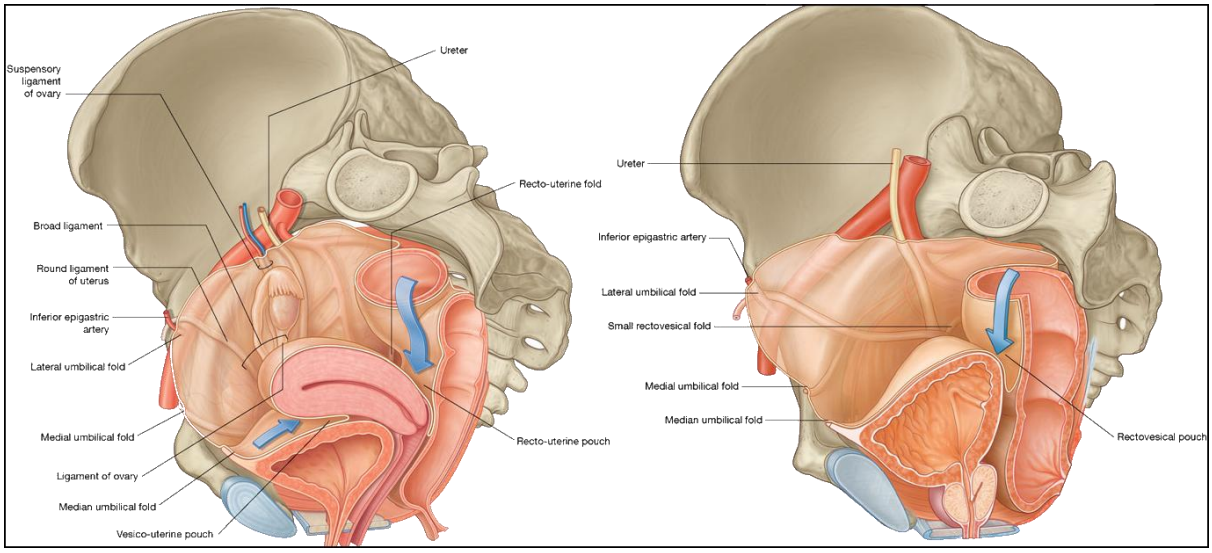
Female reproductive organs

Arrangement of the pelvic viscera

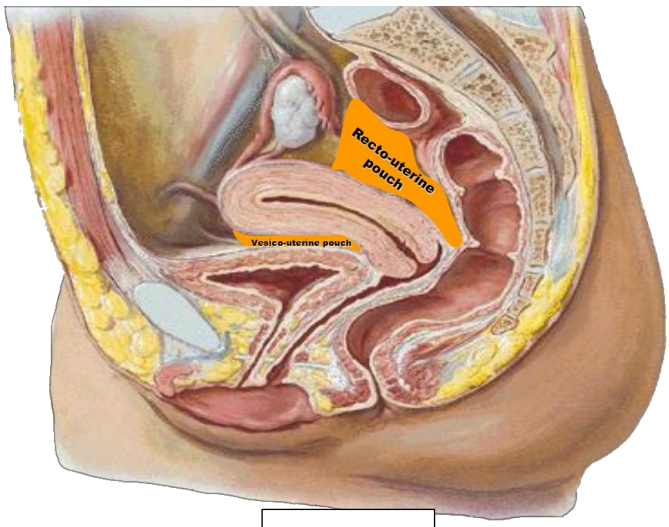
- *The pelvic cavity contains:*

Posteriorly	*The sigmoid colon and rectum*
Anteriorly	*The urinary bladder (and prostate in males)*
Intermediate	*The uterus with its broad ligaments*

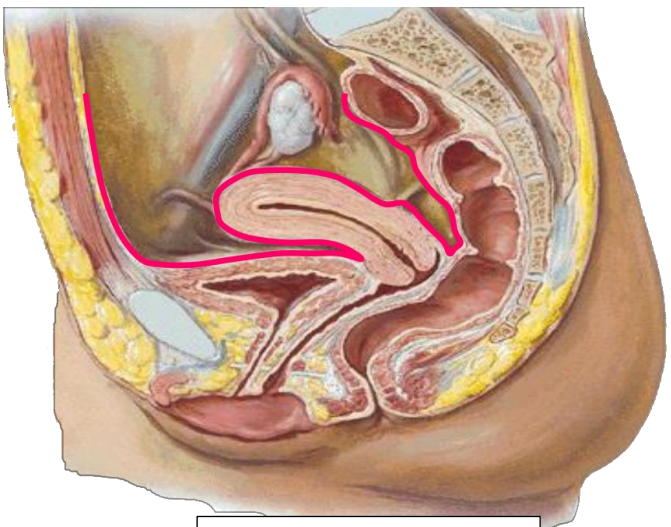


Peritoneal covering & Pouches

- *Pouches:*
  - *Between Urinary Bladder & Uterus ➔ Vesico-uterine pouch*
  - *Between Uterus & Rectum ➔ Recto-uterine pouch (Douglas pouch)*



