Female genital organs

1. Ovary:

Pair of organs, size of shelled almonds (2x4 cm) found in upper pelvic region (lateral wall of the pelvis)

- Regional histology:
  - Tunica albuginea is a fibrous capsule of dense connective tissue
  - Cortex is region just deep to tunica, contains follicles (responsible for the maturation of the oocytes inside the follicles)
  - Medulla is deeper region composed of connective tissue, blood vessels & lymphatics (connect directly to the hilum of the ovary and contain vital structures as blood vessels, nerves and lymphatics)
  - Germinal epithelium is simple epithelial covering over the ovary (modified area of peritoneum)

*The term germinal epithelium is a misnomer because the layer does not give rise to ova.

**The ovary usually lies against the lateral wall of the pelvis in a depression called the ovarian fossa, bounded by the external iliac vessels above and by the internal iliac vessels behind

**Ovary is responsible on production of: oocytes & hormones (estrogen & progesterone)
## Ovarian fossa is bounded:

* superiorly: by the external iliac artery and vein
* posteriorly: by the ureter, internal iliac artery and vein

**Ovarian ligaments:**
1. **Ovarian ligament (round ligament of ovaries):** anchors ovary to uterus
2. ovary is attached to the back of the broad ligament by the **mesovarium**
3. **suspensory ligament of the ovary:** between mesovarium and lateral pelvic wall/ The part of the broad ligament that lies lateral to the attachment of the mesovarium forms it
   * This ligament Covers blood vessels to ovaries
**Note:**
*the parietal layer of peritoneum reflects on visceral organs within the pelvis that include uterus, superior part of urinary bladder, upper part of the posterior surface of the vagina, where it forms the anterior wall of the rectouterine pouch (pouch of Douglas).

**In the female, the lowest part of the abdominopelvic peritoneal cavity in the erect position is the rectouterine pouch.**

**Broad ligament:**
The broad ligaments are two-layered folds of peritoneum that extend across the pelvic cavity from the lateral margins of the uterus to the lateral pelvic walls.

**Superiorly:** the two layers are continuous and form the upper free edge.

**Inferiorly:** at the base of the ligament, the layers separate to cover the pelvic floor.

**Parts:**
**The ovary is attached to the posterior layer by the mesovarium.**
**The part of the broad ligament that lies lateral to the attachment of the mesovarium forms the suspensory ligament of the ovary.**
**The part of the broad ligament between the uterine tube and the mesovarium is called the mesosalpinx (salpinx acc to uterine tube) / above ovary and ovarian ligament**
**the lower part of it: mesometrium (below mesovarium)**

**Content:**
#The uterine tube in its upper free border
#The round ligament of the ovary and the round ligament of the uterus.
#The uterine and ovarian blood vessels, lymph vessels, and nerves
# The epoophoron: In the mesosalpinx /Mesonephric remains
# The paroophoron: In the mesometrium/ Mesonephric remains

- **Blood supply:**
  - **Arteries:**
    The ovarian artery arises from the abdominal aorta at the level of the 1st lumbar vertebra.
  - **Veins:**
    The ovarian vein drains into the inferior vena cava on the right side and into the left renal vein on the left side.
  - **Lymphatics:** para aortic nodes – at L1
  - **Nerve supply:** aortic plexus

* Blood & lymphatic vv. & nerves reach ovary via suspensory lig & mesovarium
**the ovaries are developed in the abdomen so they will take supply from there

2. uterine (fallopian) tube:

**Function:**
The uterine tube catch up the ovum from the ovary and prevent it from go to the abdominal cavity and provides a site where fertilization of the ovum can take place (usually in the ampulla). It provides nourishment for the fertilized ovum and transports it to the cavity of the uterus. The tube serves as a conduit along which the spermatozoa travel to reach the ovum.

** if the uterine tubes are damaged ------ ectopic pregnancy (fertilized ova will go to the abdominal cavity)

*Narrow, 4 inch tube extends from ovary to uterus
*Parts:
- **Infundibulum** is open, funnel-shaped portion near the ovary
  - **fimbriae** are moving finger-like processes, located in the free edge of the infundibulum (they catch the ova)
- **Ampulla** is widest, central region of tube
  * if the ova passes this part without joining with sperm, it will be less likely to become fertilized
- **Isthmus** is narrowest portion joins uterus / lateral to uterus
- **Intramural part** pierces the uterine wall

