

Academic year 2019-2020

3rd year S 5/6

REPRODUCTION SYSTEM MODULE

SESSION 4:

LECTURE: 1

Clinical anatomy of female reproductive system

presented by Dr Nawal Mustafa

Module staff:

Dr.Raya Muslim Alhassan (module leader)

Dr. Nada Hashim Aljassim

Dr. Nawal Mustafa Abdullah

Dr.Nehaya Mnahi Al-Aubody

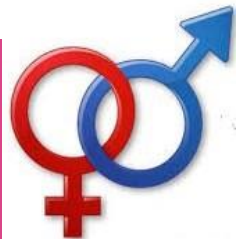
Dr. Ihsan Mardan Humod

Dr. Ansam Munadhel

Dr.Nesreen Muhsin Jaralla

Dr.Hadeel S. Al Ali

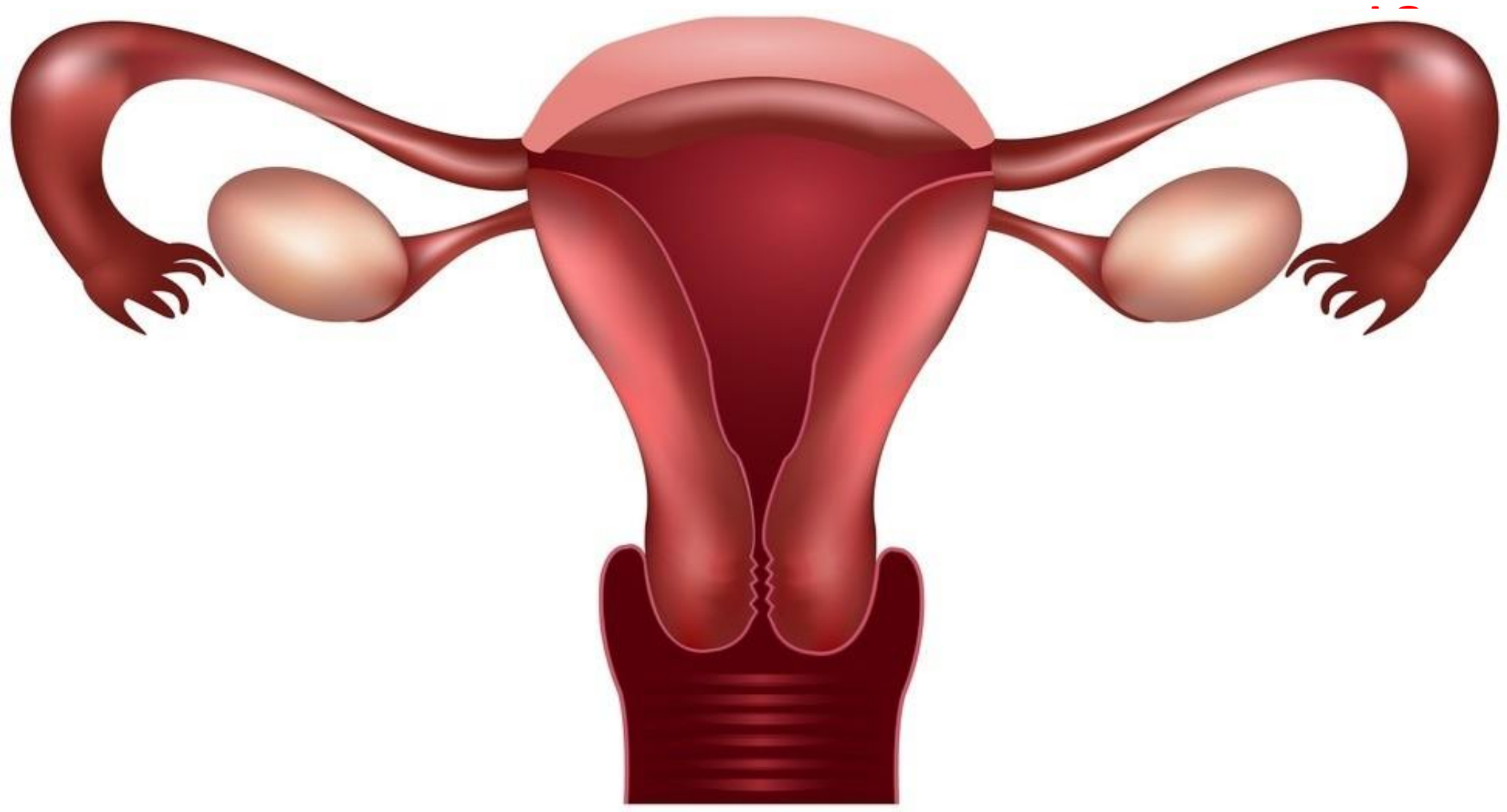
Hacker and Moore's essentials of obstetrics and gynecology, (5th edition 2010),
Essential Obstetrics & Gynaecology (4th edition 2003), Symonds & Symonds,
Obstetrics by Ten Teachers, (19th edition, 2011), Kenny, L.C & Baker P.N., Hodder
Arnold.



Learning objectives:

- 1- Describe the principle anatomical structure of the female reproductive system
2. Describe the functional anatomy of each structure in relation to reproduction
3. Describe the clinical investigation and assessments imaging
- 4- Relate anatomy to common clinical problems

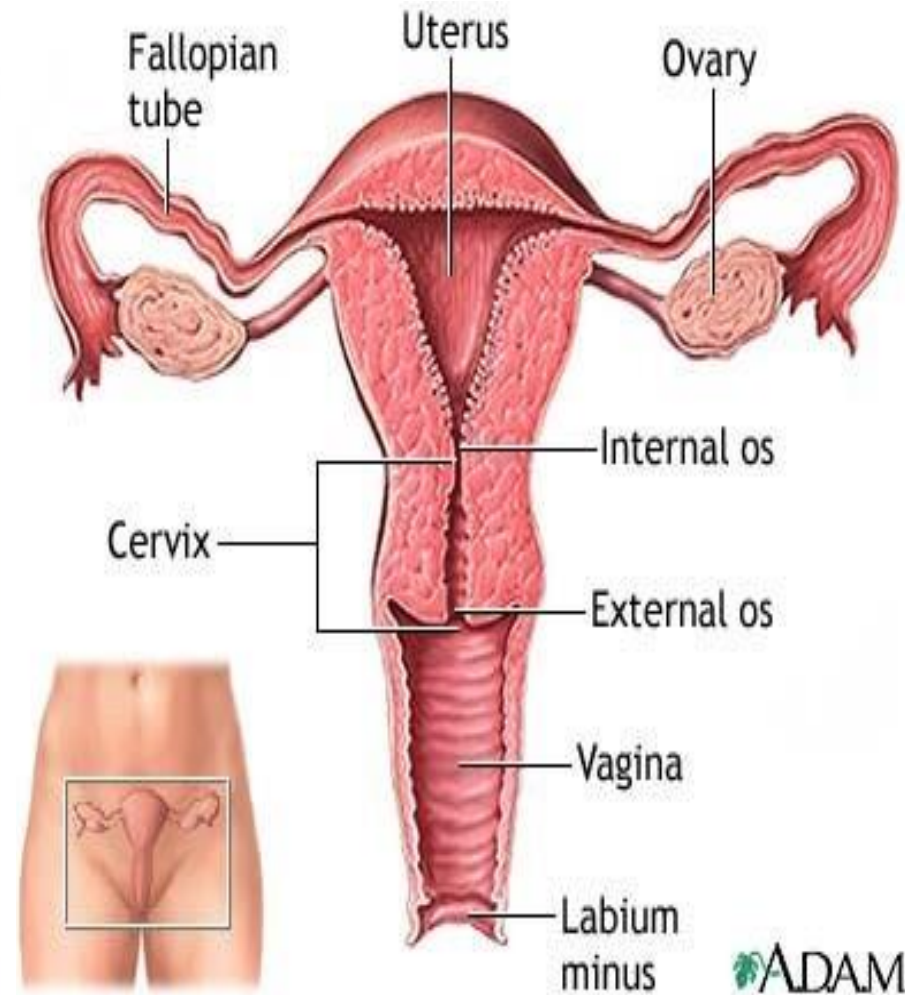




Female reproductive organs

Major structures

- ❑ Ovaries
- ❑ Uterine tubes
- ❑ Uterus
- ❑ Cervix
- ❑ Vagina
- ❑ External genitalia



Ovaries

LO1,2

- ❑ Paired intraperitoneal reproductive ova producing organ and hormones
- ❑ The ovaries lie adjacent to the lateral pelvic wall just inferior to the pelvic inlet.
- ❑ Each of the two almond- shaped ovaries is about **3 cm** long and is suspended by a mesentery (the **mesovarium**) from the posterior aspect of the broad ligament

❑ Size:

Premenarche = 3cc

Premenopause = 4 - 16cc

N: Vol increase in follicular phase, peak at ovulation

Postmenopausal = 6cc

- ❑ **Position:** Neonate above pelvis
 Nillipara at ovarian fossa

- ❑ **Ligaments** : Suspensary lig , Uteroovarian lig

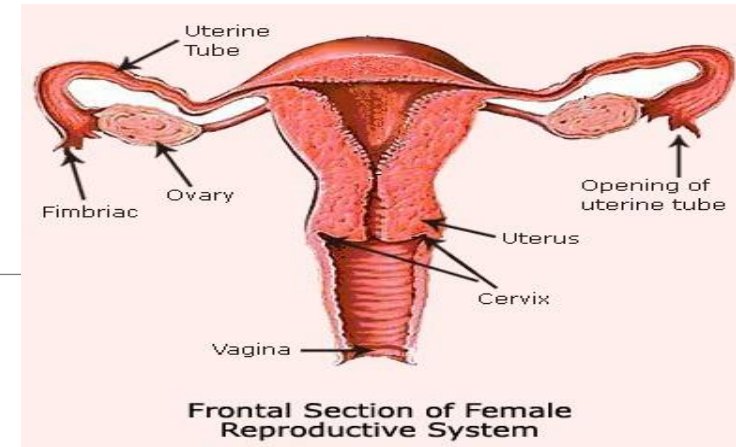


Ovarian blood vessels

LO1,2

Blood supply

- The ovarian artery (major) a branch of the abdominal abdominal aorta
- Uterine artery (minor)