Pouches



Peritoneal covering

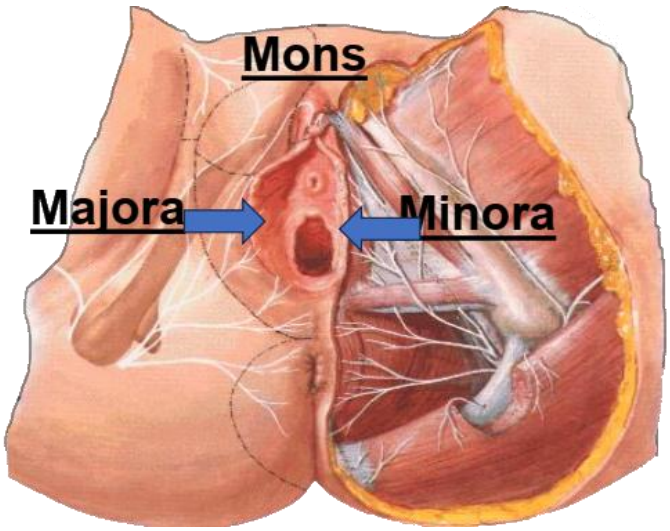
Female external genitalia

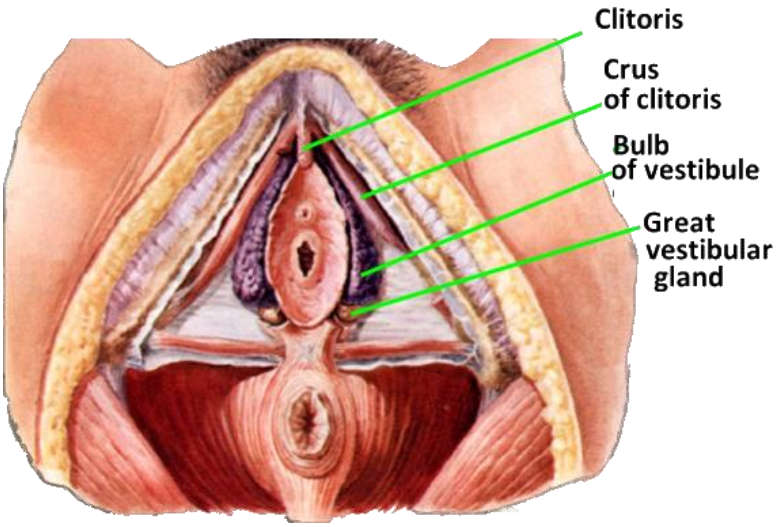
The Vulva

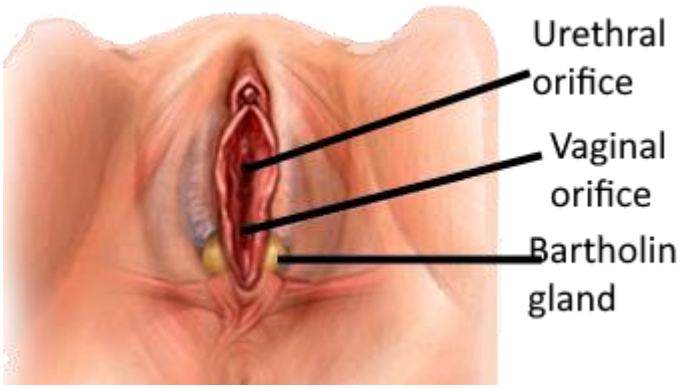
Mons Pubis	A pad of fat overlying the symphysis pubis and covered by skin & hairs		
Labia Majora	- Outer 2 skin folds, raised by underlying fat, and is covered by hairs. - The inner medial surface is smooth, hairless and contains sebaceous and sweat glands.		
Labia Minora	2 thin folds of modified skin situated medial to the labia majora		
Clitoris	▪ Corresponds to penis in males ▪ Erectile Cavernous tissue	**Body**	▪ Similar to penis ▪ Smaller & not traversed by urethra
		Root	▪ Two bulbs (on each side of vaginal orifice) ▪ Two crura
Vestibule	The area between the inner aspects of the labia minora.	**Structures opening in it:**	▪ Urethra ▪ Paraurethral duct & Bartholin gland ▪ Vagina

