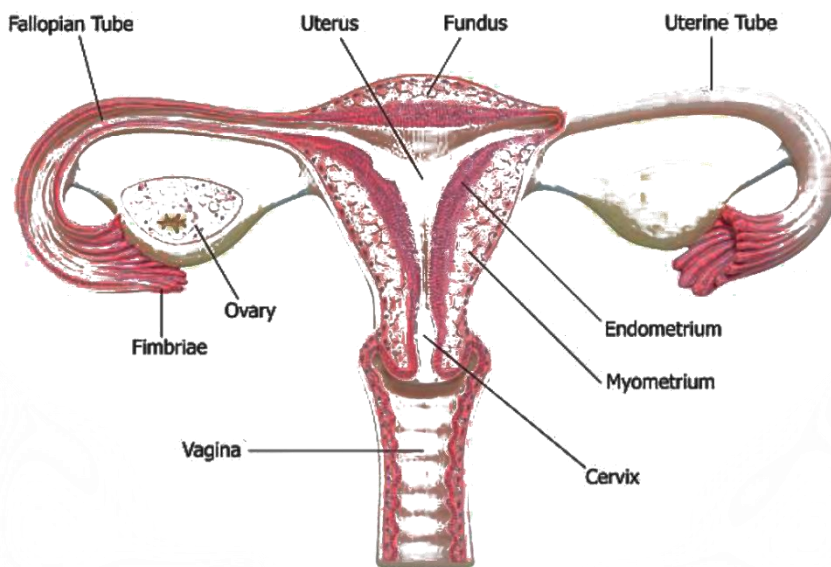


# Reproductive System (Female Reproductive System)

## FEMALE REPRODUCTIVE SYSTEM

A pair of ovaries ----primary sex organ.  
attached to the posterior layer of broad  
ligament (Peritoneal ligament)--Mesovarium.

### Female secondary sex organs



1. Pair fallopian tube

2. Uterus

3. Vagina.

Infundibulum

Ampulla-- thin walled dilated part of tube.

Fertilization takes place in the ampulla.

