



GENITOURINARY SYSTEM

SUBJECT : Anatomy

LEC NO. : 9

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وَقُلْ رَبِّ زِدْنِي عِلْمًا



GUS..

Lecture (9)

Anatomy of Female Reproductive System (2)

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ILOs

- 1. Describe the anatomy of uterus, location, parts, relations, blood & nerve supply, and lymphatic drainage.**
- 2. Understand the true (fibrous) ligaments supporting the uterus in its position.**
- 3. Discuss the broad and round ligaments.**
- 4. Understand the antiversion and antiflexion position of uterus.**
- 5. Describe the anatomy of vagina, relations, blood & nerve supply, and lymphatic drainage.**
- 6. Outline the anatomy of female external genitalia.**

Uterus

Definition:

↗ Has a cavity

The uterus is a hollow thick – walled muscular organ.

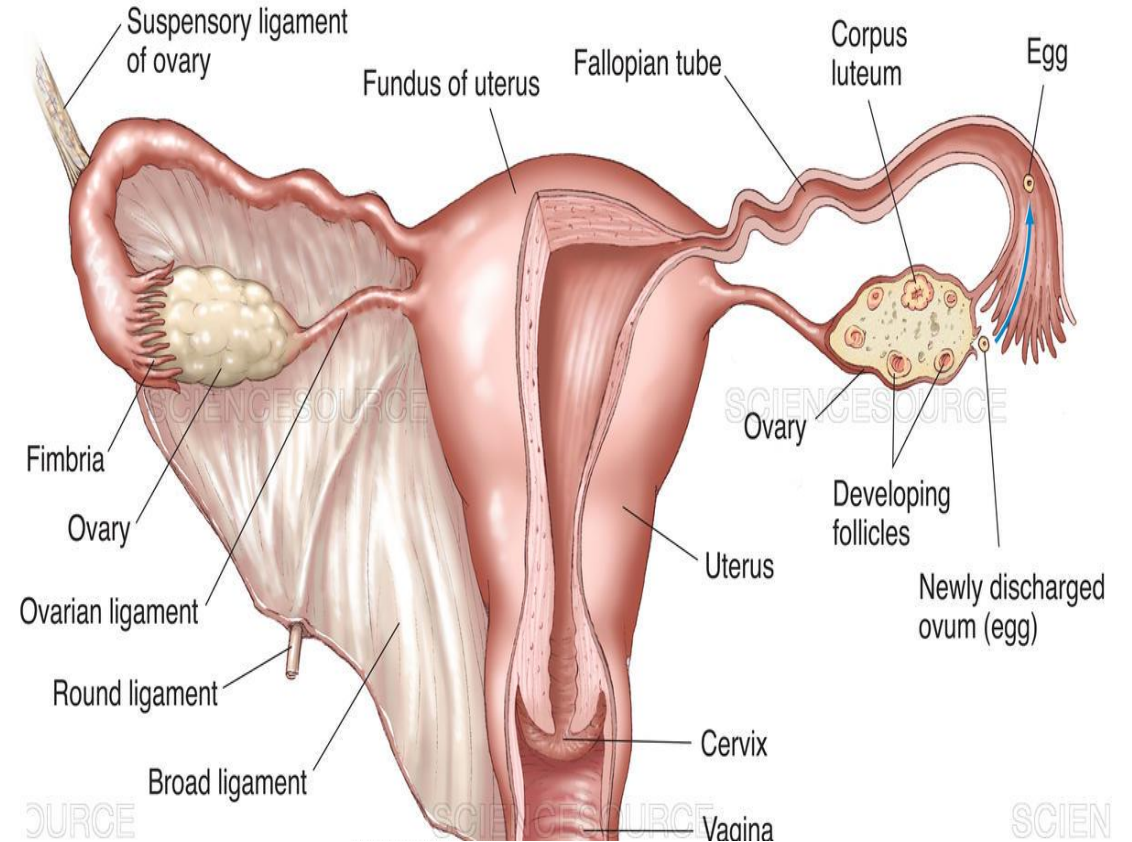
Site: It lies in the lesser pelvis.

Shape: Shape of an inverted pear. ↗

شبه الانجاسة

Size:

In females who have never been pregnant, it is about 7.5 cm long, 5 cm wide, and 2.5 cm thick. (3×2×1) inch.



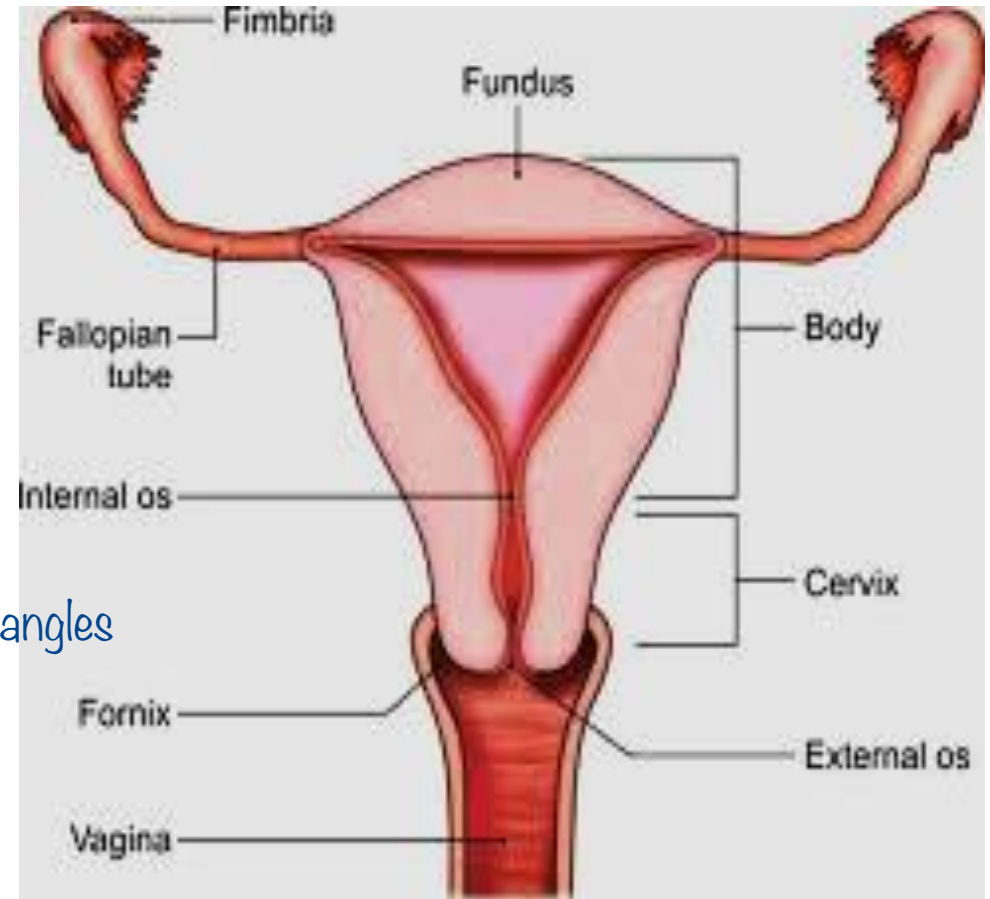
Parts of the uterus:

The uterus is divided into two main parts:

- Body.
- Cervix.

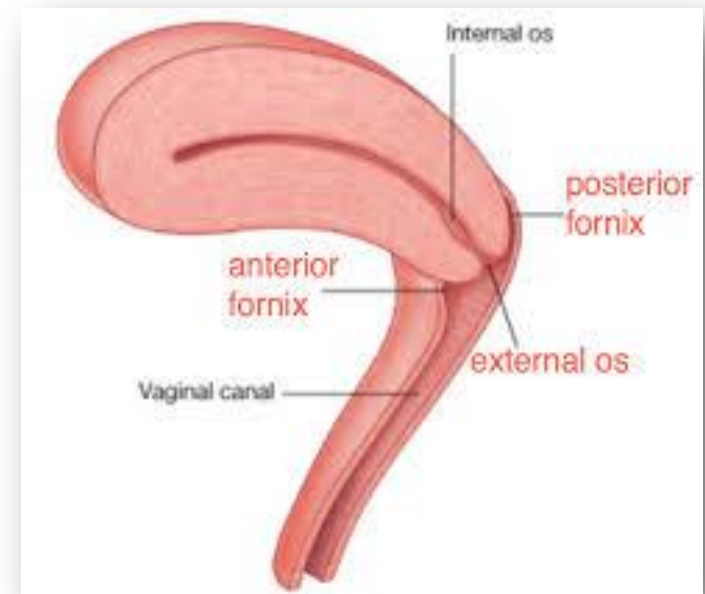
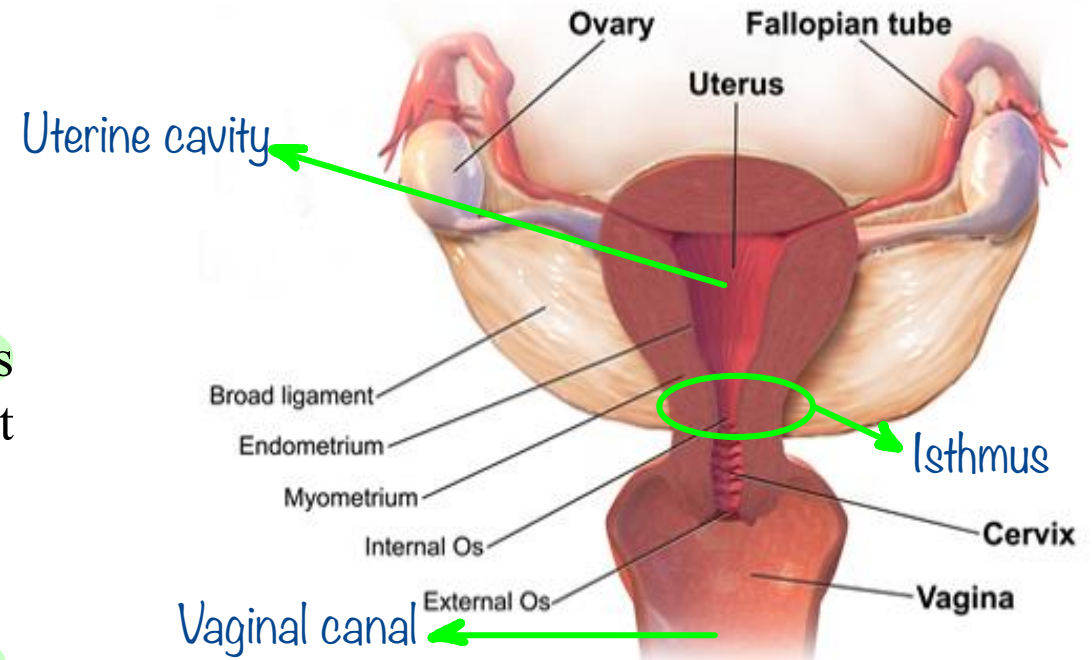
Body of the uterus:

- It forms the upper two-thirds.
- Near its upper end, the uterine tubes enter the uterus on both sides at the uterine cornua. → At supralateral angles
- The part of the body superior to the entry points of the uterine tubes is dome-like and is called **Fundus.**