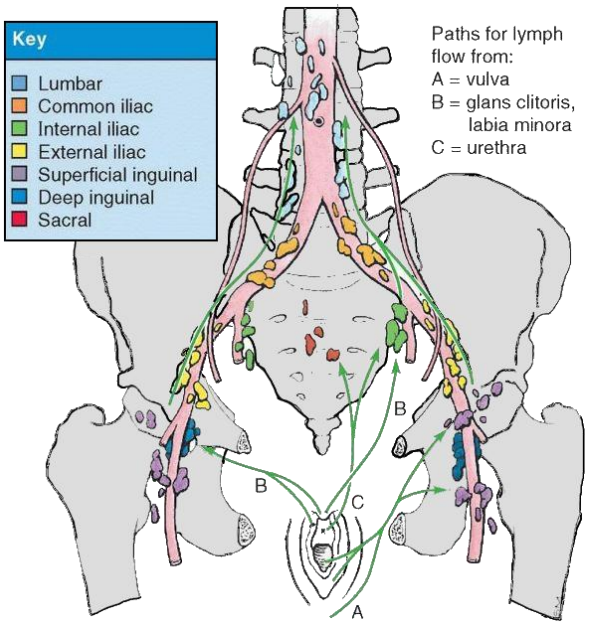
Supply of the Vuvla

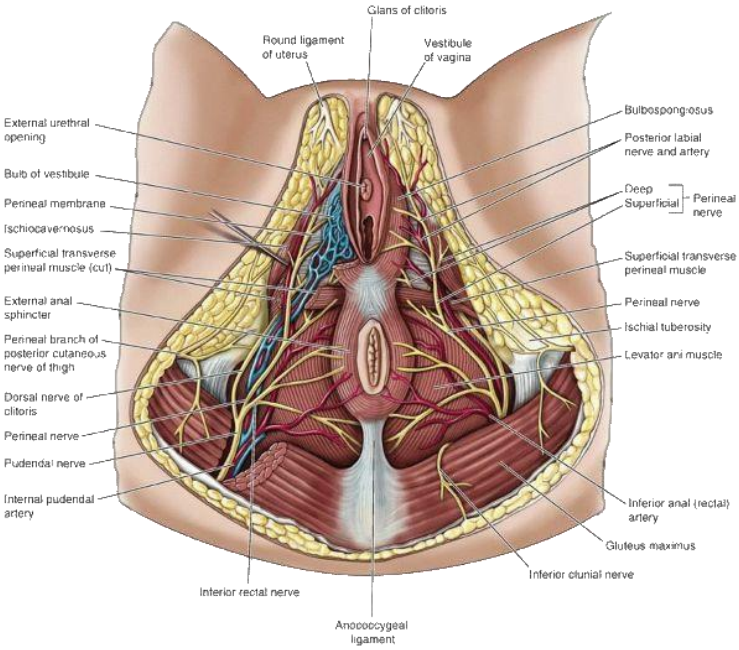
Arterial supply	• External & Internal pudendal arteries. • Anterior division of internal iliac give deep & dorsal artery of the clitoris.
Venous drainage	• The veins draining the vulva form a venous plexus from which veins accompany their corresponding arteries. • The veins draining the clitoris join vaginal and vesical venous plexuses.
Lymphatic drainage	• From the skin and appendages, to the superficial inguinal lymph nodes, to the deep inguinal and femoral lymph nodes of which the lymph node of Cloquet drains the clitoris directly
Nerve supply	• The vulva is supplied mainly from the pudendal nerve (S 2, 3 & 4). • Additional sensory nerves are supplied from the Ilio-inguinal nerve (L1), the genital branch of genito-femoral nerve (L 1,2) and the posterior cutaneous nerve of the thigh.

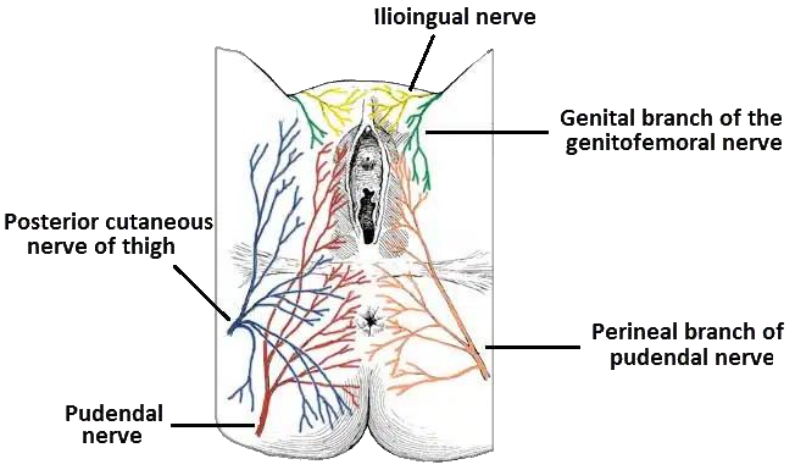

Mons
Majora
Minora


Clitoris
Crus of clitoris
Bulb of vestibule
Great vestibular gland


Urethral orifice
Vaginal orifice
Bartholin gland


Key
Lumbar
Common iliac
Internal iliac
External iliac
Superficial inguinal
Deep inguinal
Sacral
Paths for lymph flow from:
A = vulva
B = glans clitoris, labia minora
C = urethra
A
B
B
C


Glans of clitoris
Round ligament of uterus
Vestibule of vagina
External urethral opening
Bulb of vestibule
Perineal membrane
Ischiocavernosus
Superficial transverse perineal muscle (cut)
External anal sphincter
Perineal branch of posterior cutaneous nerve of thigh
Dorsal nerve of clitoris
Perineal nerve
Pudendal nerve
Internal pudendal artery
Bulbospongiosus
Posterior labial nerve and artery
Deep
Superficial
Perineal nerve
Superficial transverse perineal muscle
Perineal nerve
Ischial tuberosity
Levator ani muscle
Inferior anal (rectal) artery
Gluteus maximus
Inferior clunial nerve
Inferior rectal nerve
Anococcygeal ligament


Ilioingual nerve
Genital branch of the genitofemoral nerve
Posterior cutaneous nerve of thigh
Perineal branch of pudendal nerve
Pudendal nerve