## Uterus

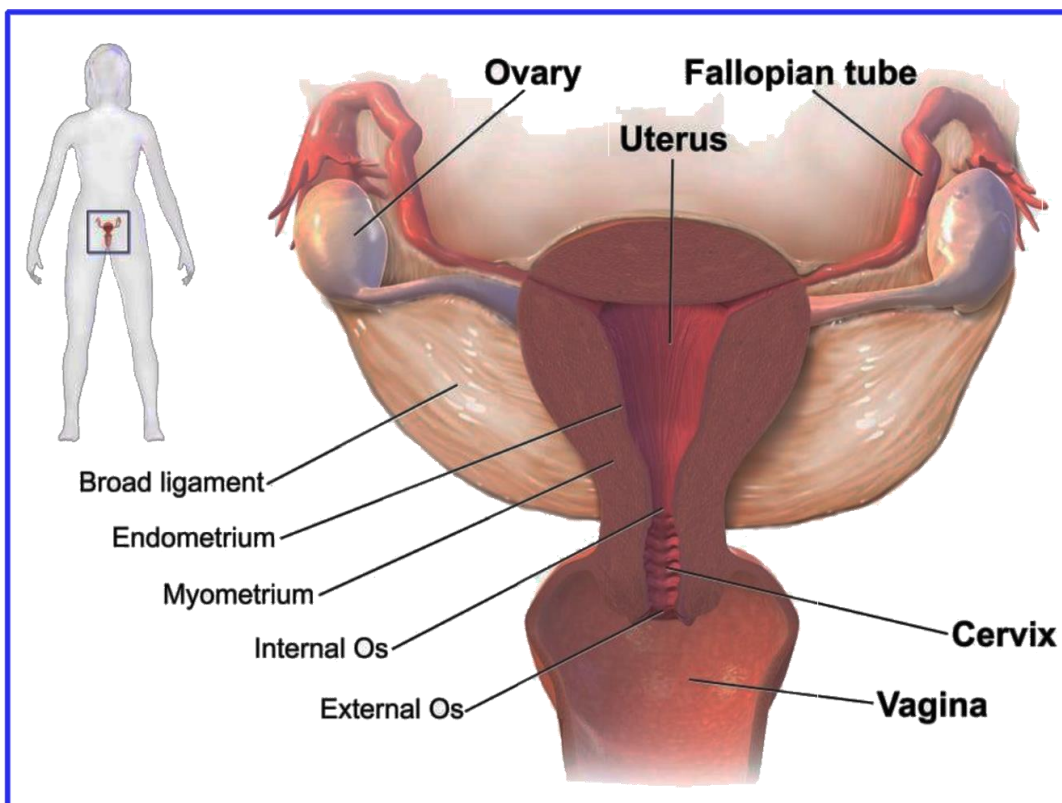
piriform (inverted pear) shape

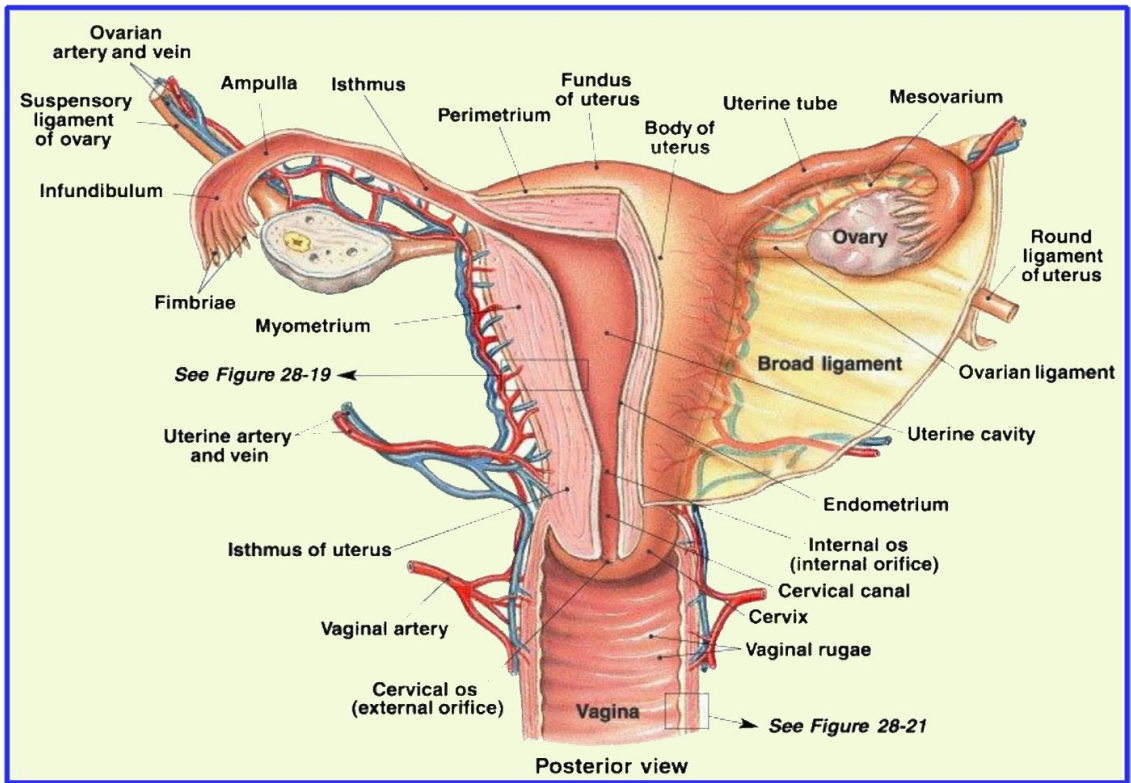
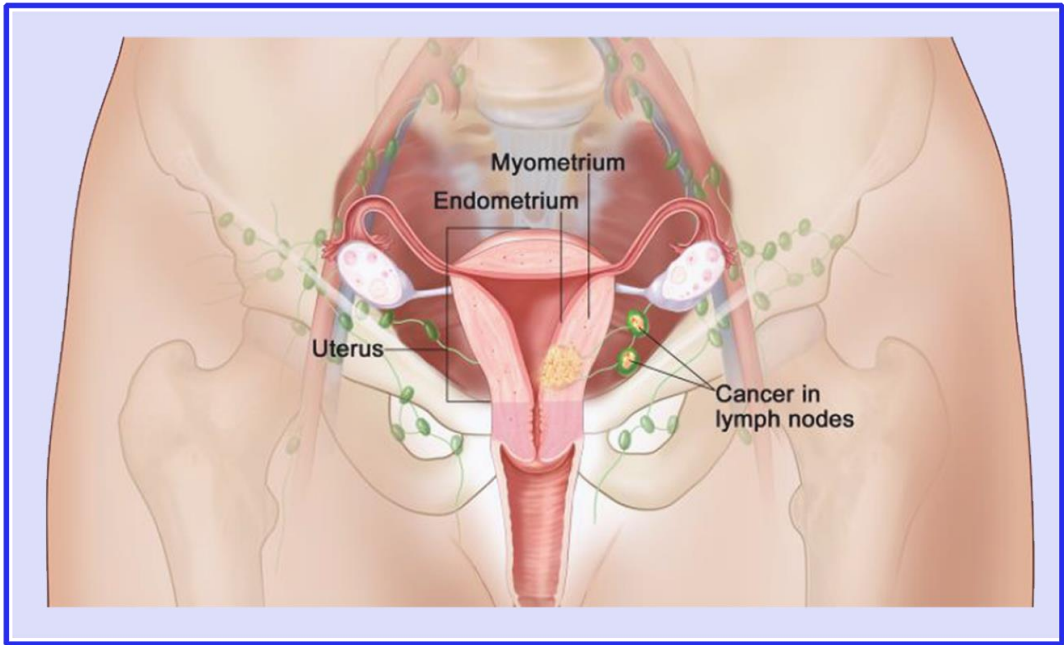
Os-cervix