Venous drainage

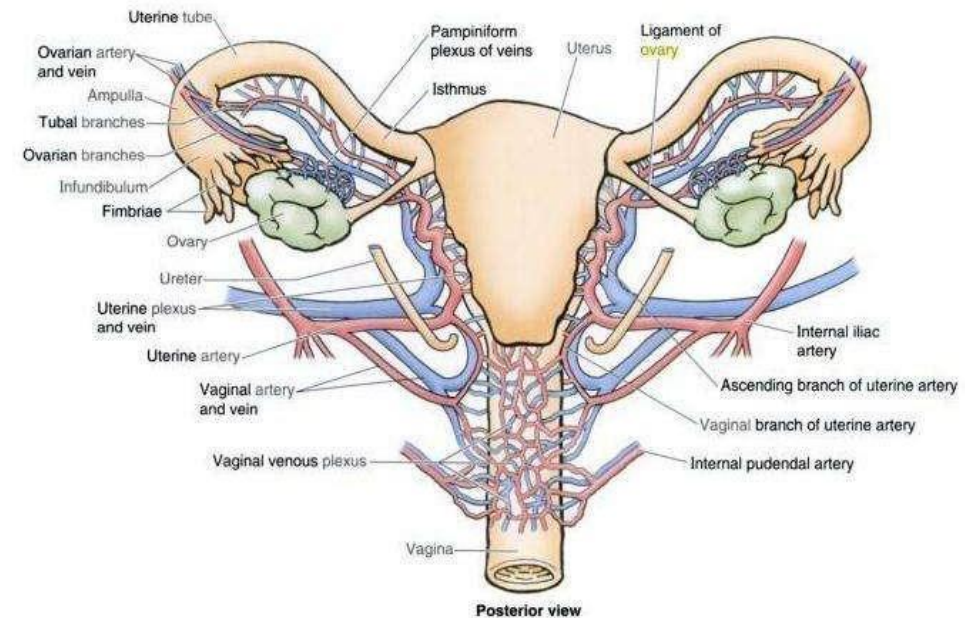
Ovarian veins

Rt to IVC

Lt to renal vein

Lymphatic drainage

Aorto caval LN



Blood supply and venous drainage of uterus, vagina, and ovaries. The broad ligament of the uterus is removed to show the anastomosing branches of the ovarian artery from the aorta and the uterine artery from the internal iliac artery supplying the ovary, uterine tube, and uterus. The veins follow a similar pattern, flowing retrograde to the arteries, but are more plexiform, including a pampiniform plexus related to the ovary and continuous uterine and vaginal plexuses (collectively, the uterovaginal plexus).

Uterine = fallopian tube

- ❑ The **two** fallopian tubes, which are about **4 to 5** inches (**about 10 to 13 centimeters**) long, extend from the upper edges of the uterus toward the ovaries.
- ❑ The fallopian tubes are lined with tiny hair like projections (**cilia**). The cilia and the muscles in the tube's wall propel an egg downward through the tube to the uterus.
- ❑ The ends of the fallopian tubes lying next to the ovaries feather into ends called **fimbria**
- ❑ The cilia **beat in waves** hundreds of times a second catching the egg at ovulation and moving it through the tube to the uterine cavity.
- ❑ **Fertilization** typically occurs in the fallopian tube



Uterine tubes

Parts:

- The isthmus
- The ampulla
- The infundibulum

Blood vessels :

Artery – uterine and ovarian art

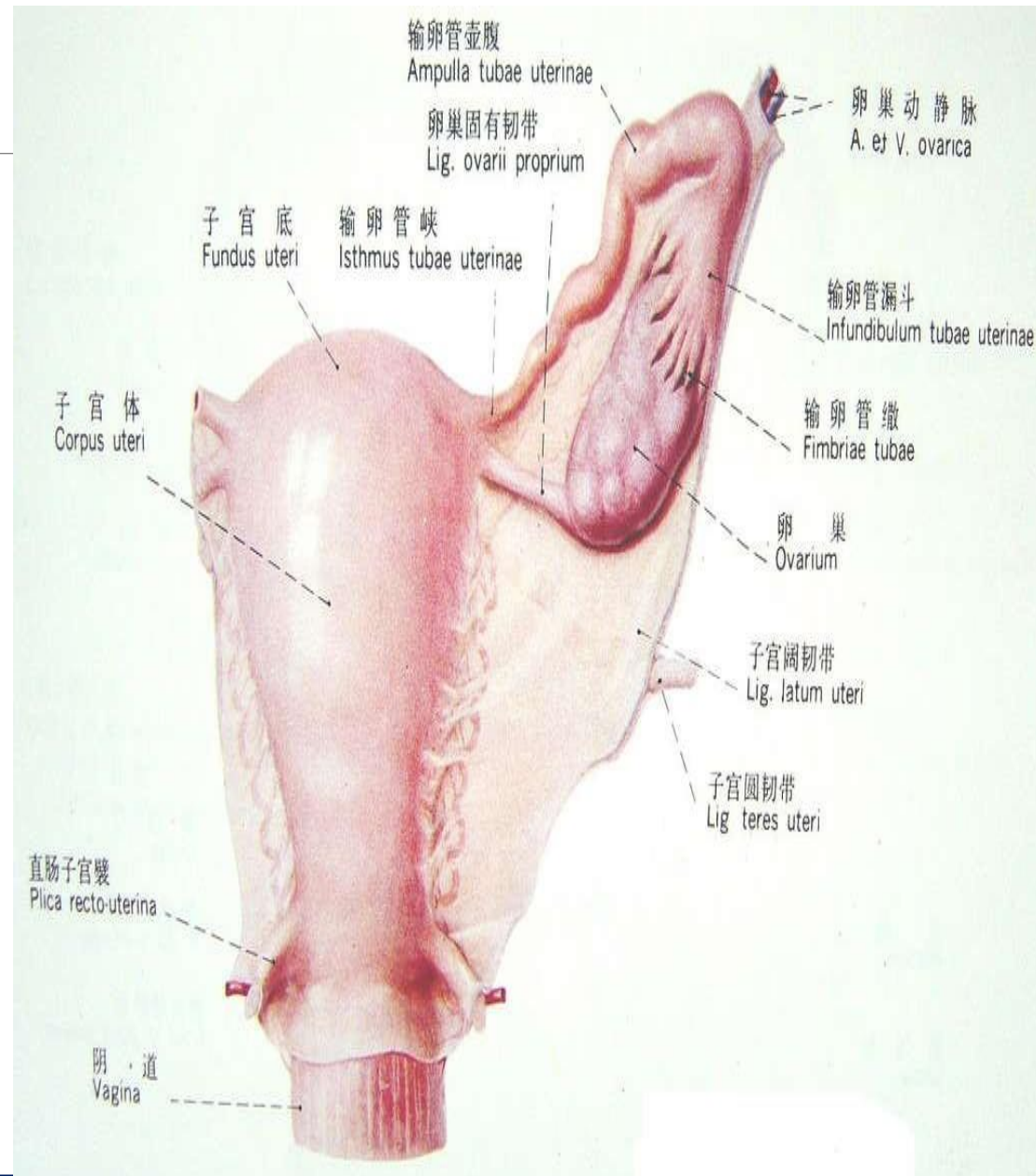
Venous – ovarian vein

Lymphatics:

Along with the ovarian vessels to
para-aortic LN

Nerve supply:

Uterine and ovarian **nerves**

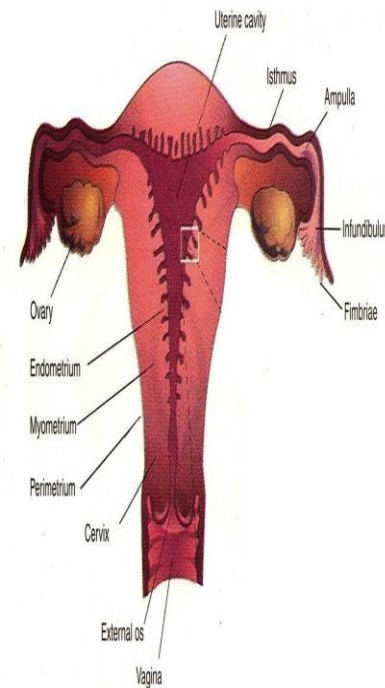
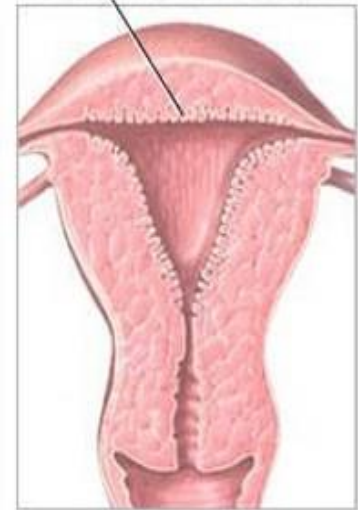


