Anatomy and Physiology of the Fallopian tubes and Ovaries

By

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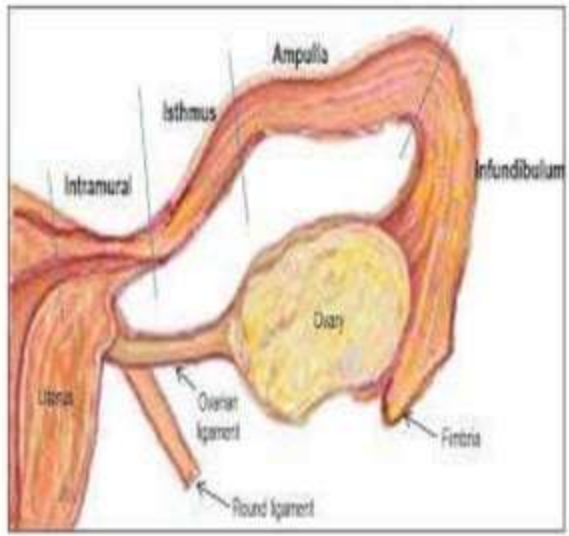
Objective

By the end of this session each student is expected to be able to:

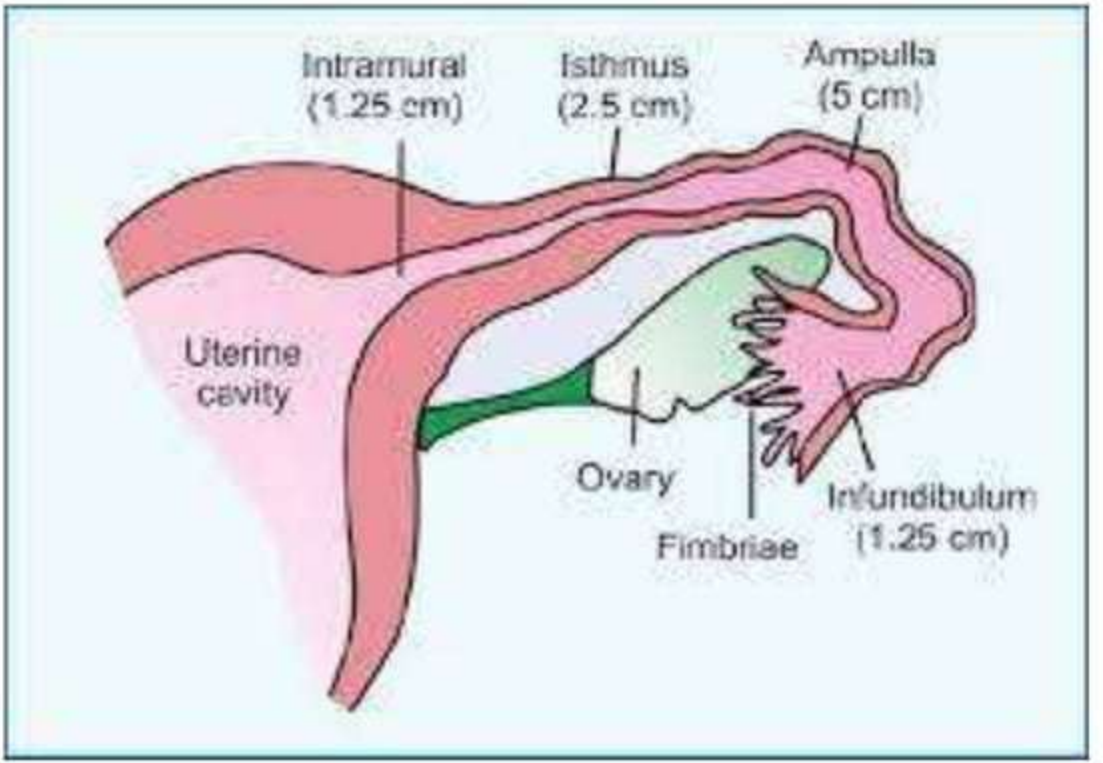
- Explain the anatomy and physiology of fallopian tubes and ovaries