Internal Os

External Os

Fibromuscular & Non Glandular tube like organ called vagina (Copulatory organ).





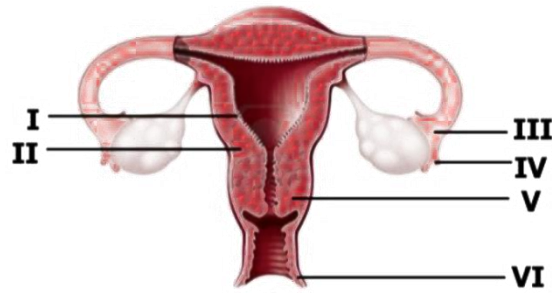
## **Histology of uterus and fallopian tube**

- I. Serosa or the adventitia -- outermost layer of visceral-peritoneum (Perimetrium)**
- II. Muscle-layer --middle layer of the oviduct.**
- III. Mucous membrane --Innermost layer. Simple columnar epithelium.**

**Q. The part of Fallopian tube closest to the ovary is:**

- A. Ampulla**
- B. Isthmus**
- C. Infundibulum**
- D. Cervix**

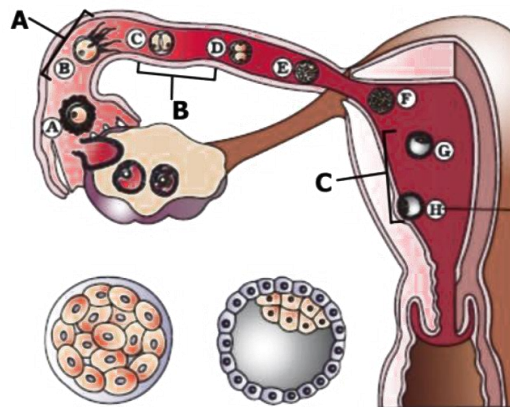
The figure given below depicts a diagrammatic sectional view of the female reproductive system of humans. Which one set of three parts out of I- VI have been correctly identified ?