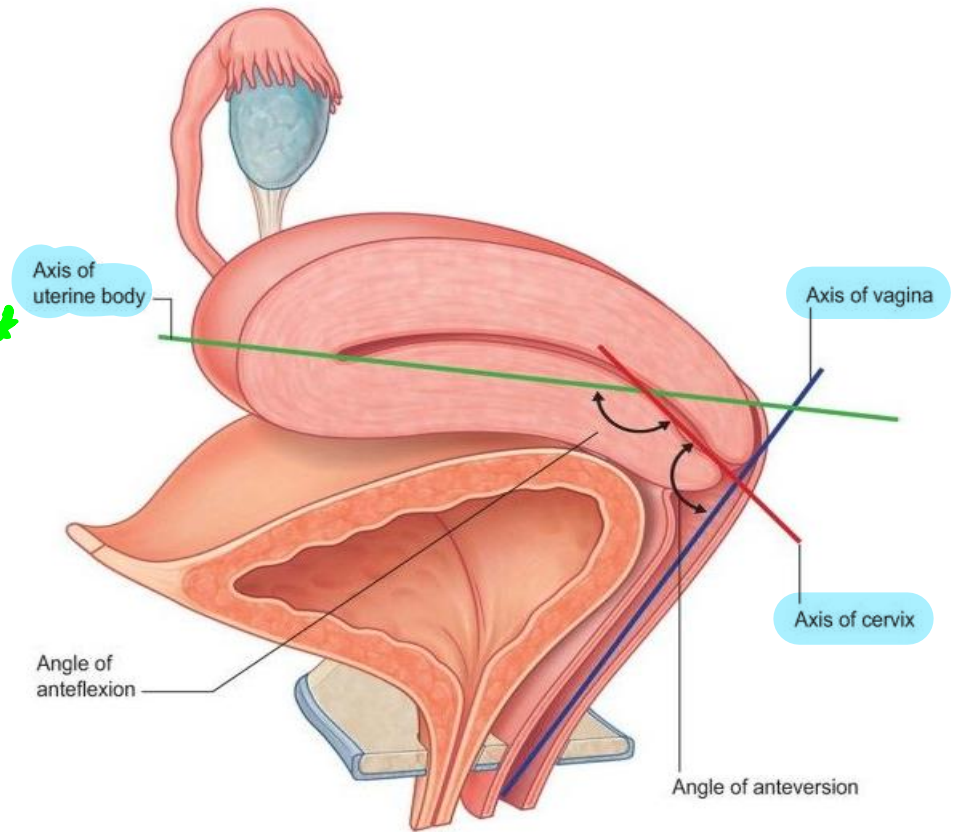
Cervix of the uterus:

- It forms the lower third.
- It is a narrow cylindrical portion.
- Between the body of the uterus and the cervix is a constricted region about 1 cm long, isthmus, (at the level of internal os).
- The cervix enters the upper end of the vagina, thereby the cervix is divided into;
 - **Supravaginal part.** → Not surrounded by vaginal wall
 - **Vaginal part.** → Part surrounded by vaginal wall



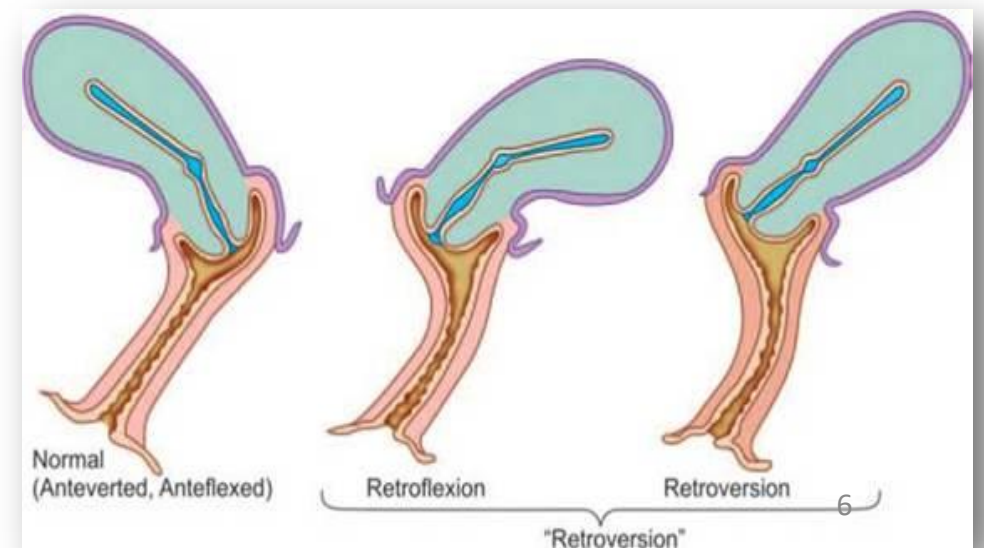
Positions of the Uterus: Most women

- The normal position of the uterus in the pelvis is **anteverted anteflexed** *مش جابين على خط واحد، متنيين على بعض*
- **Anteverted** means that the long axis of the uterus (cervix) is bent forward on the long axis of the vagina.
- **Anteflexed** means that the long axis of the body of the uterus is bent forward at the level of the internal os on the long axis of the cervix.



- In some women, the whole uterus are bent backward on the vagina so that they lie in the **rectouterine pouch**. In this situation, the uterus is said to be **retroverted**. → 10% *Doglus pouch*
- If the body of the uterus is, in addition, bent backward on the cervix, it is said to be **retroflexed**.

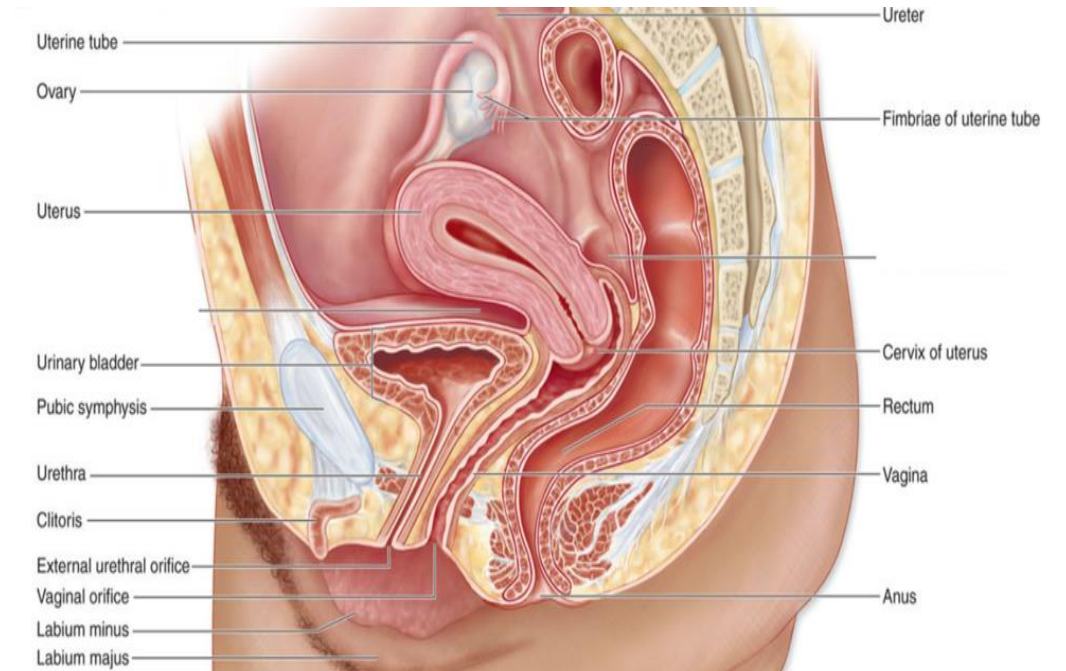
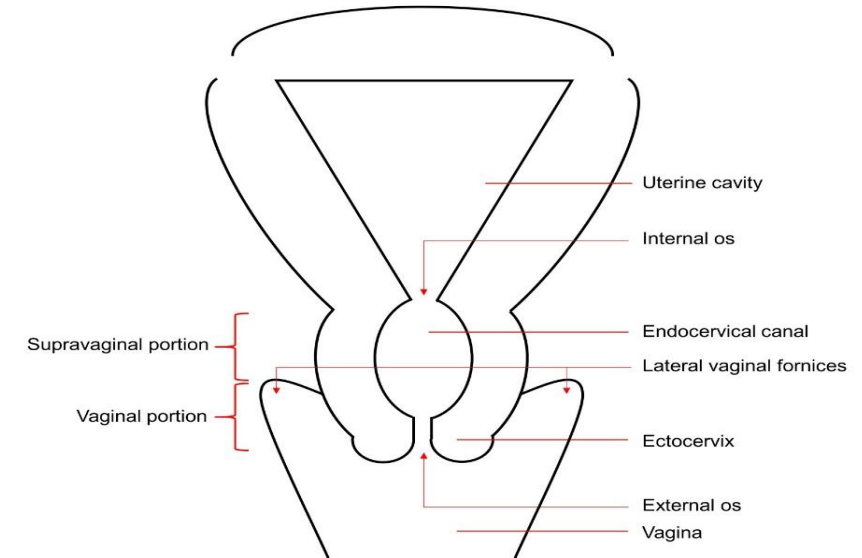
Causes infertility



Cavity of Uterus:

a-The cavity of the body of the uterus:

- **In a sagittal section**; It appears as a narrow slit where the anterior and post walls are close together.
- **In coronal section**, The cavity is triangular with the base towards the fundus and the apex towards the cervix.



b-The cavity of cervix (cervical canal):

- It is **fusiform in shape**; being wider in the middle but narrows at its ends.

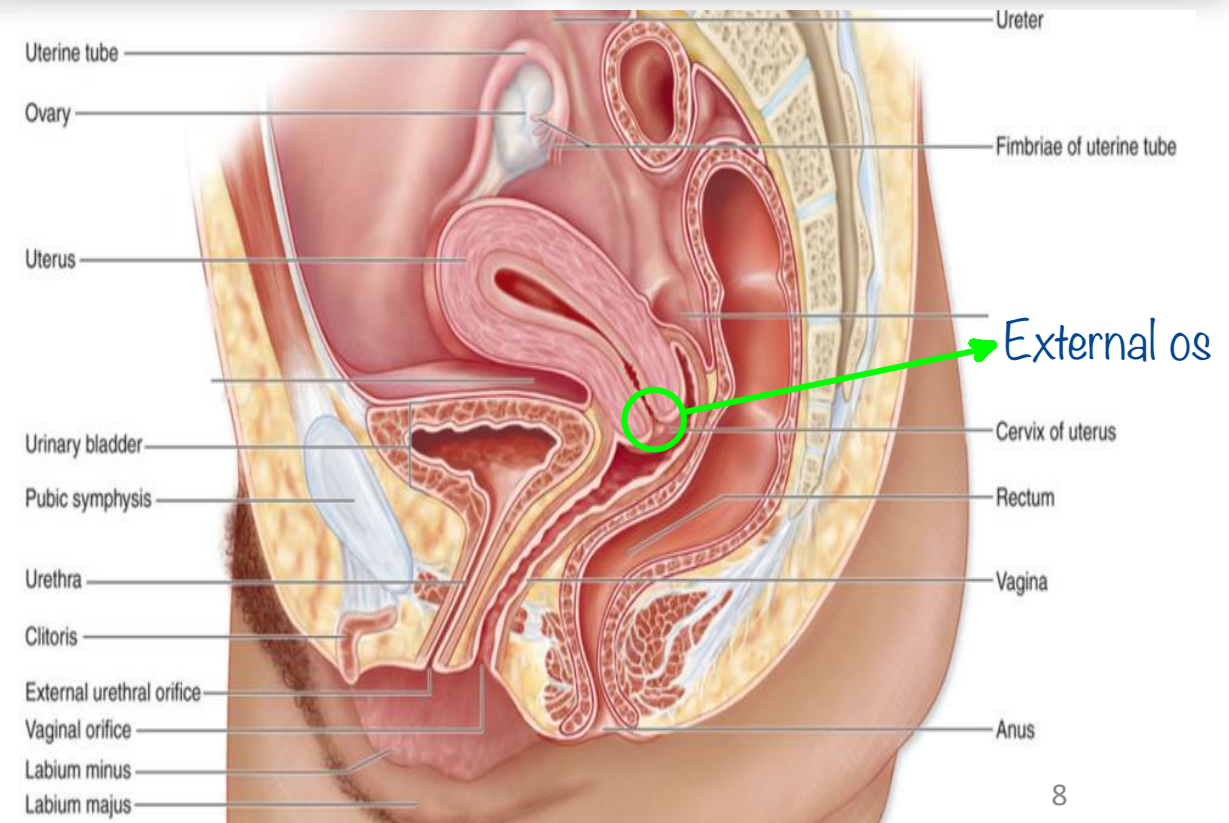
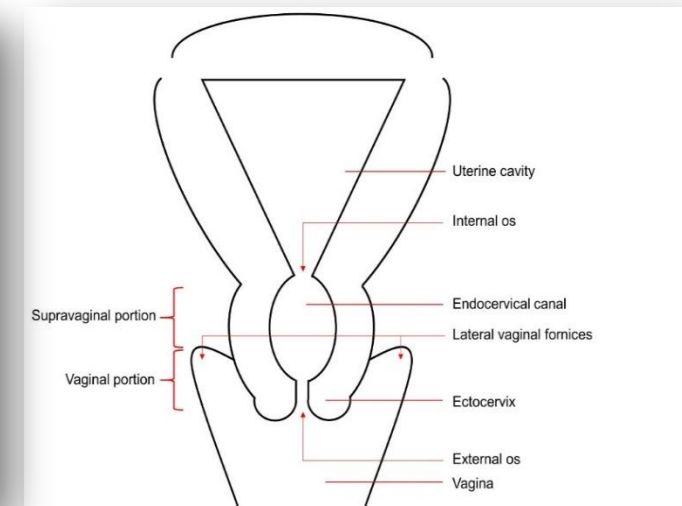
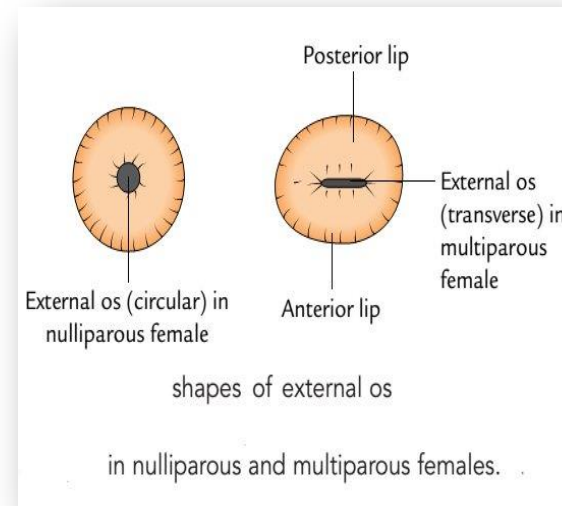
Widder at its middle