UTERUS

LO1,2

- ❑ Thick walled **Pear-shaped fibromuscular** organ
- ❑ Mostly covered by serous membrane of **peritonium**
- ❑ Composed of **myometrium** and **endometrium**
- ❑ Myometrium = smooth m + connective tissue + elastic fibers
undergo hyperatrophy and hyperplasia during pregnancy
- ❑ Endometrium = mucosal lining = **tubular glands** and **stroma**
- ❑ Endometrium:
 - ❑ 1. superficial part = **Stratum functionalis** = cyclic changes / shedding
 - ❑ 2. deep layer = **Stratum basalis** = regeneration of upper endometrium
- ❑ Parts : **body ,fundus ,isthmus**

Normal endometrium



Cyclic changes of endometrium:

Uterus in the three phases

1. Menstrual phase

Sloughing of the functional layer

2. Proliferative phase

Day 1-14

****estrogen dependent

=follicular phase of the ovary

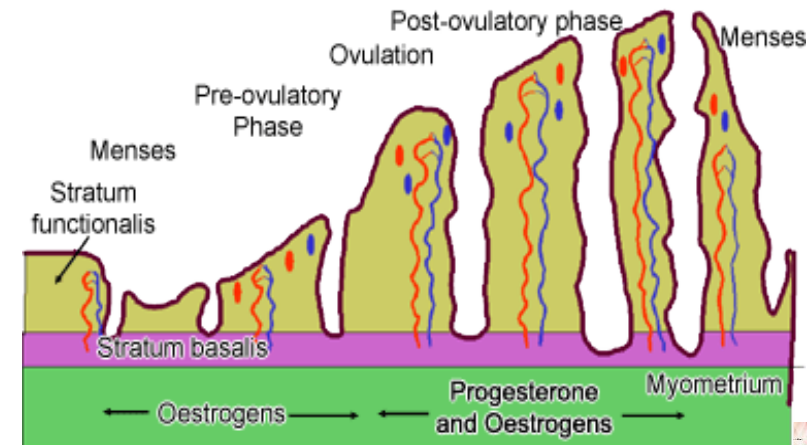
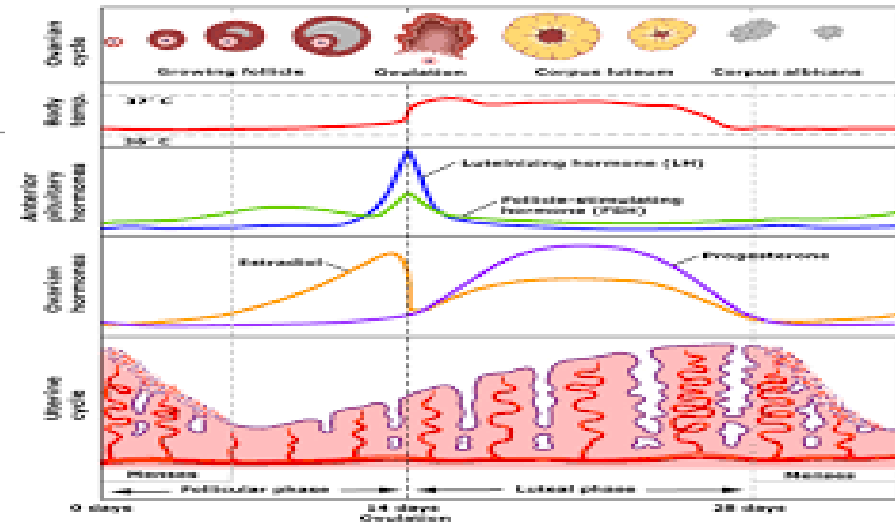
3. Secretary phase

Day 15- mensuration

****Progesterone dependent

=correspond to luteal phase of the ovary

Endometrial gland atrophy



Supporting structures:

LO1,2

Broad ligament

Laterally to pelvic wall

Round ligament

Transverse cervical ligament

Uterosacral ligament

Vesicouterine ligament

, Vesicocervical

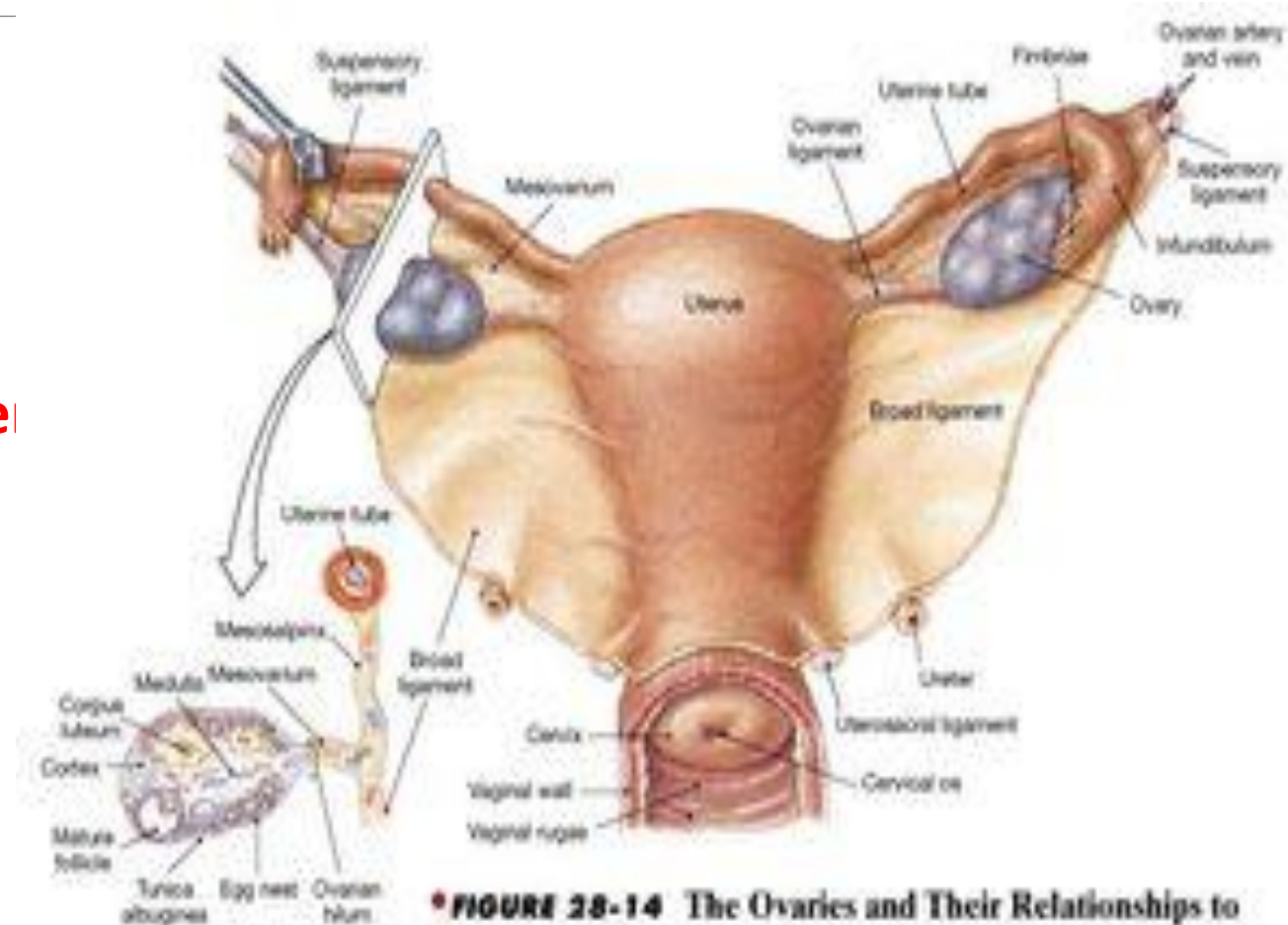


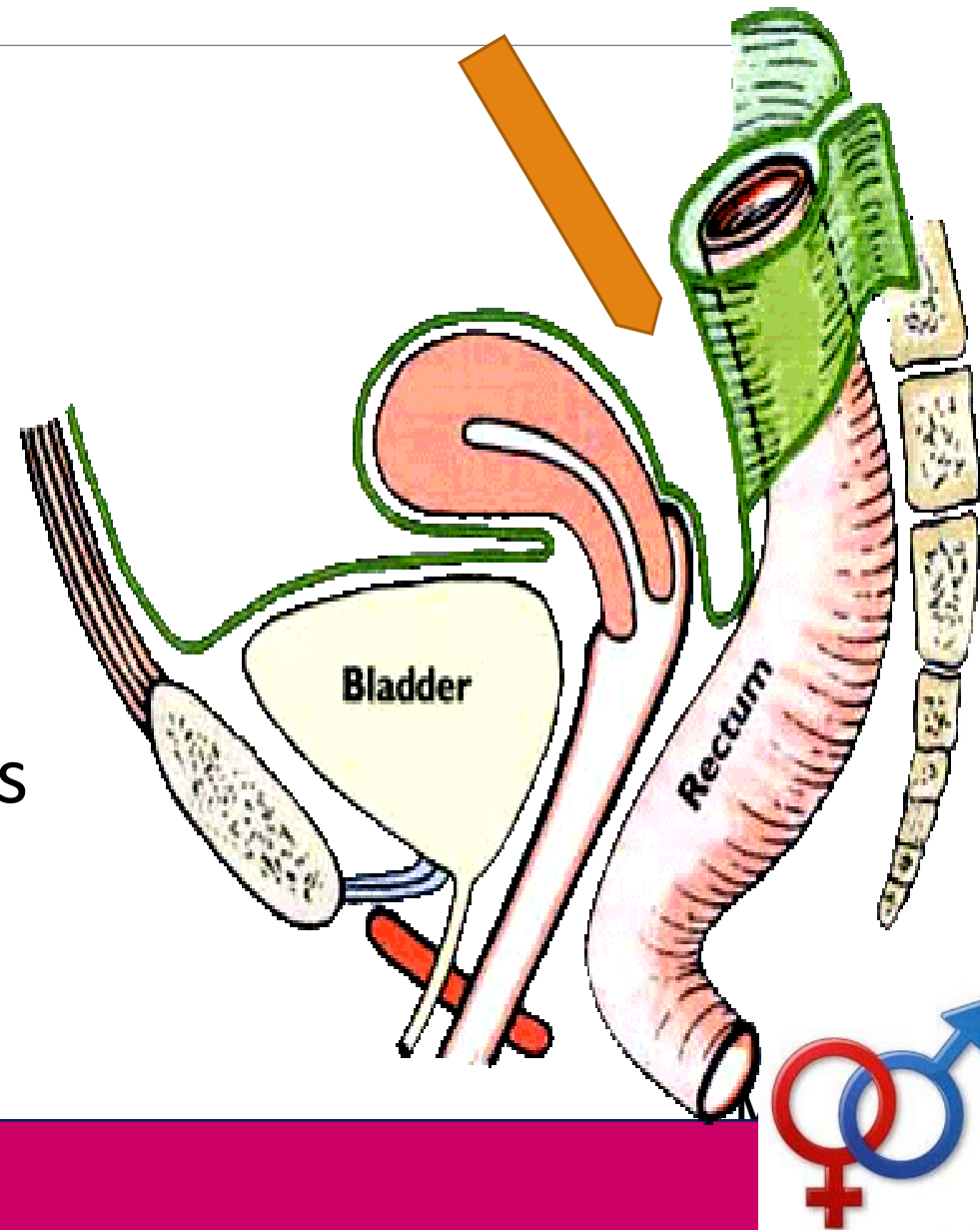
FIGURE 28-14 The Ovaries and Their Relationships to the Uterine Tube and Uterus. Posterior view of the uterus, uterine tubes, and ovaries and sectional view of the ovary, uterine tube, and associated mesenteries.