Female Internal genitalia

a) The Ovary

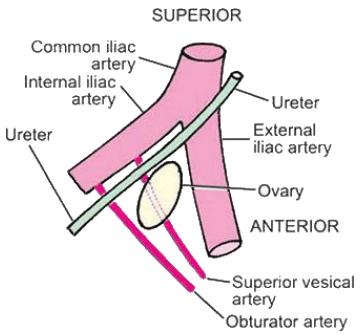
Features

- *Almond-shaped*
- *Has 2 ends, 2 surfaces & 2 borders*

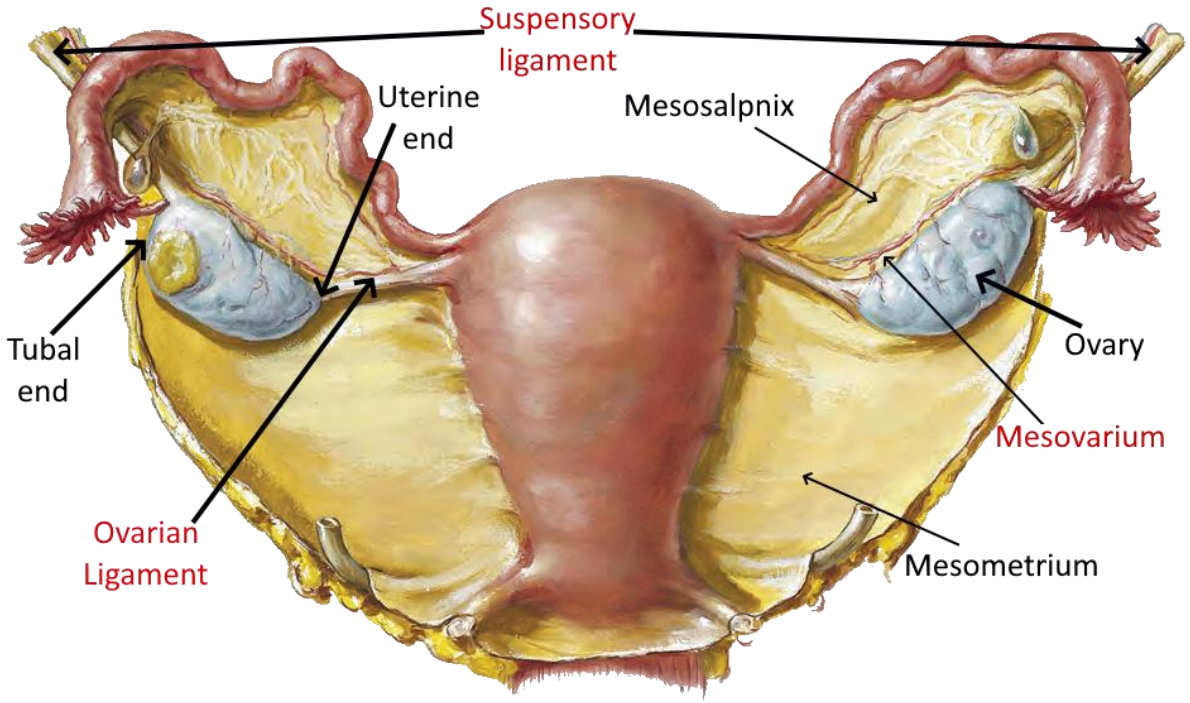
Ends		Borders	
Uterine end	Attached to the **uterus** by **ovarian ligament**	**Anterior border**	Gives attachment to the **mesovarium**.
Tubal end	related to the fimbria of the uterine tubes	**Posterior border**	Directed backwards

Site

- *It commonly lies against the lateral wall of the true pelvis in a depression called the* **ovarian fossa**.
- **Boundaries of the ovarian fossa:**



From above	External iliac vessels
From below	Obturator nerve & Vessels
Behind	Internal iliac vessels & ureter