- It opens into the cavity of the body of the uterus through an opening called the **internal**

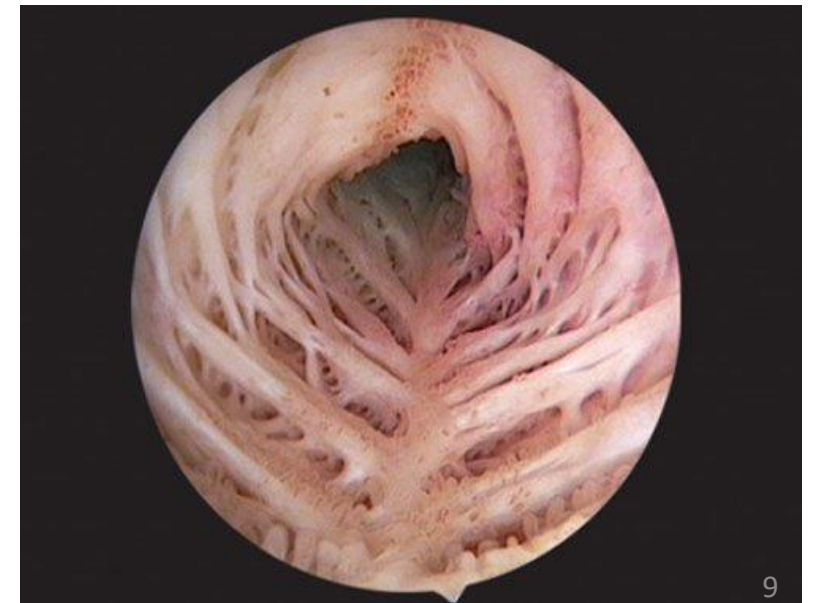
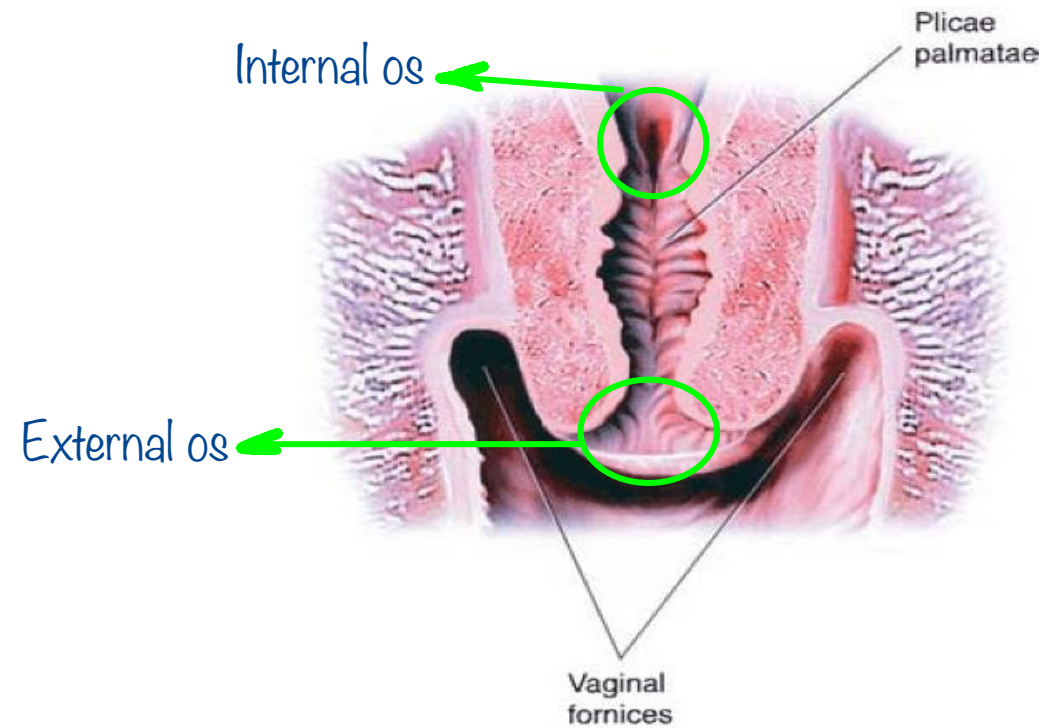
os. → يقابلها ال isthmus

- The canal opens into the vagina through the **external os**, this opening is directed backwards towards the posterior wall of the vagina.

- In nulliparous women, the external os is usually a circular aperture, whereas after childbirth it is a transverse slit.



- Its anterior and posterior walls show mucosal ridges with small side branches which are known as the palmate folds. This appearance is called **arbor vitae uteri**.
- The folds of both anterior and posterior walls fit into each other to close the cervical canal.



Relations of Uterus

Body of the uterus:

- **Fundus:** It is convex in all directions & covered by peritoneum that separates it from the sigmoid colon and coils of ileum.
- Below the level of entrance of uterine tube, the body has the following relations:

a-The anterior surface:

- It is related to the bladder, from which it is separated by the uterovesical pouch.

b-The posterior surface:

- It is directed upwards and backwards and is related to rectouterine (Douglas) pouch.

↳ Separates it from rectum

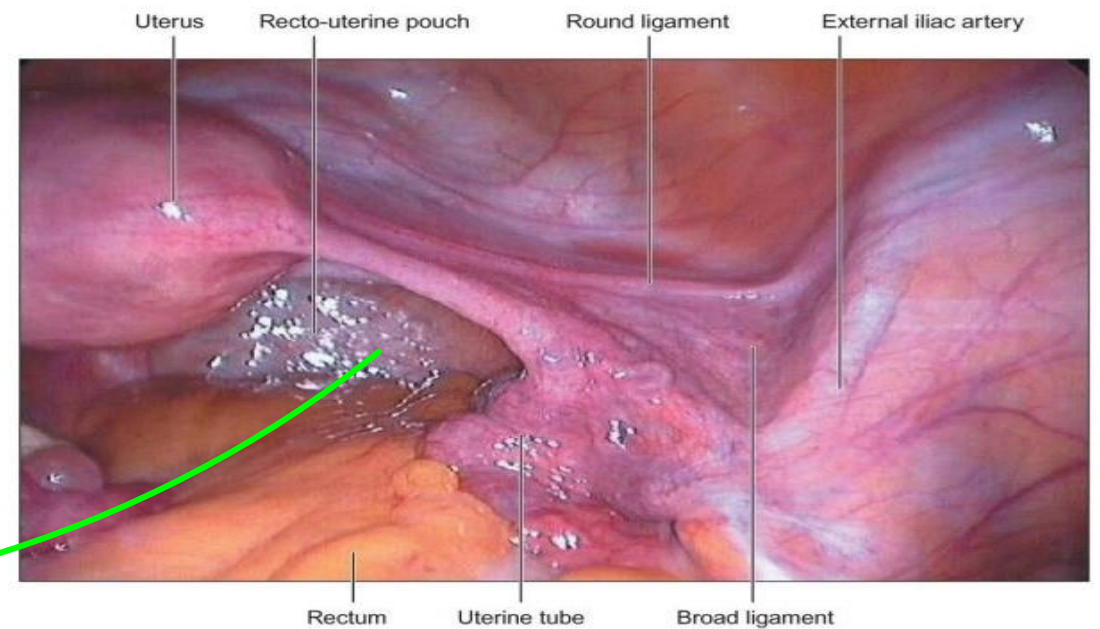
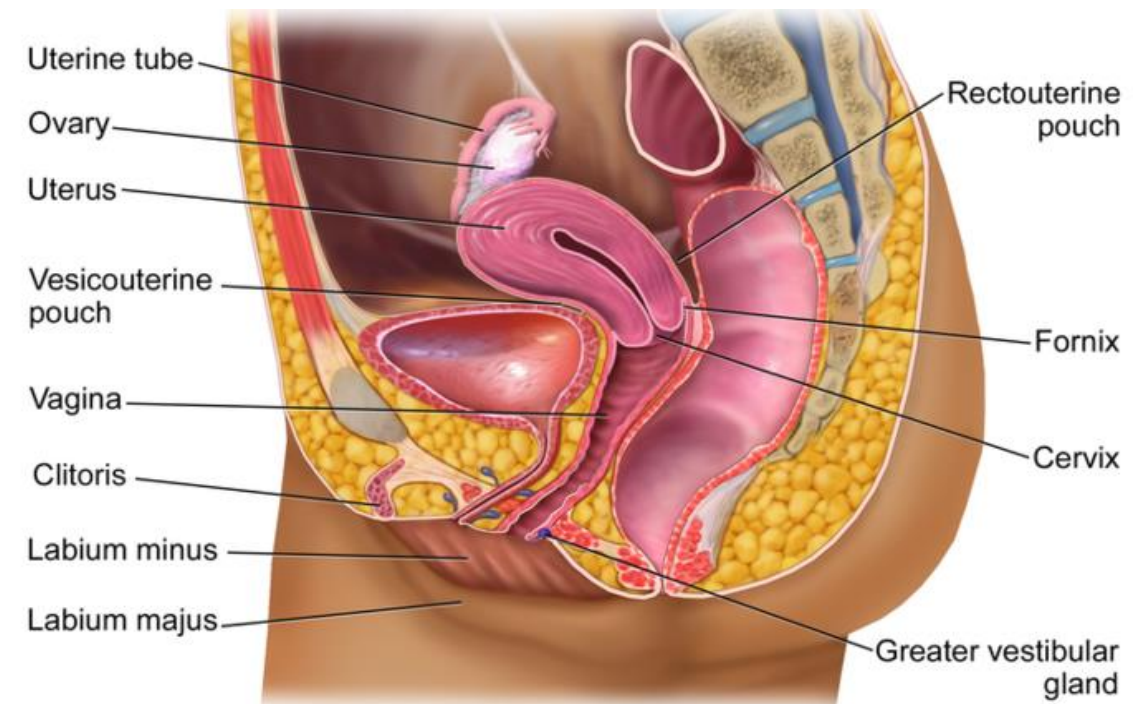
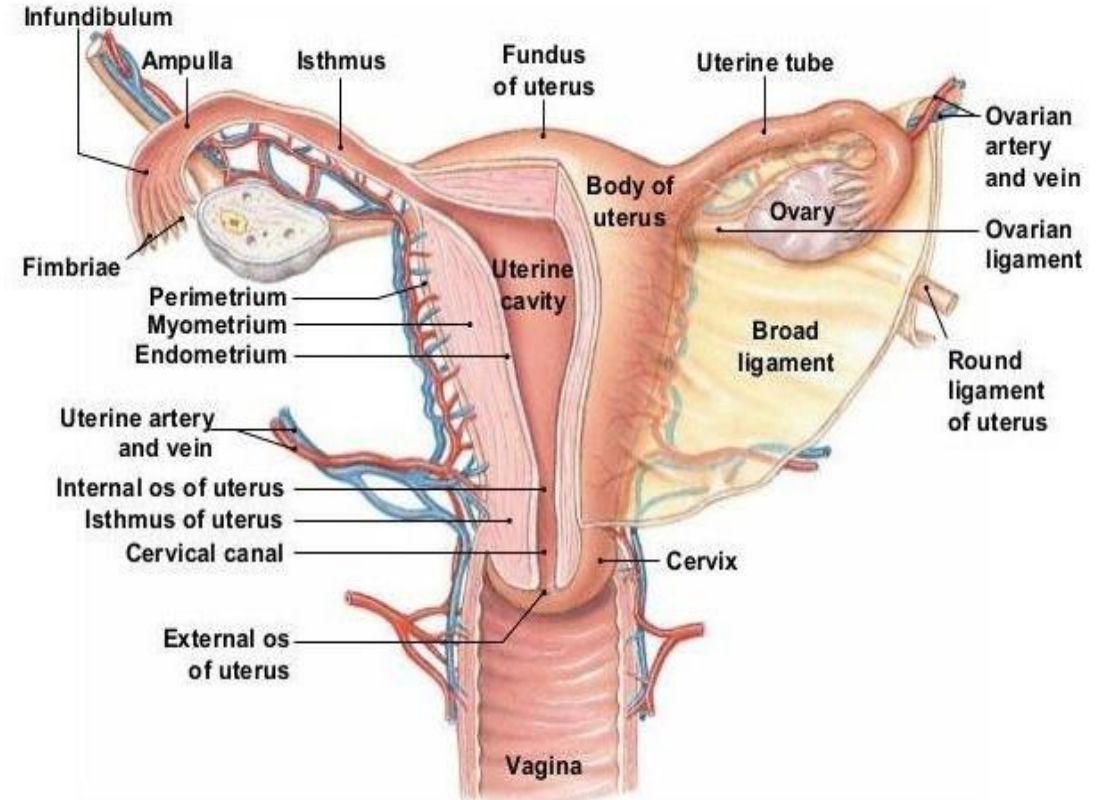