- 1) II-Endometrium, III- Infundibulum, IV-Fimbriae
- 2) III-Infundibulum, IV-Fimbriae, V-Cervix
- 3) IV-Oviducal funnel, V-Uterus, VI-Cervix
- 4) I-Perimetrium, II-Myometrium, III-Fallopian tube

**AIPMT 2012**

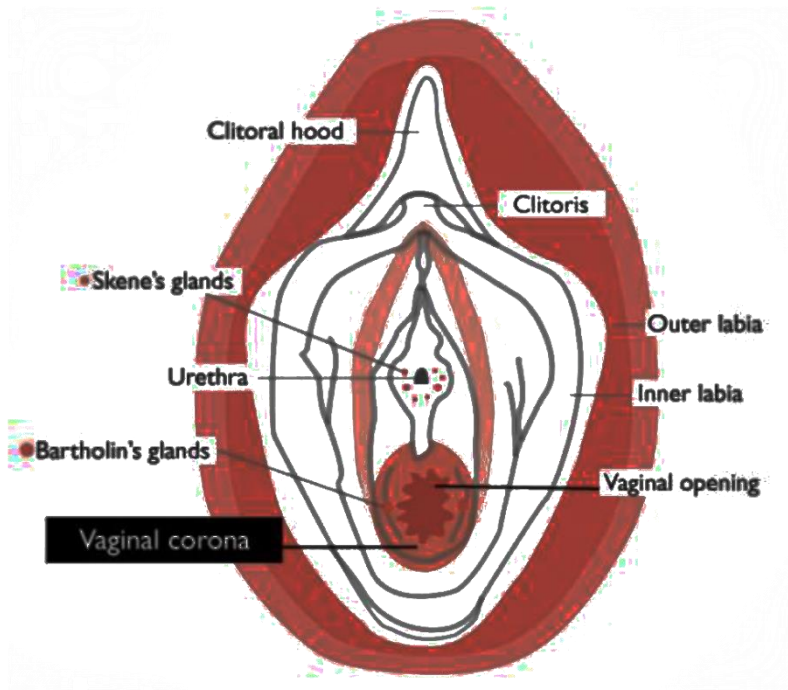
Which is the correct match of indicating points (A, B, C) with the given events regarding following diagram.



- 1) B → I mitotic division start, holoblastic cleavage along with synthesis phase
- 2) A → II meiosis complete which was arrested in metaphase-U
- 3) A → II meiosis complete and formation of haploid zygote.
- 4) C → Implantation occurs in morula stage.

## VULVA-

### External genitalia of female



Include mons veneris  
Labia majora  
Labia minora  
Clitoris  
Vestibule  
Mons veneris (mons pubis)

#### Labia majora

Folds of skin & subcutaneous tissue  
Outer surface -- sebaceous gland  
Sweat gland & hair follicles  
Homologous -- scrotum in the male.

#### Labia minora

two thin folds

Lower portion- minora fuses - form a fold of skin - Fourchette.

Clitoris-- Erectile body --Fusion of two Labia minora

Situated -- Anterior part of vulva

Made up of two erectile bodies --corpora cavernosa

Vestibule

Vulva has openings

- Urethral opening
- Vaginal orifice

Hymen-- Not be a true sign of virginity.

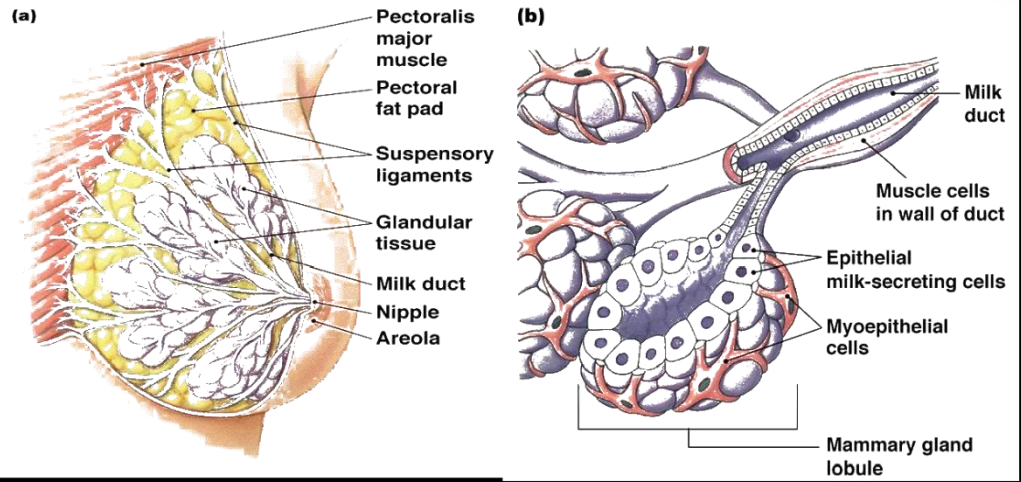
c) Bartholin's ducts: Opening of one pair bartholin's /greater vestibular glands