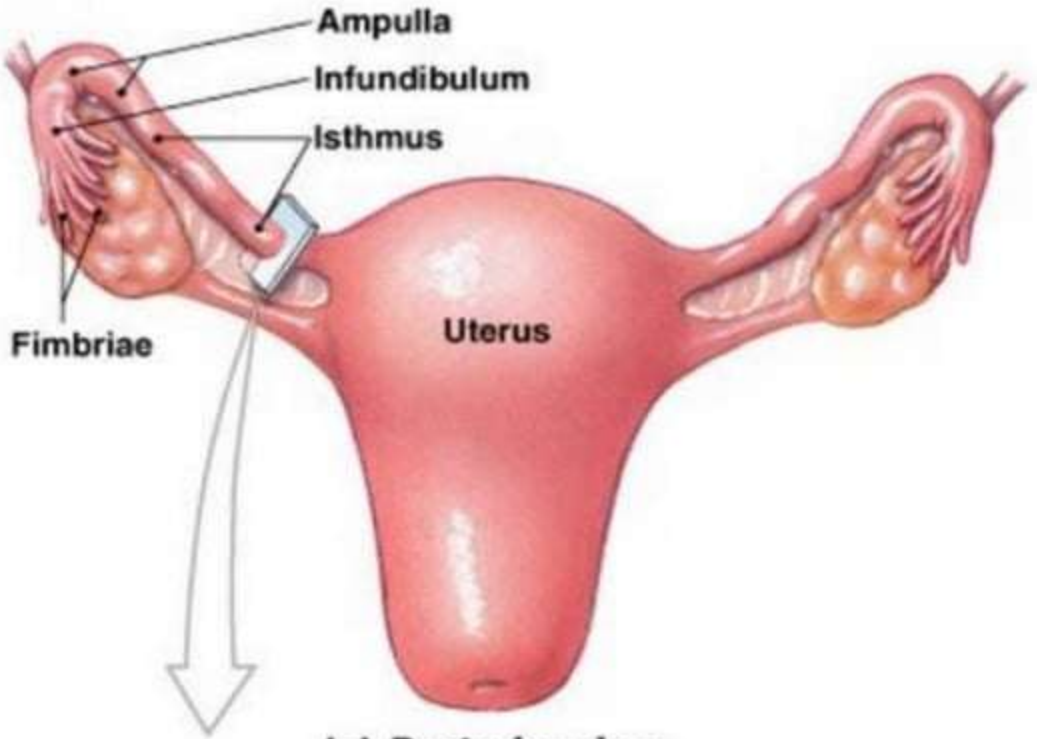
The Fallopian Tubes

- The fallopian tubes (Uterine tubes or Oviducts) extend laterally from the cornua of the uterus towards the side walls of the pelvis
- They arch over the ovaries their marginal end suspended near the ovary in order to receive the fertilized ovum
- Serve as the channel of the oocyte from the ovary to the uterus



Parts of the fallopian Tubes





(a) Posterior view

Functions

- Propels the ovum towards the uterus
- Receives the spermatozoa
- Provide a site for fertilization
- It supplies the fertilized ovum with nutrition during its journey to the uterus

Relations

- Anterior, posterior and superior - In front of, behind and above the uterine tubes are peritoneum cavity and intestines
- Lateral - On either side of the uterine tubes are the side walls of the pelvis
- Inferior - The broad ligaments and ovaries lie below the uterine tubes
- Medial - The uterus lies below the two uterine tubes