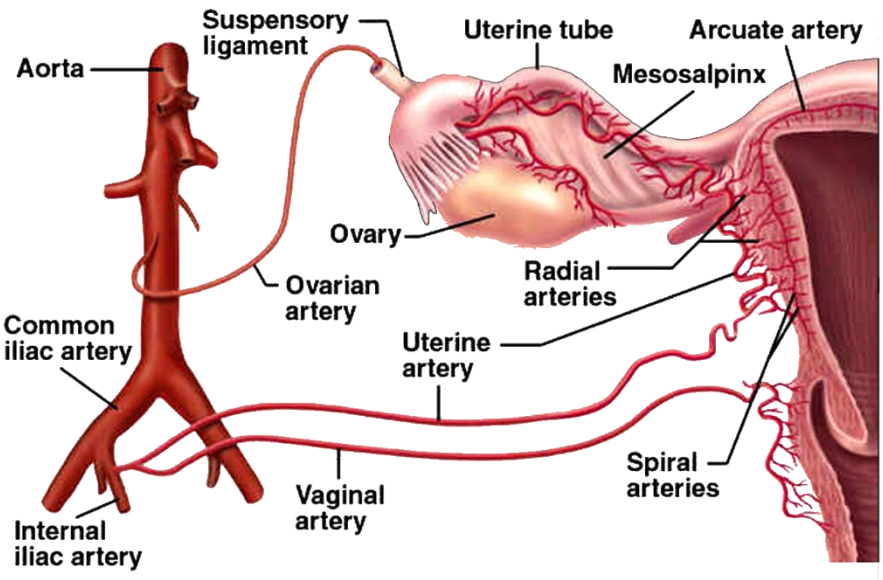
Peritoneal covering & Support

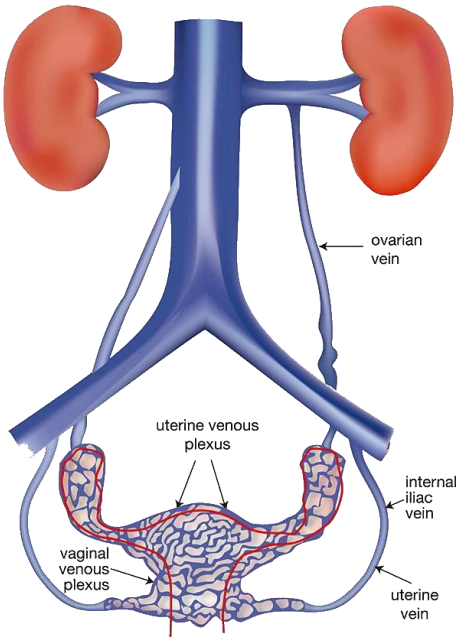
- It is **completely covered by peritoneum**
- It is **attached to the broad ligament by mesovarium**

Peritoneal ligaments		Non-peritoneal ligaments	
Suspensory ligament	Between the tubal end of the ovary to side wall of the pelvis.	**Ovarian ligament**	• From the uterine end of the ovary to the lateral angle of the uterus • It's an **embryonic ligament**
Mesovarium	Between the anterior border of the ovary to the upper layer of the broad ligament		

Blood supply

Arterial supply	**Ovarian artery**	• From the abdominal aorta (**at level of L2**) • It reaches the ovary through both the suspensory ligament then mesovarium
	Uterine artery	• A branch from the anterior division of the internal iliac artery • It anastomoses with the ovarian artery.
Venous drainage	**Right ovary**	Drains in the I.V.C.
	Left ovary	Drains in the left renal vein





b) The Uterine tube

Site	• It extends from the superior angle of the uterus to the ovary on the side wall of the pelvis • In the **medial 4/5** of the upper free border of the **broad ligament**
Length	10 cm

Parts

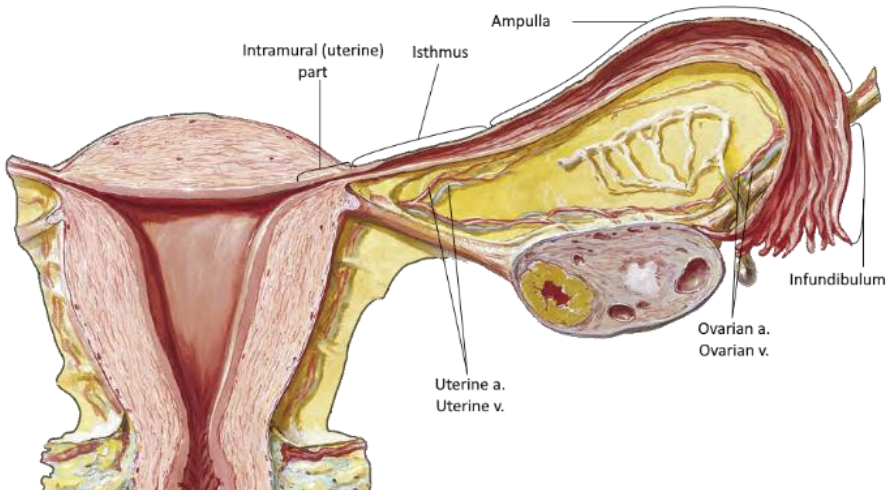
Intramural	It's the uterine part & the shortest (1 cm) & narrowest part
Isthmus	It is 2 cm in length, rounded, narrow and thick-walled
Ampulla	Widest part of the tube (5 cm) where **fertilization** occurs
Infundibulum	- It's the fimbriated end of the tube (2 cm). - Are the finger-like projections around the opening that trap the egg as it leaves the ovary. - End of tube ➔ Ostium

Function

Ovum pickup	at the time of ovulation, by their free fimbrial end.
Transport ova	through the tubal lumen, by their peristaltic and ciliary movements.
Produce secretions	necessary for capacitation of the sperm and nutrition of the ova during their journey by their lining cells.

