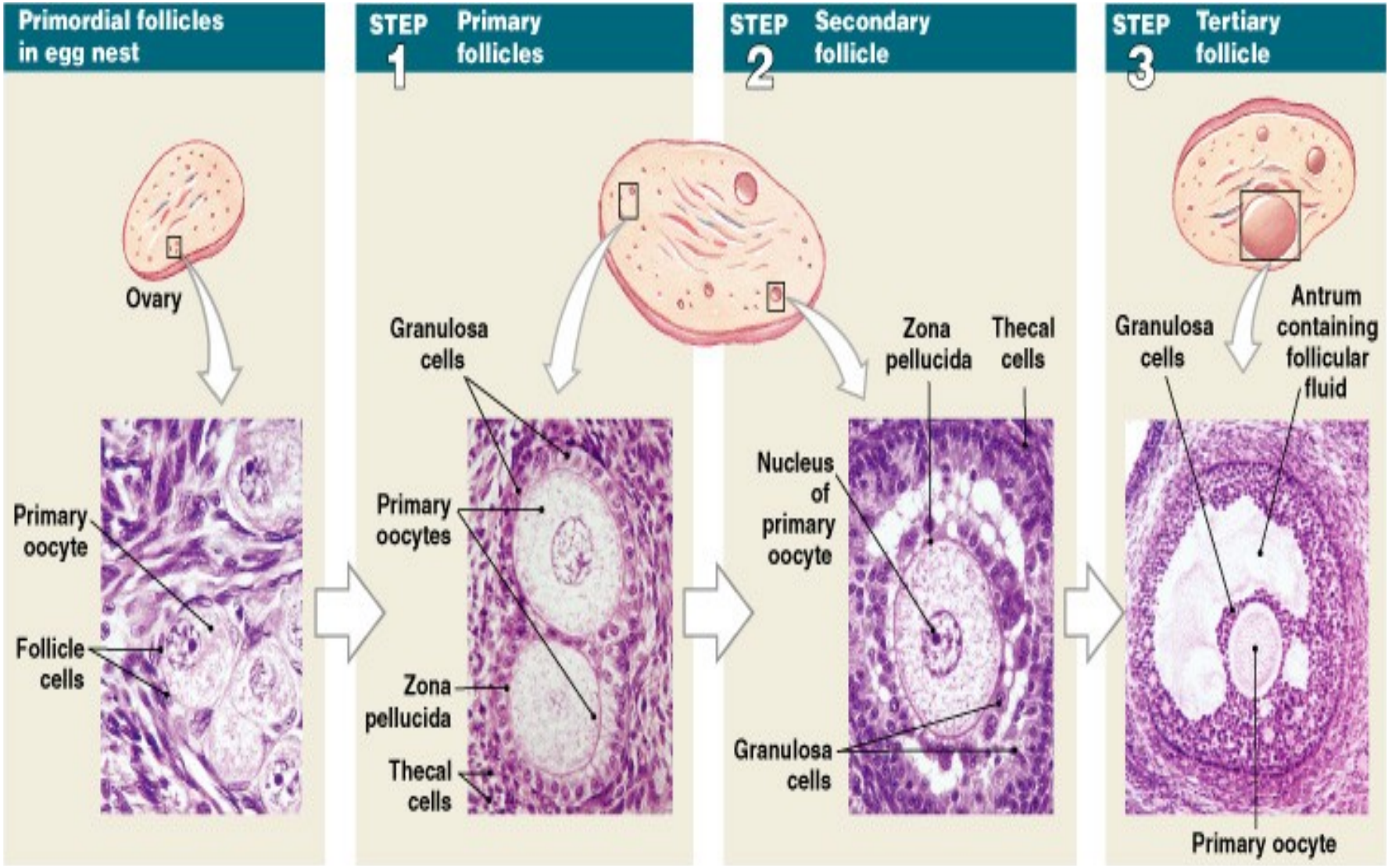
Follicular Growth

Modification of :

- Oocyte
- Granulosa cells
- Stromal fibroblast

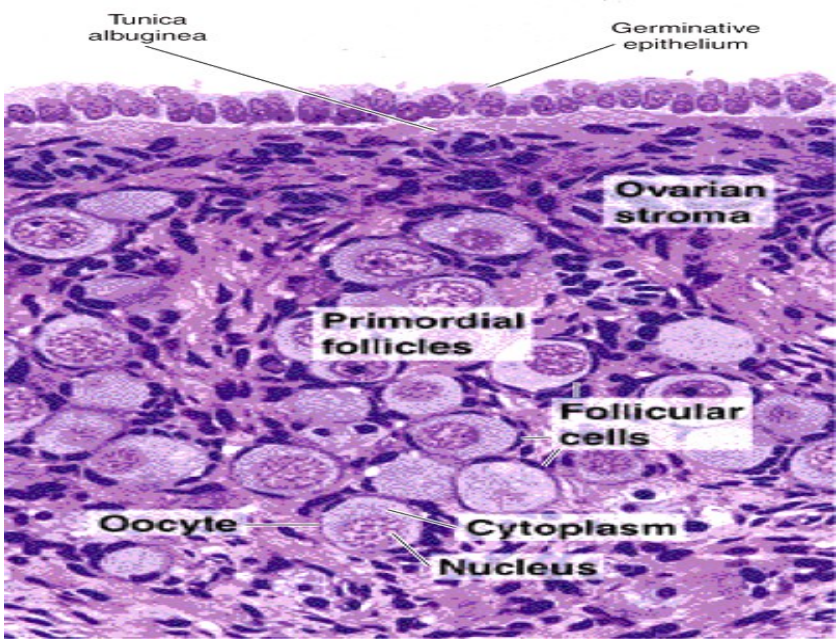


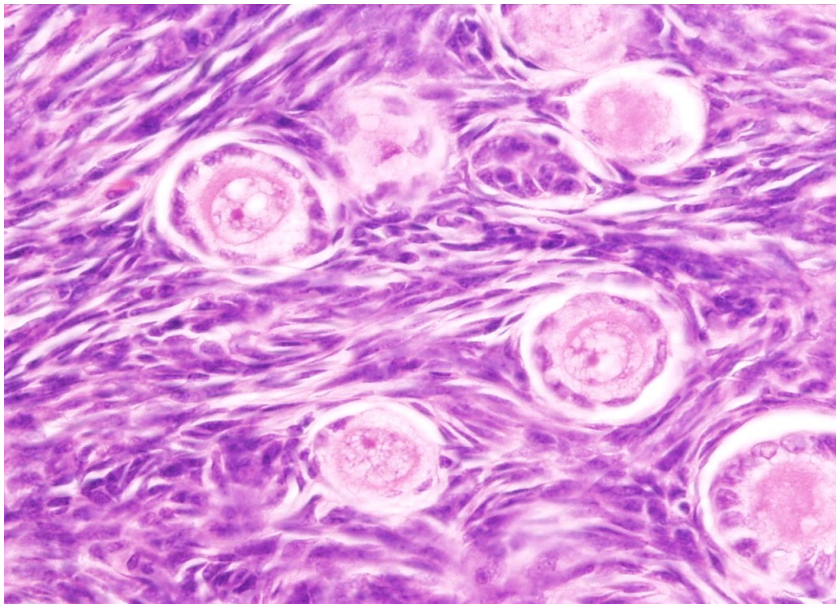
FOLLICULAR GROWTH (Follicular phase)



FOLLICULAR GROWTH (Follicular phase)

1. PRIMORDIAL FOLLICLE :
   - **A. primary oocyte**
     - Arrested in prophase stage of MI
     - ~ 25 µm in diameter
   - **B. follicular cells**
     - single layer of flattened cells
     - Attach by desmosomes





Start at puberty, small groups of primordial F. stimulated by FSH begins the follicular growth → primary F. → Secondary F. →Graafian F.

FOLLICULAR GROWTH (Follicular phase)

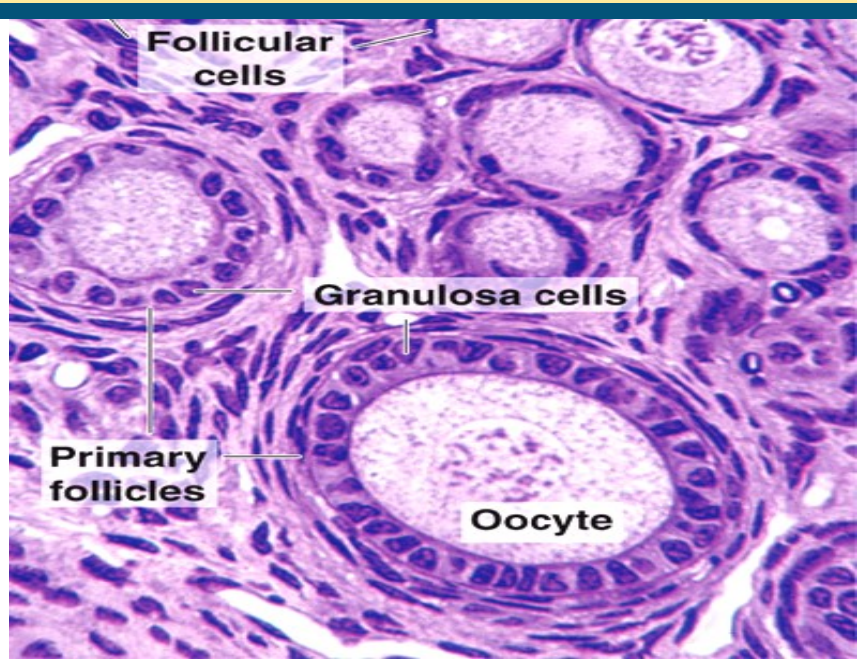
2. PRIMARY FOLLICLE

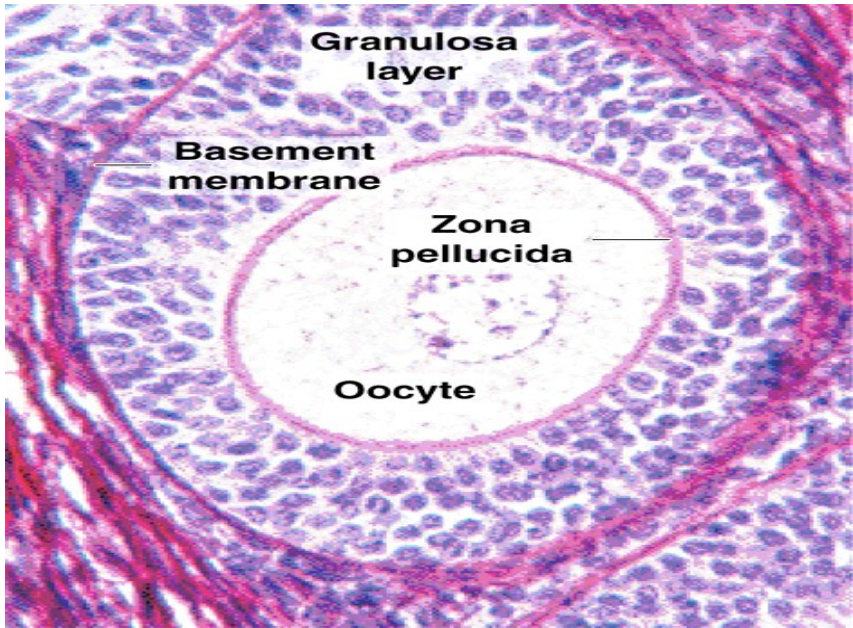
B. primary oocyte
   - growth to 125-150 μm diam.