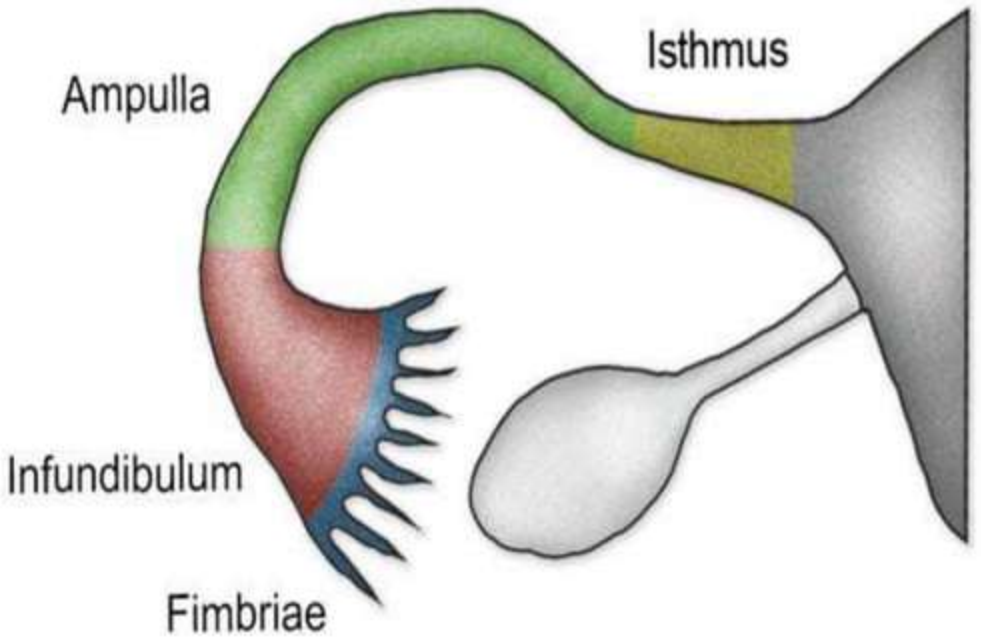
Supports

- The uterine tubes are held in place by their attachment to the uterus
- The peritoneum folds over them as the broad ligaments and extend at the sides to form the infundibulo pelvic ligaments

Structure

- The tube is 10 to 13 cm long
- The lumen of the tube provides a pathway from outside to the peritoneum cavity
- The uterine tube has 4 portions
- The interstitial portion is 1.25 cm long and lies within the walls of the uterus
- Its lumen is 1 mm wide
- The Isthmus is another narrow part which extends to 2.5 cm from the uterus

- The Ampulla is the wider portion 5 cm long where fertilization usually occur
- The infundibulum is the funnel-shaped fringed end which is composed of many processes known as fimbriae
- One fimbria is elongated to form the ovarian fimbria which is attached to the ovary


Isthmus
Ampulla
Infundibulum
Fimbriae

Layers

- The lining - This is a **mucous membrane** of ciliated cubical epithelium that are thrown into folds known as plicae
- These folds slow the movement of the ovum on its way to the uterus
- The cells in the lining produce a secretion containing glycogen which nourishes the ovum

- Beneath the lining is a layer of vascular connective tissue
- The muscle coat - This consists of two layers of smooth muscles an inner circular layer and outer longitudinal layer
- The peristaltic movement of the tube is due to these muscles.
- The tube is covered with peritoneum

Blood supply

- This is via uterine and ovarian arteries. Blood drain via corresponding veins.

Lymphatic drainage

- This is to the lumber glands. Means the drainage is via the **iliac, sacral** and **aortic lymph nodes.**

Nerve supply

- From the ovarian plexus. That means they receive both sympathetic and parasympathetic innervation via nerve fibres from the **ovarian** and **uterine (pelvic) plexuses**

