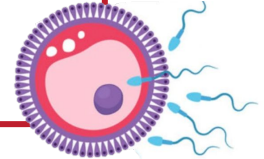


Female Reproductive System

Reproductive block-Anatomy-Lecture

[Editing file](#)
[Summary file](#)



Color index:

- Girls' slides
- Boys' slides
- Main content
- Extra
- important
- Drs' notes



**Special thanks for 438's team and their
leaders for allowing us to use their team ,
we truly appreciate it ♡**

Objectives

At the end of the lecture, students should be able to:

- List the organs of female reproductive system.
- Describe the pelvic peritoneum in female.
- Describe the position and relations of the ovaries.
- List the parts of the uterine tube.
- Describe the anatomy of uterus regarding: subdivisions, cavity, relations, ligaments & main support.
- Describe the anatomy of vagina regarding: structure, extent, length & relations.
- Describe the supply (arteries, veins, lymph, nerves) of female reproductive system.

Useful Links:

- [Kenhub](#)
- [Teach me anatomy](#)
- [Amboss](#)

Pelvic peritoneum in female

The pelvis in a female is covered internally with a thin translucent peritoneal membrane continuous with that of the abdominal cavity, and it forms 3 important structures: Douglas pouch, uterovesical pouch and the broad ligament.

The peritoneum extends from the abdomen to the pelvis and it completely surrounds the sigmoid colon and sigmoid mesocolon and at the rectum:

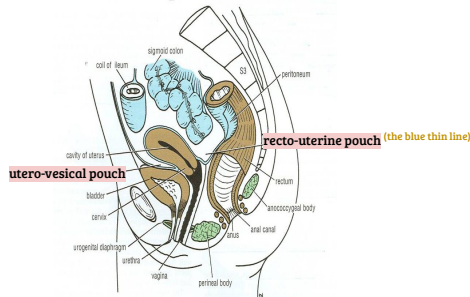
- The upper one third is covered from the front and sides.
- The middle one third is covered only from the front .
- The lower one third and the anal canal are NOT covered by peritoneum .
- The cervix anteriorly is not covered by the peritoneum.

1- Rectouterine (Douglas) pouch

Reflection of peritoneum from rectum (junction of middle one third and lower one third) to upper part of posterior surface of vagina.

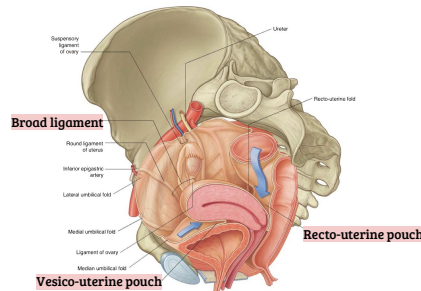
Used in the treatment of end stage renal failure in patients who are treated with peritoneal dialysis in which the tip of dialysis catheter is placed into the deepest point of the pouch.

(Clinical importance: this is where pus and fluid collects in a pelvic infection as it is the farthest point in the abdominopelvic cavity)



2- Uterovesical (vesicouterine) pouch:

Reflection of peritoneum from uterus to upper surface of urinary bladder.

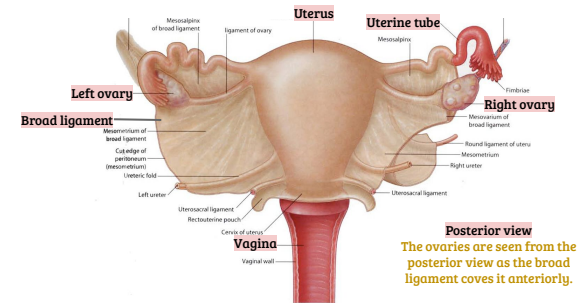


3- Broad ligament of uterus:

Extension of peritoneum from lateral wall of uterus to lateral wall of pelvis, encloses the uterine tubes.