Fig. 77.13 Laparoscopic view of the broad ligament.

c-The lateral borders:

- On each side gives attachment to the broad ligament of the uterus.
- The uterine vessels run along this border between the two layers of the broad ligament.

Peritoneal fold



Relation of Cervix:

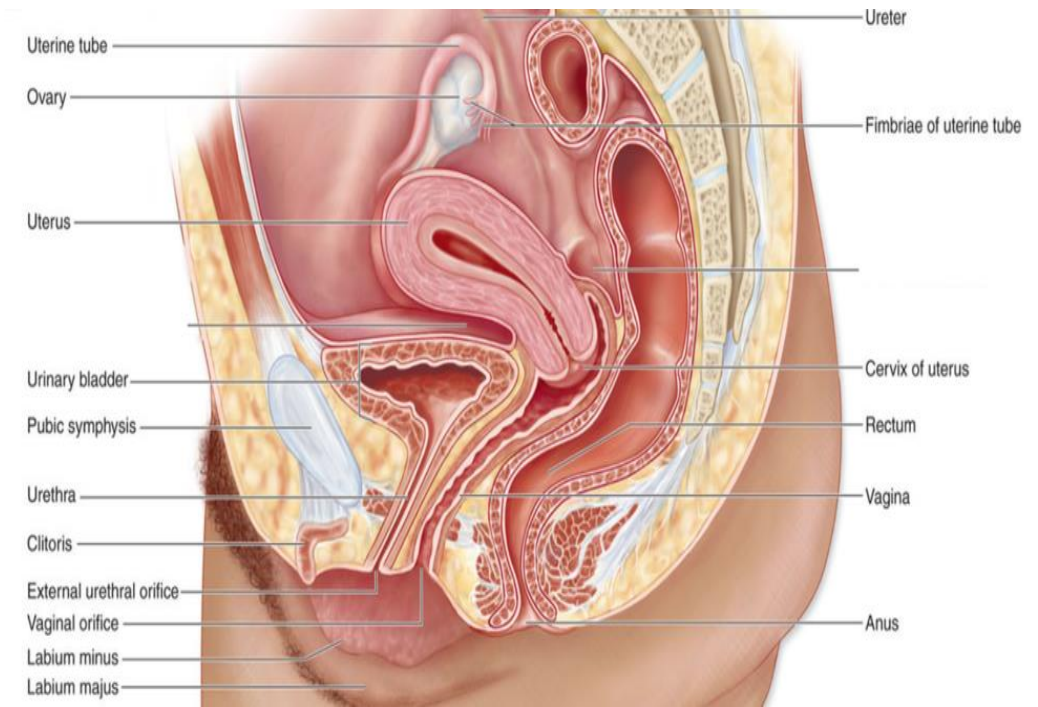
A-The supravaginal part

- **Anteriorly;** Base of the bladder (direct contact). → No peritoneum in between
- **Posteriorly;** Rectouterine (Douglas) pouch.
- **Laterally;** Uterine vessels and the ureters.

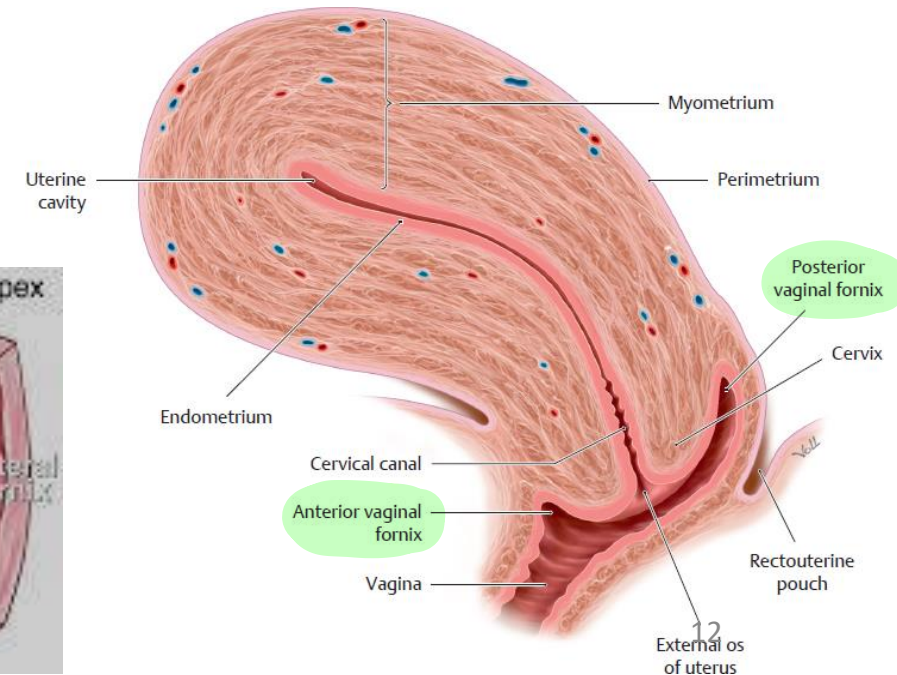
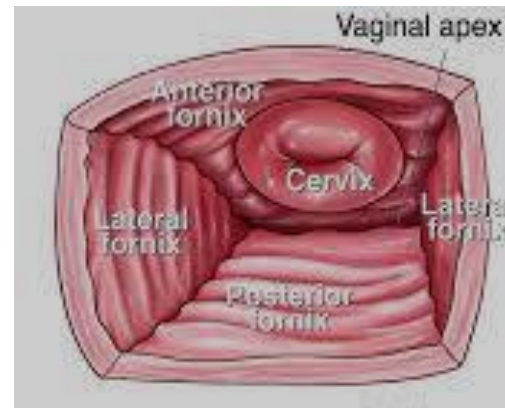
B-The vaginal part: Most deep

- **Anteriorly;** anterior fornix of vagina.
- **Posteriorly;** posterior fornix of vagina.
- **Laterally;** lateral fornix of vagina one on each side.

→ Surrounded by angular recess between wall of vagina and vaginal part of cervix called fornix



* Transverse section
و ينطلع من تحت

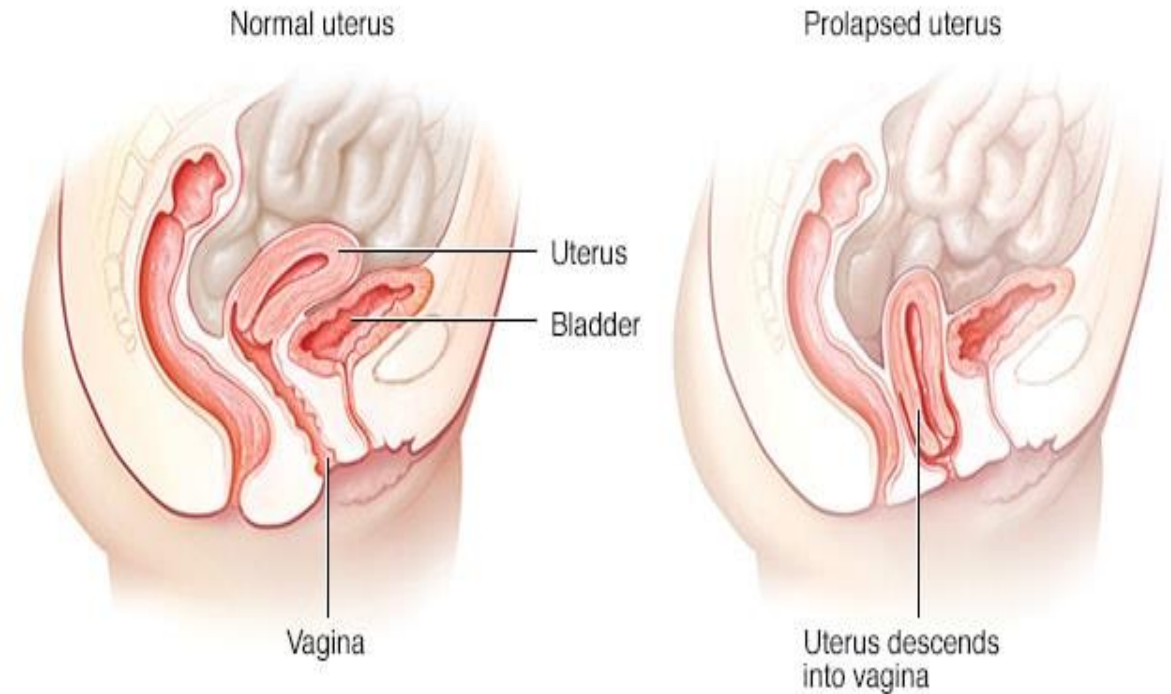


Factors support the uterus in its position:

- Levator ani muscles.
- Ligaments of the uterus.
- Urogenital diaphragm.
- Perineal Body.

Applied anatomy:

- Weakness of the uterine supports specially the muscles of the pelvic floor, leads to downward displacement of the uterus. This condition is called uterine prolapse. بالعادة بتكون كبيرة بالسنة و خلفت كثير



Ligaments of the uterus:

The uterus is attached to the pelvic walls and the neighboring organs by ligaments.

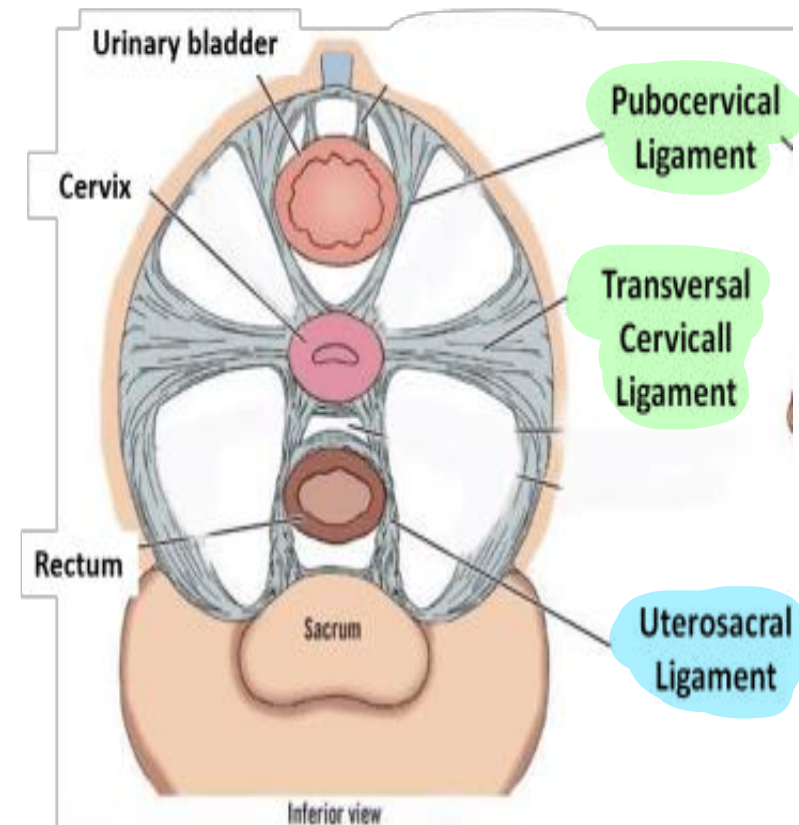
1- **Transverse cervical ligaments** (Mackenrodt's ligament):

- Extend from the side of the cervix & lateral fornix of the vagina to the side wall of the pelvis.
- Lie in the base of the broad ligament. ↗ support عامل ligament اكثر
- They are the most important ligament of the ligaments of the uterus so, it is called the **cardinal ligament** of the uterus.

