



Female reproductive system

maya .alrefae ♡



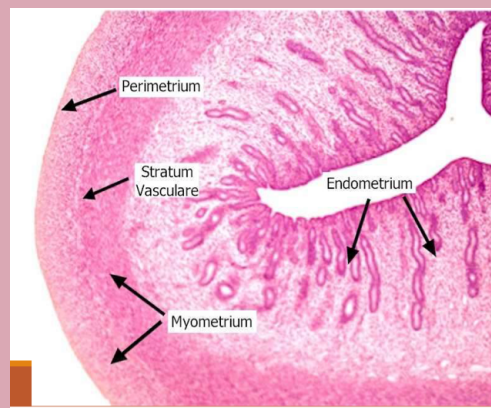
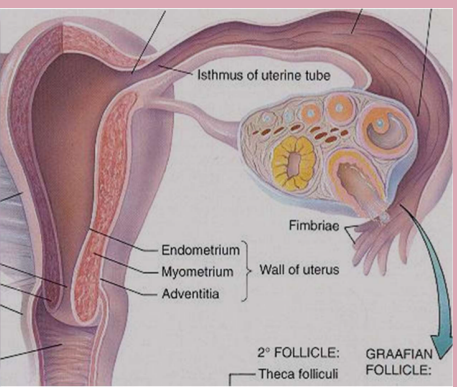
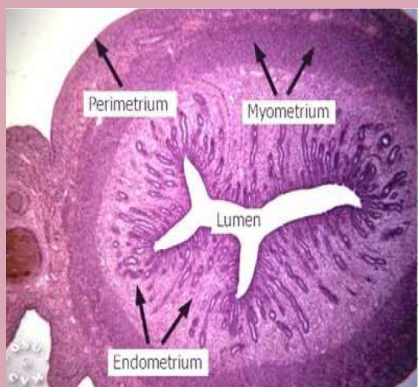
Uterus

*it's pear shape it's attached to uterine tube at upper end and vagina at lower end

*uterus is divided into Fundus, body, cervix

• wall of body & Fundus has 3 layers :-

- Inner **① endometrium** ⇒ Inner mucosal lining
- muscle **② myometrium** ⇒ muscular layer
- ③ perimetrium** ⇒ external layer



①. Perimetrium ⇒ two region

- ① *one covered by peritonum (serosa) Composed of layer of simple squamous cell (mesothelium) resting on an areolar connective tissue
- ② * one isn't covered by peritonum (adventitia) anterior portion of body covered by adventitia which is composed of areolar connective tissue.

② myometrium ⇒ thickest layer & composed of poorly defined layers of smooth muscle separated by poorly defined connective tissue

① Inner layer: **Stratum Submucosum**

only 2

- thin layer composed of longitudinal & circular muscular fiber

② middle layer: **Stratum vasculare**

Contraction كتابين Inner + middle layer.

- thick + highly vascularized
- + with irregular arranged muscle fiber
- they are run longitudinally, circularly, obliquely, transversely

arcuate arteries located in this layer

③ outer layer: **Stratum subserosum**

- * muscle fibers are mostly longitudinal in orientation.

only 1
I don't want that much bc less contraction.



* myometrium is **estrogen dependent**

- means estrogen helps myometrium to grow thicker during pregnancy with more & large smooth muscle cell (hyperplasia & hypertrophy) + increased collagen fiber

تزيد عمالتها انه تنهيا لاستقبال الجنين للرحمة

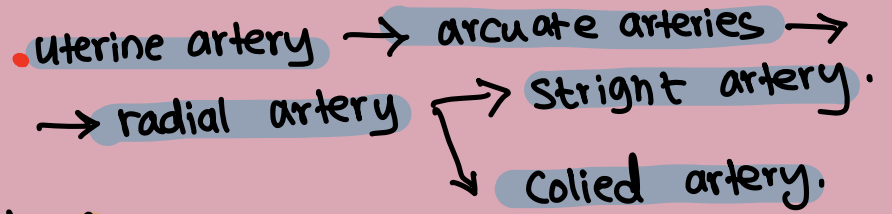
- but it's relaxed due to Relaxin hormone produced by Corpus luteum.