**Blood supply:**
**Arteries**
The uterine artery from the internal iliac artery and the ovarian artery from the abdominal aorta (there is anastomosis between them)
**Veins**
The veins correspond to the arteries.
**Lymph Drainage:**
The internal iliac and para-aortic nodes.
**Nerve Supply:**
Sympathetic and parasympathetic nerves from the inferior hypogastric plexuses.
3. uterus:
* Site of menstruation & development of fetus
  * Hollow pear shaped
  * 3 inches long by 2 in. wide and 1 in. thick
  * it has apex (toward caudal part) and base (toward abdominal cavity)

Parts:
* The fundus is the part of the uterus that lies above the entrance of the uterine tubes.
  The body is the part of the uterus that lies below the *entrance of the uterine tubes/The cavity of the uterine body is triangular in coronal section, but it is merely a cleft in the sagittal plane.
* Isthmus: between body & cervix
  * The cervix is the narrow part of the uterus. It pierces the anterior wall of the vagina and is divided into the supravaginal and vaginal parts of the cervix.
  * The cavity of the cervix, the cervical canal, communicates with the cavity of the body through the internal os and with that of the vagina through the external os.
  * The part of the vagina surrounding the cervix is called the fornix (recess like structure).

Relations:
#Anteriorly: The body of the uterus is related anteriorly to the uterovesical pouch and the superior surface of the bladder. The supravaginal cervix is related to the superior surface of the bladder. The vaginal cervix is related to the anterior fornix of the vagina
**so, from inferior to superior: anterior fornix, urinary bladder & uterovesical pouch**

**Posteriorly:** The body of the uterus is related posteriorly to the rectouterine pouch (pouch of Douglas) with coils of ileum or sigmoid colon within it and posterior fornix.

**Laterally:** The body of the uterus is related laterally to the broad ligament and the uterine artery and vein. The supravaginal cervix is related to the ureter as it passes forward to enter the bladder. The vaginal cervix is related to the lateral fornix of the vagina. The uterine tubes enter the superolateral angles of the uterus, and the round ligaments of the ovary and of the uterus are attached to the uterine wall just below this level.

So, from inferior to superior:
lateral fornix, ureters, uterine aa., round ligaments of ovary & uterus, uterine tube & broad ligament

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**Position of the uterus:**
*In most women, the long axis of the uterus is bent forward on the long axis of the vagina. This position is referred to as **anteversion of the uterus**. Furthermore, the long axis of the body of the uterus is bent forward at the level of the internal os with the long axis of the cervix. This position is termed **anteflexion of the uterus**.*
Thus, in the erect position and with the bladder empty, the uterus lies in an almost horizontal plane. In some women, the fundus and body of the uterus are bent backward on the vagina so that they lie in the rectouterine pouch (pouch of Douglas). In this situation, the uterus is said to be retroverted. If the body of the uterus is, in addition, bent backward on the cervix, it is said to be retroflexed.

*Usually the uterus is anteverted and anteflexed*

**Blood supply:**
1. Uterine artery (branch from internal iliac)
   * Cross ureters at level of internal os and ascend at the lateral wall of the uterus /mostly supply lower part
2. Ovarian artery (branch from aorta)/ mostly supply upper part

##you have to differentiate between the ureter and uterine artery during surgery because both of them located near the cervix

**Lymphatics:**
* Fundus – para aortic nodes
* Body & cervix – internal & external iliac nodes
* Some follow round lig. to superficial inguinal nodes

**Nerve supply:**
Inferior hypogastric plexus
**Uterus ligaments:**

1. **Transverse cervical (cardinal) lig**: from the lateral walls of the pelvis. *(lateral)*
2. **Pubocervical lig**: pass to the cervix from the posterior surface of the pubis *(anterior)*
3. **Sacrocervical lig**: pass to the cervix and the upper end of the vagina from the lower end of the sacrum *(posterior)*

# These three ligaments are subperitoneal condensations of pelvic fascia on the upper surface of the levatores ani muscles.

**They are attached to the cervix and the upper part of the vagina**

# function: play an important part in supporting the uterus and keeping the cervix in its correct position

4. **Round ligament of the uterus**: Extends between the superolateral angle of the uterus, through the broad lig toward deep inguinal ring and inguinal canal, until reaches the subcutaneous tissue of the labium majus
Hysterectomy
• Surgical removal of the uterus
• Indications for surgery
  – endometriosis, ovarian cysts, excessive bleeding, cancer of cervix, uterus or ovaries
• Complete hysterectomy removes cervix
• Radical hysterectomy removes uterus, tubes, ovaries, part of vagina, pelvic lymph nodes and supporting ligaments

4. Vagina:
*4 inch long fibromuscular organ traversing the pelvis (upper half of the vagina lies above the pelvic floor) & perineum (the lower half)
* It is oriented upward and backward ending at uterus
* The anterior wall is pierced by the cervix, which projects downward and backward into the vagina
* Orifice partially closed with membrane (hymen)