2- **Pubocervical ligaments.**

- Extend from the cervix forwards to the body of the pubis

✦ Transverse section



↖ Runs forward and lateral

3-Round ligaments of the uterus:

- Attached to the superolateral angle of the uterus.
- Pass through the corresponding inguinal canal to end in the labium majus.

Where uterine tubes enter uterus

4-Ligaments of the ovary.

↖ Directed backward, attached to lower end of ovary

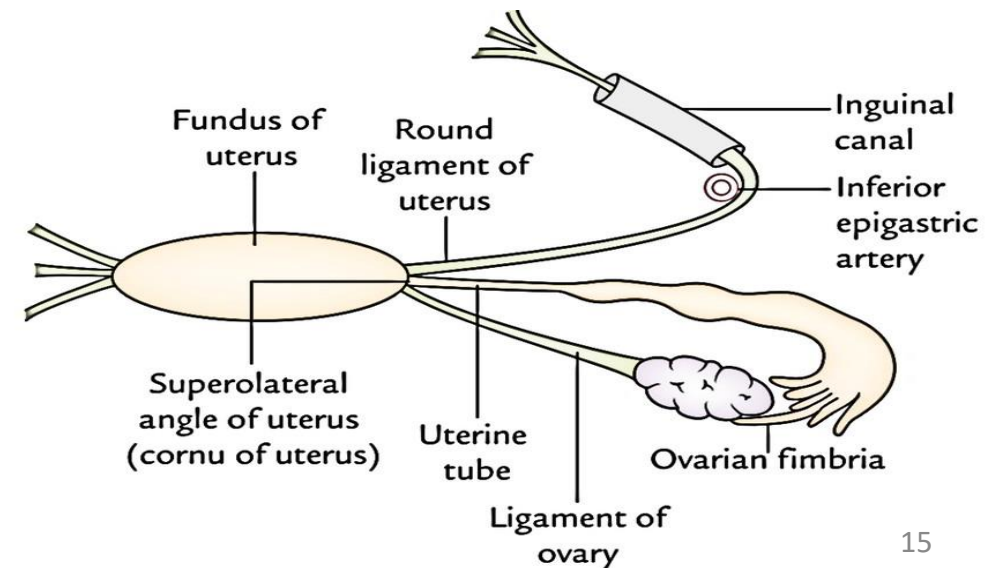
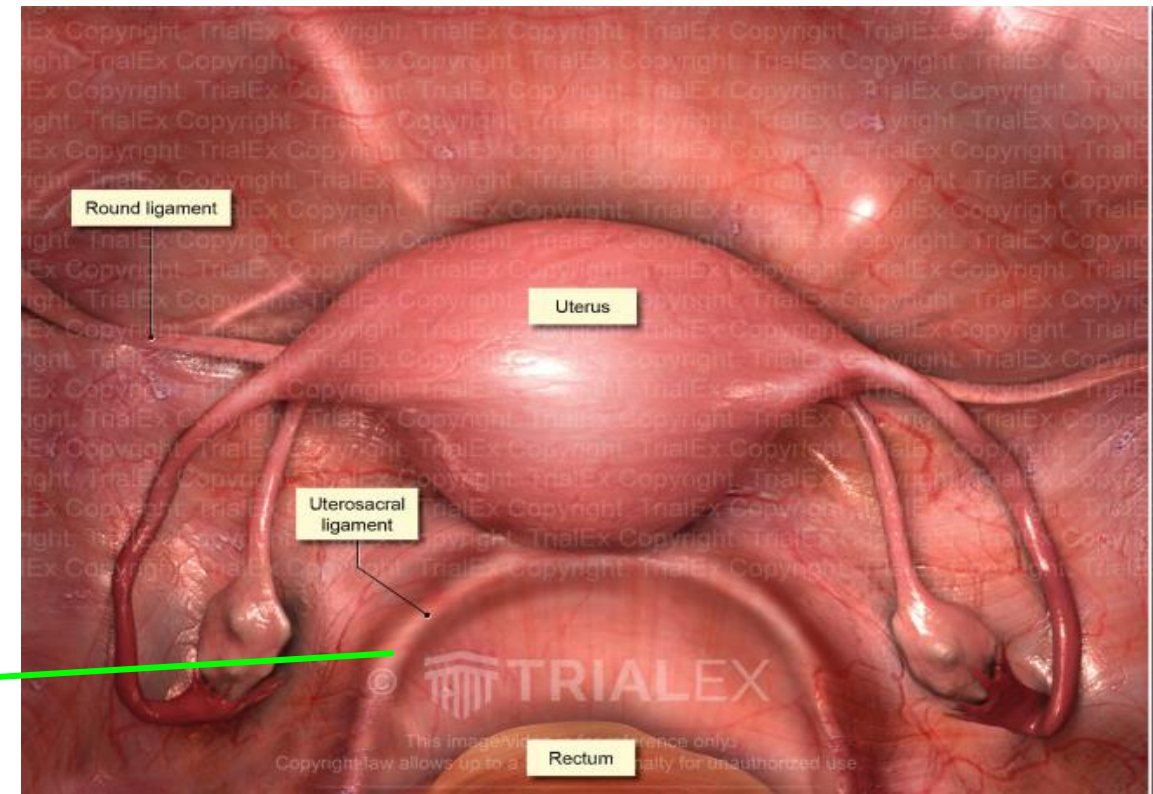
One of it's contents

5- Uterosacral ligaments:

- Extend from the cervix to the sacrum on the side of the rectum. They are covered by recto-uterine folds.

6-Anterior ligament: Uterovesical peritoneal folds.

7-Posterior ligament: Rectouterine peritoneal folds.



* Round ligament & ligament of ovary in embryologic life they were a single ligament (single fibromuscular cord) called gubernaculum which is located in both males and females then it starts to shorten and pulling testis or ovaries, so that testis reach scrotum then fades, in females it pulls the ovaries from posterior abdominal wall but they don't reach labia majora they reach lesser pelvis (level of uterus) and becomes 2 parts in females, we can say that gubernaculum in females attaches to three parts » lower end of ovary, supralateral angle of the uterus, labia majora

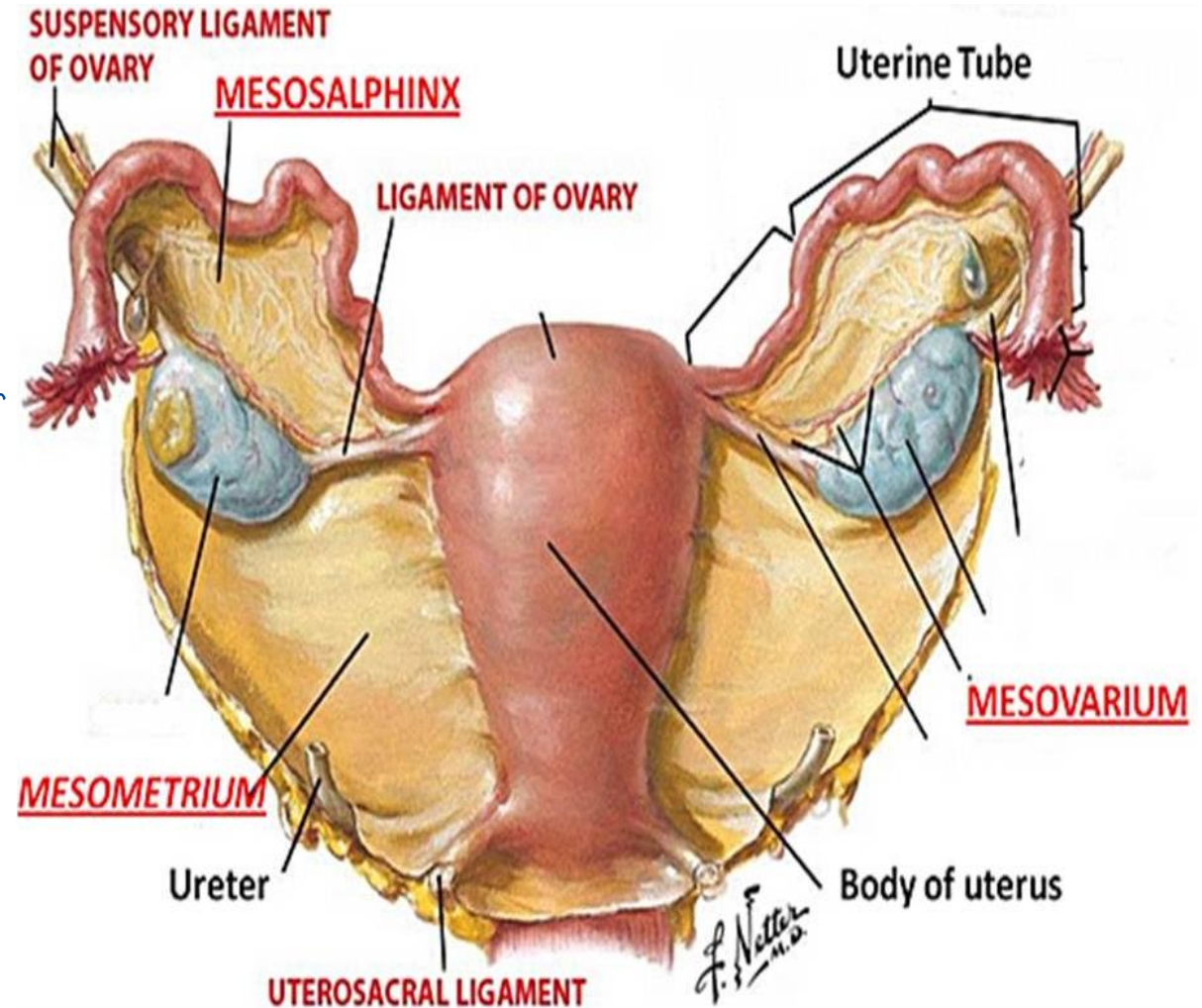
Round ligament preserves the uterus in it's position » anteflexed anteverted

8- Broad ligaments:

- They extend on each side from the uterus to the lateral pelvic walls, where they become continuous with the peritoneum covering those walls.

The broad ligament has: 2 layers continuous with each other

- A free upper (anterior) border enclosing the uterine tube.
- Lower border (posterior) which is attached to the pelvic floor, forming the root of the broad ligament. → Attached border
- The ligament also has two surfaces; posterior (upper) and anterior (lower) surface.



The broad ligament of the uterus is represented into 4 parts:

Between uterine tube and ovarian ligament

a-Mesosalphinx.