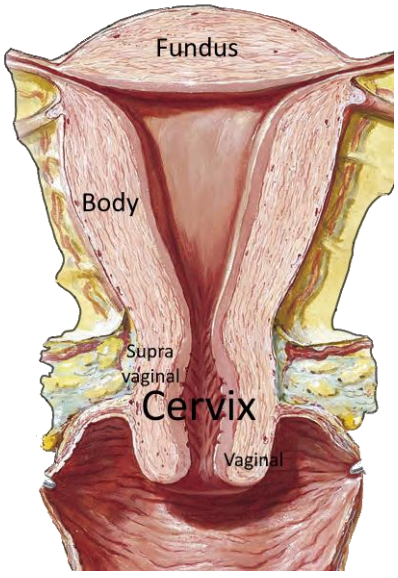
Blood supply

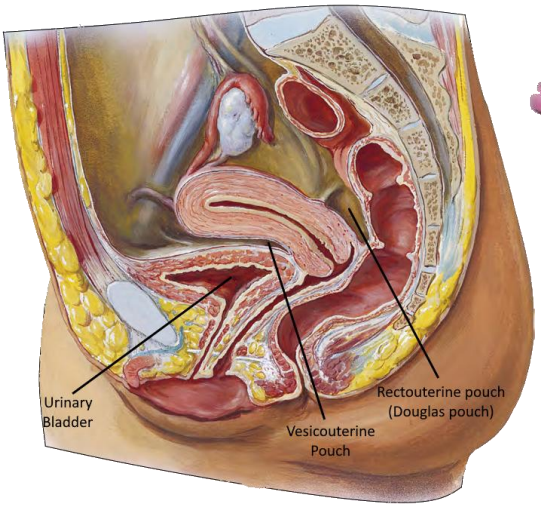
Arterial supply	Venous drainage
• Medial $^{2}/_{3}$ ➔ Uterine artery • Lateral $^{1}/_{3}$ ➔ Ovarian artery	• By veins accompanying the arteries into the uterine and ovarian veins

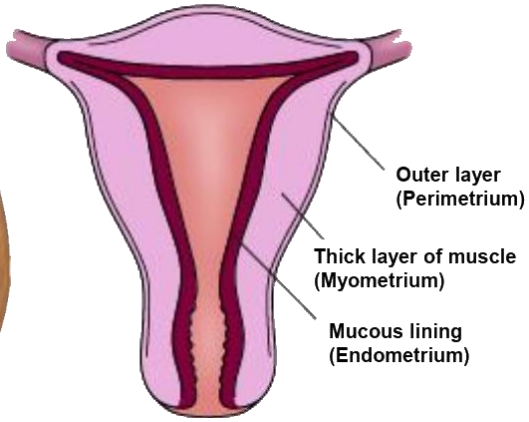


c) The Uterus

<table>
<tr><td>Def</td><td colspan="3">The uterus is a hollow, muscular, pear-shaped organ</td></tr>
<tr><td>Size</td><td colspan="3">About the size of woman's clenched fist</td></tr>
<tr><td>Site</td><td colspan="3">In the true pelvis in between urinary bladder (ant) and rectum (post)</td></tr>
<tr><td>Parts</td><td colspan="3"><table>
<tr><th>Fundus</th><th>Body/Corpus</th><th>Cervix</th></tr>
<tr><td>The upper & rounded end of the uterus</td><td>It is triangular in outline
It has two surfaces: anterior (vesical) and posterior (intestinal).</td><td>It is cylindrical tube 1x1 inch. It is subdivided into two parts: vaginal and supravaginal portions.
The cervical canal is fusiform lies between the internal and external os.</td></tr>
</table></td></tr>
<tr><td>Layers</td><td colspan="3"><table>
<tr><th>Outer</th><th>Middle</th><th>Inner</th></tr>
<tr><td>Perimetrium</td><td>Myometrium (muscular)</td><td>Endometrium (mucous membrane)</td></tr>
</table></td></tr>
<tr><td>Relations of the body</td><td colspan="3"><table>
<tr><th>Anteriorly</th><th>Posteriorly</th><th>Laterally</th></tr>
<tr><td>The bladder and vesicouterine pouch</td><td>The pouch of Douglas</td><td>The broad ligament on each side</td></tr>
</table></td></tr>
<tr><td>Arterial supply</td><td colspan="3">Uterine artery
Ovarian artery
<u>N.B.,</u> they anastomose within the broad ligament</td></tr>
</table>

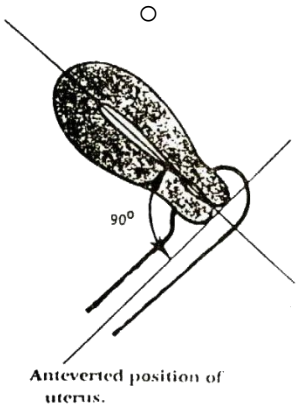




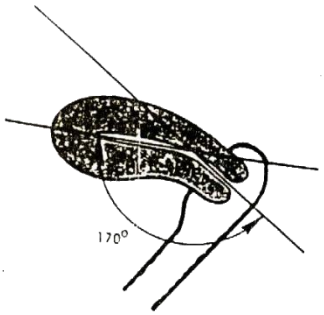


Position

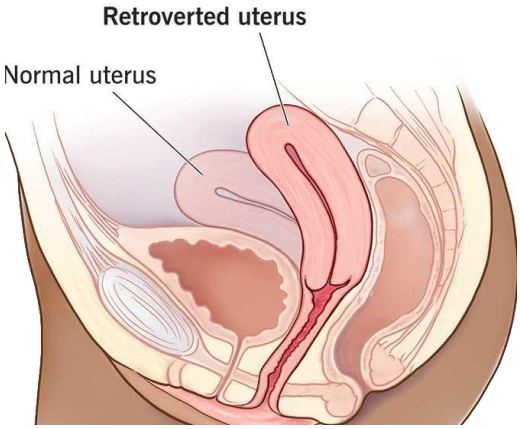
- *The uterus is kept in an **anteverted anteflexed (AVF) position**.*
  - *AnteVersion (right angle) → The uterus is inclined anteriorly to axis of the Vagina.*
  - *AnteFleXed (obtuse angle) → The body of the uterus is bent forwards upon the cerviX.*
  - ***Abnormal*** *→ Retroverted and/or Retroflexed.*



Anteverted position of uterus.