C. follicular cells
   - cuboidal cells
   - 1 to many layers

→ Zona pellucida separate oocyte from F.C

C. Stromal cells
   - Theca interna
   - Theca externa





FOLLICULAR GROWTH (Follicular phase)

3. SECONDARY FOLLICLE

B. primary oocyte

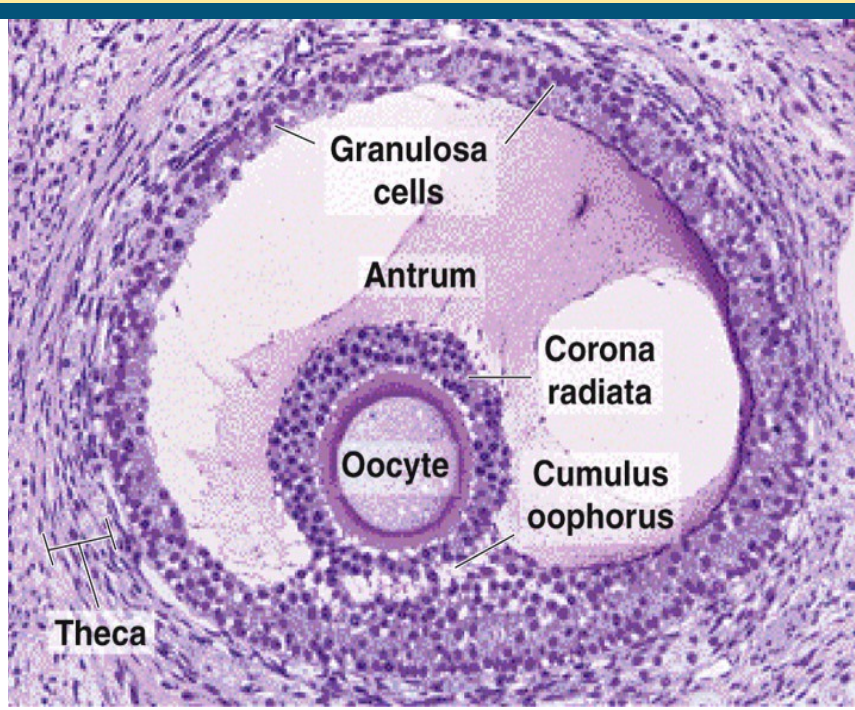
- 125-150 μm diam.

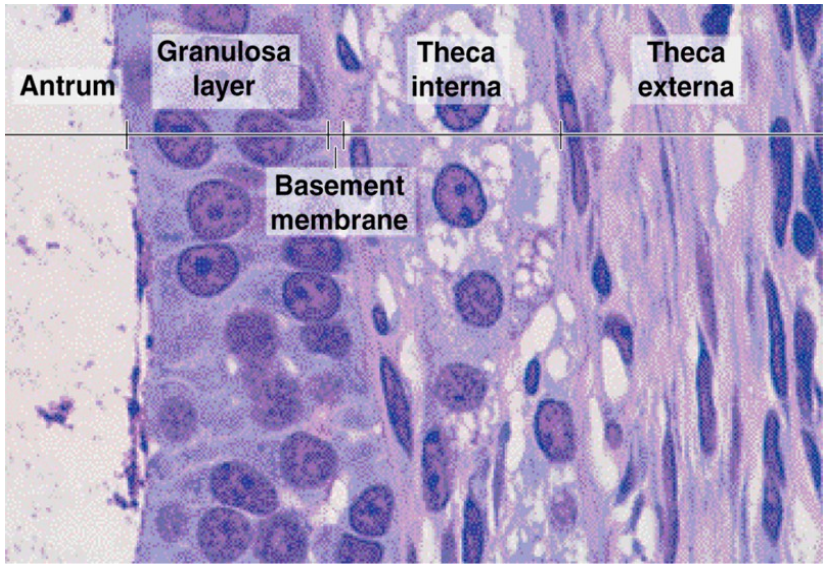
C. follicular cells

- cuboidal cells, many layers
- **Liquor folliculi→Antrum**
- Cumulus oophorus
- Corona radiata

C. Stromal cells

- Theca interna ~steroid producing cells
- Theca externa

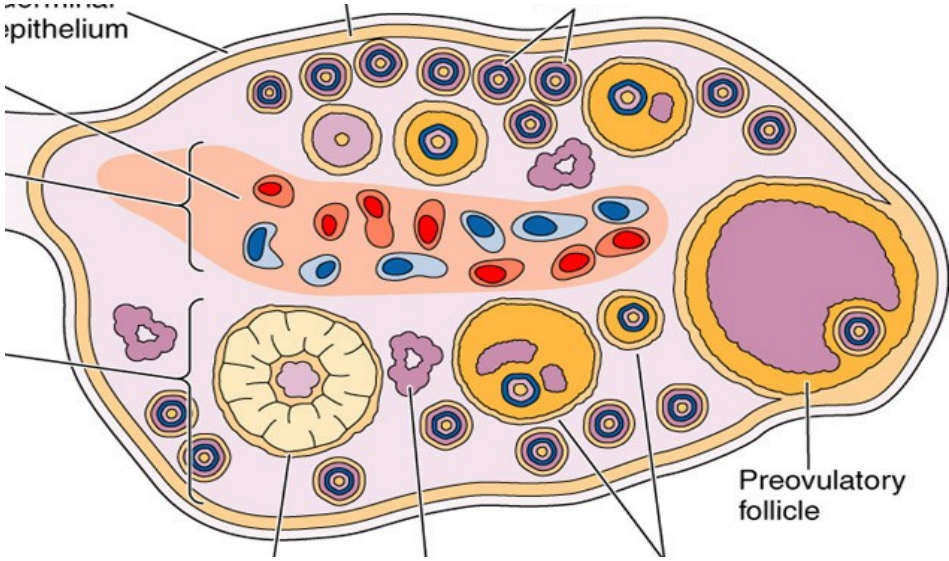


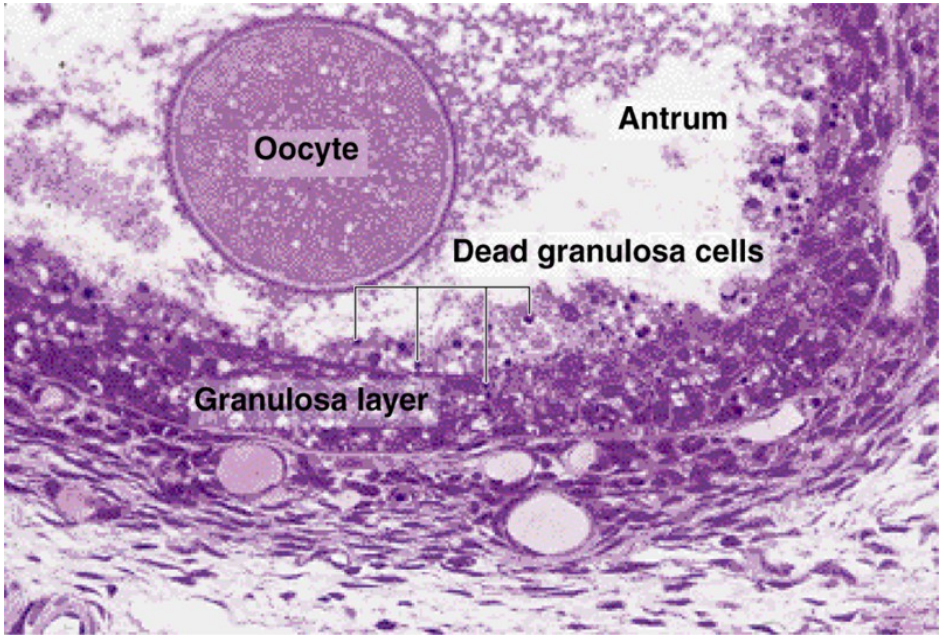


FOLLICULAR GROWTH (Follicular phase)

4.GRAAFIAN FOLLICLE

- Primary oocyte
- Follicular cells
  - Continued growth → 2.5 cm in diameter
  - Continues formation of liquor foliculi →oocyte floating





During each menstrual cycle,
Only one follicle growth
Becomes Dominant F.
The other enter ATRESIA

OVARIAN CYCLE

Three phases of ovarian cycle :

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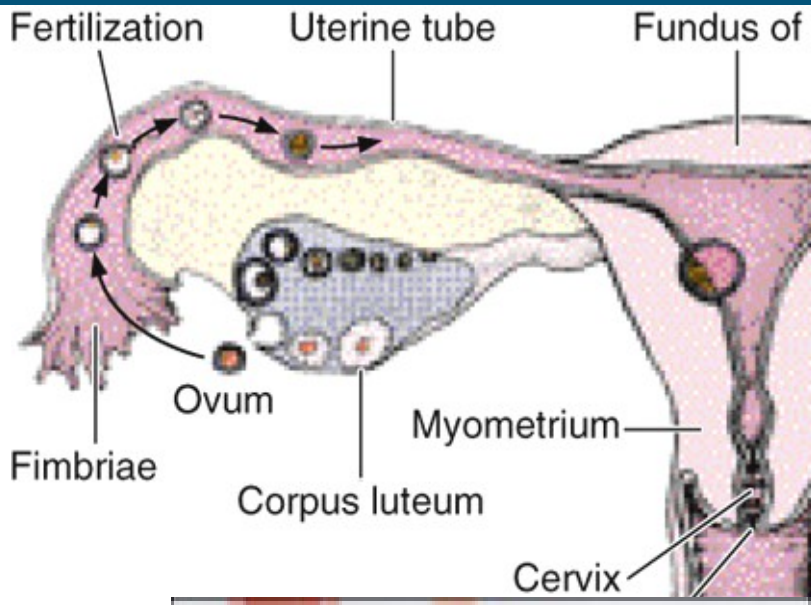
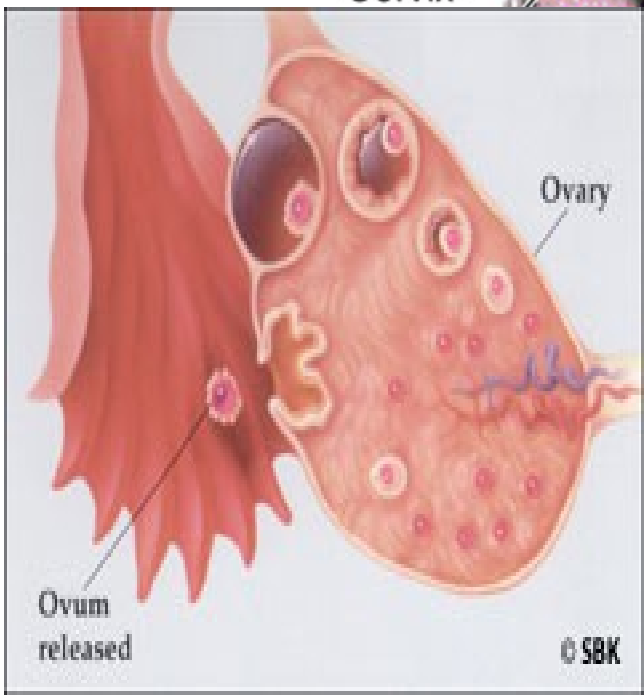
  - Development of primordial F.→Mature F.
- **Ovulatory phase**
  - Release of oocyte from mature F. and capture by oviducts
- **Luteal phase**
  - Residual follicular cell folds and becomes part of Corpus Luteum (C.L.)