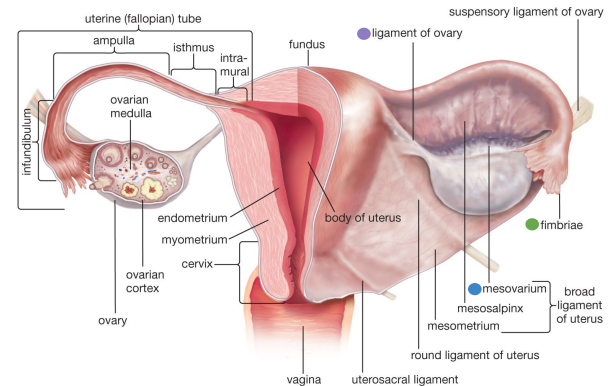
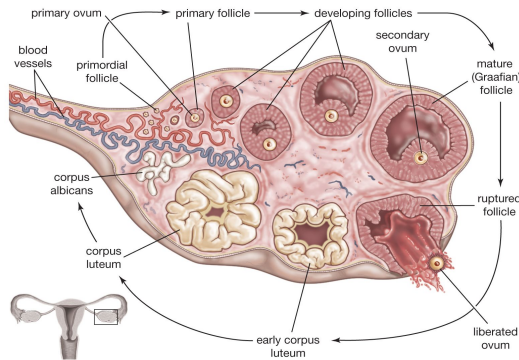
-imagine the uterus and vagina is a person laying down with their hands open (uterine tube) so wide to the back with his fingers (fimbriae) closed posteriorly grabbing the ovaries and then this is covered by the peritoneum and the extent of this covering is the broad ligament (It encloses the ovaries and the uterine tube) .

It has 3 parts: Mesosalpinx, Mesovarium and Mesometrium



The Ovaries

- **Primary sex organs in female** (Primary organs are the organs that produce the gametes (**Ovaries and Testes**). The secondary sex organs in females are the uterine glands, uterus and vagina.)
 - **It is an almond-shaped organ**
 - **They dialaise against the lateral wall of the pelvis in the ovarian fossa**
 - **It is attached to the back of the broad ligament by a peritoneal fold (● **mesovarium** & the other parts of the broad ligament are important in keeping the ovaries in its place and position. The position of the ovaries are variable but usually are found hanging down in rectouterine pouch while during pregnancy the enlarging uterus will pull up the ovaries in the abdominal cavity)**
 - **Its medial end is attached to the uterus by the ● ligament of the ovary**
 - **Its lateral end is related to the ● fimbriae of the uterine tube they are finger like projections that have an important function which is grabbing the ovulated follicle from ovaries into fallopian tube**
- Doctor: Do not forget the relations**
- **Function: Production of female germ cells (Oocyte/egg) , **Secretion of female sex hormones** (estrogen & progesterone)**



The uterine (fallopian) tubes

- It is 10 cm long
- It is enclosed in the broad ligament of uterus
- **Function:** Site of fertilization, Transport of fertilized ovum into the uterus
- Divided into:

1

Intramural part

Opening into the uterine wall

2

Isthmus

Narrowest part

3

Ampulla

Widest part (**site of fertilization**)
Equipped everything for the fertilization (the tissue lining of this area and the micro-environment signals all help the fertilization happens)

4

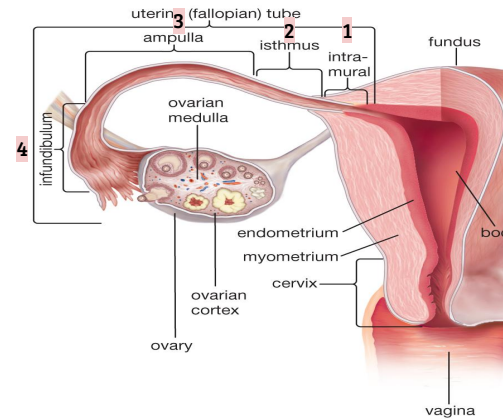
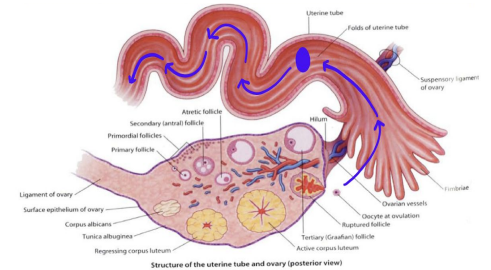
Infundibulum

funnel-shaped end, has finger-like processes (fimbriae), related to ovary
fimbriae grabs the ovulated follicles into fallopian tube and cause the meeting of the sperm if it is at the ampulla.