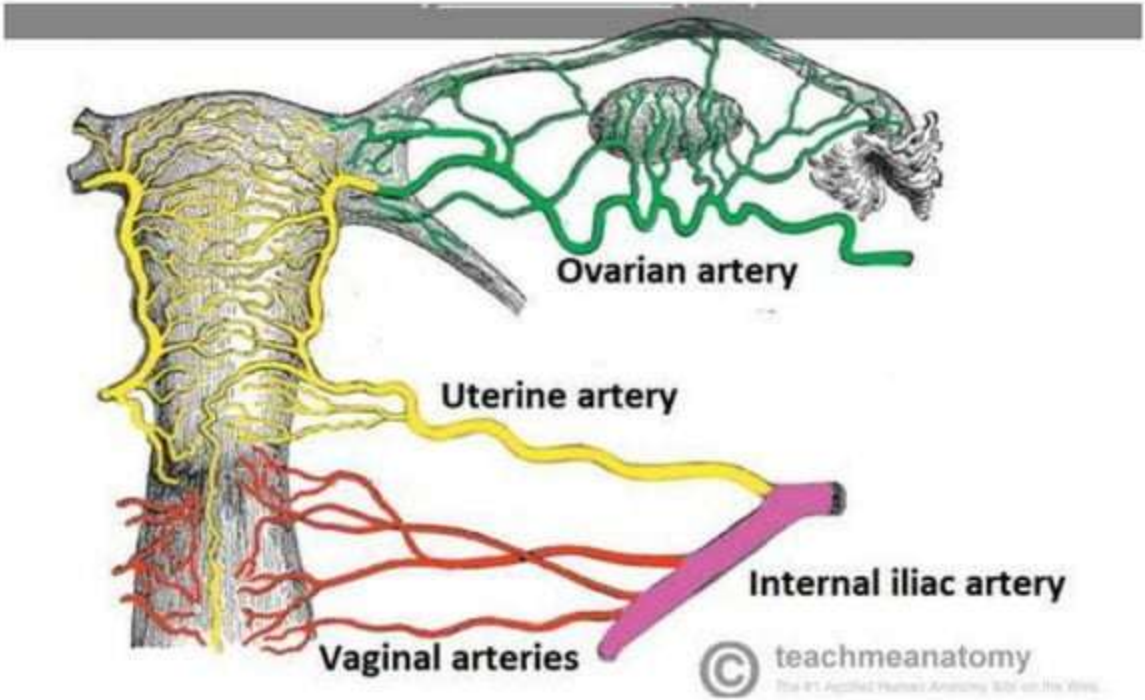


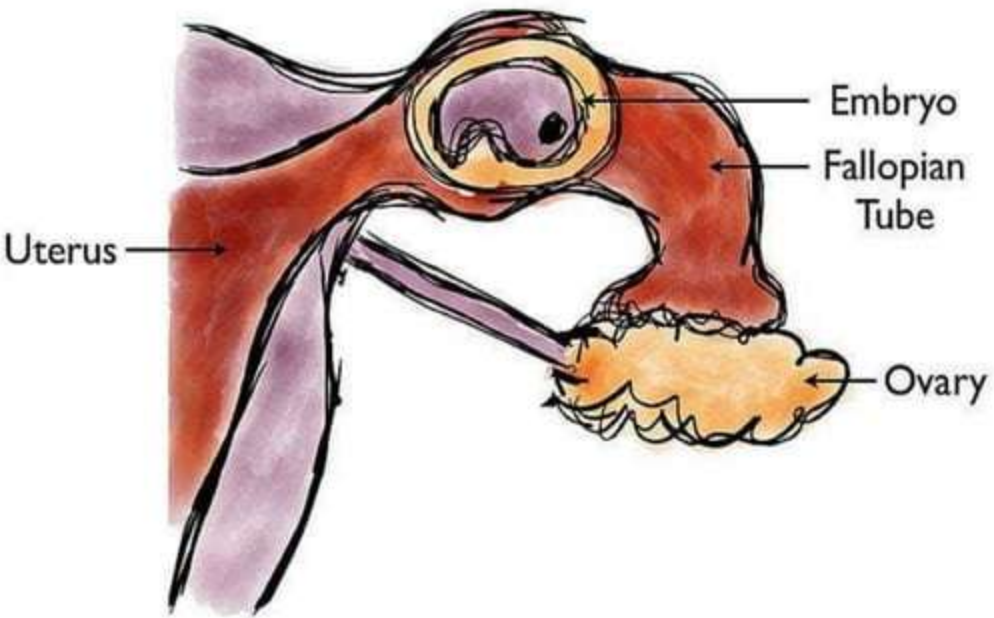
Fig 3 – Posterior view of the arterial supply to the female reproductive tract.

Clinical Relevance

- **Salpingitis** is inflammation of the uterine tubes that is usually caused by bacterial infection.
- It can cause adhesions of the mucosa which may partially or completely block the lumen of the uterine tubes
- This can potentially result in **infertility** or an **ectopic pregnancy**.

Ectopic Pregnancy

- If the lumen of the uterine tube is **partially occluded**, sperm may be able to pass through and fertilize the ovum. However, the fertilized egg may not be able to pass into the uterus, and can implant in the uterine tube. This is known as an ectopic pregnancy.
- An ectopic pregnancy is a **medical emergency** – if not diagnosed early, the implanted blastocyst can cause rupture and haemorrhage of the affected tube.