- at labour => it undergo strong contraction in response to oxytocin produced by neurohypophysis (posterior lobe of Pituitary gland)

المختبر =>

during pregnancy myometrium grow thicker + stay relaxed due to estrogen and relaxin while at labour => oxytocin cause myometrium to contract to help with child birth.

Endometrial blood supply



* Branches of uterine artery

penetrate myometrium to its middle

Give arcuate arteries

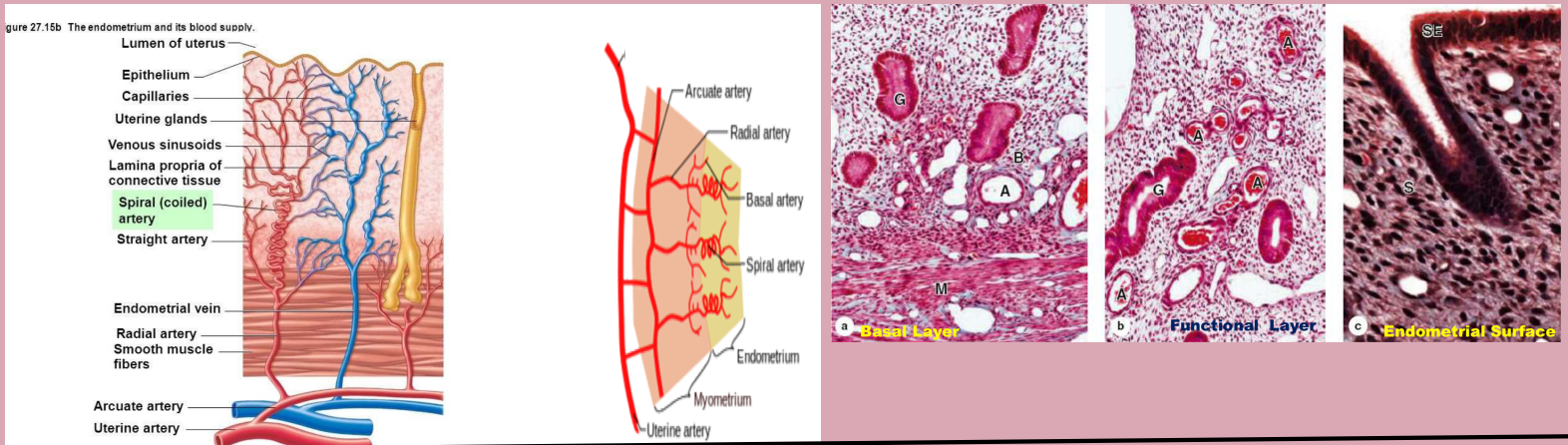
arcuate run supply superficial layer

of myometrium, it give radial arteries

that supply endometrium

① Straight artery → stratum basale

② Coiled spiral artery → stratum functionale



Menstrual Cycle

* estrogen & progesterone produced by ovaries stimulate changes in endometrium

* the average menstrual cycle is 28 day

* Begins age 12-15 years and end stage 45-50 years

* menstrual cycle has 3 phases:

- menstrual phase ⇒ 1-4 days : bleeding due to shed of endometrium
- Proliferative (Follicular) Phase ⇒ 5-14 → uterine lining rebuild & thicken
- Ovulation around day 14 → egg released from ovaries
- secretory (luteal phase) : day 15-28

↳ the lining thicken more & prepare for pregnancy.

Proliferative (Follicular) Phase :-

↓
کلاسیکی
نیو

- Days 5-14 leading up to ovulation
- estrogen produced by **theca cells** of ovarian follicle
- Cells at the base of gland proliferate forming simple Columnar epithelium & tubular gland.
- ✓ • Connective tissue proliferate in lamina propria
- ✓ • Coiled arteries grow into regenerated lamina propria.
- ✓ • glands are stright with narrow lumen but their cells accumulate glycogen.
- At day 14 Functional layer has been fully restored.

Secretory (Luteal) Phase

: Some book called it "progesterone phase"

- Begins after ovulation **15-28**
- progesterone : produced by **Corpus luteum**
- Glands develop, become highly coiled & branched & begin to secrete
- Coiled arteries also **"full development"**
- endometrium reaches 5 mm in thickness due to **edema** & accumulated **glycogen secretion** of glands.