Anteverted and anteflexed position of uterus.

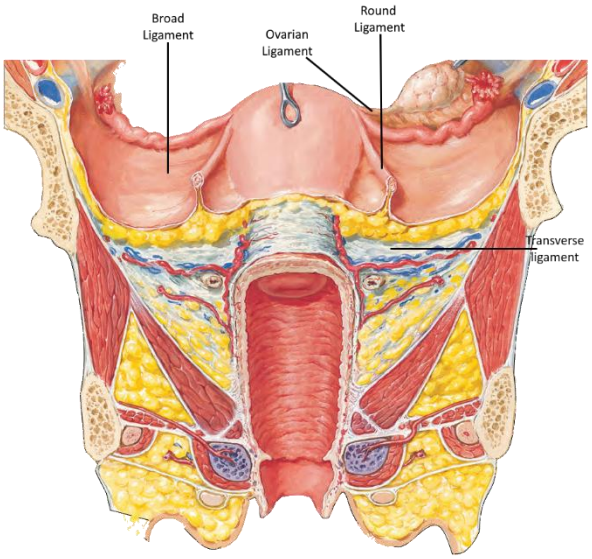


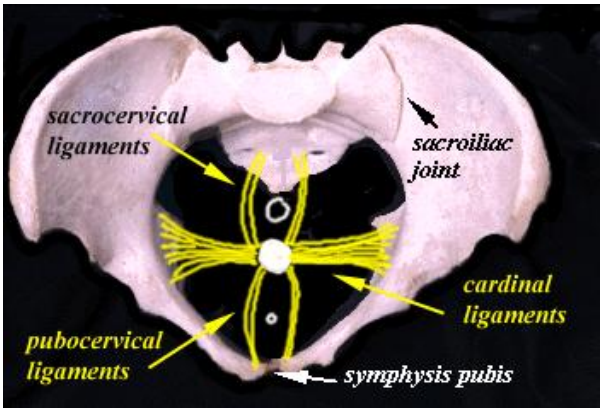
Peritoneal covering

Fundus	*Completely covered with peritoneum.*	
Body	• *Covered anteriorly and posteriorly with peritoneum.* • *The two layers of peritoneum meet together at lateral border as the broad ligament.*	
Cervix (Supravaginal portion)	**Posteriorly**	*Covered with peritoneum*
	Anteriorly	***Not covered with peritoneum*** *and comes in contact with fundus of urinary bladder*

Ligaments

Peritoneal	Embryonic	Non-peritoneal
• *Broad ligament of uterus* • *Anterior (uterovesical ligament)* • *Posterior (rectovaginal ligament*	• *Round ligament of uterus* • *Ovarian ligament*	• *Right & left utero-sacral ligament.* • *Mackenrodt's (transverse) ligament*



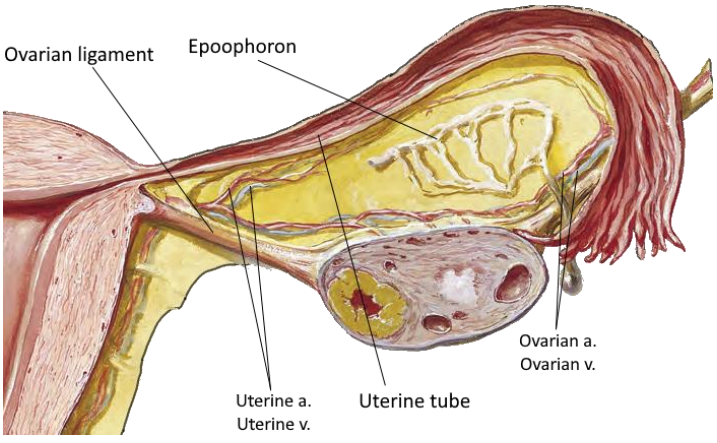


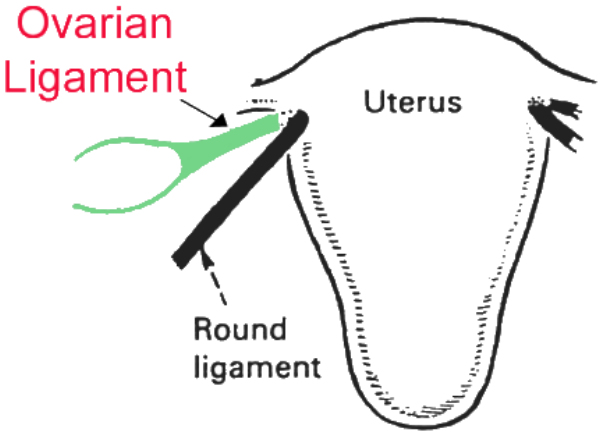
The broad ligament

Parts	Mesosalpinx	The part between Fallopian tube & mesovarium & and round ligament of ovary.
	Mesovarium	-
	Mesometrium	The remaining medial lower part on the side of the uterus.
	Suspensory ligament of ovary	the part lateral to the ovary