Pouches of uterus

LO1,2

- In female
 - **Recto uterine pouch**
 - **Douglas pouch**
 - — between rectum and uterus
 - **Vesico uterine pouch** — between bladder and uterus



Relations of uterus

LO1,2

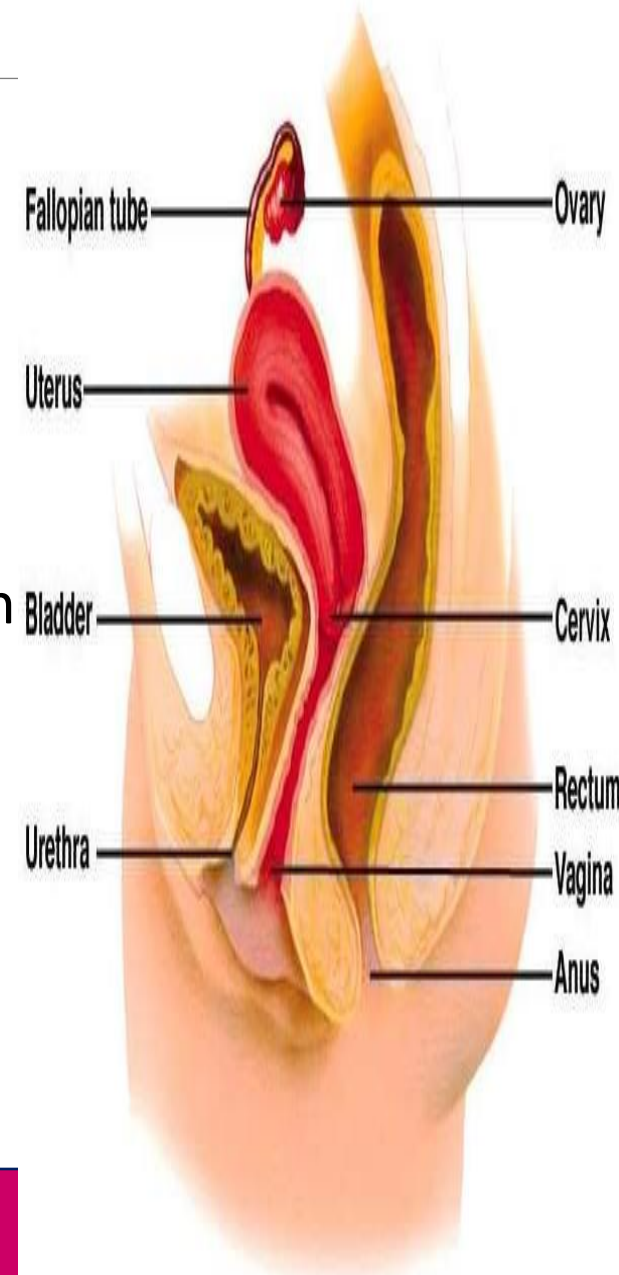
Anteriorly

- The uterus and cervix are related to the **uterovesical pouch** and superior surface of the bladder.

Posteriorly

- The uterus is related to the **recto-uterine pouch (douglas pouch)**, which extends down as far as the posterior fornix of the vagina.

Laterally: the broad ligament



Uterus /Vascular supply

LO1,2

Arterial supply:

1. Uterine artery (internal iliac) give
arcuate arteries -radial arteries –
spiral arteries

2. Ovarian arteries

Venous drainage:

1. Myometrial veins

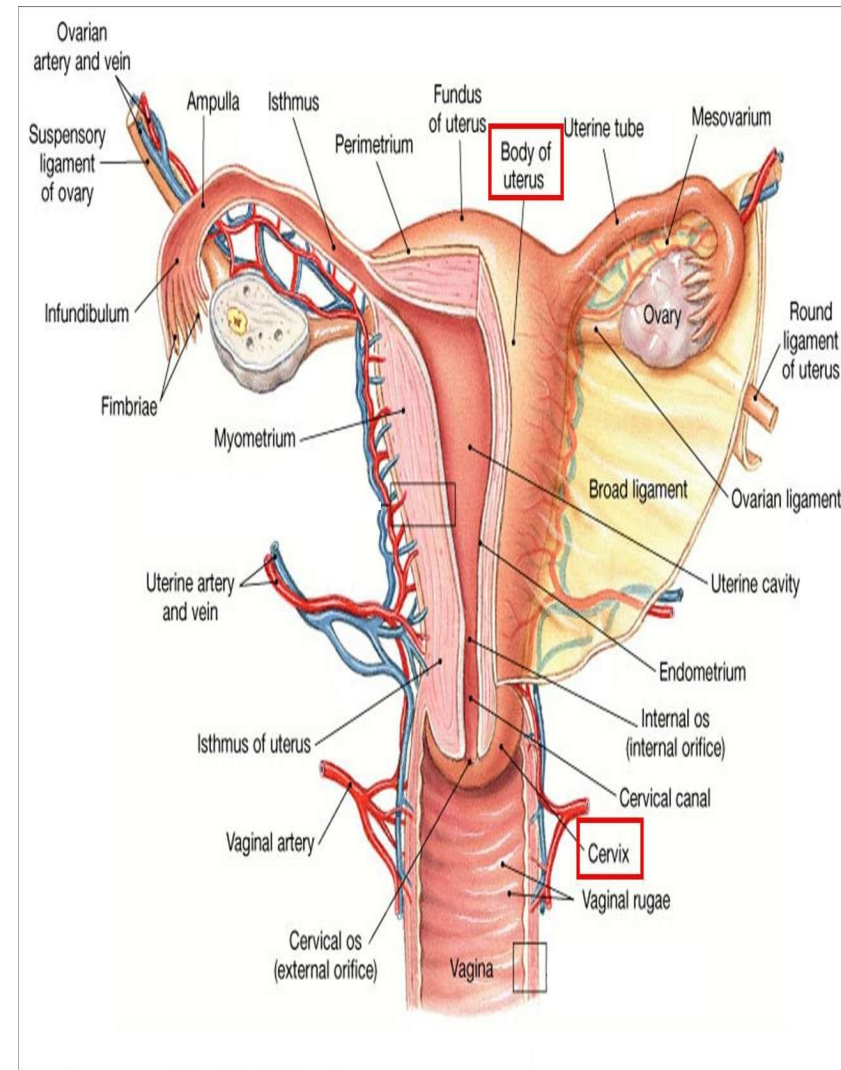
Drain into **uterine** or **ovarian veins** in
the broad ligament

3. Lymphatic drainage

upper superficial inguinal LN

middle external ilia LN

lower internal iliac lymph nodes



Cervix

LO1,2

Fibromuscular caudal segment of the uterus

communicate with vagina

Two segments:

- supravaginal segment = **internal os**
- Vaginal segment = **external os**

Endocervix is lined by tall col epithelium with numerous mucus glands

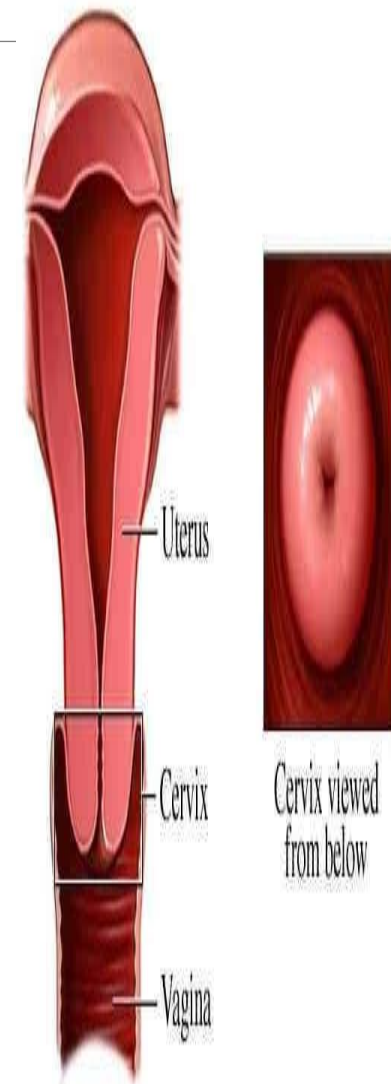
Exocervix is covered with non kertinized stratified squamous

N: Change of mucosa at the transformation zone is abrupt ???