OVULATION PHASE

Day 14 of menstrual Cycle

- LH surge
- Rupture the wall of G.F
  - PG, Histamine,Collagenases
  - Hyaluronic acid
- Complete the 1st meiosis
- Release of **secondary oocyte** (arrest in metaphase II) with corona radiata
- Received the oocyte by fimbriae





fertilization usually in oviduct
male & female pronuclei fuse = zygote

OVARIAN CYCLE

Three phases of ovarian cycle :

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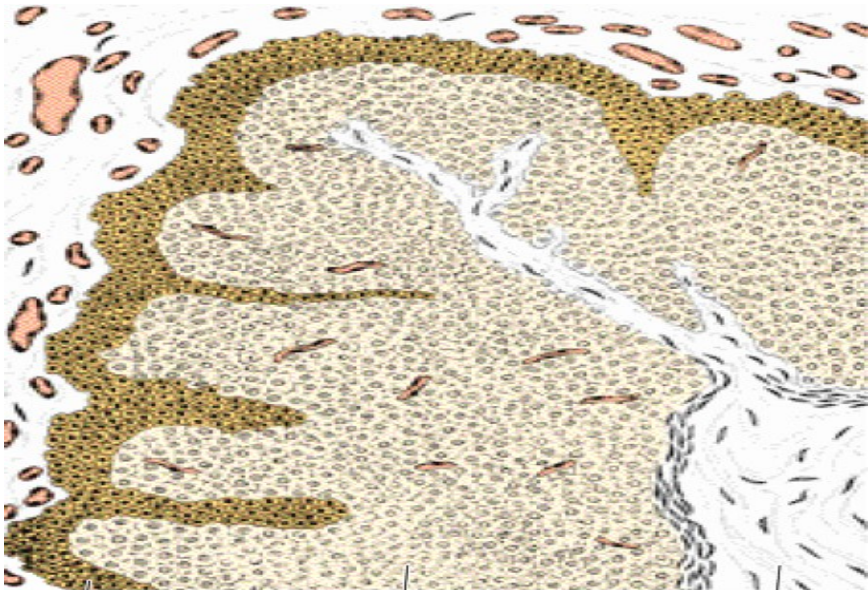
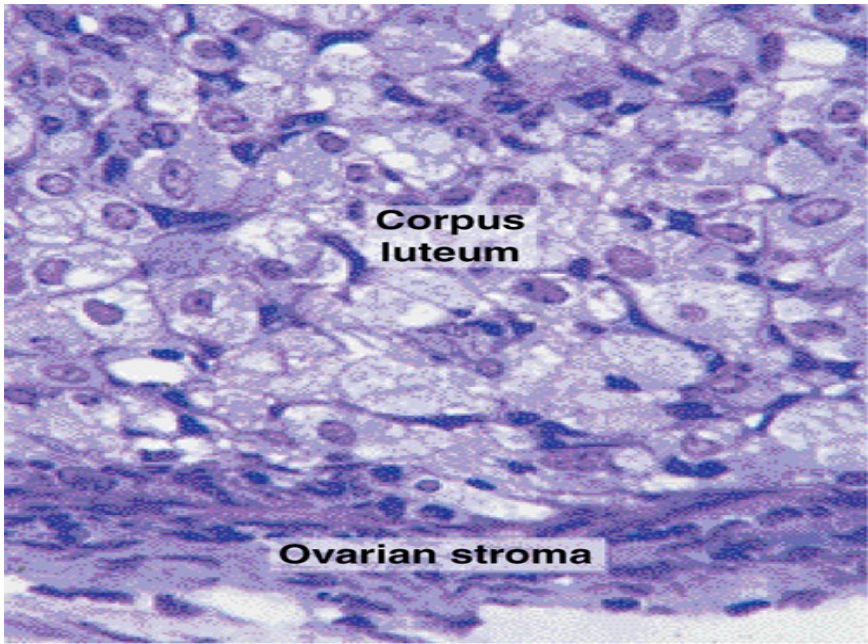
  - Residual follicular cell folds and becomes part of Corpus Luteum (C.L.)

CORPUS LUTEUM/C.L. (LUTEAL PHASE)

AFTER OVULATION :

- remainder of graafian follicle collapse & folded
- Blood flow into follicular cavity → clot + invaded by C.T.→ phagocytes → central part C.L.
- Granulosa cell→granulosa-lutein cells
- Theca interna cells → theca-lutein cells
- C.L produce estrogen & progesteron

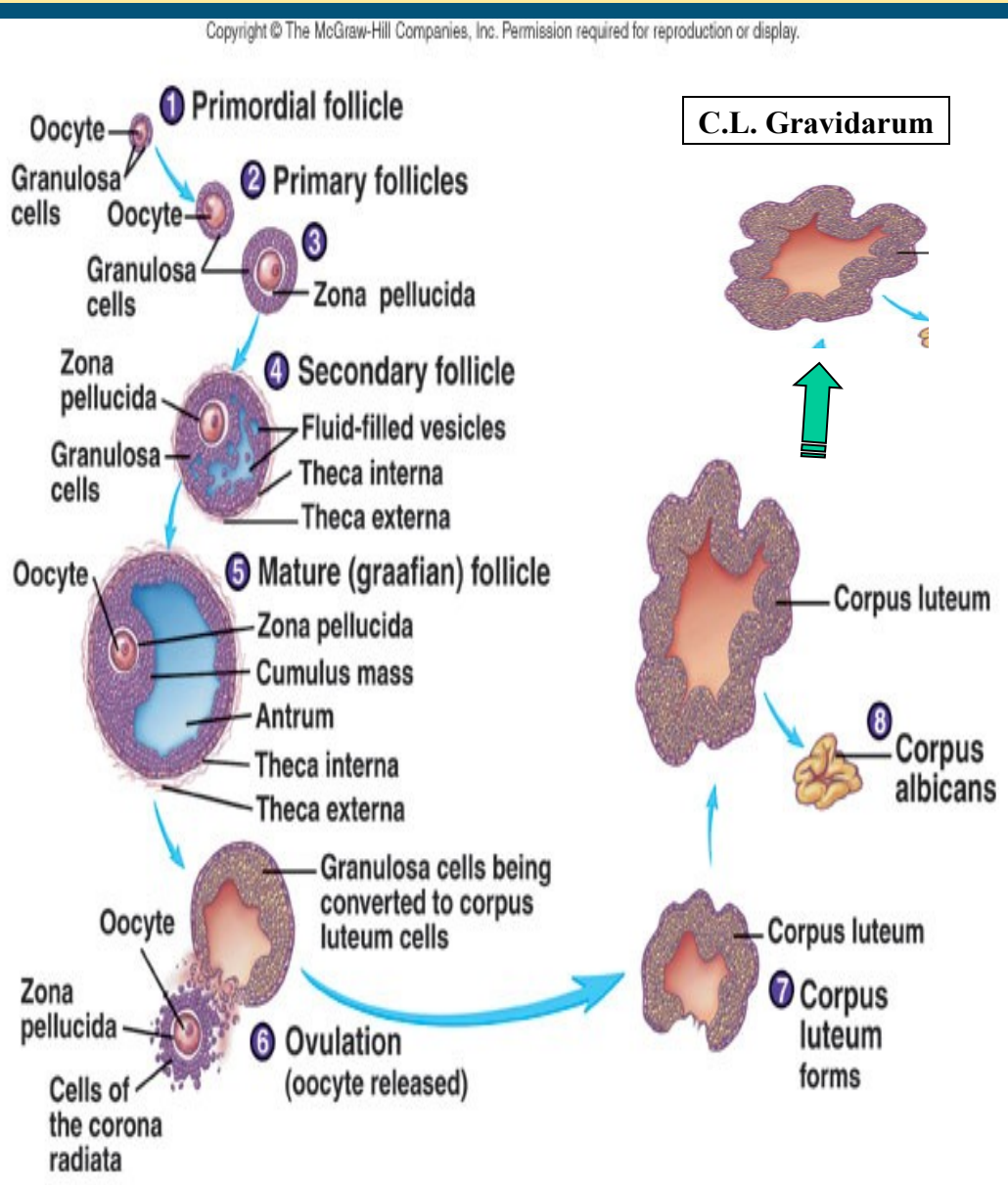




FATE OF CORPUS LUTEUM ??

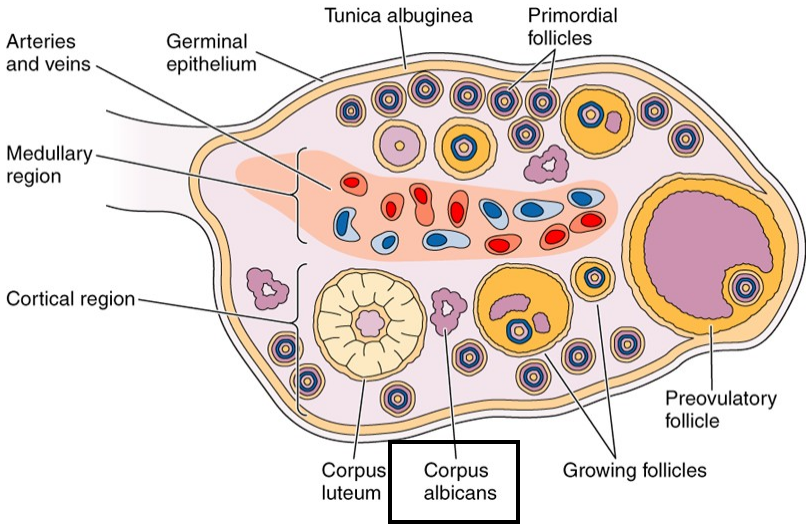
DEPEND ON WHETHER PREGNANCY IS ESTBALISH OR NOT :

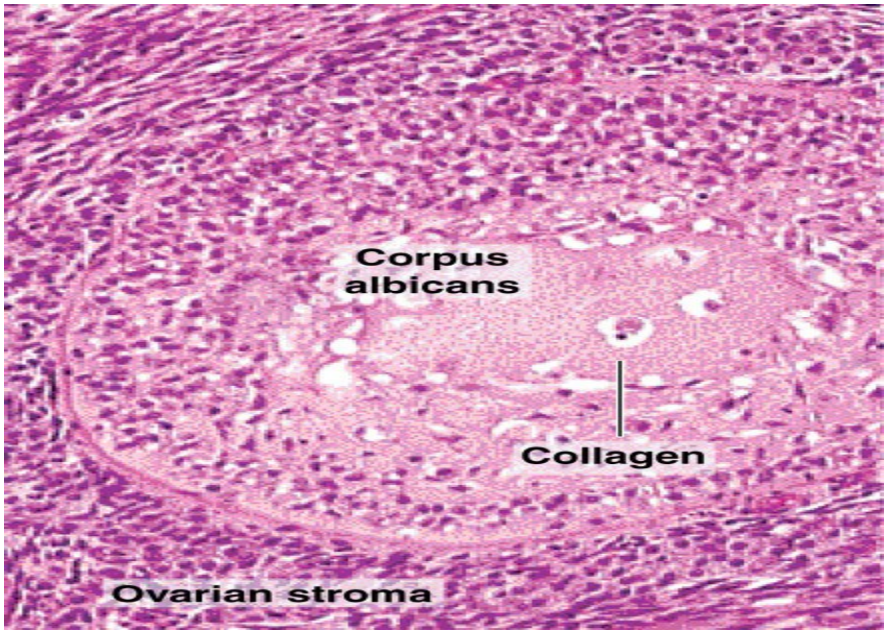
- If the pregnancy does not occur → C.L. degenerate → **CORPUS ALBICANS**
- If pregnancy occur →hCG maintains C.L → C.L. of pregnancy → secrete hormone → maintain pregnancy



CORPUS ALBICANS

- C.L of menstruation is invaded by fibroblasts→ fibrotic.
- Its remnant undergo luteolysis
- Fibrous connective tissue → corpus albicans
- Persist as the scar on the surface of ovary



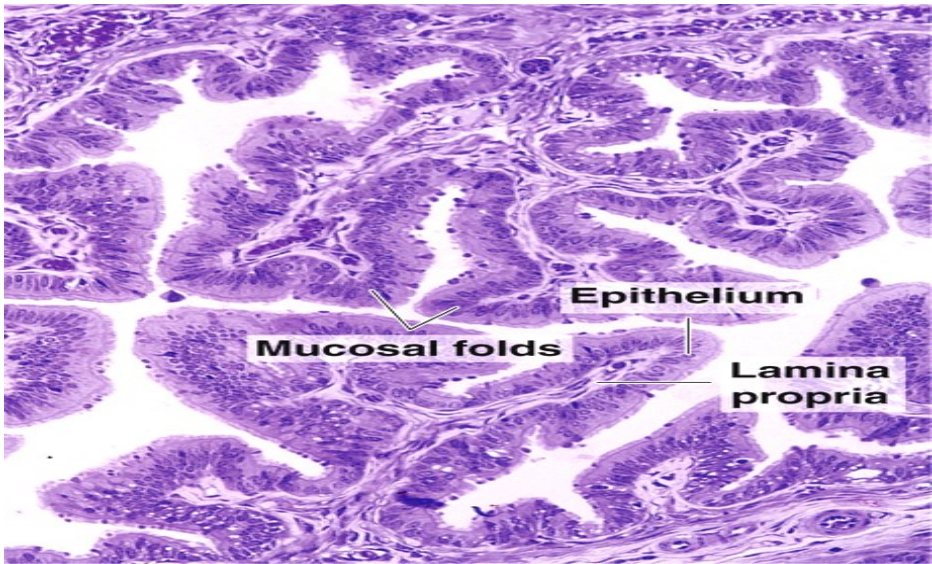


OVIDUCTS (Fallopian Tubes)