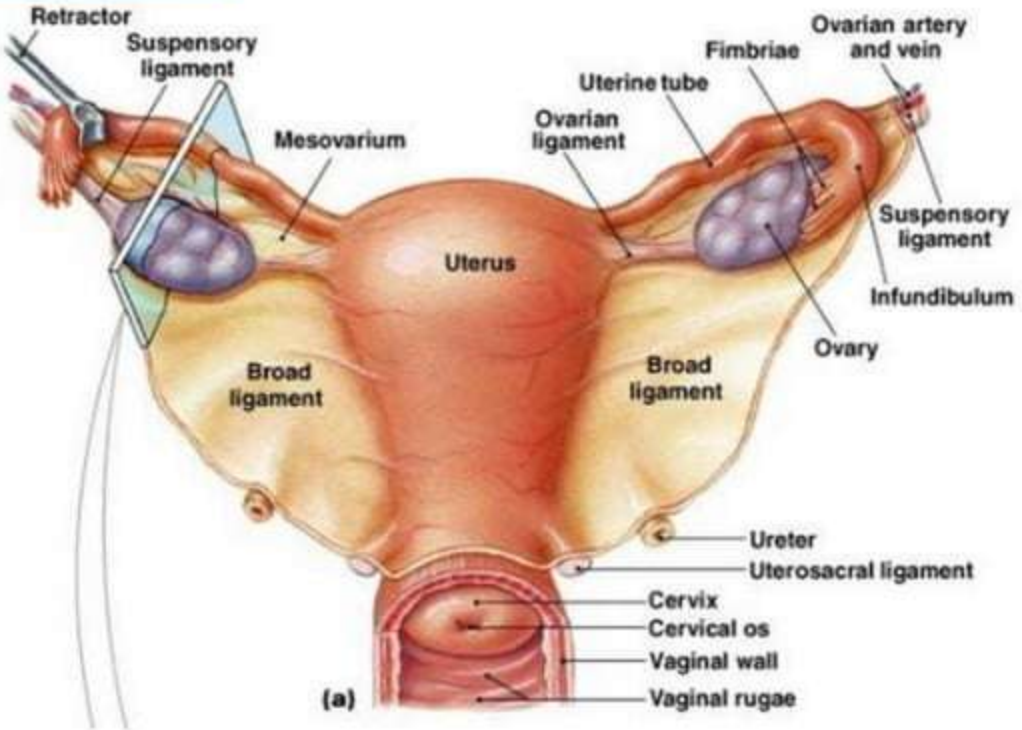

Embryo
Fallopian Tube
Uterus
Ovary

Ligation of the Uterine Tubes

- Surgical cutting of the uterine tubes is a method of **sterilisation**. The oocyte is unable to pass into the uterus, and therefore cannot progress to a pregnancy.
- There are two main methods of ligation:
- **Open abdominal** – Carried out via a suprapubic incision
- **Laproscopic –** Carried out via a fibre optic laproscope, inserted via a small incision near the umbilicus.

2.
The Ovaries

- The ovaries are a pair of **primary female reproductive organs (**female gonads) which produce ova and the hormones estrogen and progesterone
- Each ovary is a solid, ovoid in shape
- The size is about 3.5 cm in length, 2 cm wide, and 1 cm thick


Retractor
Suspensory ligament
Mesovarium
Ovarian artery and vein
Fimbriae
Uterine tube
Ovarian ligament
Suspensory ligament
Infundibulum
Ovary
Uterus
Broad ligament
Broad ligament
Ureter
Uterosacral ligament
Cervix
Cervical os
Vaginal wall
Vaginal rugae
(a)

Position

- The ovaries are located within the pelvic cavity
- The ovaries are attached to the back of the broad ligaments within the peritoneal cavity
- The ovary itself is attached to the uterus via the ovarian ligament

Structure

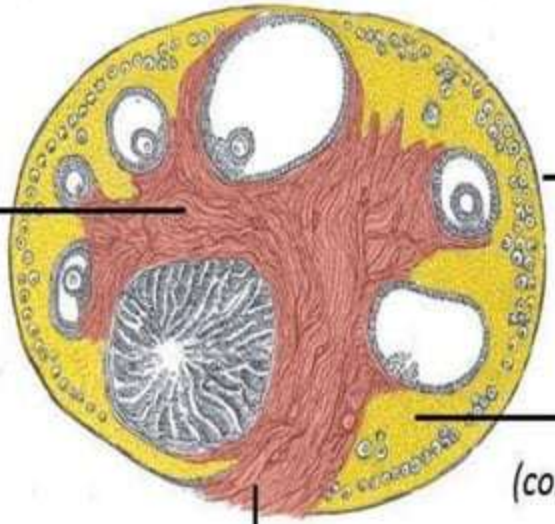
The ovary is composed of medulla and cortex covered with germinal cells