Contents

1. Uterine tube	2. Ligaments	3. Vessels
Running in the medial four-fifth of the free border of the broad ligament	A. Ovarian ligament: between cornu of the uterus and the ovary. B. Round ligament of the uterus: between cornu of the uterus and labia majora	A. Uterine artery B. Ovarian artery
4. Embryonic remnants	**5. Parametrium & extraperitoneal fat**	**6. Sympathetic plexus around the arteries**
Epoophron & Paraophran		





d) The Vagina

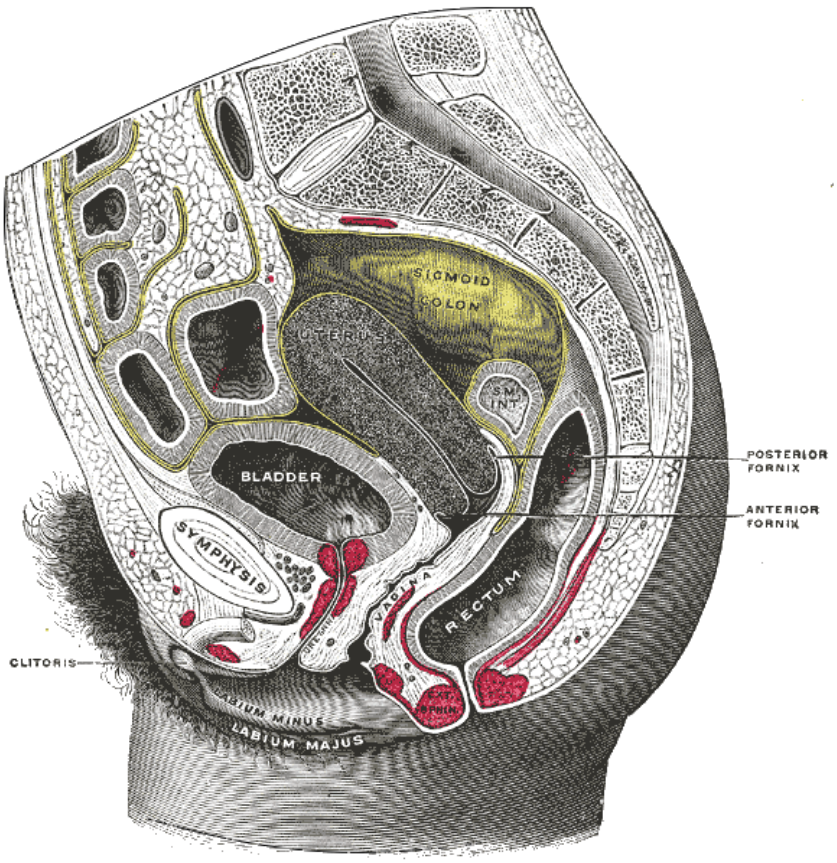
- *It is fibro-muscular tube between the cervix and vestibule. It lies between urinary bladder and urethra (**anteriorly**) and rectum and perineal body (**posteriorly**).*

The Fornices

- *They are the vaginal cavity around vaginal portion of the cervix.*
- *They are 4 in number (Anterior, Posterior and 2 lateral)*
- *The posterior fornix is the deepest one*

Relations

Anterior wall	Upper ½	Base of the bladder
	Lower ½	Urethra
Posterior wall	Upper 1/3	Douglas pouch
	Middle 1/3	Ampulla of rectum
	Lower 1/3	Perineal body (separates it from anal canal)
Lateral wall	Upper 1/3	Ureter
	Middle 1/3	Sphincter vaginae (part of levator ani)
	Lower 1/3	Urogenital diaphragm & bulbs of vestibule



Blood supply & Lymphatic drainage

Blood supply	Arterial supply	Azygous artery Anastomoses of:	1. Uterine artery 2. Vaginal artery 3. Middle rectal artery 4. Internal pudendal artery
	Venous drainage	The vaginal veins form plexuses that drain into internal iliac vein	
Lymphatic drainage	Upper 1/3	External iliac lymph nodes	
	Middle 1/3	Internal iliac lymph nodes	
	Lower 1/3	Superficial inguinal lymph nodes	

Applied anatomy

- The posterior fornix: a passage to the pouch of Douglas for drainage of a pelvic abscess.
- The lateral fornix: The ureter lies 1-2 cm lateral to it so that it may be injured during clamping the angle of the vagina in hysterectomy operation.

Q1: Which of the following describes the anatomy of the ovarian vessels?

A. Right ovarian artery arises from the right renal artery.
B. Right ovarian vein drains into the inferior vena cava.
C. Left ovarian artery arises from the left internal iliac artery.
D. Left ovarian vein drains into the vena cava.
E. Right ovarian artery arises from right internal iliac artery.

Answer: B

Q2: A 34-year-old woman who has diabetes develops a "boil" on the right labia majora. Which of the following lymph nodes is most likely to be enlarged in response to the infection?

A. Internal iliac
B. External iliac
C. Superficial inguinal
D. Obturator
E. Paraaortic

Answer: C

Q3: The normal position of the uterus:
A. Anteversion and anteflexion.
B. Anteversion and retroflexion.
C. Retroversion and retroflexion.
D. Retroversion and anteflexion.
E. Retroflexion

Answer: A