The walls composed of :

- **Mucosa layer**
  - Lines by simple column. Epith.
  - Lamina propia
  - Charaterized by longitudinal folds
- **Muscularis layer**
  - Inner circular and outer longitudinal layers of smooth muscle
- **Serosa layer**
  - Simple sq. epithelium

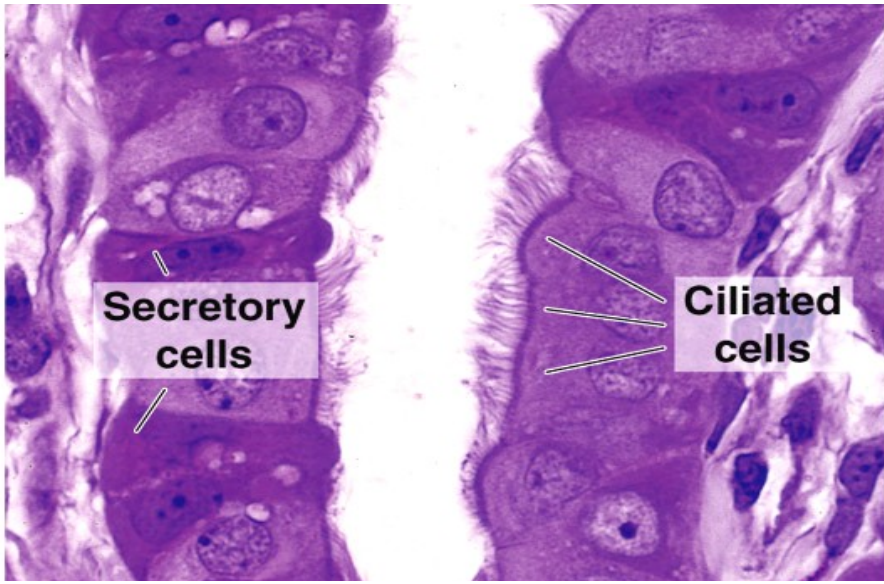
The oviducts is the site of fertilization & early cleavage of the zygote

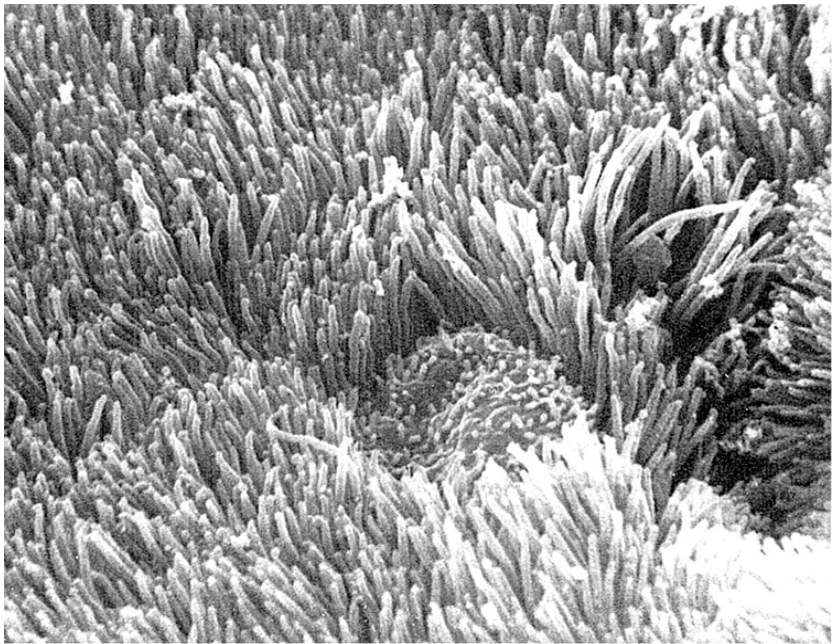


Oviducts (Fallopian Tubes)

Two types epith. Cell :

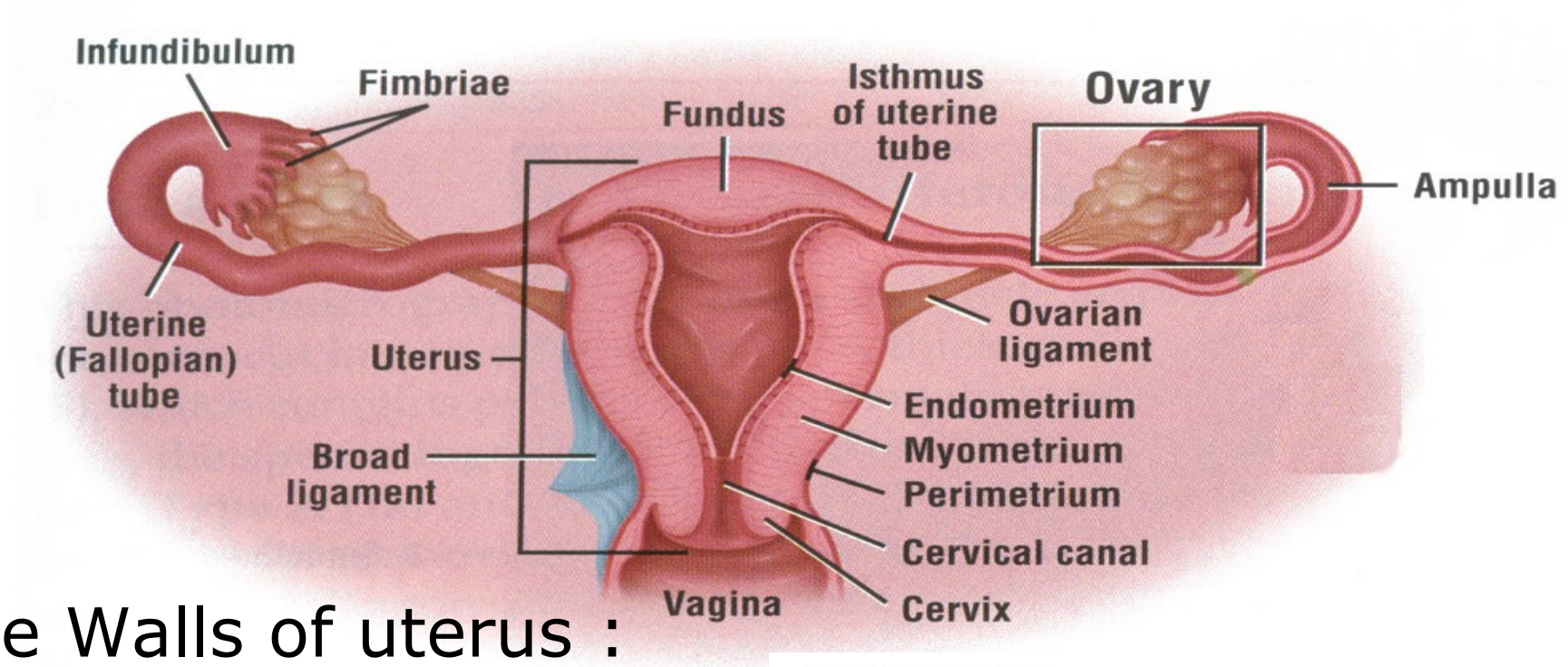
- Non ciliated peg cells
  - No cilia
  - Secretory :
    - Nutritive & protective for oocyte
    - capacitation of sperm.
- Ciliated cells
  - Cilia beat toward the uterus





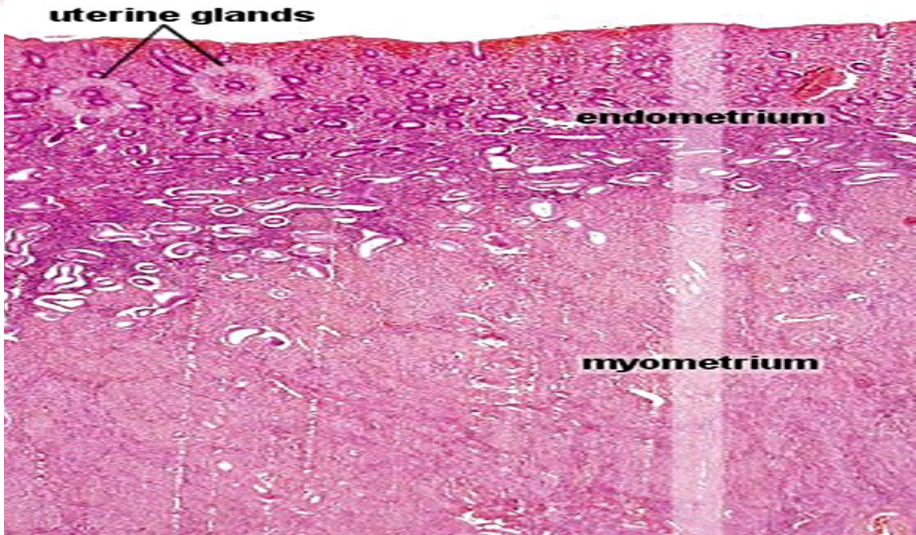
Peristaltic contraction + ciliary activity + fluid → move oocyte/ zygote toward the uterus

UTERUS



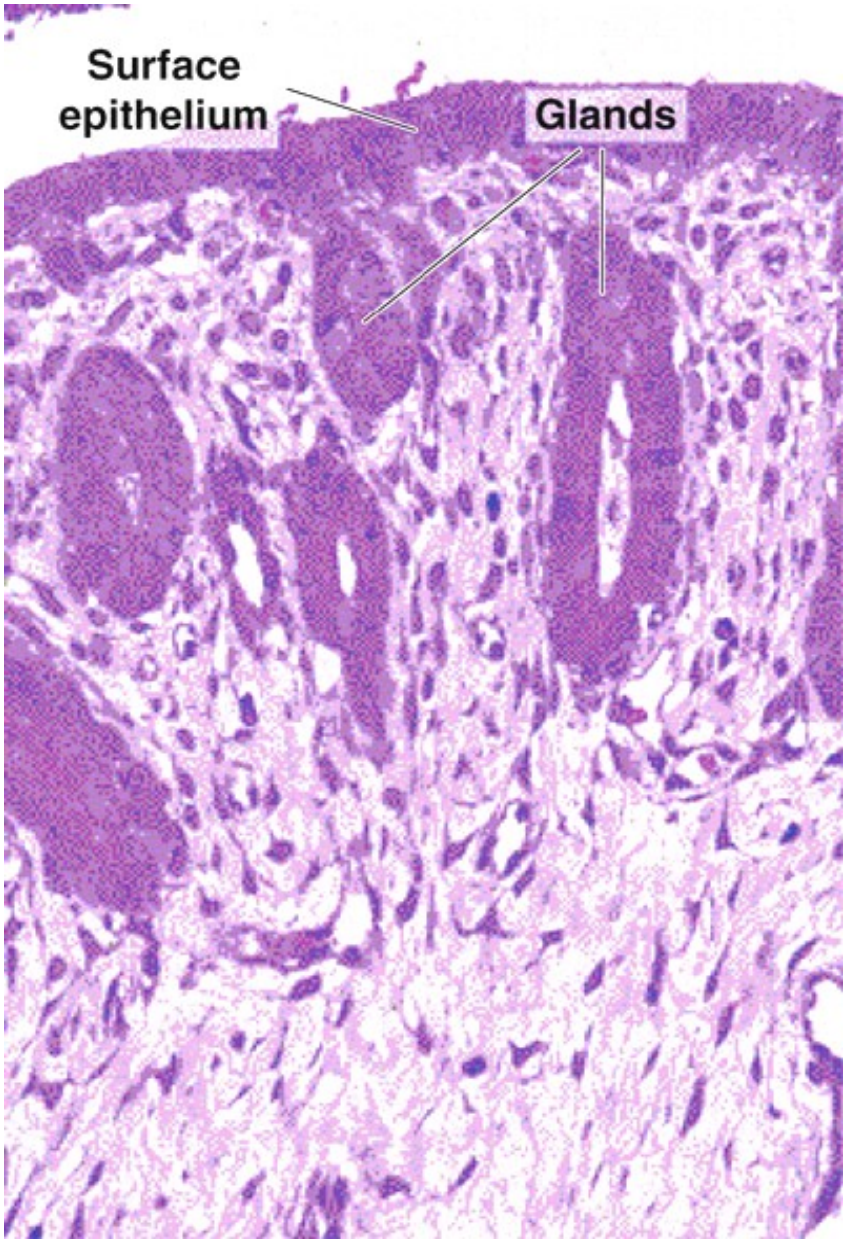
The Walls of uterus :