Menstrual Phase

* IF Fertilization doesn't take place the **Corpus luteum** stop secreting hormones after about 14 days.

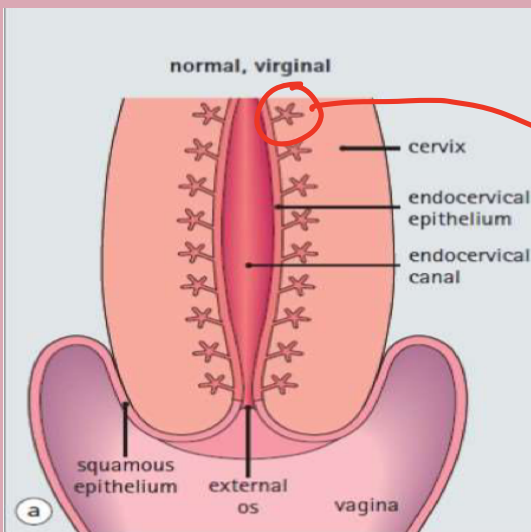
↙ ↘
* progesterone & estrogen decreasing causing coiled artery to constrict cutting off blood to functional layer of endometrium. ⇒ Endometrial cells die & functional layer is sloughed off then coiled arteries dilate again bc they are weakened they reapture.

↓
rupture
↓
bleed

Excellent

Uterine Cervix

- Cervix $\begin{cases} \rightarrow \text{inside uterus (endocervical canal)} \\ \rightarrow \text{inside vagina (vaginal part)} \end{cases}$
- mucosa of endocervix \Rightarrow it's lined by mucous secreting simple **partially ciliated** columnar epithelium.
- vaginal part of cervix has stratified squamous **non-keratinized** epithelium.
- transitional zone from columnar epithelium of endocervix is as result of vaginal acidity. \rightarrow acidity cause this change from one type cell to another
- ducts of mucosal gland in transition zone get blocked forming cyst "**nabothian follicles**"
- the **transitional zone** is the most common site for development of **cervical cancer**
- Cervical mucosa contain **cervical glands** and no **branched tubule-alveolar spiral arteries**.
- Cervical mucosa don't slough off during menstruation. (no spiral \rightarrow no functional layer as endometrium in uterus)



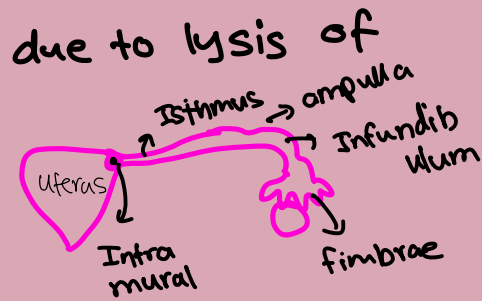
this gland when it rupture due to obstruction form **Nabothian follicles**.

- the glands show changes in secretory activity from thin **alkaline** fluid at mid-cycle to **less** **thick** viscous after ovulation & formation of corpus luteum.

lamina propria composed of dense connective tissue and many elastic fiber & few smooth muscle cell
 cervical قوام الشدة لأنه ثقل الجنين كالقوام
 muscular layer of cervix is myometrium made of inner circular + outer long muscle layers.

increase of diameter of cervix during labor.

softening of cervix during childbirth is due to lysis of collagen.



Uterine Tube

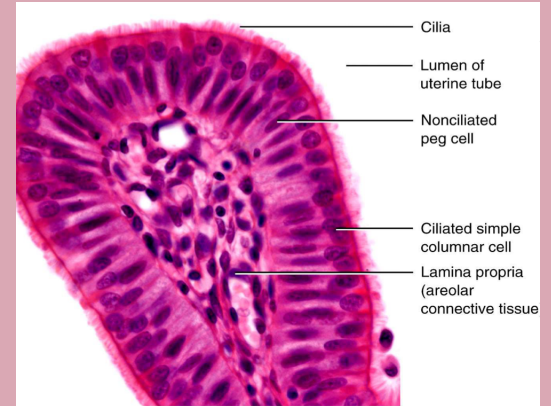
Intramural part in uterine wall

Isthmus is adjacent to uterine wall

Infundibulum is funnel-shaped part near ovary with Fimbriae.