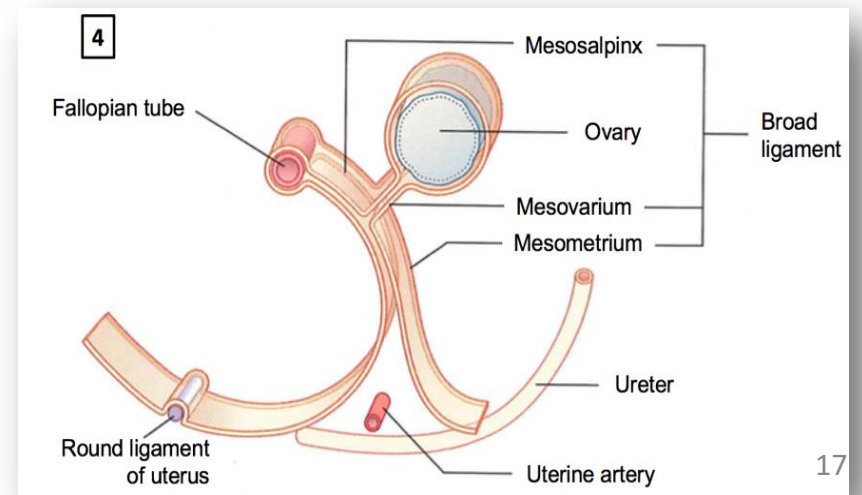
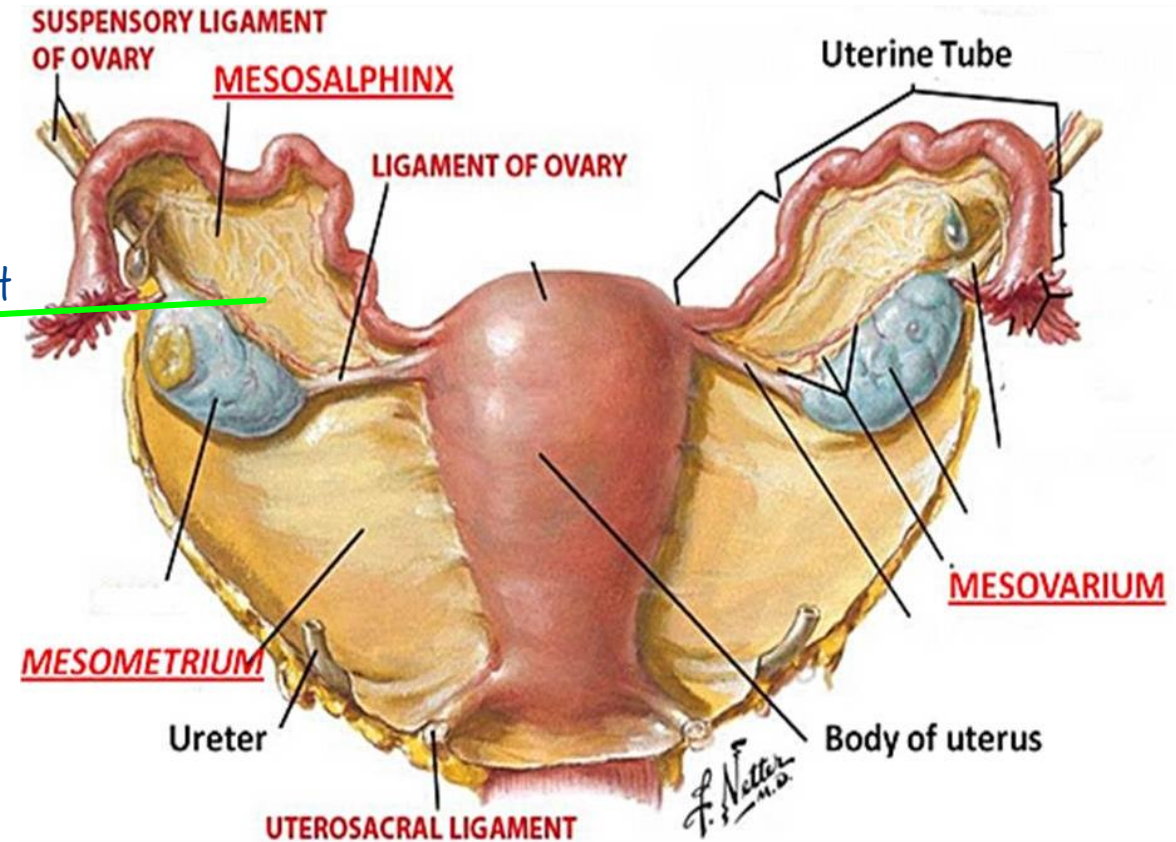
b-Mesometrium: between route and uterine body and ovarian ligament

- It is the largest part of the broad ligament, and extends from the pelvic floor to the ovarian ligament and uterine body.

c-Mesovarium Extends from posterior layer of broad ligament to anterior border of ovary

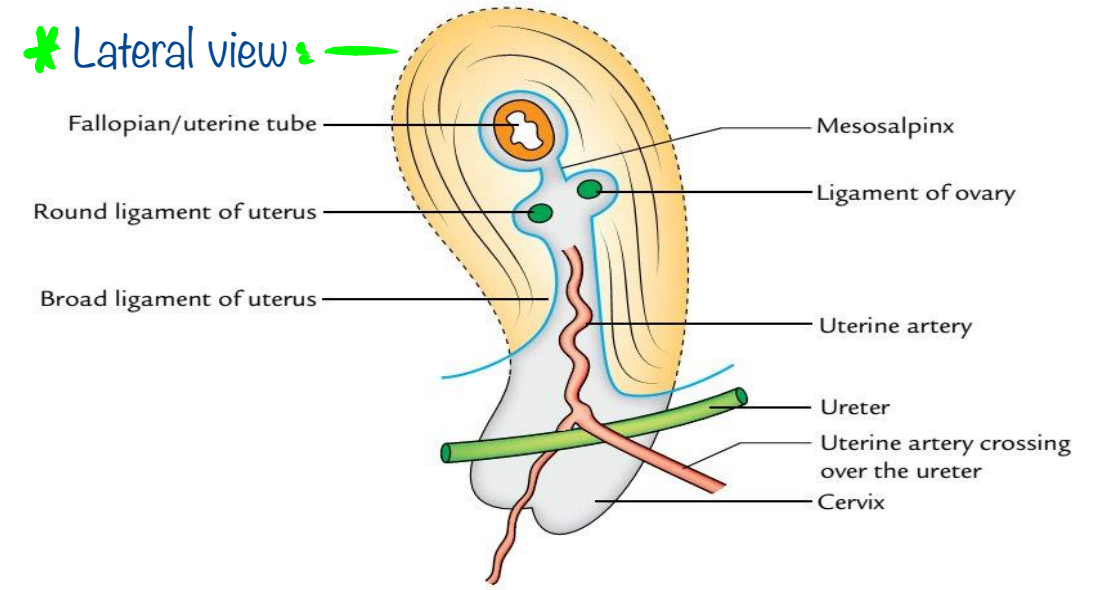
d-Suspensory ligament of the ovary.

From upper and of the ovary laterally

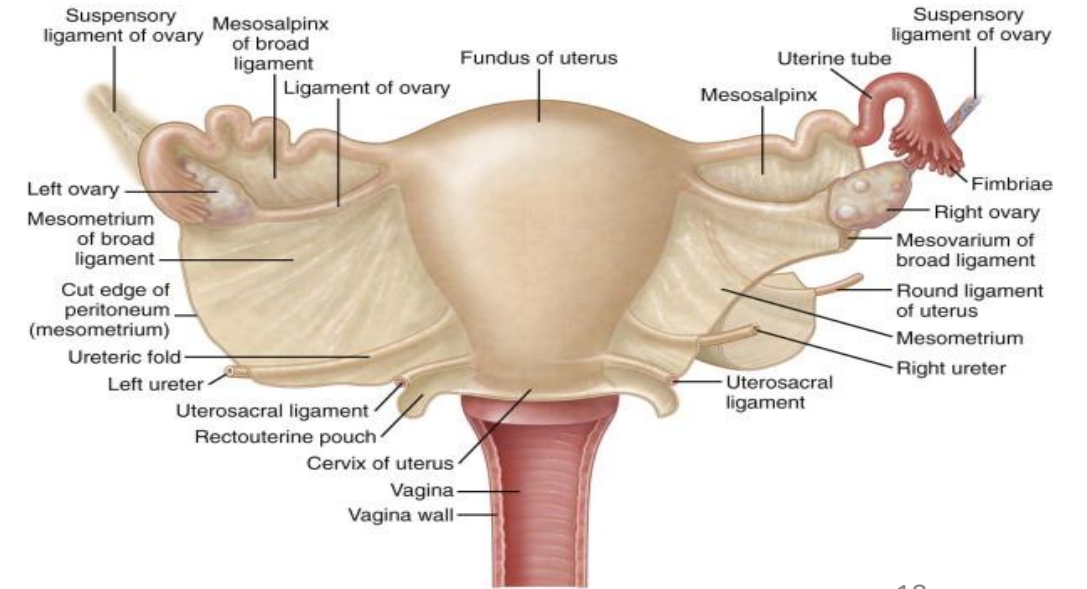


Contents of broad ligaments:

- 1- Uterine tube.
- 2- Ureter.
- 3- Uterine vessels
- 4- Terminal part of the ovarian vessels.
- 5- Round ligament of the uterus.
- 6- Ligament of the ovary.
- 7- Autonomic fibers
- 8- Lymphatics.



sagittal section through the broad ligament of the uterus showing structures that lie within the broad ligament.



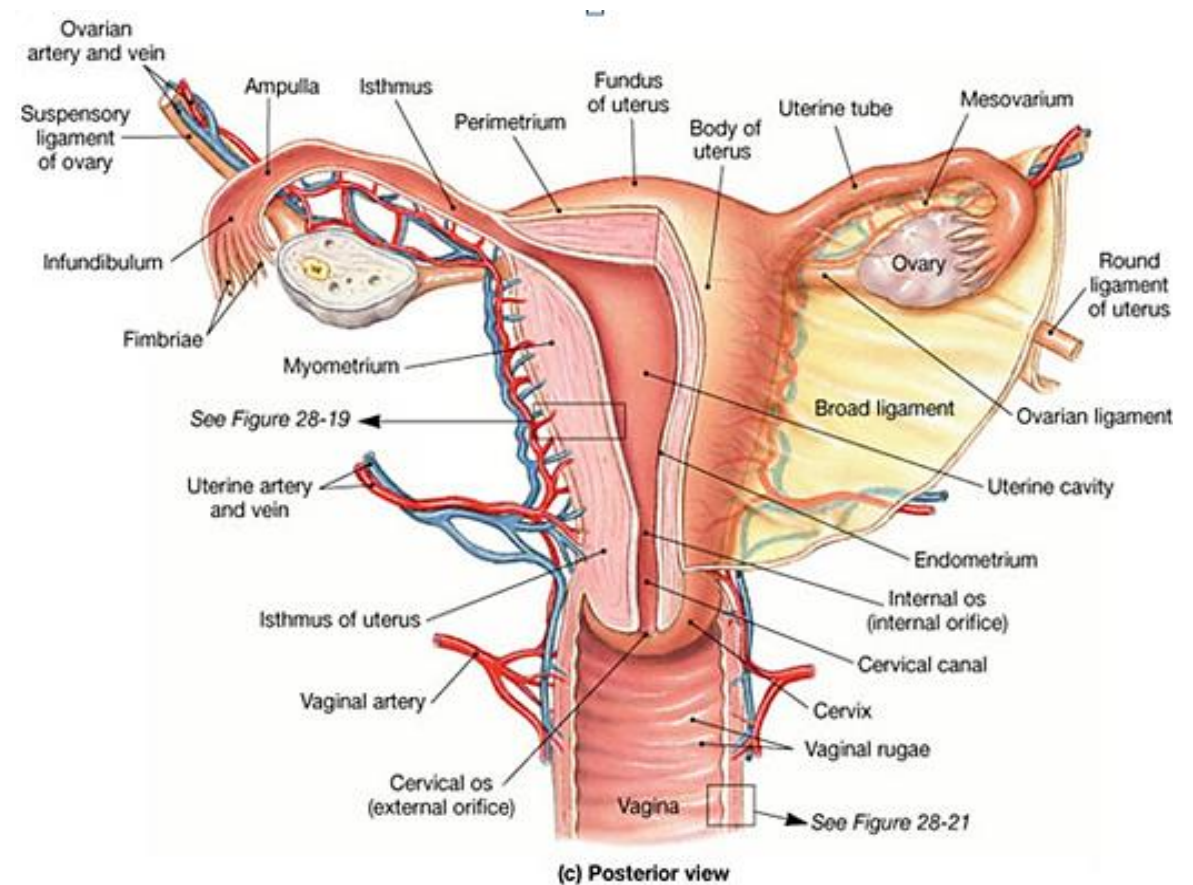
Uterus and broad ligament (posterior view)

* ال ureter يكون ماشي من ورا لقدام و عشان يوصل ال bladder لازم يعمل cross لل uterus من اي جهة؟ من ال supravaginal part و بعمل cross لل uterine artery و هاي الحزئية مهمة بعملية ازالة الرحم و حكينا عن هاي الملاحظة بمحاضرة قبل عشان الدكتور ينتبه ما يعمل ligation to ureter بالغلط

Arterial supply of uterus:

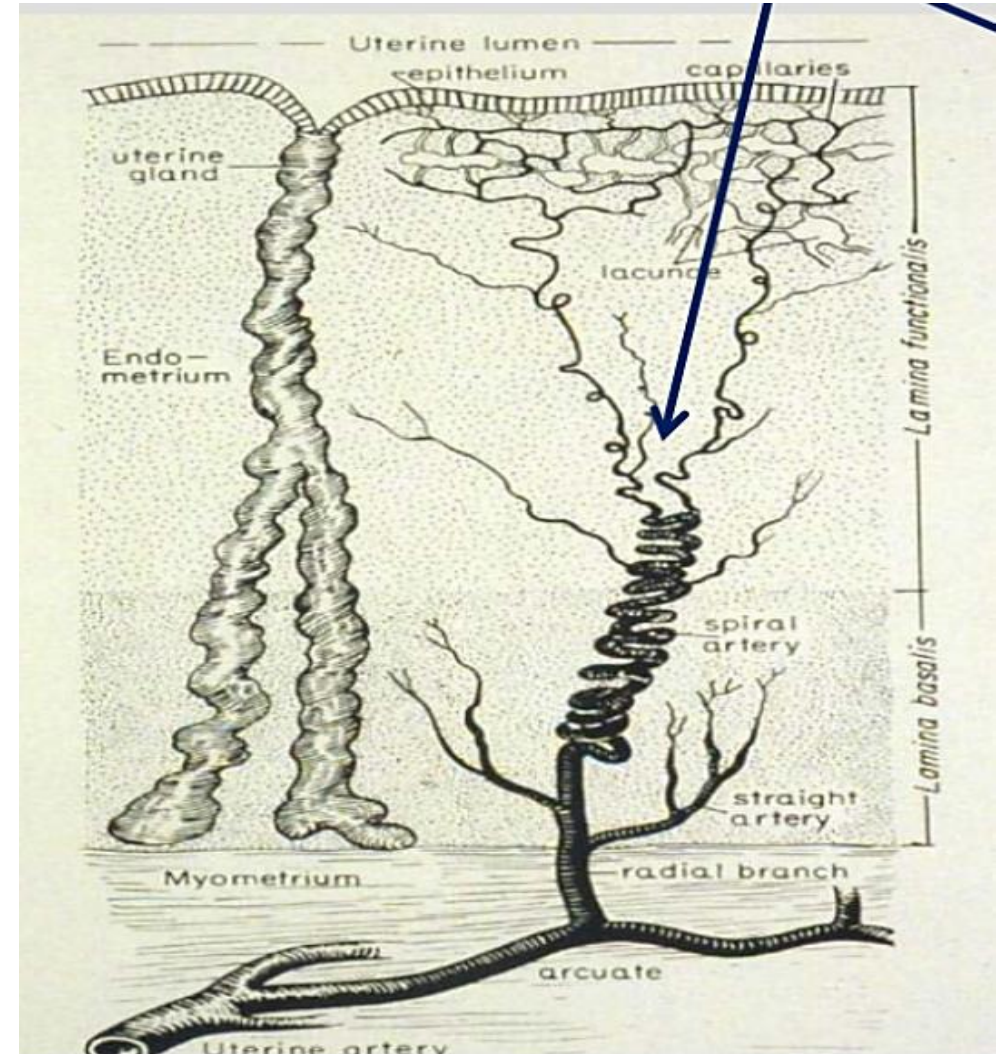
The uterine artery:

- It is a branch from of internal iliac artery.
- It passes medially in the root of the broad ligament.
- Then, it ascends along the lateral border of uterus in a tortuous course.
- It turns laterally below the uterine tube and ends by anastomosing with the ovarian artery.
- It supplies the uterus, medial part of uterine tube, ovary & vagina.



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- Uterine arteries give off branches called **arcuate arteries** that are arranged in a circular fashion in the myometrium. These arteries branch into **radial arteries** that penetrate deeply into the myometrium.
- The radial artery give two kinds of arterioles:
 - **Straight arterioles** supply the stratum basalis of endometrium with the materials needed to regenerate the stratum functionalis.
 - **Spiral arterioles** supply the stratum functionalis of endometrium and change markedly during the menstrual cycle.



Venous drainage of uterus:

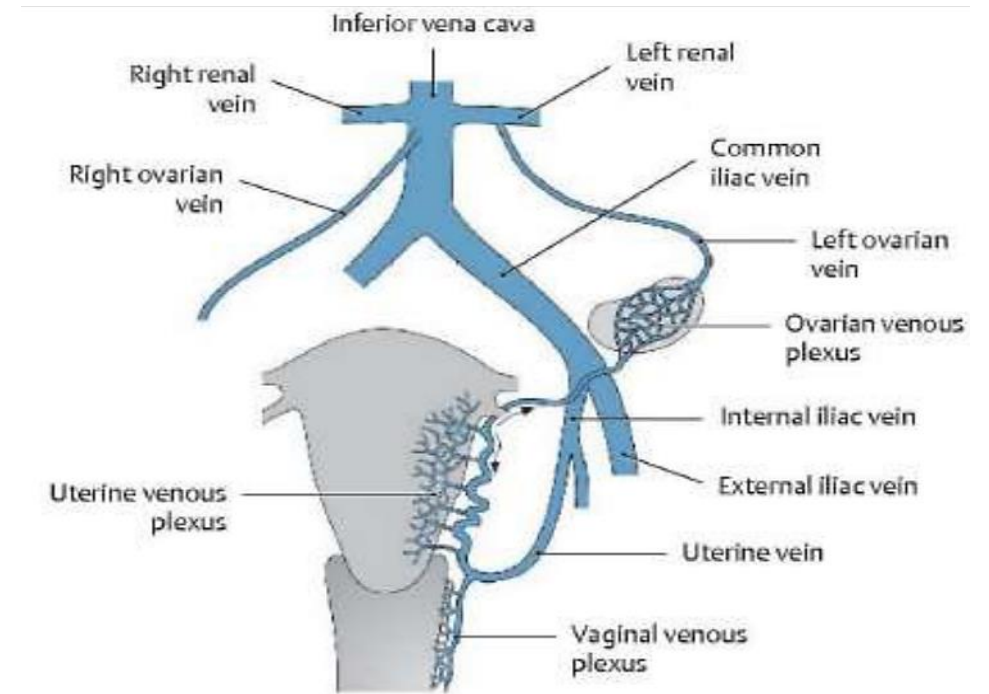
- The **uterine veins** extend laterally in the broad ligaments.

Lymphatic drainage:

- **External and internal iliac nodes.**
- Lymphatics of the region at the junction of the uterus with uterine tube pass **along the round ligament of the uterus** to drain into the **superficial inguinal lymph nodes.**

Nerve supply of uterus:

- **Sympathetic fibers:** from the **last thoracic and first lumbar spinal segments.**
- **Parasympathetic fibers:** **pelvic splanchnic nerve**



Vagina

The vagina is fibromuscular canal.

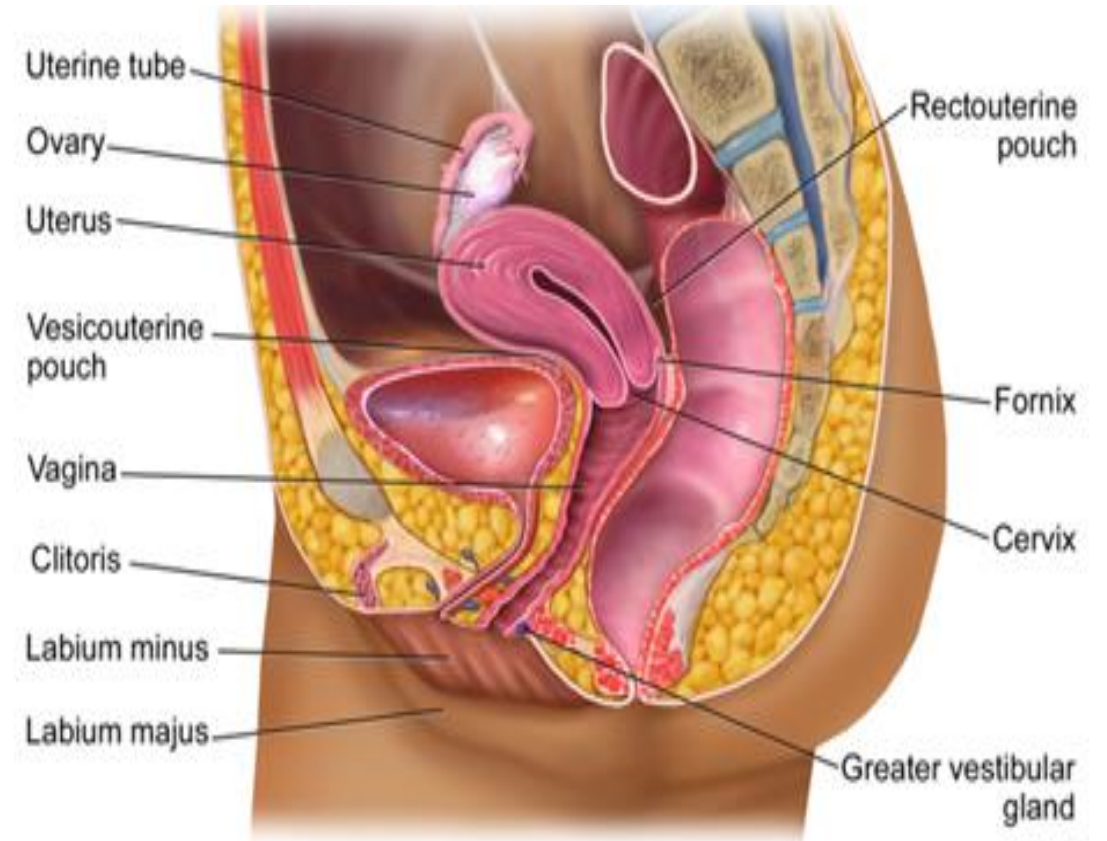
Site:

↗ Between 2 labia minora

- It extends from vestibule of vulva below to the cervix of uterus above.
- It opens externally via vaginal orifice (introitus) within the vestibule positioned below & behind the external urethral orifice.
- The lower end of the vagina is closed by a perforated membrane; the hymen in virgin.

Length:

- The anterior wall is about 7.5 cm.
- The posterior wall is 9 cm.

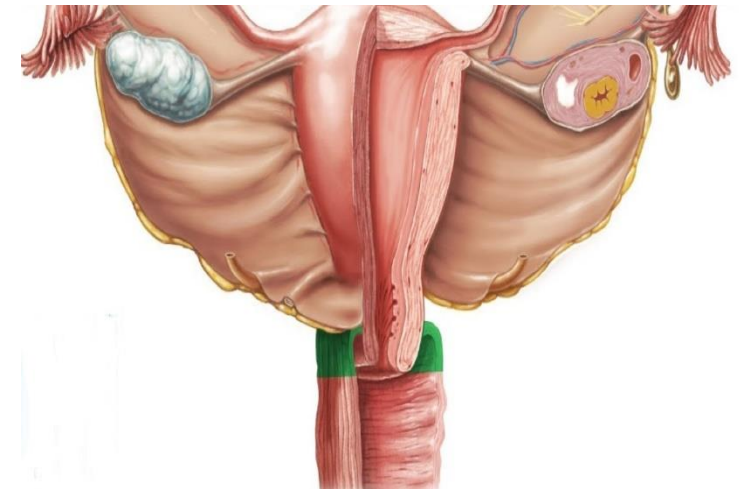
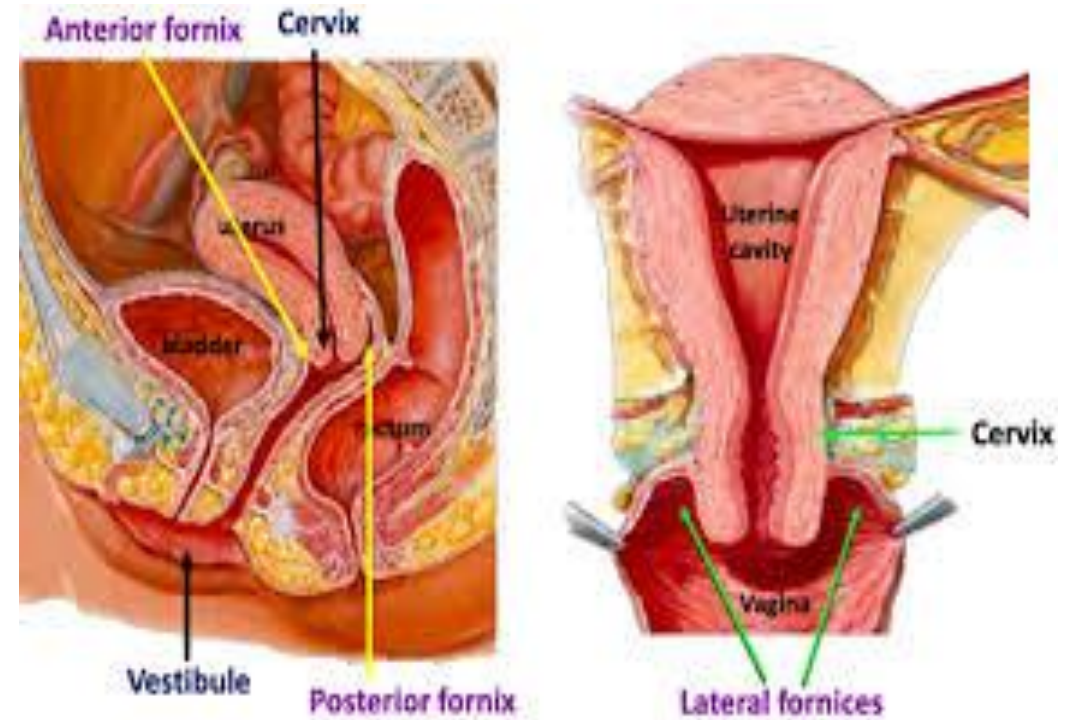


Course of vagina:

- It courses upwards and slightly backwards.
- The **Vaginal part** cervix projects into the uppermost part of the anterior wall of vagina. ← عشان هيڪ هو اقصر
- **Fornices of vagina:** They are annular recess formed between the margin of the cervix and the vaginal wall.