- Endometrium
- Myometrium
- Serosa/adventitia



Uterus (Endometrium)

- Epithelium :
  - simple columnar epith.
    - ciliated cells
    - secretory cells
- lamina propria
  - loose CT, rich in fibroblast, reticular fiber
  - uterine glands (simple tubular)



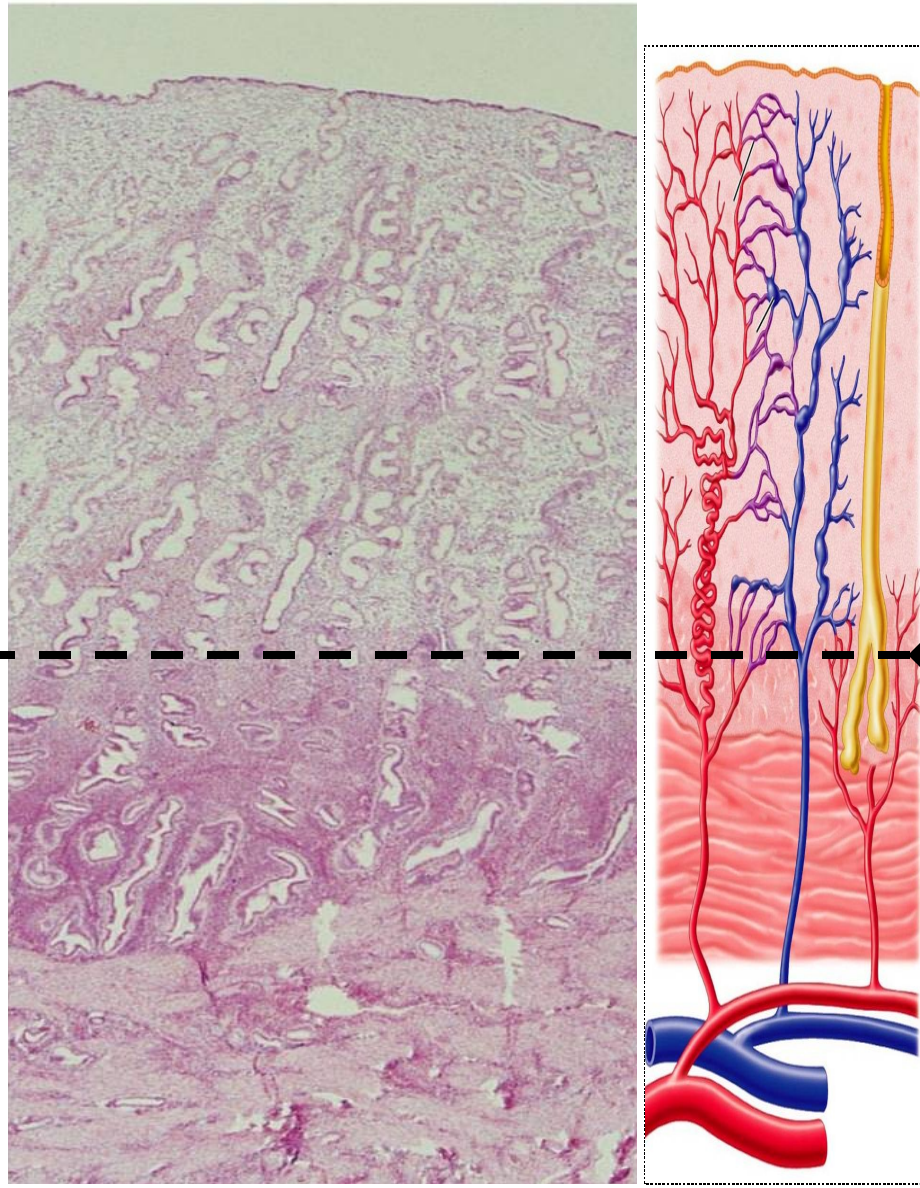
The microscopic structure of The endometrium change during Menstrual cycle

Uterus (Endometrium)

Two layers (zone) :

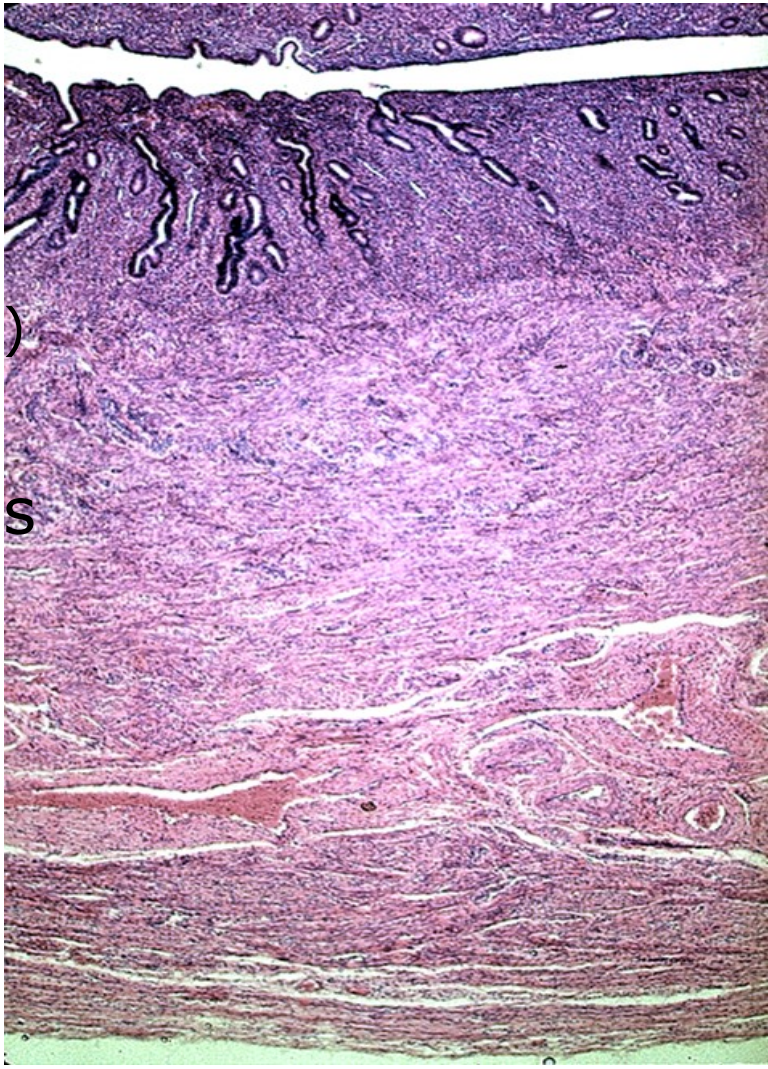
- Functionalis
  - Thick, superficial (surface epith., lam. prop., & gland)
  - Rich capillary network (coiled arteries)
  - **Sloughed at menstruation**

- Basalis
  - Deep, narow (lam. prop., & gland)
  - straight arteries
  - **Regenerate functionalis layer each mentrual cycle**



Uterus (Myometrium)

- ✓ Thickest layer of uterus
- ✓ Composed of three layers of smooth muscle:
  - inner longitudinal
  - middle circular (strat.Vasculature)
  - outer longitudinal
- ✓ The size & number of muscle cells are related to estrogen levels
- ✓ Pregnancy : hyperplasia & hypertrophy

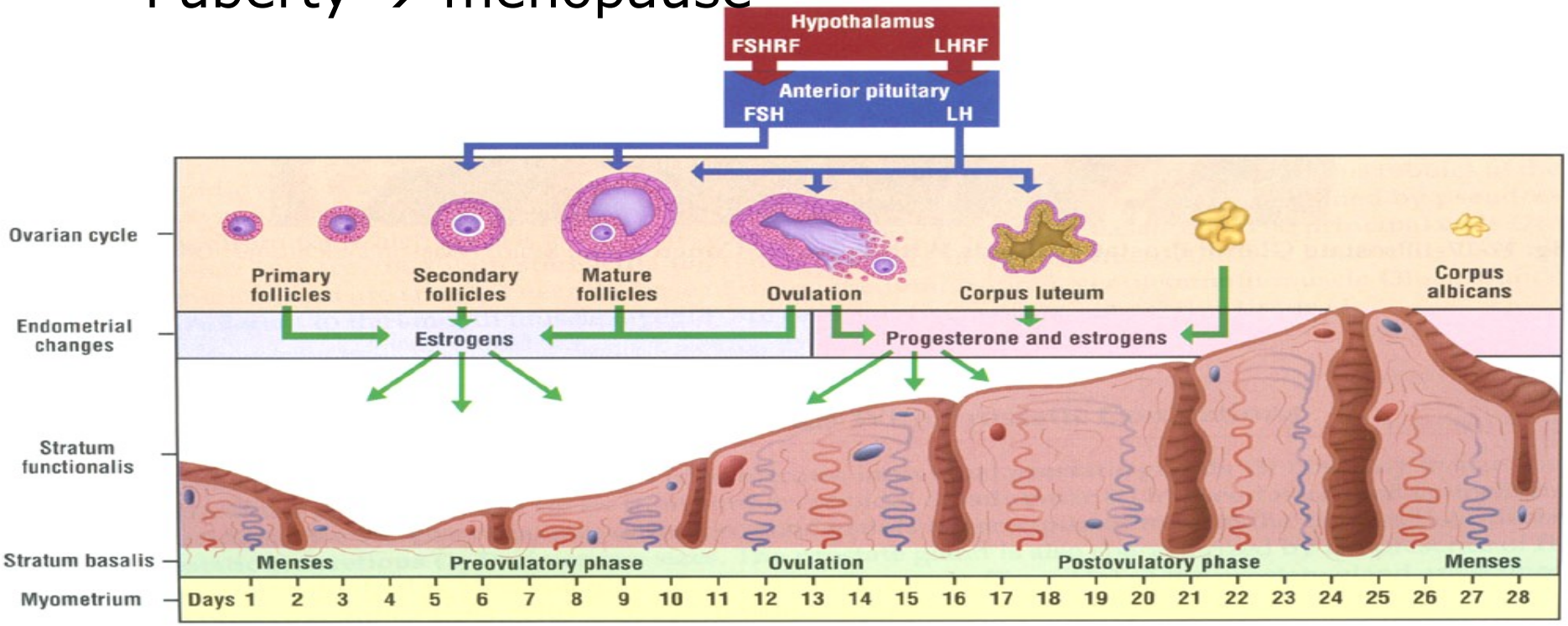


Menstrual Cycle

- Under stimulus of estr. & progest. endometrium undergo cyclic structure modification

→Proliferatif→secretion→mentruation→proliferatif→

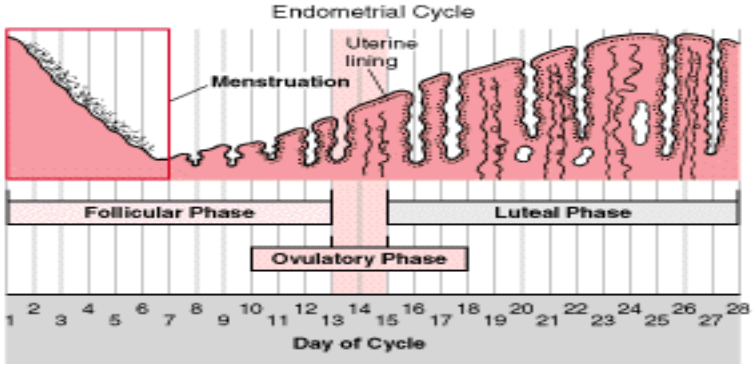
- Duration = 28 days
- Puberty → menopause