💡 Usually women are born with approximately 2 millions eggs in their ovaries. Before puberty about 11 thousands of these eggs die in every month. At puberty a woman has only about 400 thousands eggs remaining in her ovaries and after puberty a woman will lose one thousand eggs every month instead of 11 thousands and only one of the one thousand follicles will mature and reach to the fallopian tubes. this phenomenon of the degeneration/dying of this huge number of eggs is independent of any hormonal production, pregnancy, nutritional supplements, lifestyle, birth controlling pills. Basically independent of any process or anything that could be done even ovulation inhibition or stimulation and nothing will stop the death of one thousands eggs every month. This means out of the 2 millions follicles only about 400 follicles will be matured during the whole life of the woman. After menopause (age 50-55) only very little or no follicles remain in her ovaries.

💡 In females ,the uterine tube penetrates the peritoneal cavity and uterine cavity.. When ovulation happens the fimbriae of the uterine tube penetrates the peritoneal cavity and the ovaries and then grabs the oocyte and takes it to the uterine tube where it goes to the ampulla to await the sperm for fertilization . After fertilization the fertilized egg forms a zygote which continues dividing till it forms about 52 to 60 cells (the isthmus helps the fertilized egg to divide more as it is narrow which slows the arrival to the uterus) after 6 to 7 days it arrives at the uterus for more division.

In males ,the peritoneal cavity is completely closed



The Uterus

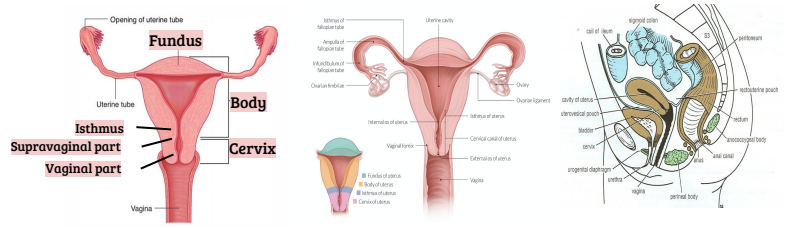
- A hollow, pear-shaped muscular organ because it expands during pregnancy and contracts during birth. At time of pregnancy it expands till it almost reach the symphysis pubis. After birth, it shrinks back but mostly not to its original size especially in case of multiple pregnancies .
- Function: **maintaining pregnancy**

💡 Don't forget we have an isthmus in the uterine tube and in the uterus
 In the uterine tube , it is a narrow part between the the intramural part and the ampulla
 In the uterus, it is the junction between the body and the cervix.
 -Anatomical parts of the uterus can be differentiated even before opening it.

Divided into:

- Fundus**
- Body**
- Cervix:**

- No cavity
- **Implantation site**
- **Above the level of uterine tubes**
- Cavity is triangular **largest part of uterus**
- From the level of uterine tube to the level of the isthmus of uterus
- Cavity is fusiform
- Below the level of the isthmus of the uterus
- Divided into: **Supravaginal part above the vagina , Vaginal part**



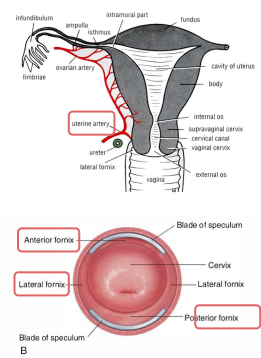
Relations of uterus

Fundus + body + supravaginal part of cervix

Anterior
Superior surface of urinary bladder

Posterior
Sigmoid colon

Lateral
Uterine artery



💡 The vaginal wall surrounding the vaginal part is called fornix
 plural : fornices
 The peritoneum is a covering not a relation.

Vaginal part of cervix (surrounded by vaginal fornices)

Anterior
Anterior fornix of vagina

Posterior
Posterior fornix of vagina

Lateral
Lateral fornices of vagina



The Uterus: cervical canal

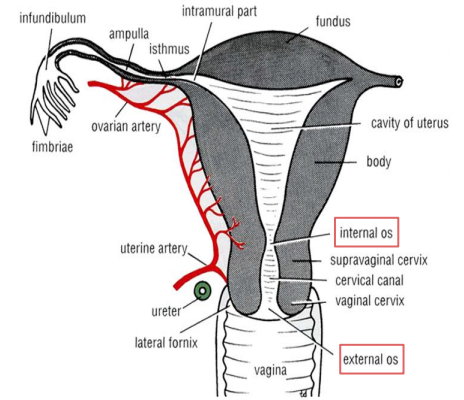
Cervical canal is the extend from the internal OS to the external OS.