Ampulla is dilated part

- Mucosa has many longitudinal folds which are prominent in the ampulla
- Mucosa has a simple columnar epithelium consist of ciliated cell and non ciliated peg cell *non ciliated*
- Peg cells** are secretory cells that produce a watery tubal fluid which nourish spermatozoa, zygote
- Lamina propria composed of loose connective tissue, reticular cell, fibroblast, mast cells and lymphoid cells.



(a) Details of epithelium in sectional view

Muscularis consists of poorly defined inner circular layer and outer longitudinal layer of smooth muscle cells

Muscularis peristaltic movements with the beating of the cilia of epithelium help to propel oocyte to the uterus

Serosa is a connective tissue layer lined by a simple squamous epithelium contains blood vessels, and nerves



(b) Details of epithelium in surface view

Figure 28.17b: Tortora - PAP 12/e Copyright © John Wiley and Sons, Inc. All rights reserved.



Vagina

- the mucosa is thick stratified squamous non-keratinized rich in glycogen.
- vaginal bacterial flora use glycogen to synthesis lactic acid.
- lamina propria composed of Dense Connective tissue that highly vascularized with many elastic fibers.

حافظ على
acidity of vagina

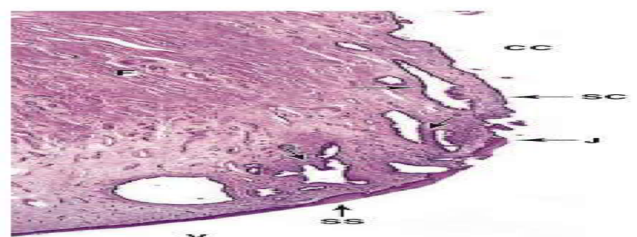
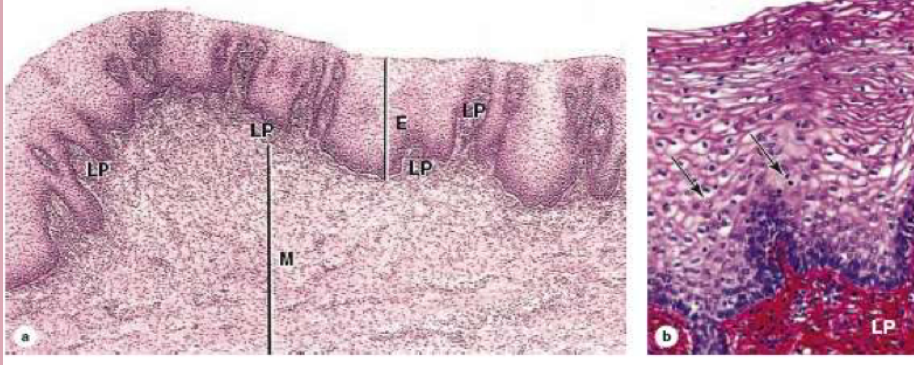
• Mucosa has't gland but increment of fluid during Sexual arousal is due to

- transudate from vessels of lamina propria and secretion of cervical gland.

وَقَدْ الْوَالِدَةُ بِصَبْرٍ فِي امْتِحَانِ
بَيْنَ رَأْسِ الْكَبِينِ وَالْهَيْئَةِ
عِندَ هَيْئِ بَدَنِ يَكُونُ
Dense connective tissue →
to prevent rupture of
vagina.

- ① Before puberty & after menopause ⇒ the epithelium is thin
- ② during reproductive year → epithelium is thickened under activity of estrogens.
- ③ muscular layer of circular and longitudinal smooth muscle
- ④ adventitia → of fib-collagenous tissue containing elastic fiber - many vessels & nerves
- ⑤ elastic fiber responsible of vaginal distention during childbirth

I → this thickens due to increased mitotic activity of basal cells & parabasal layer, superficial cells increase in number & size due to accumulation of glycogen & lipid within the cytoplasm.