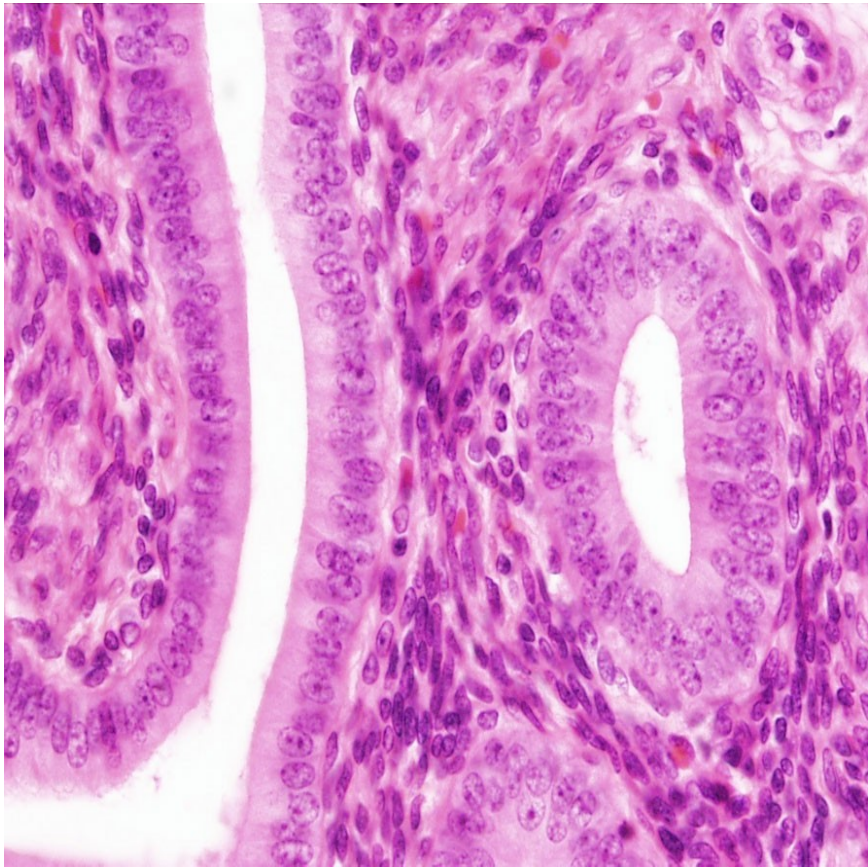


Proliferative/follicular phase (days 5-14)

- After menstrual phase
- Coincides with ovarian follicles development (estrog.)
- Regeneration of endometr.

  →day 14, fully restored
  - surface epithelium
  - lamina propria
  - coiled arteries
  - <u>uterine glands : simple columnar epithel, straight tubule, narrow lumens.</u>



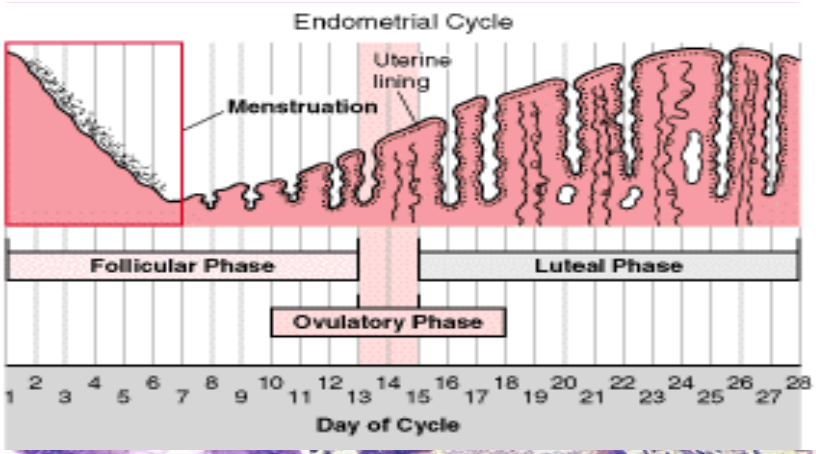


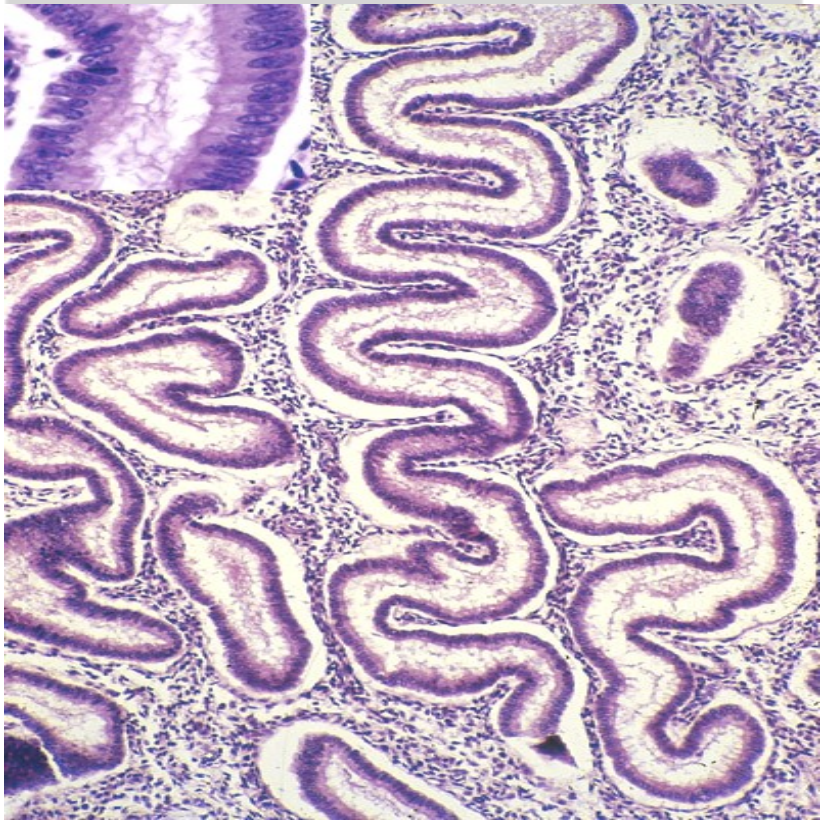
Secretory / Luteal phase (days 15-28)

- Begins after ovulation
- Depends on C.L. Secretions (progest)

→<u>Uterine glands: coiled & branched, accumulation of glycogen→dilate the lumen</u>

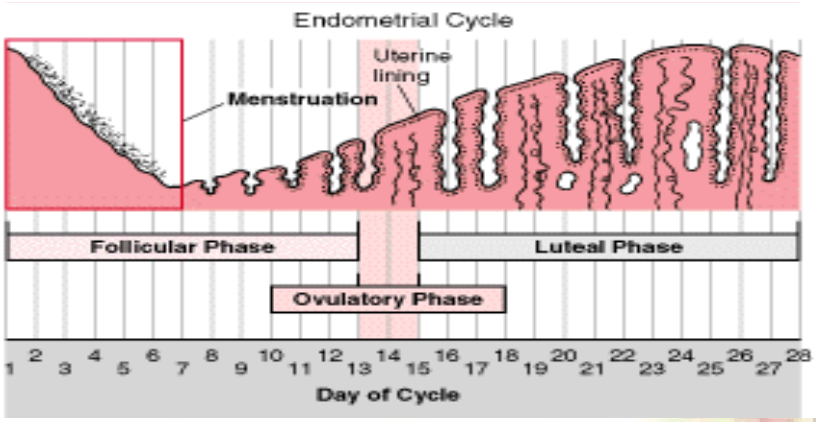
- <u>Thickening of functionalis</u> (edema and secretory product)
- Prepared to receive zygote

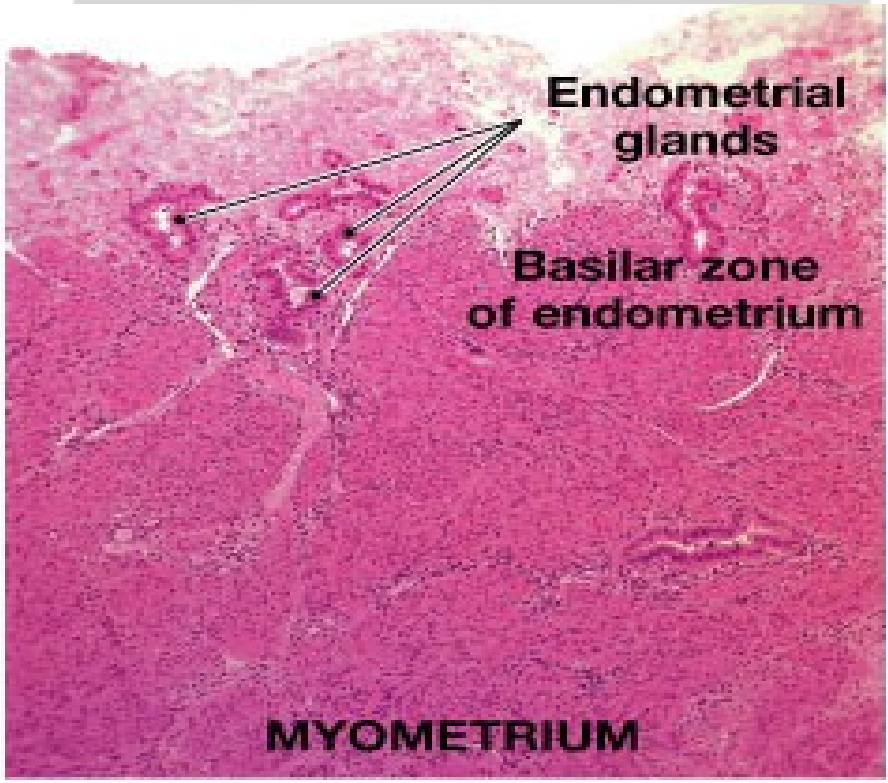




Menstrual phase (days 1-4)