Size:

2.5-3 cm non gravid

Less than 6 cm in pregnancy



Blood supply arterial :

- Descending cervical** branch from uterine artery
- Superficial branch** from vaginal artery

Venous drainage :

Parametrial venous plexus to **uterine** vein to **int iliac vein**

Lymphatic drainage:

External iliac LN via **broad ligaments**

Internal iliac

Pre sacral nodes

Cervix

Age related

Increase in vol till 5th decade then reduce

Premenarchea:

cervix = uterine body

puberty : body
> cervix

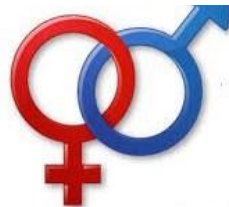
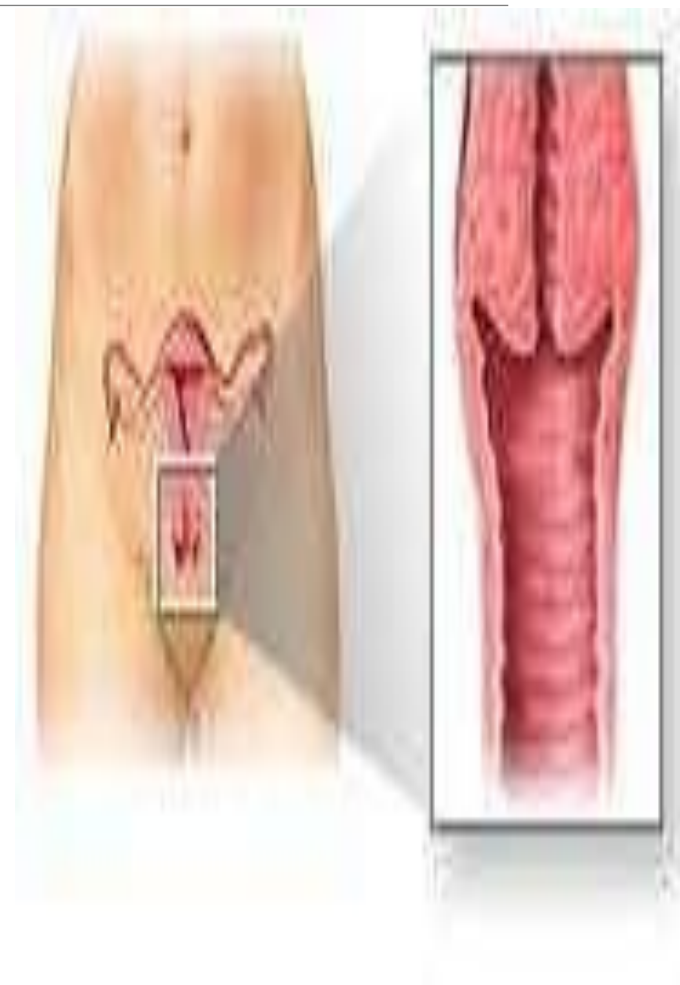
Menopause :

cervix > body



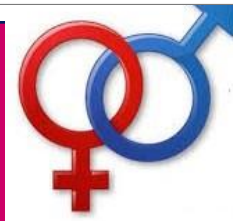
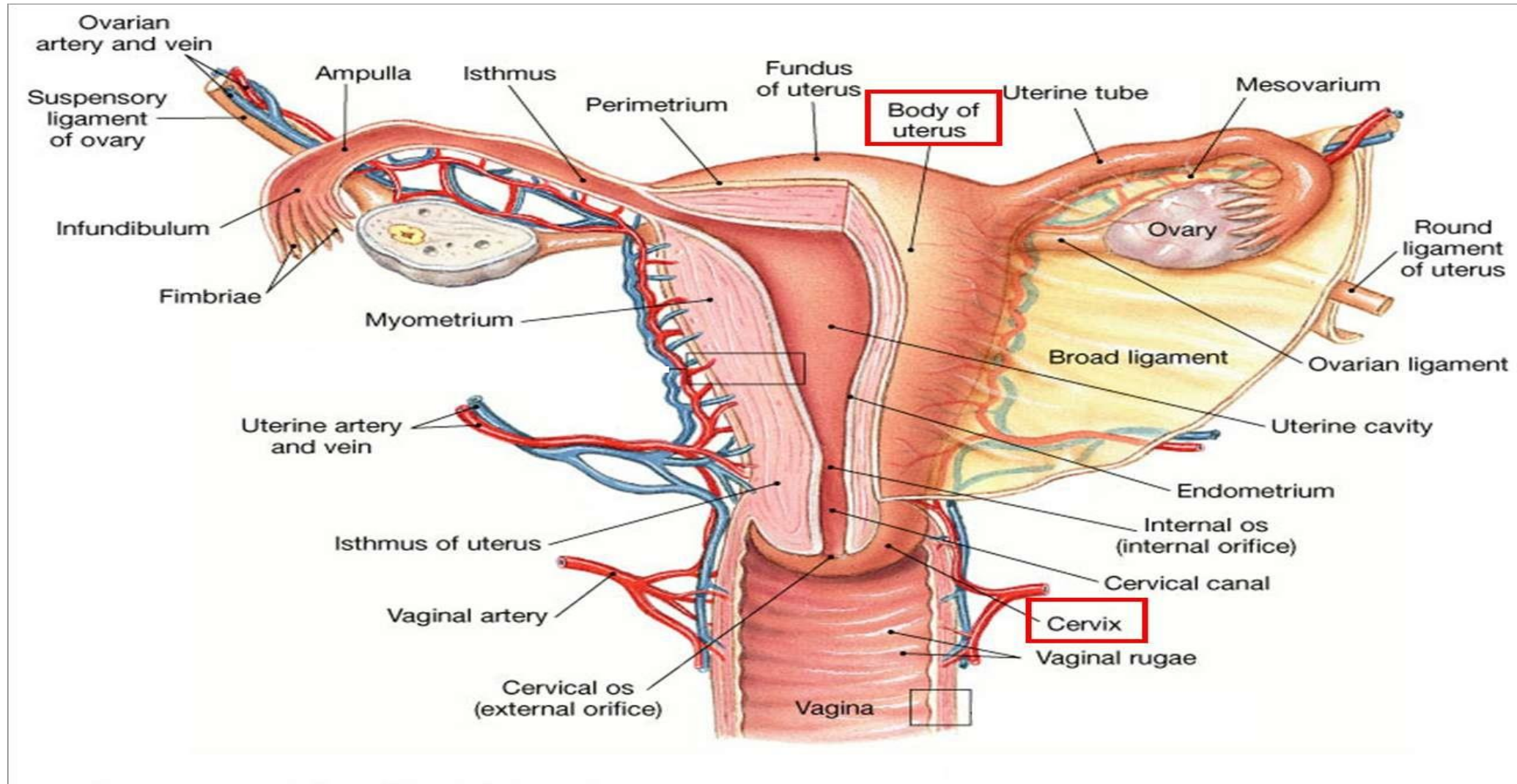
Vagina

- It is a distensible **fibromuscular tube** that extends from the perineum through the pelvic floor and into the pelvic cavity
- It measures approximately **8– 12 cm** in length.
- It extends from the vestibule to the uterus, and is situated behind the bladder and in front of the rectum.
- It is directed upward and backwards
- Its axis forming with that of the uterus an angle of over 90° , opening forward.