The medulla

- It is the supporting frame work which is made of fibrous tissue blood vessels, nerves and lymphatic pass through it

The cortex

- Is the functioning part of the ovary
- It consist of ovarian follicles in different stages of development, surrounded by stroma
- It's outer layer is formed of fibrous tissue known as tunica albuginea, over this lies the geminal epithelium



Medulla

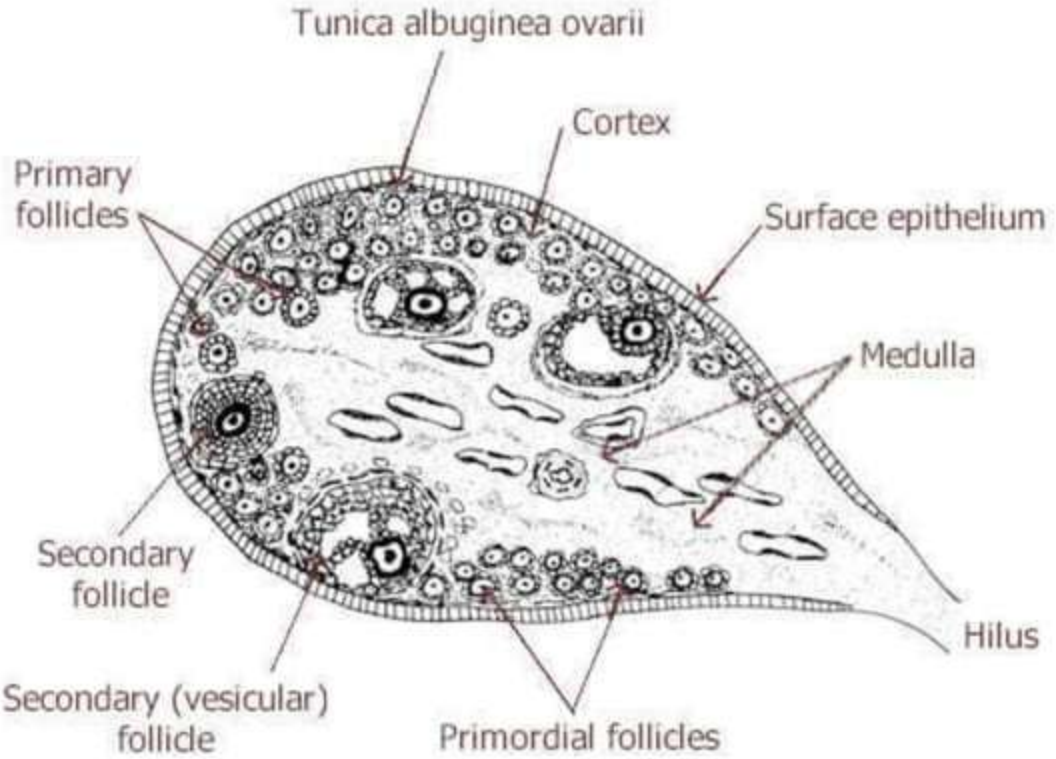
(contains neurovascular structures)

Cuboidal epithelium

Cortex

(contains ovarian follicles)

Hilum


Tunica albuginea ovarii
Cortex
Primary follicles
Surface epithelium
Medulla
Secondary follicle
Hilus
Secondary (vesicular) follicle
Primordial follicles

Blood supply

- The blood is from ovarian arteries and drains by the ovarian veins

The right ovarian vein joins the inferior vena cava the left returns its blood to the left renal vein