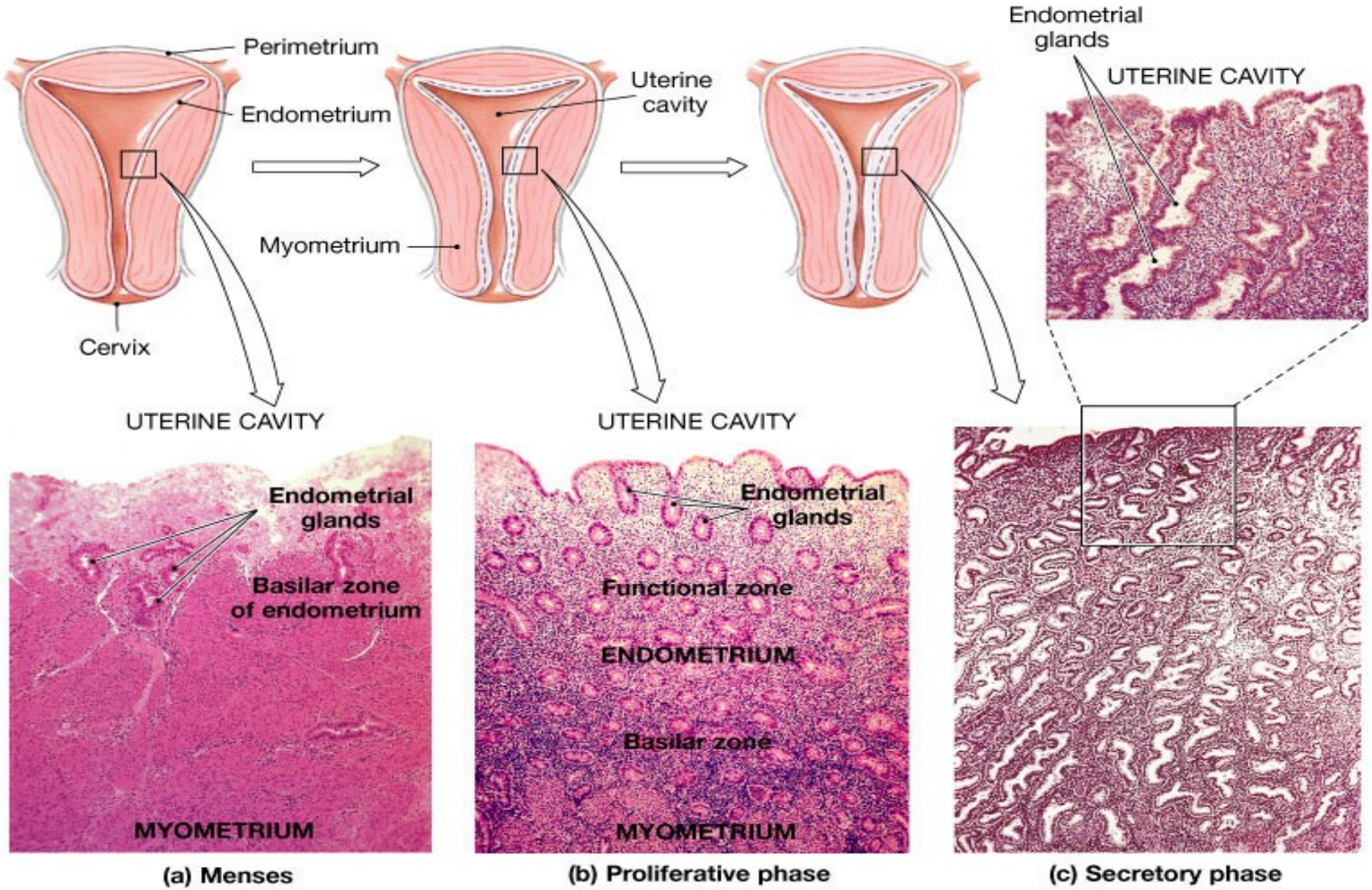
- When no fertilization →
  C.L. degenerates → drop in progest. & est.
- coiled arteries constrict → ischemia & necrosis of Functionalis layer
- Rupture of arteries → hemorrhagic
- **Shedding of functional layer**,
- basal layer remain viable → restore functional layer





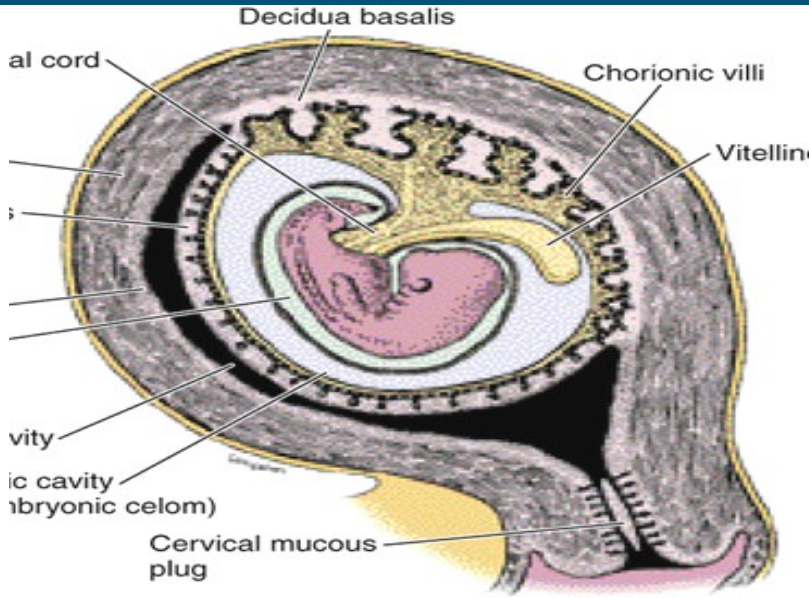
(a) Menses

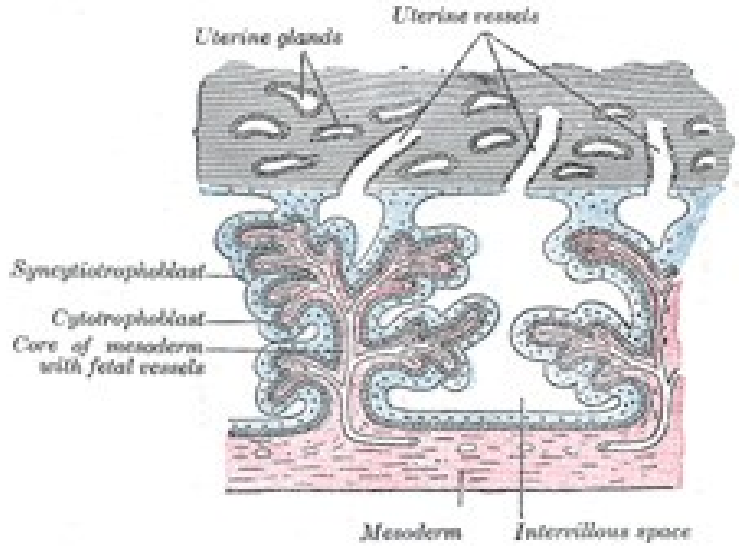
ENDOMETRIAL CYCLE



PLACENTA

- Temporary organ as the site of physiologic exchanges between mother and fetus
- also as an endocrine organ
- Consist of :
  - Fetal part :
    - Chorionic villi arise from chorionic plate
    - Connective tissue surrounded by syncytiotrophoblast and cytotrophoblast
  - Maternal part :
    - Decidua basalis form lacunae





PLACENTA

Placental barrier :

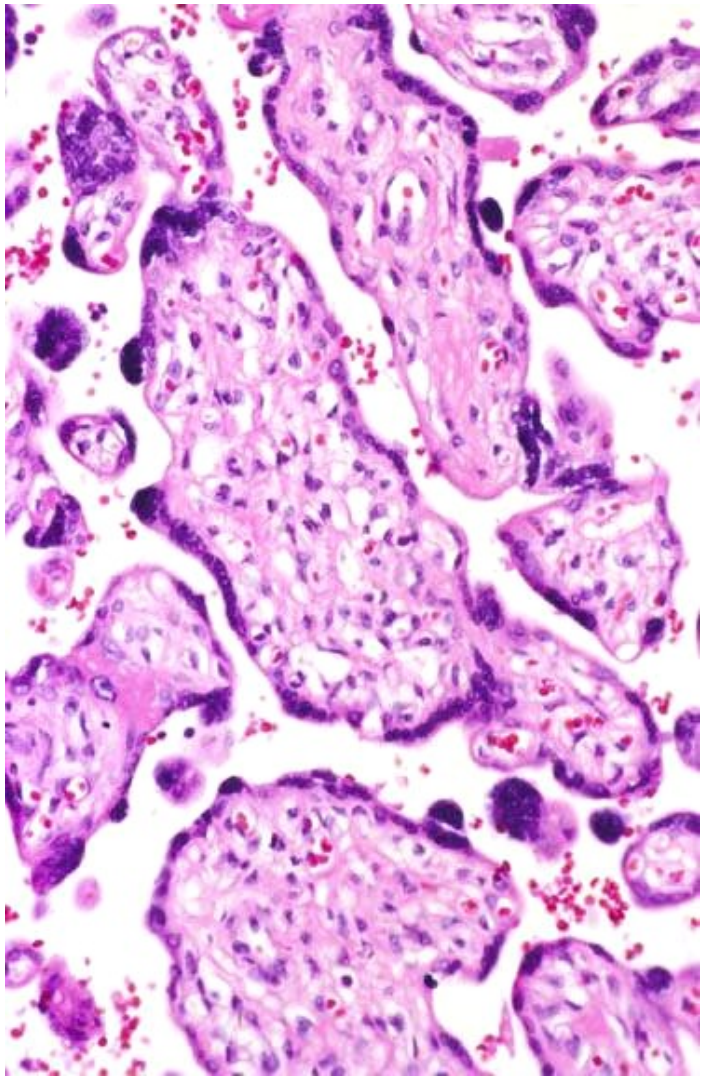
b) trophoblast layers

c) basal lamina of Trophoblast

e) Mesenchyme

f) basal lamina of capillaries

h) endothelium of fetal capillary



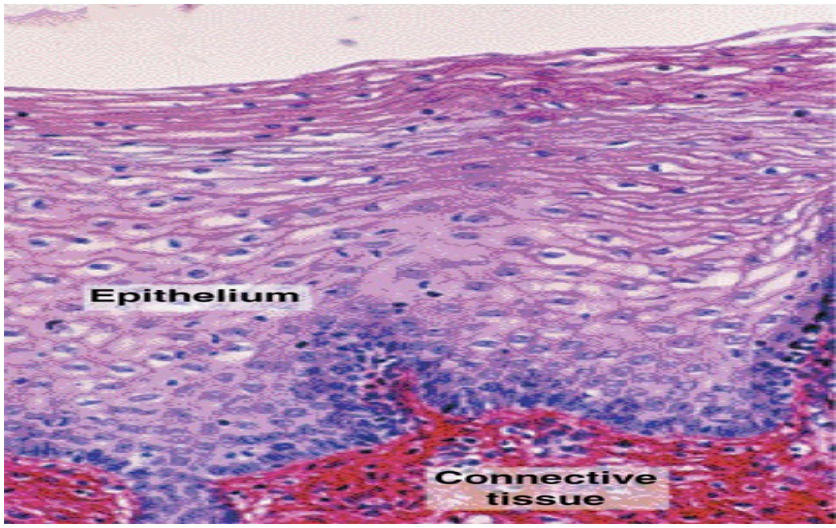
CERVIX

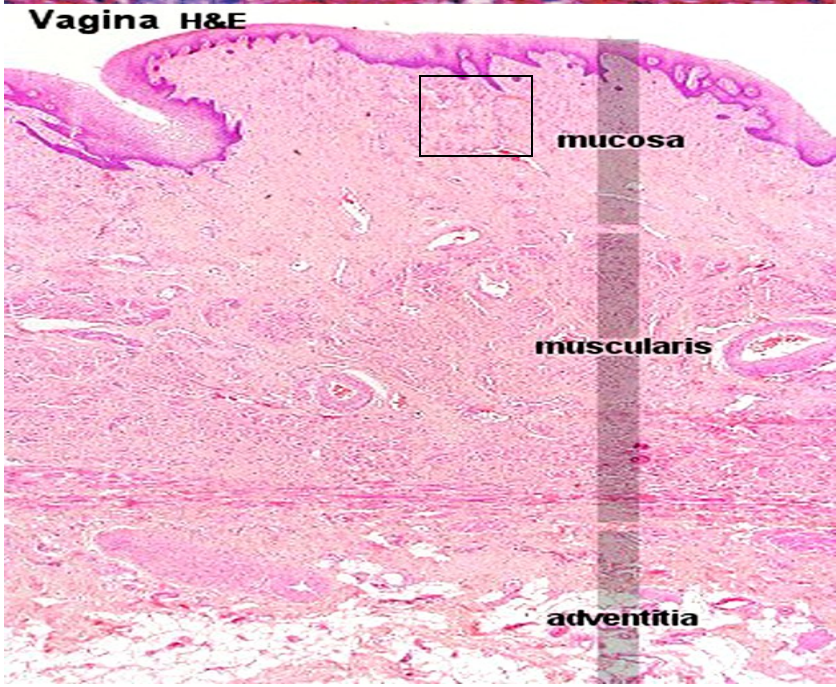
- Epithel :
  - Lumen : mucus-secreting simple columnar epith.
  - External surface : stratified sq. nonkeratinized epith.
- Wall :
  - dense, collagenous cont. tissue
- Cervical glands regulates by progesteron
  - Serous/watery fluid : around the time of ovulation
  - viscous/mucus : at pregnancy/luteal phase of menstruation

VAGINA

Vagina consist of three layers :