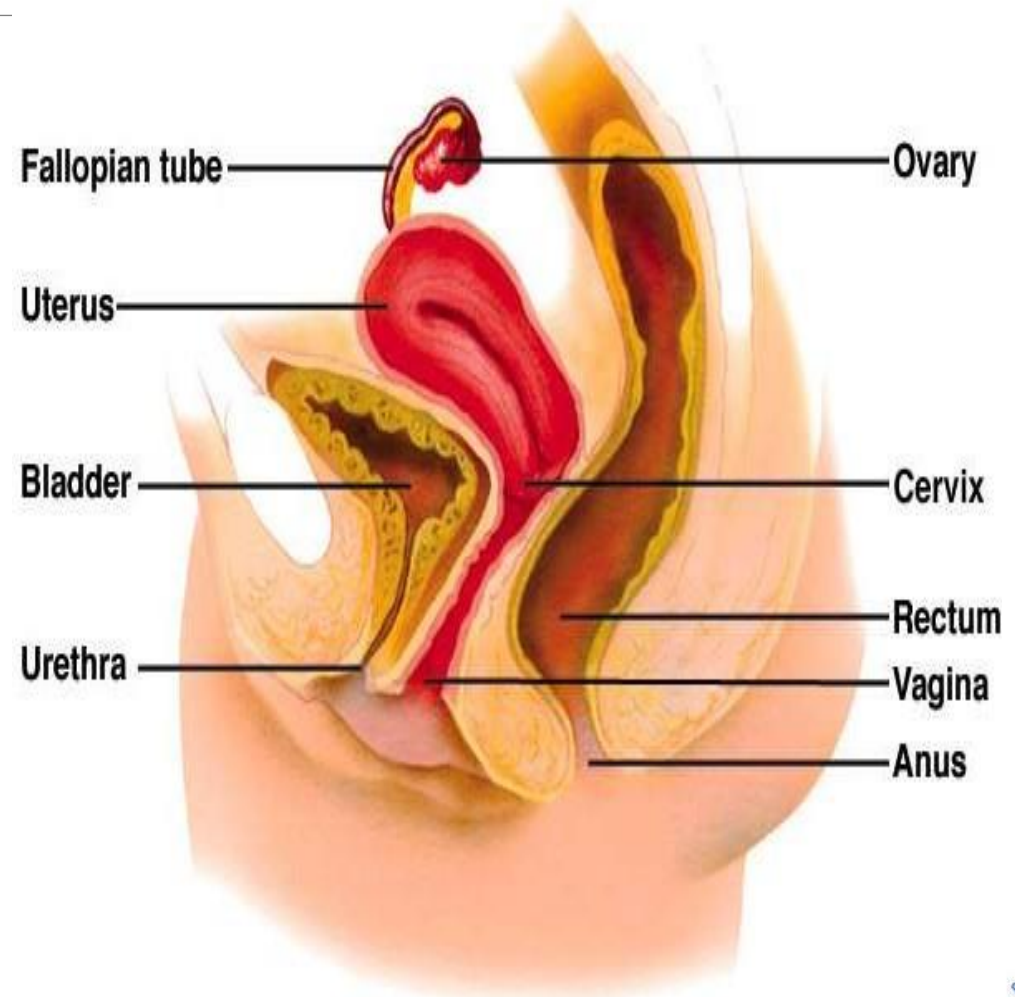
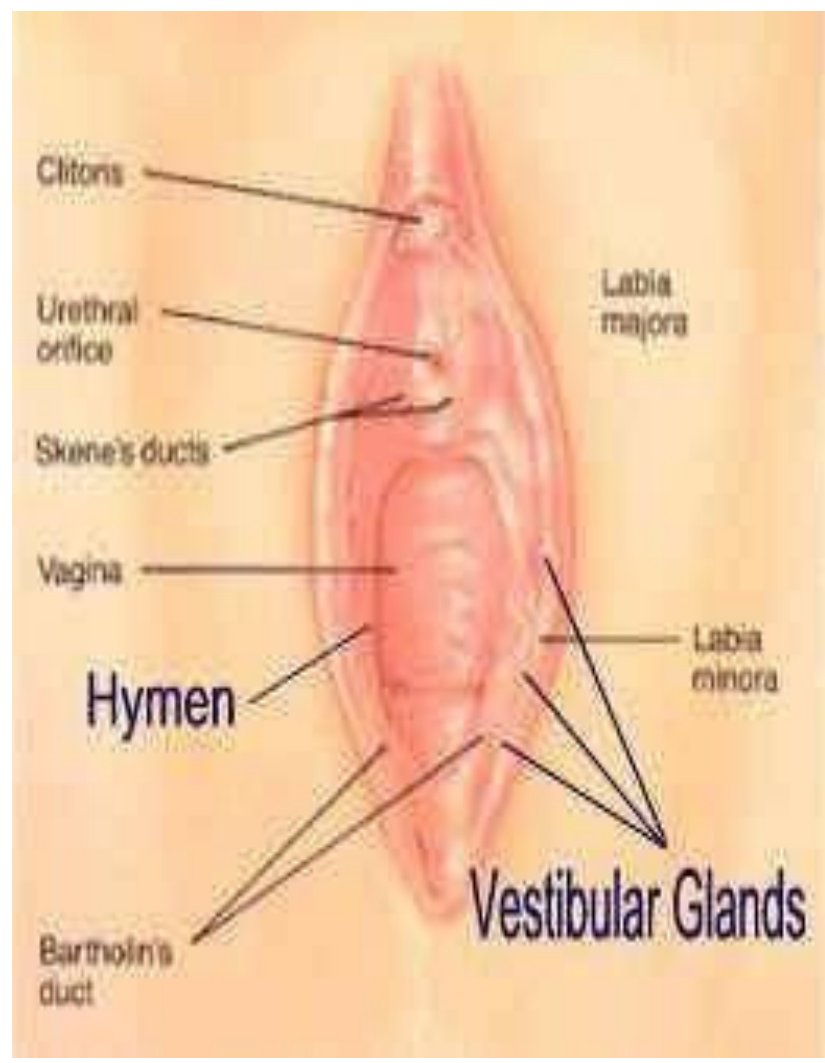
Female reproductive system

L02





LO



External genitalia

LO2

Vulva : term given to female external genitalia which runs from the pubic area downward to the rectum

Vulva includes:

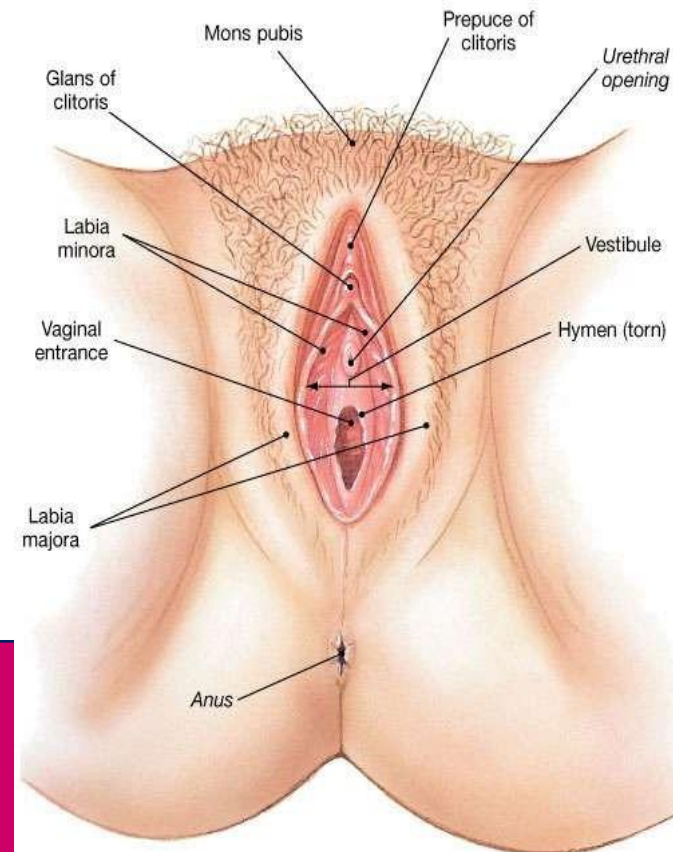
Labia majora or "greater lips" are the part around the vagina containing two glands (Bartholin's glands) which helps lubrication during intercourse.

Labia minora or "lesser lips" are the thin hairless ridges at the entrance of the vagina, which joins behind and in front. In front they split to enclose the clitoris

The clitoris is a small pea-shaped structure. It plays an important part in sexual excitement in females.

The **urethral orifice** or external urinary opening is below the clitoris on the upper wall of the vagina and is the passage for urine

The **hymen** is a thin crescentic fold of tissue which partially covers the opening of the vagina. medically it is no longer considered to be a 100% proof of female virginity.



Female genital tract Imaging techniques

Conventional radiology X ray

No major role except Hystrosalpingography (HSG)

US

CT scan

MRI



Conventional radiography Hysterosalpingography

HSG

Radiological method to assess tubal patency

Indication:

Infertility,
recurrent miscarriages
Congenital uterine anomalies
Uterine tube pathology

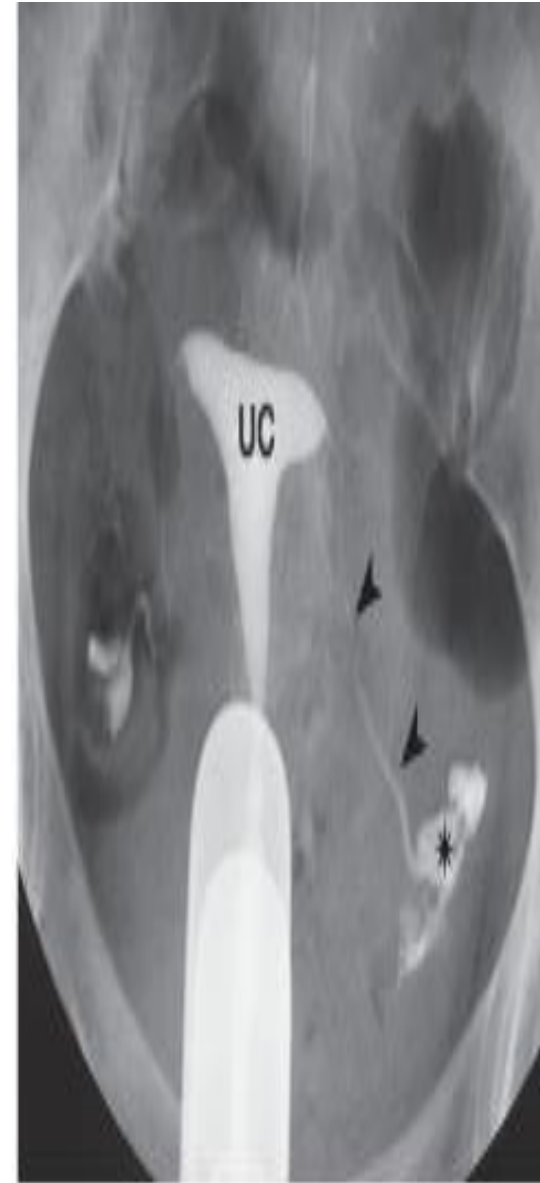
Contraindication:

Metrorrhagia
Acute and sub acute PID
Contrast allergy
Pregnancy



HSG

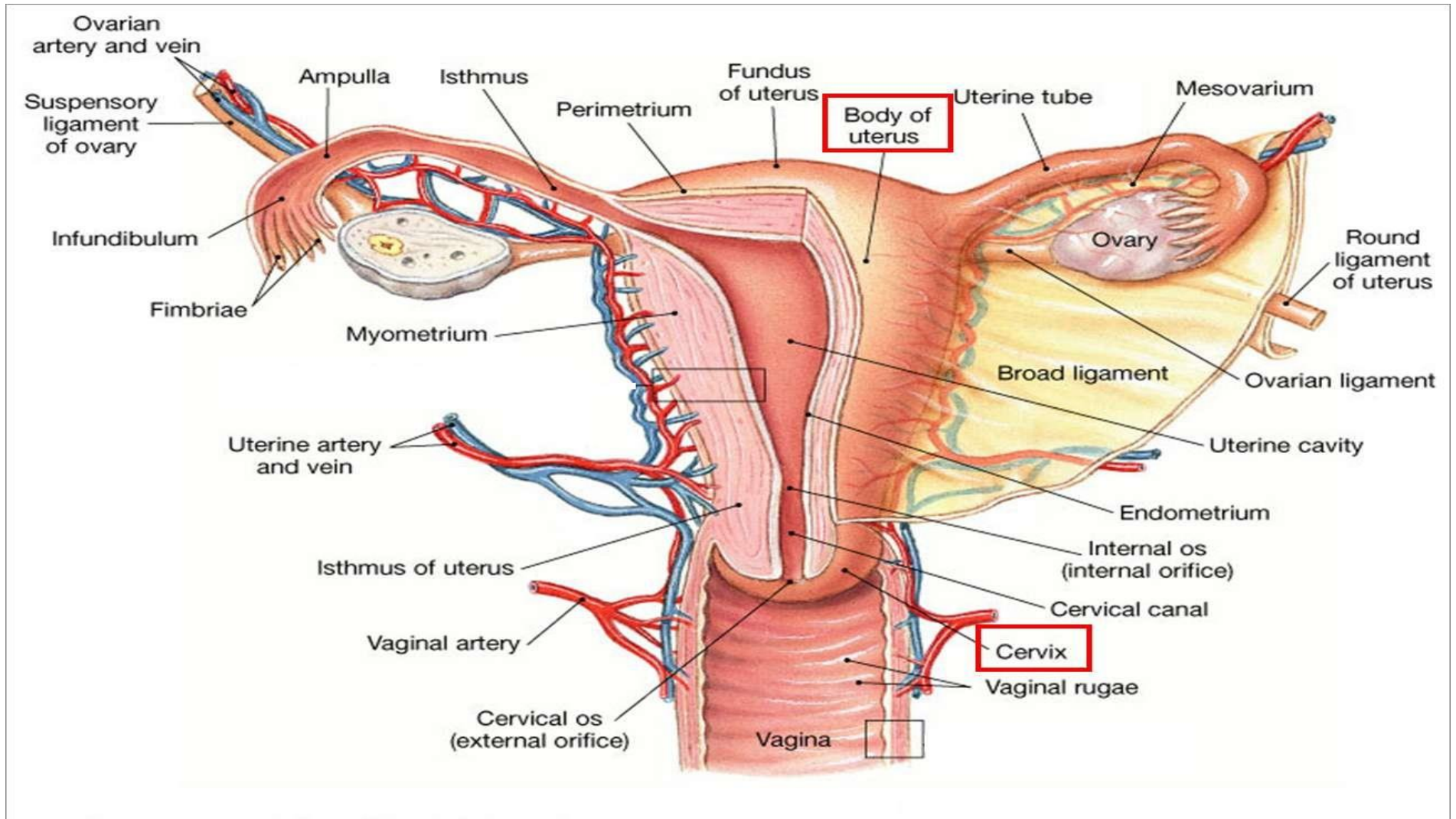
D 8 –D 12 menstrual cycle
Lithotomy position
A traumatic
Catheter/uterine injector
Non ionic contrast media
(10-20MI)

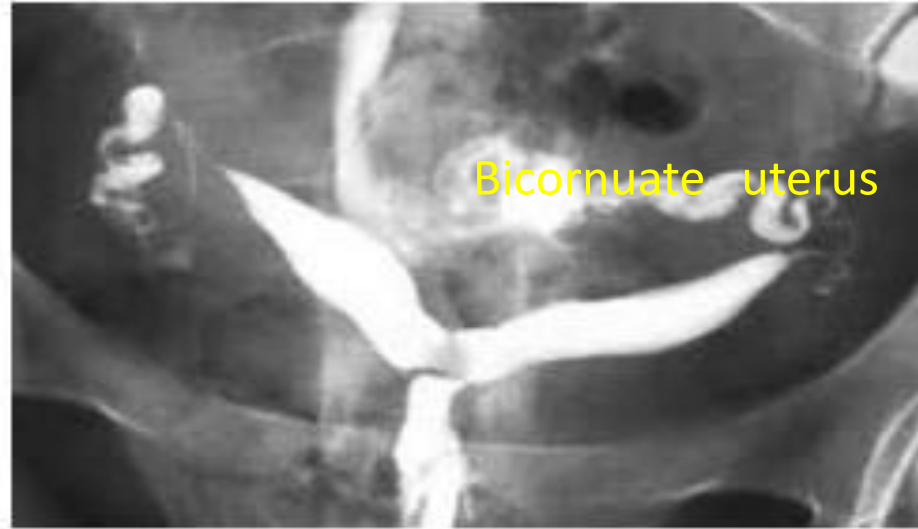


Lo3

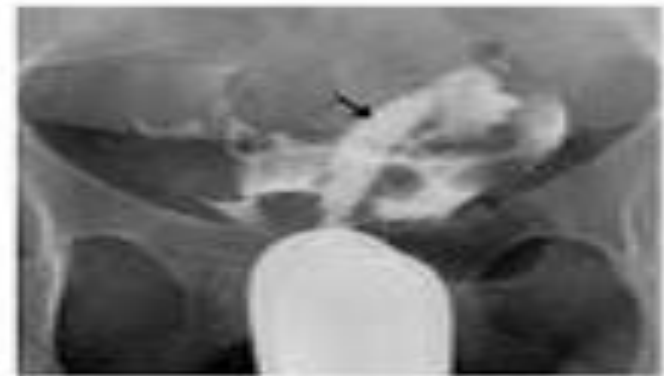
Fig. 6.1. Hysterosalpingography. The uterine tubes (*arrowheads*) appear regular in diameter and course. The normal patency is documented by the leakage of contrast medium into the peritoneal cavity (*asterisk*). UC, uterine cavity







:



Ultrasound

Trans abdominal

Trans vaginal

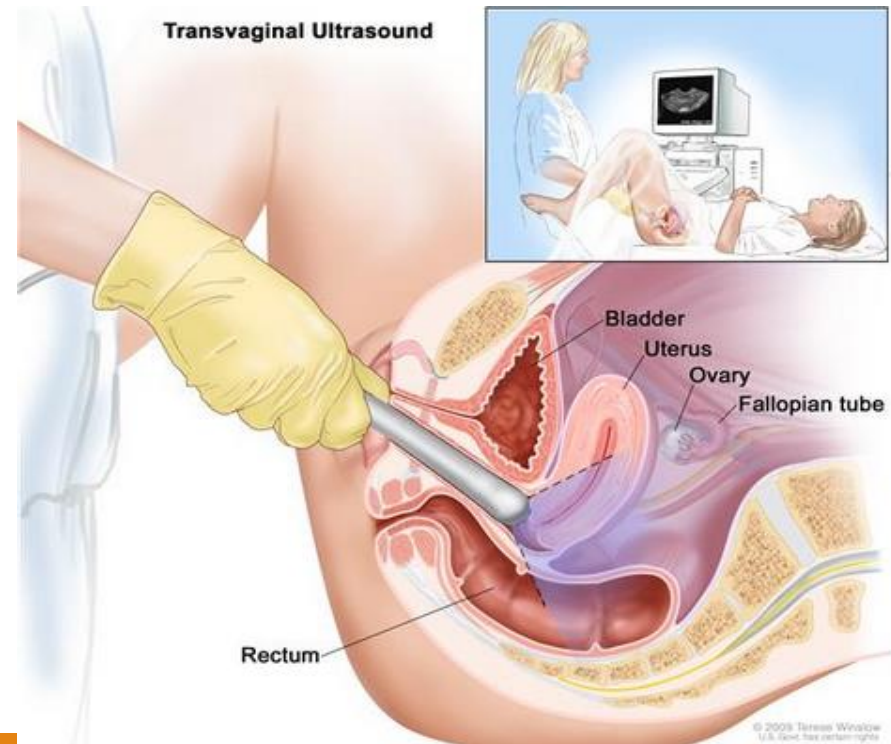
Ex: Trans abdominal

3.5-5 MHz curved transducer

Wide field of view

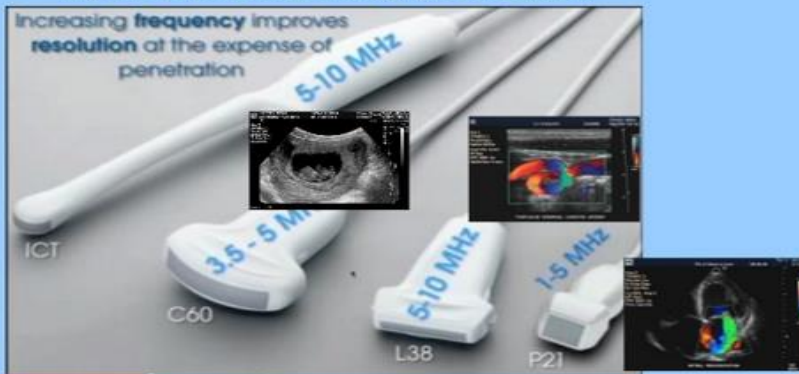
Require full bladder

Displace bowel loops



Probes (Explain)