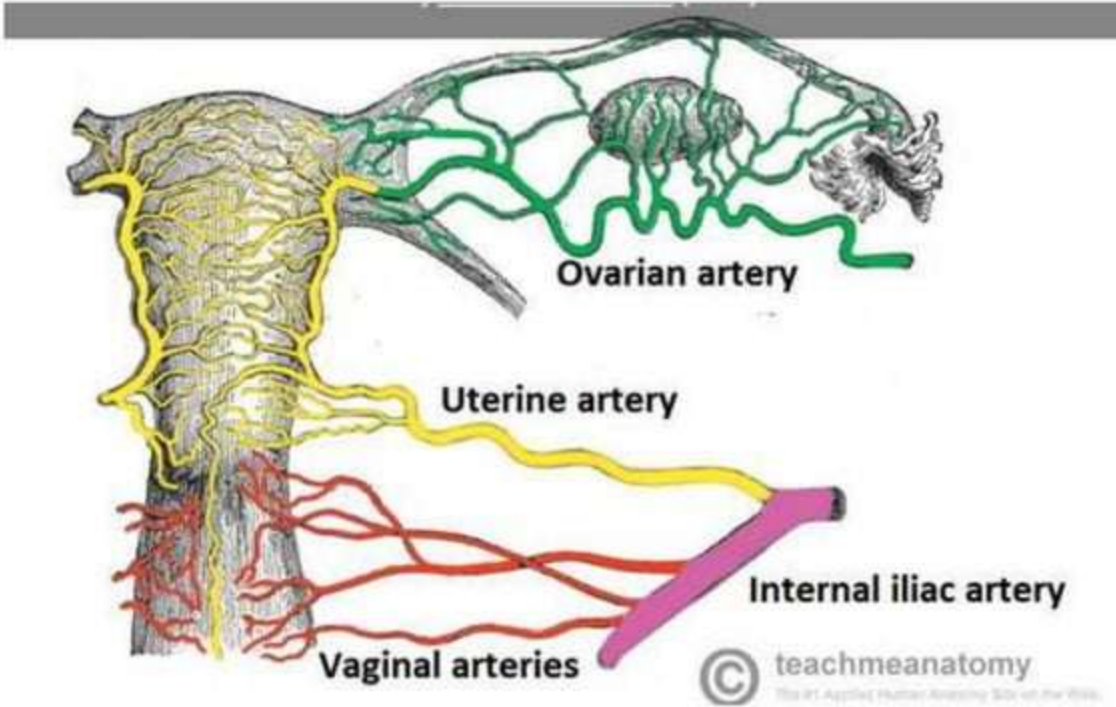
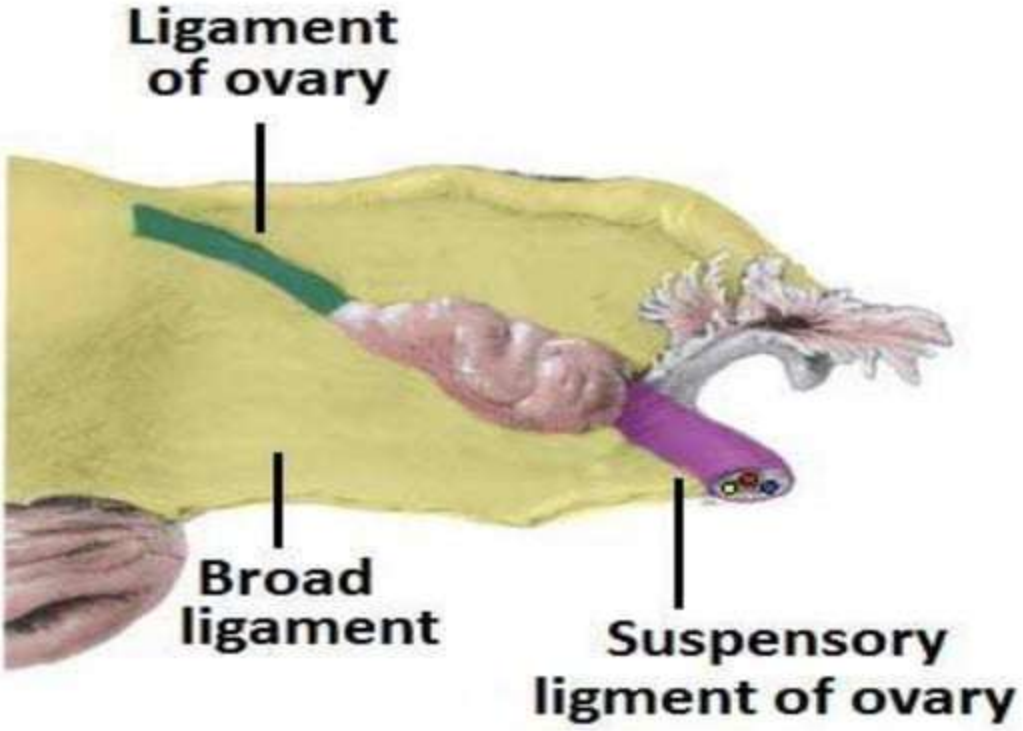