Situated on lateral side of vagina.

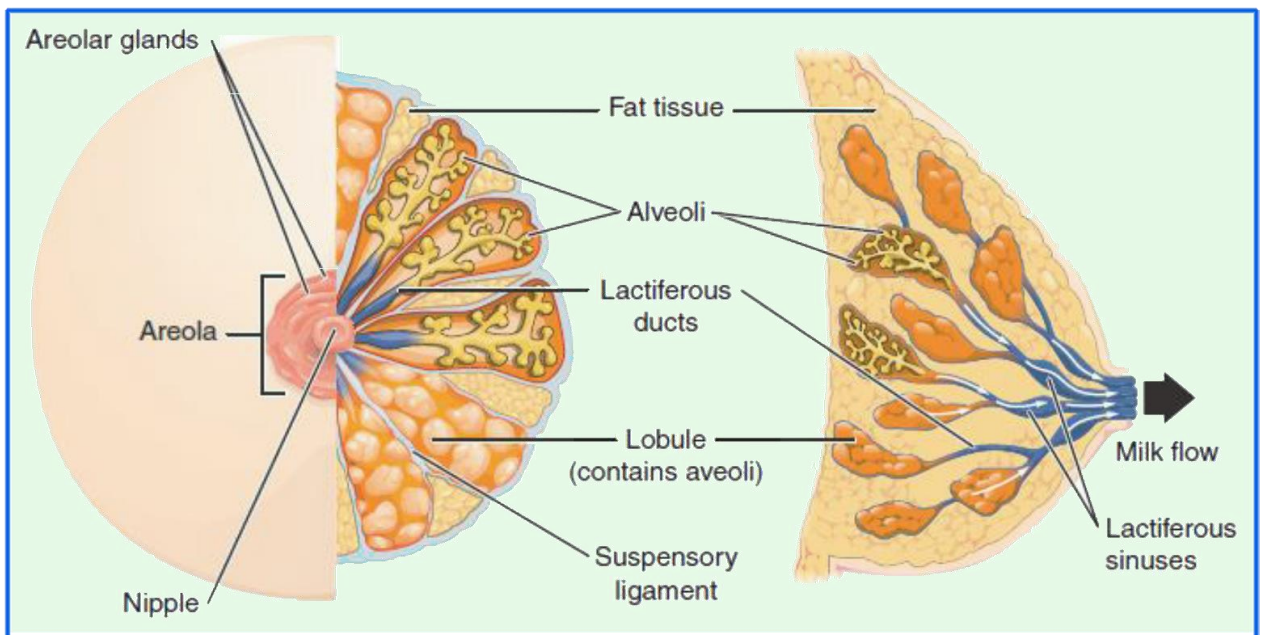
Secrete alkaline fluid

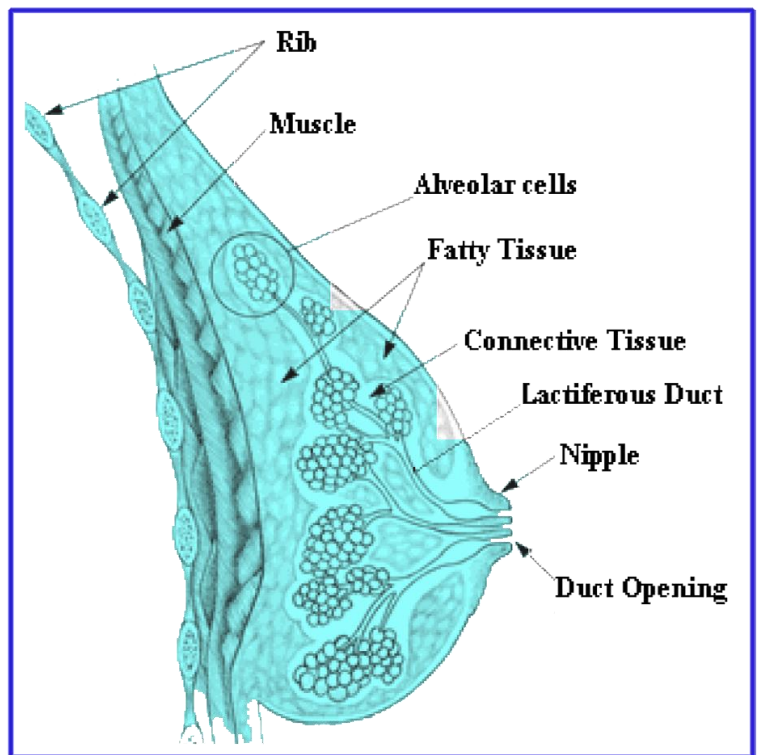
## BREAST

Mammary glands -- Paired structures  
Divided into 15-20 mammary lobes



Clusters of – Mammary Alveoli --secrete milk  
Alveoli open into -- Mammary tubules.  
Tubules - Join to form a mammary duct  
Several mammary ducts join -- wider mammary ampulla -- connected to Lactiferous duct