Opening between
cavity of body of
uterus & cavity of
cervix (cervical
canal)

Internal OS

External OS

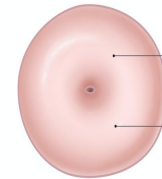
Opening between
cervical canal &
cavity of vagina



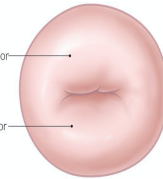
In a **nulliparous** woman: external os appears circular
(Woman who didn't give birth, external os appears intact)



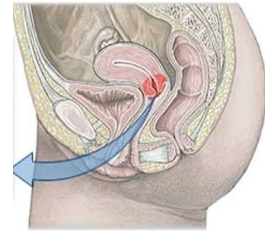
In a **multiparous** woman: external os appears as a transverse slit with an anterior & a posterior lip
(B/c during birth there will be expansion of the muscles and this will form these lips)



Nulliparous



Multiparous



★ Positions of uterus

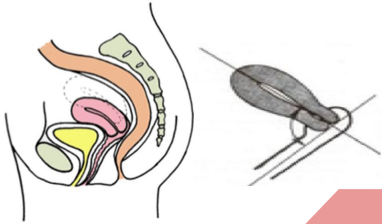
All of these positions are considered normal
 Ante- meaning anteriorly where retro- means to the back .
 Everted مقولوب and flexed منثني

💡 Before embryo transfer, IVF cycle they have to check the position of the uterus to make sure it will be transferred in the correct position

Usual position of uterus

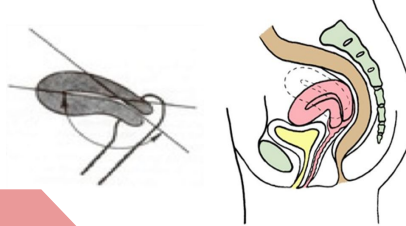
doctor : انا بحب كلمة : usual

Anteverted uterus
 long axis of **whole uterus** is bent forward
 on long axis of **vagina**

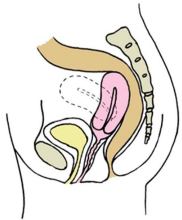


1

Anteflexed uterus
 long axis of **whole body** is bent forward
 on long axis of **cervix**



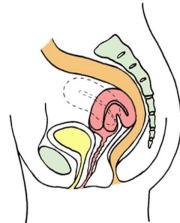
2



3

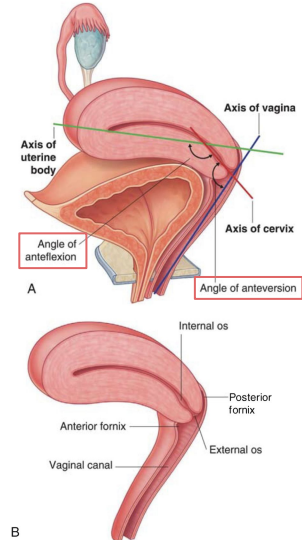
Retroverted uterus
Fundus & body of uterus are bent
 backward on the **vagina** and lie in
rectouterine pouch

4



Retroflexed Uterus

Long axis of **body** of uterus is bent
 backward on long axis of **cervix**



Anteverted Anteflexed Uterus

Most females have this position (about 75%)



Uterus

Ligaments of uterus

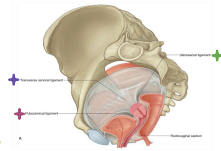
Ligaments At junction between fundus & body of uterus (At the level of uterine tube)

- Extends through inguinal canal to labium majus
- They are **Round ligament** (anterior to the uterine tube) and **ovarian ligament** (posterior to the uterine tube)

Ligaments of cervix. ligaments of uterus are attached to vervia & vagina

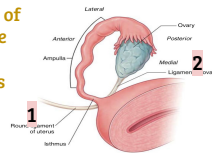
★ Extend from cervix to pelvic wall: (Veryyy important)

- **Anterior portion as a pubocervical ligament** they pass the posterior cervix from pubis and positions on either sides of bladder and give the bladder some support
- **Lateral portion as a transverse cervical or cardinal ligament** They pass to the cervix and upper part of vagina from the lateral wall of pelvis. The strongest one.
- **Posterior portion as an uterosacral or sacrocervical ligament** it passes to cervix and upper end of vagina from the end of sacrum



Ligament of the uterus:

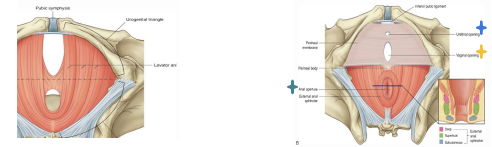
1. anteriorly at the level of the uterine tube :round ligament of the uterus .
 - ❑ In males embryology; the gubernaculum pulls the testis by contraction (shortening of the ligament) then it passes through the inguinal ligament till the testis arrive to the scrotum then the gubernaculum disappears
 - ❑ while in females embryology ,the gubernaculum pulls the ovaries toward the uterus and then it persists (does not disappear) but instead becomes the round ligament of the uterus, which helps in :
 - directing the angle of uterus
 - maintaining the angle of the uterus
2. posteriorly to the medial end of the ovaries: ligament of the ovaries; They help in the stability of the ovaries in their position.



Muscles (Levator Ani Muscle)

- Form the pelvic floor: separate pelvis from perineum
- Form the pelvic diaphragm: traversed by **urethra, vagina & rectum**

Function: Support pelvic organs



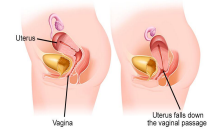
Clinical Anatomy : Uterine prolapse

Downward displacement of uterus due to damage of:

- Ligaments of uterus **at level of uterine tube**
- **Levator ani muscles**

In severe cases it can be seen from outside.

It can be due to many causes which include: repeated pregnancy(vaginal delivery), weakness of levator ani, surgery, weakness in the nerve supply etc

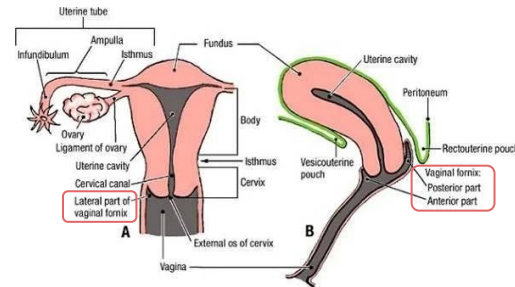
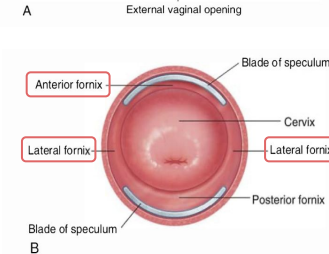
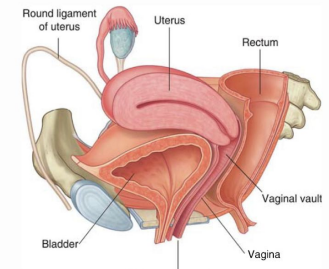
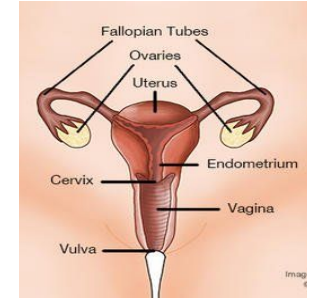


Support Of Uterus

- 1- Round ligament of uterus (maintains anteverted & anteflexed position)
- 2- ligaments of cervix (especially transverse cervical)
- 3- Levator Ani muscles

Vagina

- **Structure:** It's Fibromuscular tube because during delivery it will expand
- **Extent:** from external os, along pelvis & perineum, to open in the vulva (female external genitalia), behind urethral opening
- **Vagina fornices (arches):** are the superior portions of the vagina, extending into the recesses created by the vaginal portion of cervix.
- **Length:** Its anterior wall (7.5 cm) is shorter than its posterior wall (9 cm) The difference in length is due to the position of uterus. (This is in case of anteverted anteflexed uterus it is the opposite in case of retroverted retroflexed)
- **Functions:** 1) Copulatory organ 2) Birth canal (in case of vaginal delivery)



Relations of the vagina

Anterior

Urinary bladder (in pelvis) & urethra (in perineum)

Lateral

Ureters (in pelvis)
It comes from the back going lateral to the vagina in order to open in the urinary bladder

Posterior

Rectum (in pelvis) & anal canal (in perineum)