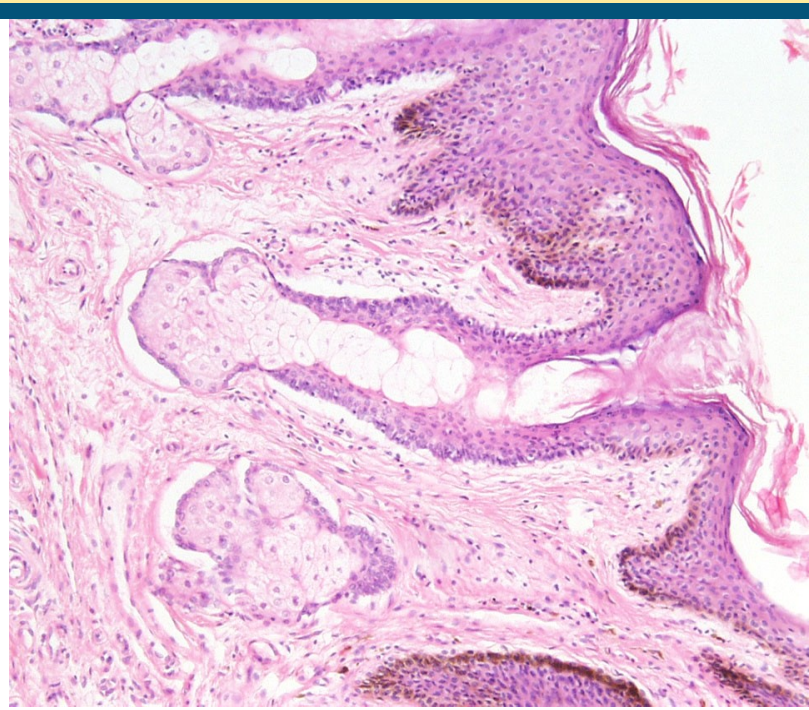
- Mucosa
  - Strat. Sq. Nonkeratinized Epit. (>> glycogen)
  - Lamina propria : loose fibroelastic C.T. , rich vascular.
  - **No glands** ; vaginal fluid comes from transudation & cervical glands
- Muscularis
  - Smooth muscle, inner circular & outer longitudinal
- Adventitia
  - Dense fibroelastic C.T





EXTERNAL GENETALIA

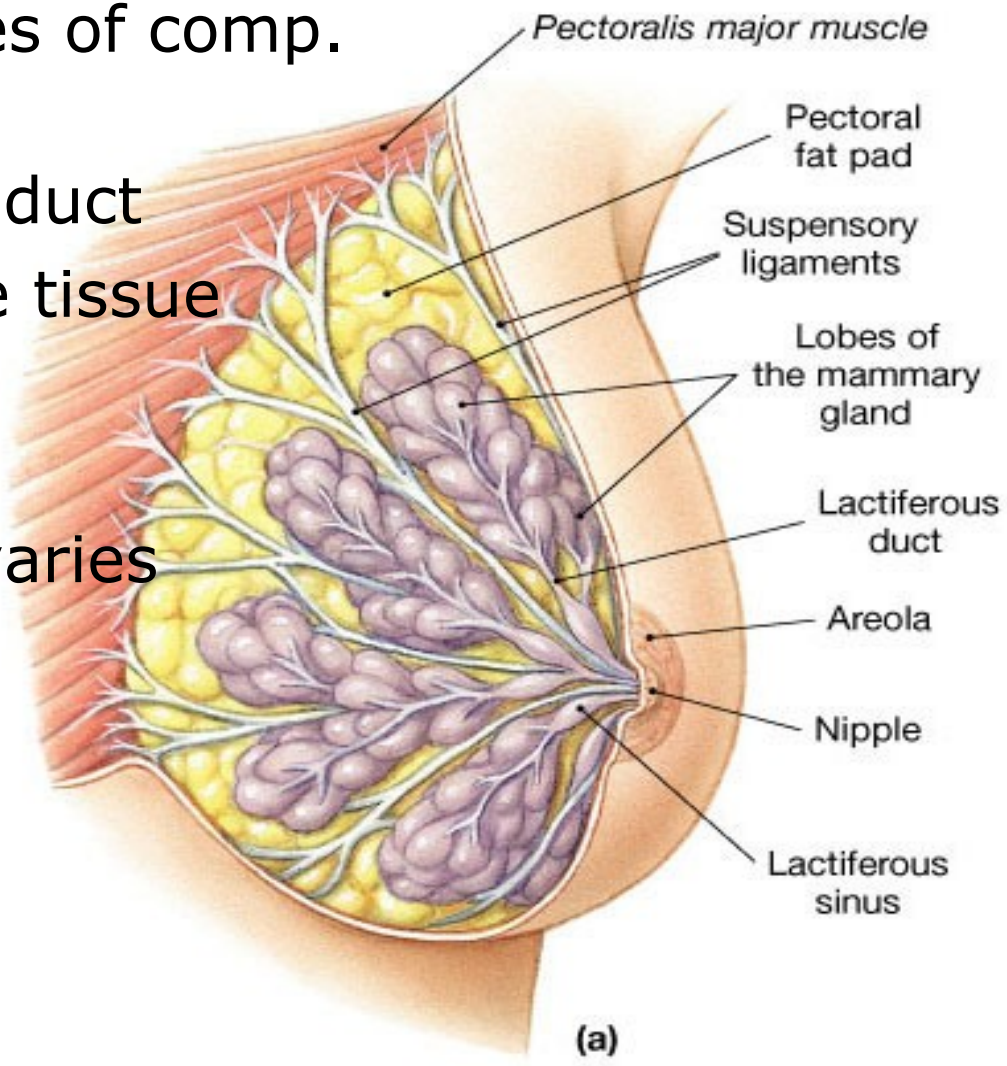
- Labia majora
  - Structure ~ skin
  - Rich adipose tissue
  - Sweat & sebaceous glands
- Labia minora
  - Spongy C.T. with elastic fiber
  - >> blood vesel & nerve ending
  - sebaceous glands
- Clitoris
  - Strat. Sq. epithelium
  - Two erectil bodies (blood vessels, sensory nerve)
- Glands
  - Glands of Bartholin : mucus
  - Minor vestibular glands



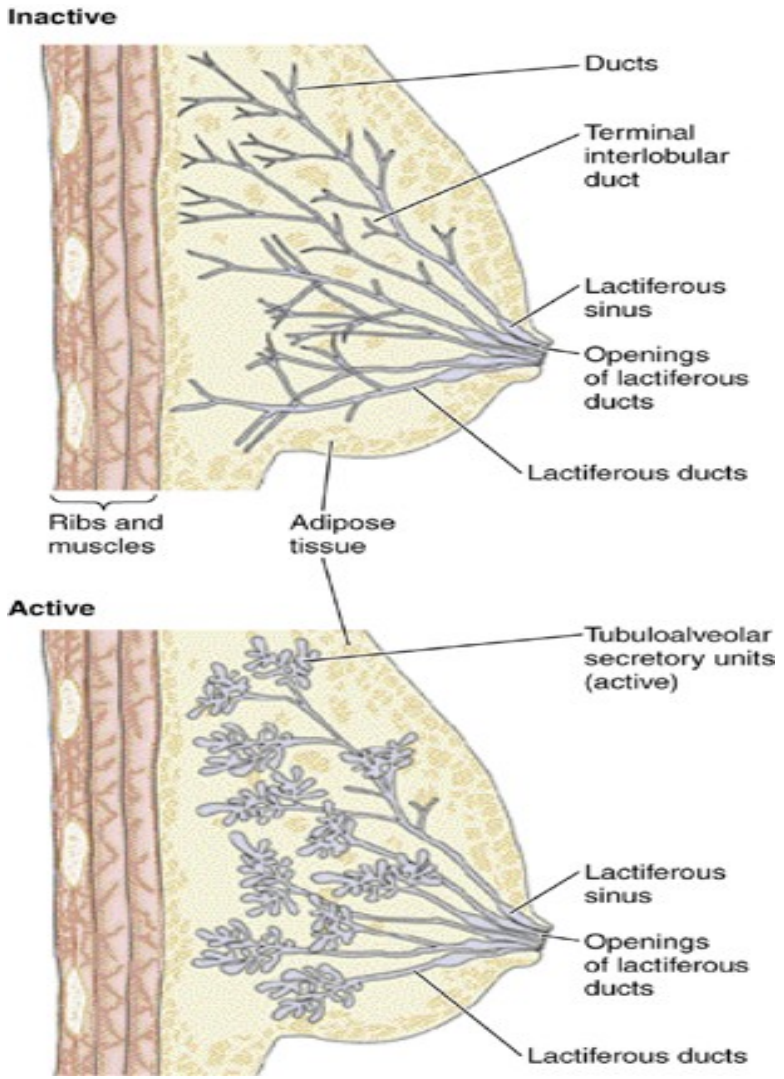
Mammary Glands

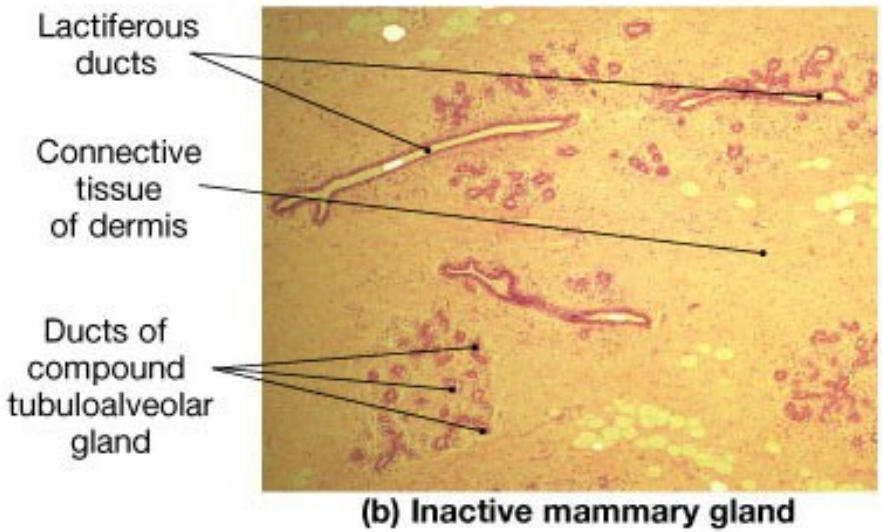
- Organs of milk production
- Consist of 15-25 lobes of comp. tubuloalveolar gland
- Excretory lactiferous duct
- Dense C.T. & adipose tissue separate the lobes

- Histologic structure varies according to :
  - Age
  - Physiologic status

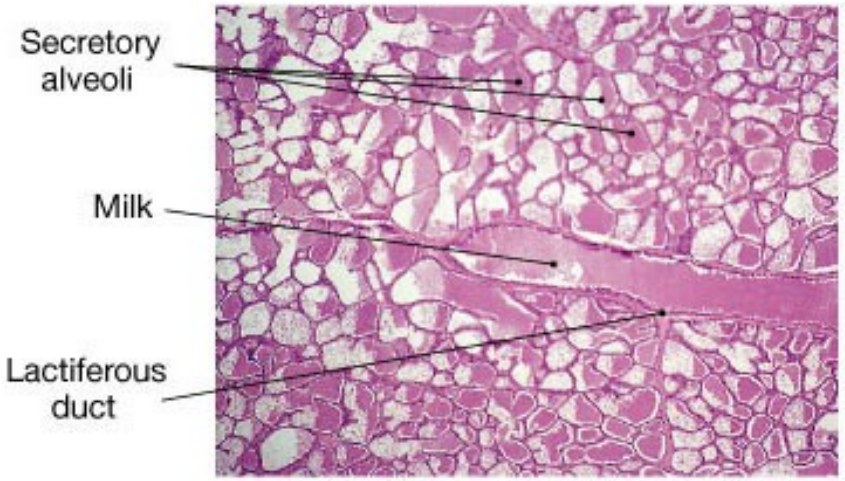


The Mammary Glands





(b) Inactive mammary gland



(c) Active mammary gland

Figure 28.23a-c

THANK YOU FOR YOUR ATENTION