### **KEY POINTS**

Longest unstripped muscles of the body -- in the walls of uterus. (During pregnancy)

Clitoris is a homologous -- penis in the male.

Bartholin Glands homologous -- Cowper's gland of male

A functional mammary gland is characteristic of all female mammals.

Colostrum - Antibodies (IgA)



## STRUCTURE OF OVARY

Outer most layer of ovary is called germinal epithelium

Inner layer --T. albuginea is

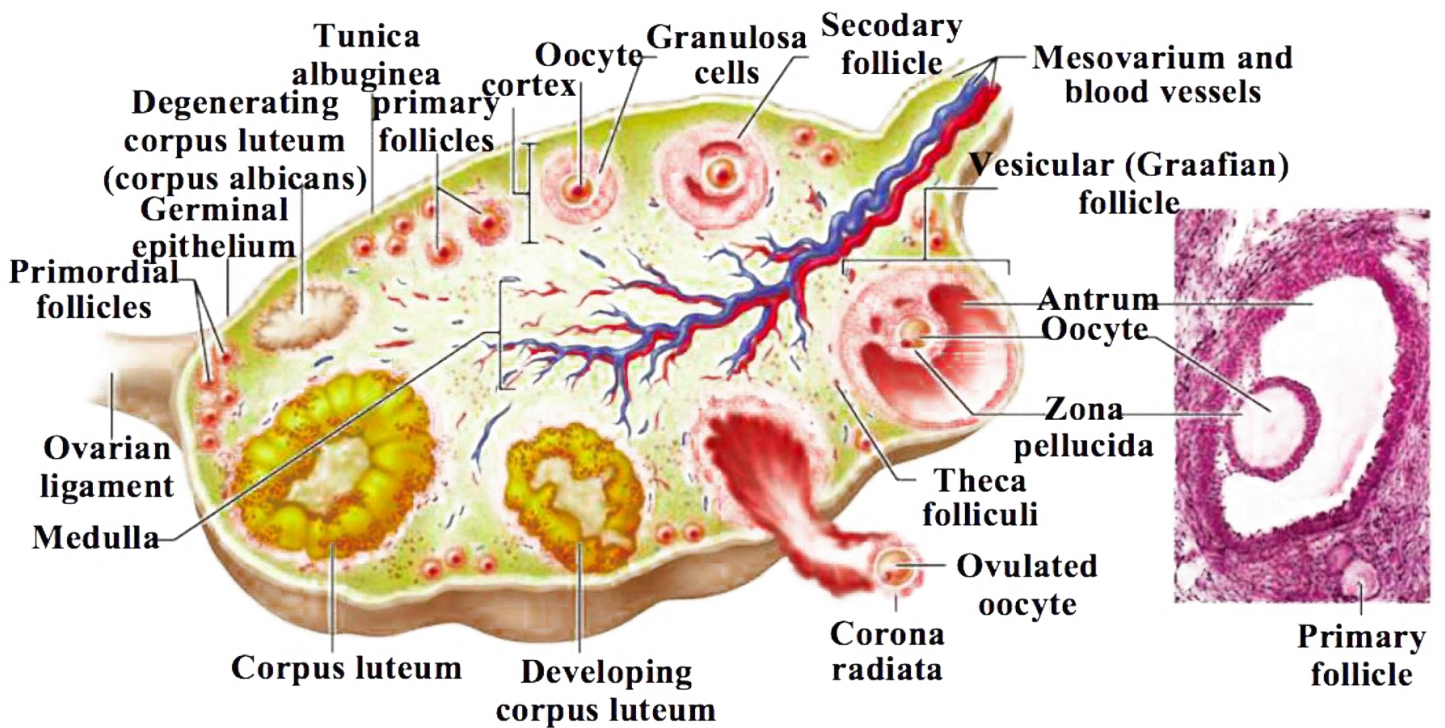
Composed - White fibrous connective tissue