Arterial supply

Organ	Arteries	Veins	Lymphatics	Nerves (Autonomic)
Ovaries	Ovarian (branch of abdominal aorta)	Ovarian (drain to inferior vena cava & left renal vein)	To paraortic lymph nodes (in abdomen) also called the sentinel lymph nodes and are the first ones to drain a metastasizing cancer (e.g. ovarian cancer)	Ovarian plexus (in abdomen)
Uterine tubes	-Ovarian (lateral) -Uterine. (Medial)	-Ovarian -Uterine	-Paraortic -Internal iliac	-Ovarian -Inferior hypogastric
Uterus	Uterine (branch of internal iliac artery in pelvis)	Uterine plexus (drain to internal iliac vein)	To internal iliac lymph nodes (in pelvis)	Inferior hypogastric plexus (in pelvis)
Vagina	Vaginal (branch of internal iliac artery in pelvis)	Vaginal plexus (drain to internal iliac vein)		



-Most structures in the pelvis are supplied by internal iliac artery.

-**Mainly the internal iliac artery gives 2 blood supplies:**
1)uterine artery

It is very tortuous artery why?
tortuous arteries are caused by one of the 2 reasons either :

- *It supplies a movable organ (e.g. lingual artery supplying the tongue and facial artery)
- * It supplies an extensible artery to prevent the rupture of the artery as when pregnancy happens and the uterus size increase the tortuosity of the artery disappears (e.g. uterine artery)

2)vaginal artery

- The ovaries were in the abdomen then the round ligament of the uterus pulls them to the pelvis (internal descend) and that why they are supplied by the abdominal aorta (not supplied by internal iliac artery)

-Uterine tube is the only part having 2 blood supplies the medial part is from the uterine artery (same as uterus) and the lateral part is from the ovarian artery (same as ovaries)

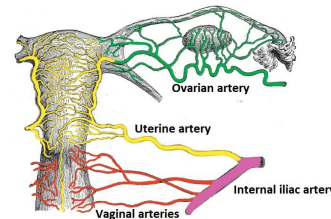
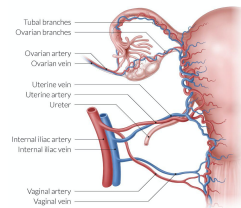
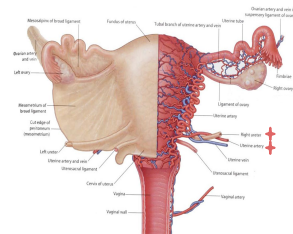


Uterine artery passes from the internal iliac artery and crosses **above the ureter** and reaches the cervix at the level of external os this is important clinically for the surgeon when performing hysterectomy to differentiate and distinguish between the uterine artery and the ureter.

mnemonic= "**Water under the bridge**" means: water (urine=ureter) is inferior to the bridge (uterine artery)



Remember: the supply to the ovaries and part of uterine tubes is always from the abdomen (abdominal aorta). While the supply of the uterus and vagina and part of the uterine tubes is always from the pelvis (internal iliac artery).



QUIZ

Q1: Regarding the female reproductive organs, which one of this statement is correct?

- A. The ampulla is the most medial part of the uterine tube.
- B. The rectum is anterior to the vagina.
- C. The ovarian artery is a branch of the internal iliac artery of the pelvis.
- D. The uterine tube is enclosed in the broad ligament of the uterus.

Q2: Which one of the following structures is related to the lateral end of the ovary?

- A. Fimbriae of uterine tube
- B. Ampulla of uterine tube
- C. Ligament of ovary
- D. Round ligament of uterus

Q3: Which one of the following structures is anterior to the uterus?

- A. Urinary bladder
- B. Ureter
- C. Sigmoid colon
- D. Ovary

Q4: Which of the following is supplied by the ovarian artery?

- A. Ovaries & uterus
- B. Ovaries & uterine tubes
- C. Uterine tubes & uterus
- D. Uterus & vagina

Q5: Which of the following parts is the site of fertilization?

- A. Intramural part
- B. Isthmus
- C. Ampulla
- D. Infundibulum

Q6: Production of female germ cells is the function of which of the following?

- A. Vagina
- B. Uterus
- C. Ovaries
- D. Uterine tubes

Q7: Which groups of lymph nodes are the sentinel nodes in cases of ovarian cancer?

- A. Paraaortic
- B. Uterus node
- C. External iliac
- D. Superficial inguinal

Q8: Which one of the following structures is lateral to the Vagina?

- A. Ureter
- B. Uterus
- C. Ovaries
- D. Uterine tubes



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