Fig 3 – Posterior view of the arterial supply to the female reproductive tract.

Nerve supply

- The nerve supply to ovaries runs via the suspensory ligament of the ovary with the vasculature, to enter the ovary at the hilum
- The ovaries receive sympathetic and parasympathetic nerve fibres from the ovarian and uterine (pelvic) plexuses, respectively

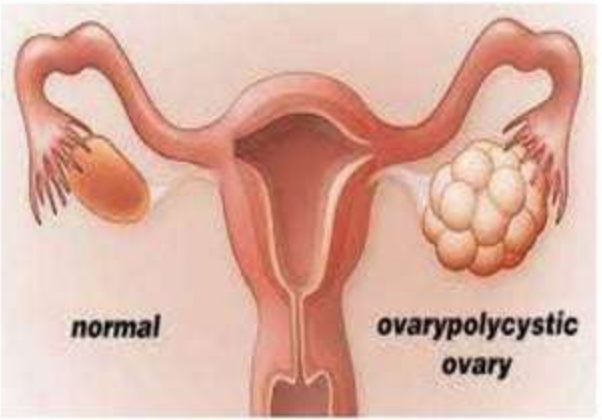

Ligament
of ovary
Broad
ligament
Suspensory
ligment of ovary

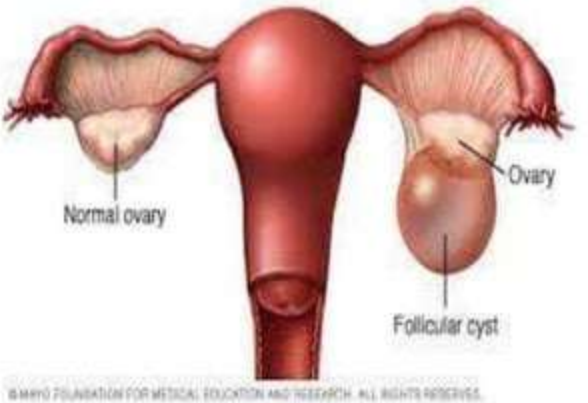
Clinical Relevance

Disorders of the Ovaries

Ovarian cysts are fluid-filled masses that may develop in the ovary.

- They are most commonly derived from ovarian follicles, reaching approximately 2-2.5 cm.
- Most ovarian cysts are benign and develop during a womans' child-bearing years, however, some larger cysts may cause problems such as bleeding and pain and require surgical removal.


normal
ovarypolycystic
ovary


Normal ovary
Ovary
Follicular cyst
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Polycystic ovaries are characterized by hormone dysfunction and multiple (over 10) ovarian cysts

- It is associated with infertility

Ovarian tumours

Ovarian tumours are another serious disorder

- The most common cancers arise from epithelial components or germ cells
- 90% of ovarian cancers are derived from epithelium, these are termed **ovarian adenocarcinomas**,
- Most germ cell tumours are **teratomas**, which comprise cells from all 3 germ cell layers and are usually benign

Key Points

- The fallopian tubes propel the ovum towards the uterus, receive spermatozoa as they travel upwards and provides site for fertilization.
- It supplies fertilized ovum with nutrition during its journey to the uterus.
- The ovaries produce ova and the hormones oestrogen and progesterone

References

- Fraser, D, M., & Cooper, M. A. (2009). Myles textbook for midwives (15th ed.). London: Churchill Livingstone
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- Lavine, C. (2011). Women to women. Retrieved from http://www.womentowomen.com London, M. L., Ladewig, P. W., Ball, J. W., Bindler, R. C., & Cowen, K. J. (2007). Maternal and child nursing care (second ed.). London: Pearson.

Thank you