Inner part of ovary – Stroma

Differentiated --2 parts

Outer peripheral part-- Cortex

Inner part – Medulla



**Q1. Both corpus lutea and macula lutea are**  
**[AIIMS '03]**

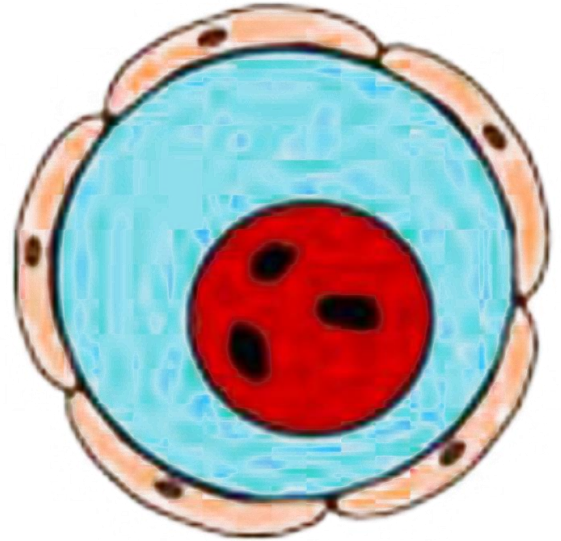
- A. Found in human ovaries
- B. Source of hormones
- C. Characterised by yellow colour
- D. Contributory in maintaining pregnancy.

**Ans. C.**

## FORMATION OF OVARIAN OR GRAAFIAN FOLLICLE

Stages in formation of Graafian follicle –

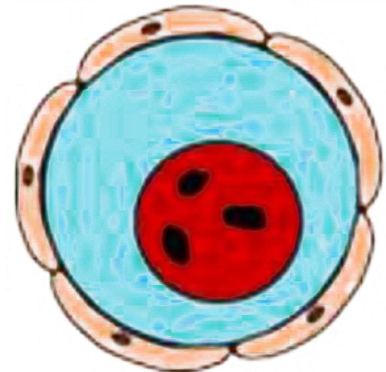
1) **PRIMORDIAL FOLLICLE** (Developing primary follicle)



### PRIMARY FOLLICLE

Glycoprotein membrane -- Zona Pellucida

Appears between the follicular cells and the oocyte



Follicular cells proliferate now to form several layers of cells to form the membrane granulosa.

These cells are now called granulosa cells.