It is subdivided into:

- a- **Anterior fornix:** Recess in front of the cervix
- b- **Posterior fornix:** Recess behind the cervix
- c- **Lateral fornices :** Two recesses one on each side of the cervix.



Relations of Vagina:

The structures felt through the vaginal wall are:

1- The anterior wall:

- It is related to; Base of the urinary bladder & the urethra.

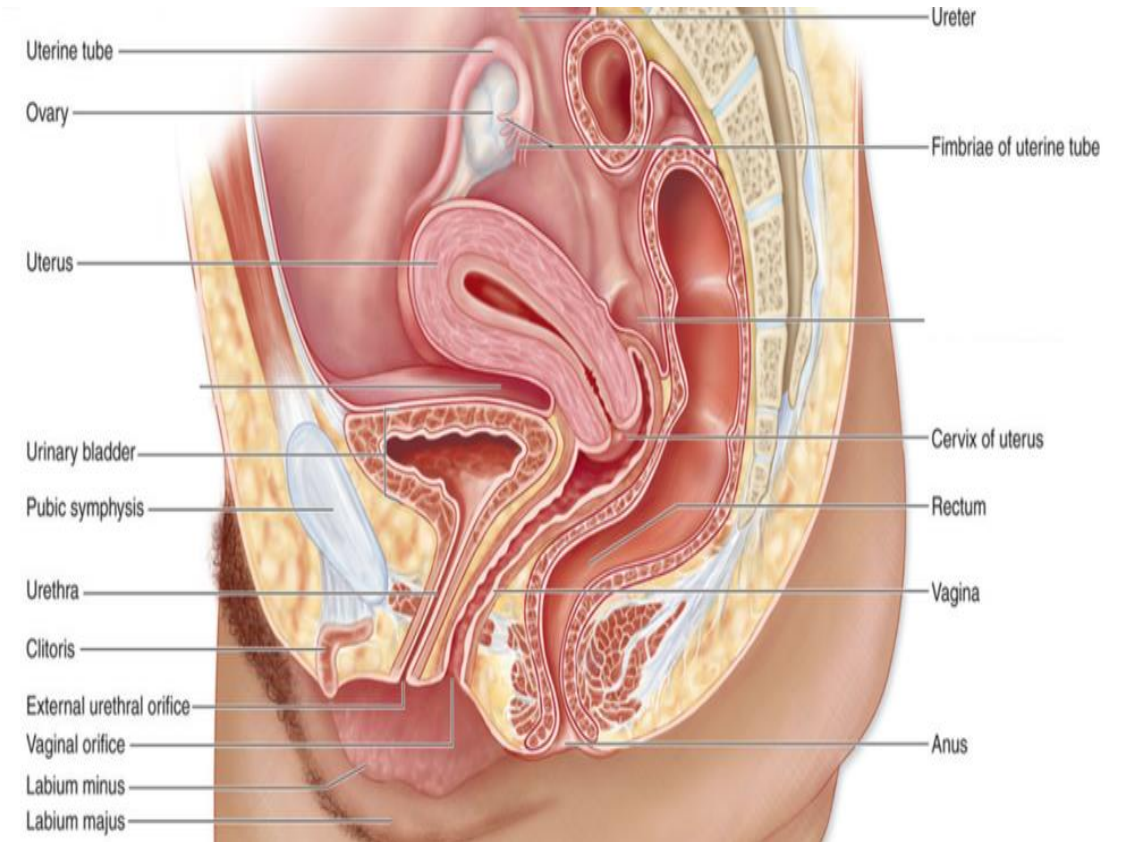
2- The posterior wall of the vagina:

It is related to:

- Its upper fourth; Rectouterine pouch.
- Its middle two fourths; Rectum.
- Its lower fourth; Perineal body which separates it from the anal canal.

3- Laterally:

- Sphincter vaginae



Arterial supply of vagina:

+ Internal pudendal artery

- It is derived from the vaginal arteries which form two median longitudinal vessels (anterior and posterior), the azygos arteries.

Venous drainage:

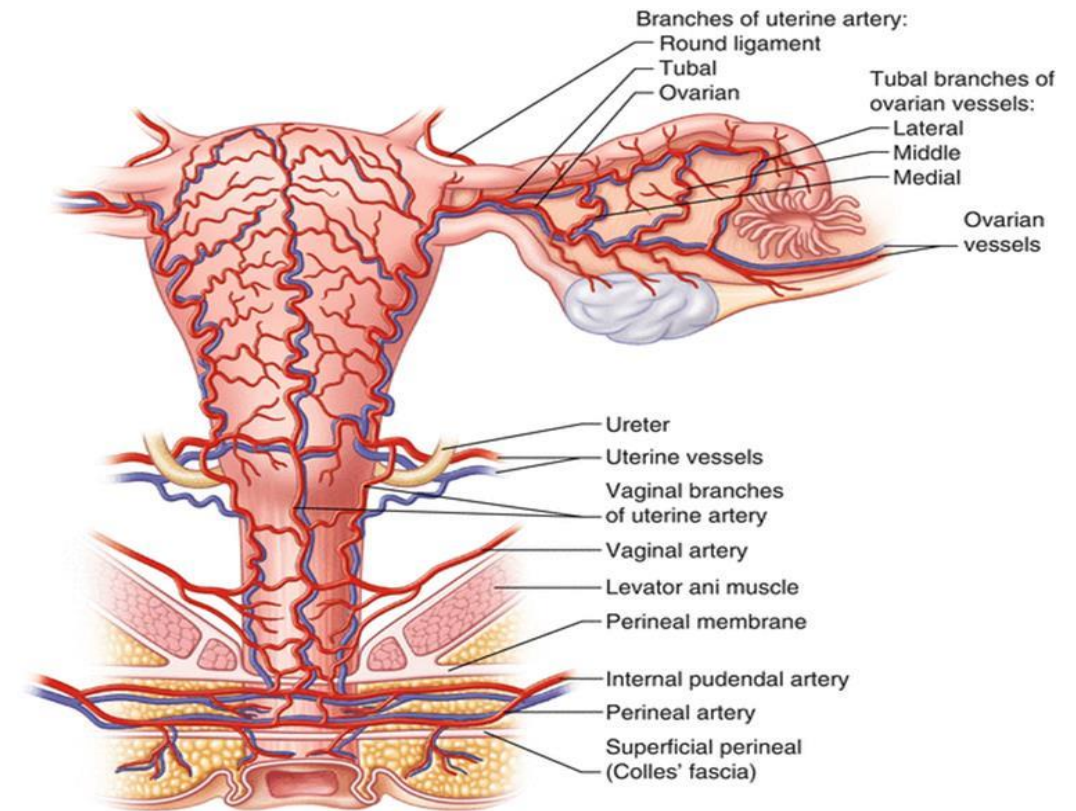
- The vaginal veins, one on each side, that connect with uterine vein.

Lymphatic drainage:

- Drains into internal & external iliac lymph nodes.
- The lower part into the superficial inguinal lymph nodes.

Nerve supply:

- It is supplied by sympathetic and parasympathetic fibers.
- Its lower part is supplied by the pudendal nerves.



Female External Genital Organs

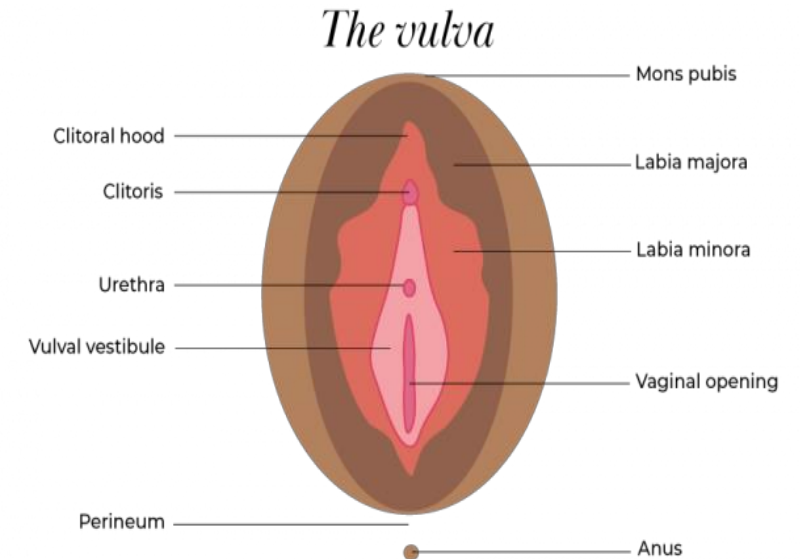
The labia majora:

- They are two broad skin folds, lateral to the labia minora.
- Unite anteriorly to form the mons pubis.
- Posteriorly, they do not join. The connecting skin between them posteriorly forms posterior commissure.

The labia minora:

- They are two thin skin folds devoid of pubic hair.
- The region between the labia minora is the vestibule. Within the vestibule are the vaginal orifice, the external urethral orifice, and the openings of the ducts of glands.

Vestibule of vulva

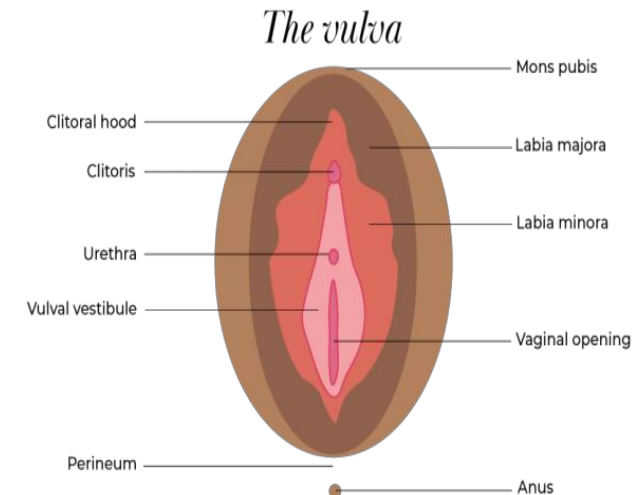


- The ducts of the para-urethral glands open into the vestibule, one on each side of the urethral orifice.
- The ducts of the greater vestibular (Bartholin's) glands open in the vestibule adjacent to the posterolateral margin of the vaginal orifice.

It can get inflamed forming abscess

The clitoris:

- It is a small cylindrical mass of erectile tissue and nerves located at the anterior junction of the labia minora.
- It is formed of two corpora cavernosa that form the body of the clitoris.
- The corpora cavernosa are continuous behind with the crura of the clitoris which form the root of clitoris.
- The clitoris ends in a rounded small tubercle; called the glans clitoris.





**Thank
you**