Range is ideal to switch between General, High and low Resolution



Increasing frequency improves resolution at the expense of penetration

Curvilinear or Abdomen

Linear or Vascular

Phased Array or Cardiac



US: Uterus

Size ; 7x5x4 cm
Endometrium

Fallopian tubes

Normally not seen
Seen in hydrosalpinx /ascites

Vagina

Length ,
layer fornix

Cervix

Walls

Rectouterine pouch

Minimum fluid during
mensturation and preovulatory
phase



Computed tomography CT

-Less used due to decrease soft tissue resolution

--Need:

Need partially distended bladder

**Useful in staging of vaginal or vulval ca

**Evaluation of nodal and metastatic diseases

Use to see **calcification in various lesions
eg: leiomyoma ,LN



Magnetic Resonance Imaging

Lo3

MRI

Criteria

- ❖ Better soft tissue resolution
- ❖ Treatment follow up
- ❖ Pelvic floor assessment
- ❖ Evaluation of pelvic lymphadenopathy
- ❖ Evaluation of pelvic pain in pregnancy

For:

Adnaxial lesions

Ovarian and cervical ca staging

Assessment of vascularity of leiomyoma (pre therapy)

Staging of pelvic malignancies

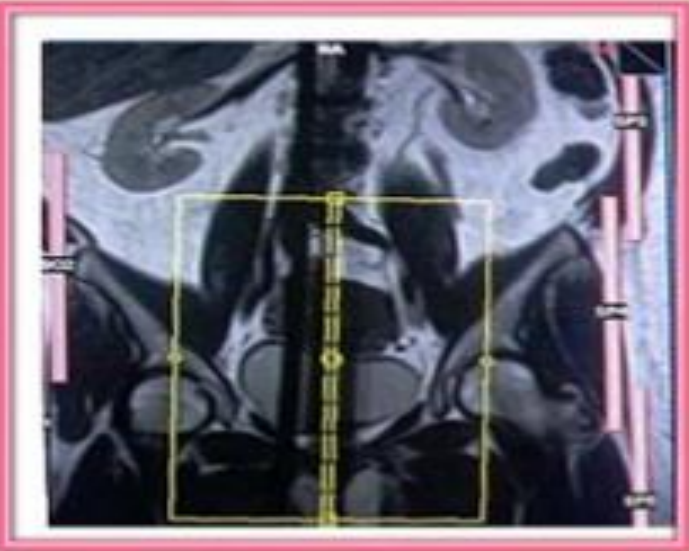
Evaluation of congenital (Mullerian)anomalies



Magnetic Resonance Imaging

Lo3

MRI PLANNING



)



Magnetic Resonance Imaging

Lo3

MRI

CT



MAGNETIC RESONANCE IMAGING

IMAGING PLANES

- Axial : pelvic anatomy and parametrial assessment
- Sagittal : Uterine zonal anatomy
- Coronal : complementary information in assessment of uterus, cervix, parametrium, vagina, and ovaries
- Oblique : evaluation of parametria in cervical Ca
 - Characterisation of mullerian duct anomalies

PELVIC MRA

MRAngiography

- Vascular involvement in pelvic malignancy
- Prior to uterine artery embolization



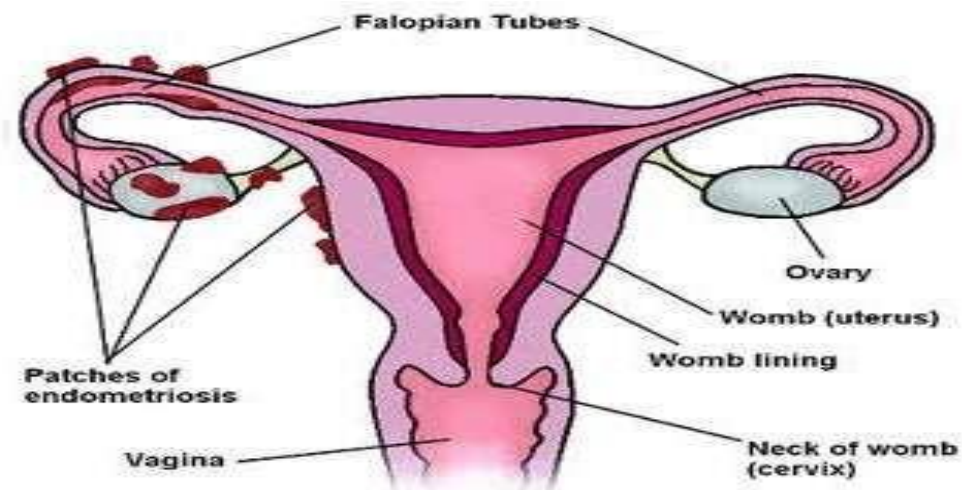
Clinical correlation with anatomy background

Endometriosis

Defintion :

Presence of endometrial tissue (both glands & stroma) outside the uterus.

- ▶ Tissue is morphologically and functionally similar to endometrial tissue → responds to hormones in cyclical manners.



Endometriosis Types:

LO4

Pelvic endometriosis

Peitoneal

Ovarian

Deep infiltrating

Extra pelvic endometriosis

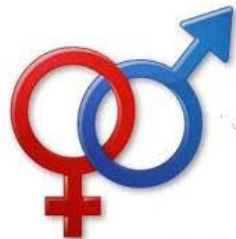
GIT

Ut

Scar endometriosis

Vaginal

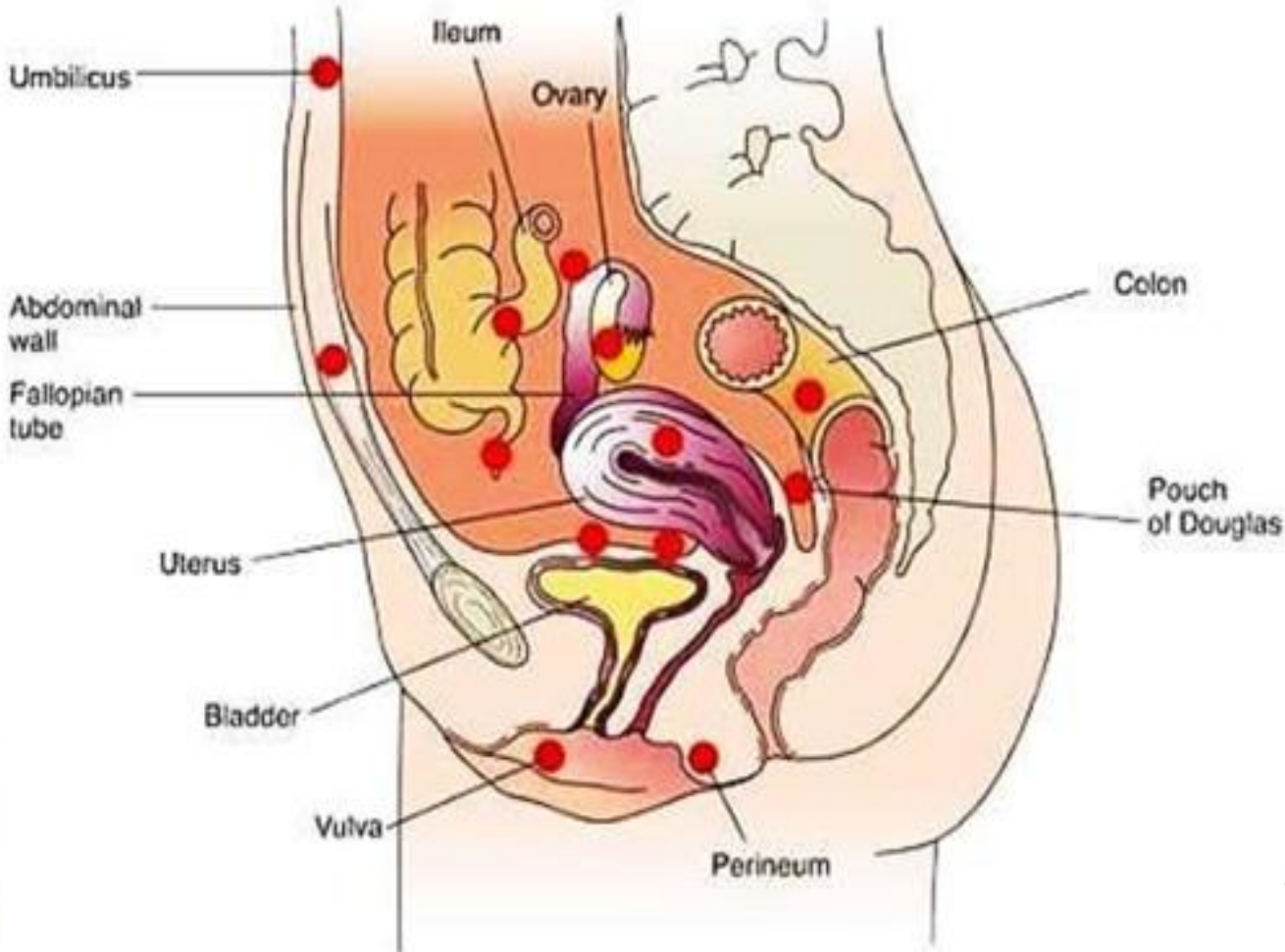
Thoracic





LO4

SITES



Endometrial carcinoma

L04

- Carcinoma of the endometrial lining of the uterus.
- Majority are adenocarcinoma.