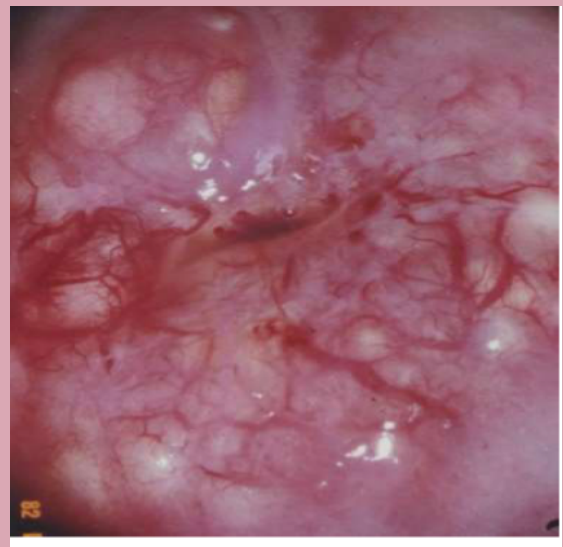


The mucosa of the cervical canal (CC) is continuous with the endometrium and like that tissue is lined by simple columnar epithelium (SC). This endocervical mucosa includes many large branched cervical mucous glands (arrows). At the external os, the point at which the cervical canal opens into the vagina (V), there is an abrupt junction (J) between the columnar epithelium and the stratified squamous epithelium (SS) covering the exocervix and vagina. Deeper, the cervical wall is primarily fibromuscular tissue (F). (Junqueira's Basic Histology Text and Atlas, 14th Edition)

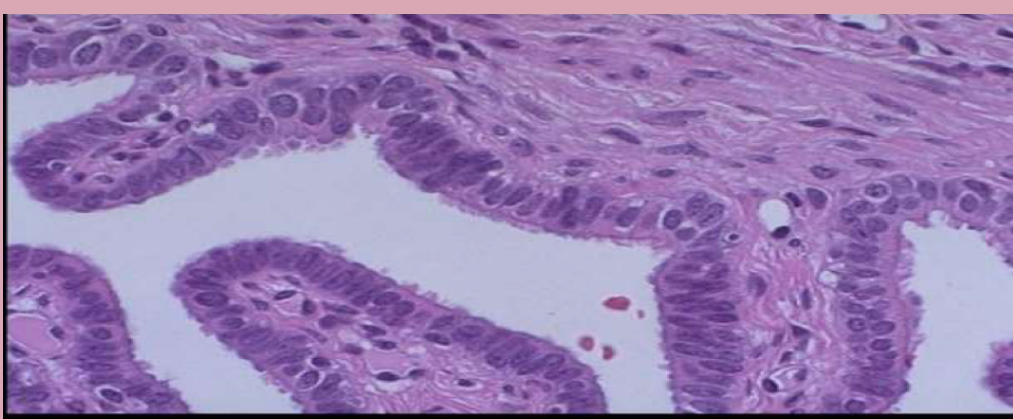
The lamina propria (LP) is highly cellular and extends narrow papillae into the thick, non-keratinized stratified squamous epithelium (E). The muscular layer (M) has bundles of smooth muscle arranged in a circular manner near the mucosa and longitudinally near the adventitia.



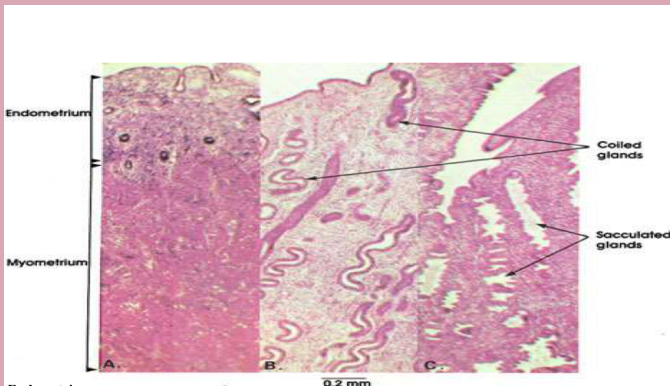
Cilia of Fallopian tube



Nabothian follicles



Normal adult fallopian tube has ciliated columnar cells lining



Endometrium
A. early postmenstrual, B. proliferative phase, C. secretory phase