** The area of the vaginal lumen, which surrounds the cervix, is divided into four regions, or fornices: anterior, posterior, right lateral, and left lateral

Relations:
* Anteriorly: The vagina is closely related to the bladder above and to the urethra below
* Posteriorly: The upper third of the vagina is related to the rectouterine pouch (pouch of Douglas) and its middle third to the ampulla of the rectum. The lower third is related to the perineal body, which separates it from the anal canal
* Laterally: In its upper part, the vagina is related to the ureter; its middle part is related to the anterior fibers of the levator ani and urogenital diaphragm
*Function: Passageway for birth, menstrual flow & intercourse

- **Blood supply:**
  - Vaginal a. – internal iliac (in male we call it inf vesical artery)
  - Vaginal branch of uterine a.
  - Vaginal plexus – internal iliac v.

- **Lymphatics:**
  - Upper third – internal & external iliac nodes
  - Middle third – internal iliac
  - Lower third – superficial inguinal nodes

- **Nerve supply:**
  - Inferior hypogastic plexus

*lower part of the vagina is developed from ectoderm

Support Structures

- **Upper part:**
  - Levator ani (sphincter vaginae)
  - Transverse cervical, pupocervical & sacrocervical ligaments

- **Middle part** – Urogenital diaphragm

- **Lower part** – Perineal body - posteriorly

5. vulva(external genital)

# Mons pubis: fatty pad over the pubic symphysis

# The labia majora are prominent, hair-bearing folds of skin from the mons pubis anteriorly, extending from it to unite posteriorly in the midline

*Analog to scrotum in male
# Labia minora: are two smaller, hairless folds of soft skin that lie between the labia majora. Their posterior ends are united to form a sharp fold, the fourchette. Anteriorly, they split to enclose the clitoris, forming an anterior prepuce and a posterior frenulum

# Vestibule of the vagina:
triangular Space between the labia minora
– Contains clitoris and the openings of:
  • Urethra – 1 in. posterior to clitoris
  • Vagina – posterior to urethral opening
  • Duct of the Greater vestibular glands (Bartholin’s glands) (larger than paraurethral glands and located beneath the labia minora)
  • Duct of the Paraurethral glands

*the clitoris at its apex and the fourchette at its base

Blood supply
– Branches of the internal & external pudendal aa.
Internal pudendal branch from internal iliac artery while external pudendal branch from the femoral artery
  • Lymphatics
– Skin – superficial inguinal nodes
  • Nerve supply
– Anteriorly (from lumbar plexus)
  • Ilioinguinal nn.
  • Genital branch of the genitofemoral nn.
– Posteriorly
  • Branches of the perineal nn.
  • Branches of the posterior cutaneous nn. of the thigh
The greater vestibular glands:
are a pair of small mucus-secreting glands that lie under cover of the posterior parts of the bulb of the vestibule. Each drains its secretion into the vestibule by a small duct, which opens on the vestibule lateral to the vaginal opening.

**These glands secrete a lubricating mucus during sexual intercourse.

Paraurethral glands:
– Analog to the prostate gland in male. Open on the vestibule lateral to the urethral opening.
#clitoris:

- Analog of penis in male

**Root of the Clitoris:**
The root of the clitoris is made up of three masses of erectile tissue called the **bulb of the vestibule** and the **right and left crura of the clitoris**

**The bulb of the vestibule** corresponds to the bulb of the penis, but because of the presence of the vagina, it is divided into two halves. It is attached to the undersurface of the urogenital diaphragm and is covered by the **bulbospongiosus muscles**.

**The crura of the clitoris** correspond to the crura of the penis and become the corpora cavernosa anteriorly. Each remains separate and is covered by an **ischiocavernosus muscle**

**Body of the Clitoris (small)**
The body of the clitoris consists of the two **corpora cavernosa** covered by their **ischiocavernosus muscles**. The corpus spongiosum of the female is represented by a small amount of erectile tissue leading from the vestibular bulbs to the glans.

**Glans of the Clitoris:**
The glans of the clitoris is a small mass of erectile tissue that caps the body of the clitoris at the apex of the vestibule. It is provided with numerous sensory endings. The glans is partly hidden by the **prepuce**.

**Blood supply:** branches of the [internal pudendal a.]
- Deep aa. Of the clitoris – corpora cavernosa
- Artery of the bulb of vestibule – corpus spongiosum
- Dorsal artery of the clitoris

**Lymphatics:**
- Skin – superficial inguinal nodes
- Glans – internal iliac nodes

**Nerve supply:**
- Dorsal nerve of the clitoris – pudendal n. (sensory)
- Parasympathetic – inferior hypogastric plexus

**Good luck**