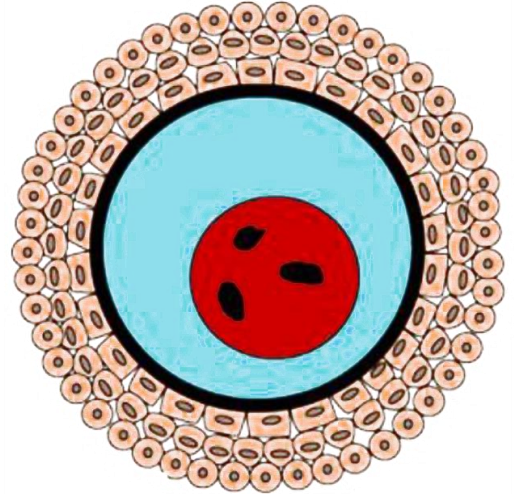
## 2) SECONDARY FOLLICLE

Membrane Granulosa become condensed to form --Theca Interna.

The cells of Theca Interna (Thecal cells)--

Secrete a hormone-- Oestrogen.

Outside the Theca Interna some fibrous tissue become condensed --Theca Externa.

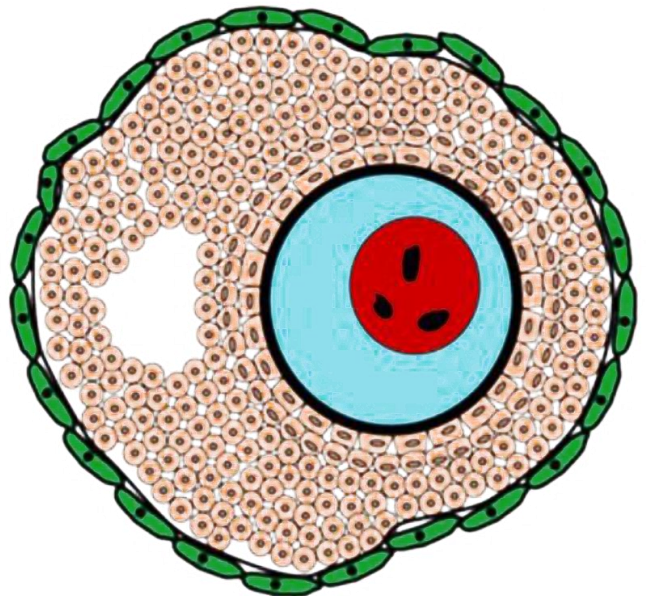


## TERTIARY FOLLICLE

A cavity appears within the membrana granulosa. --

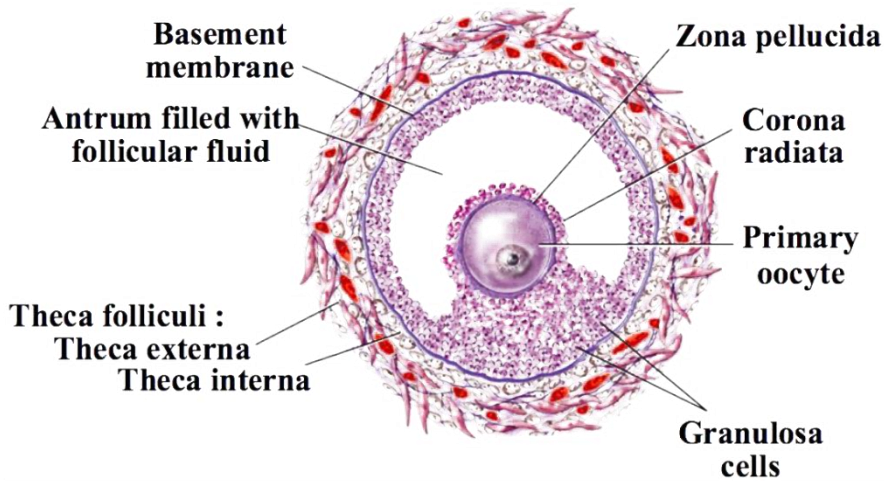
Antrum

Appearance of this cavity--The follicle is formed --  
follicle means a small sac



## MATURE TERTIARY FOLLICLE/GRAAFIAN FOLLICLE

Cavity gets filled with a fluid -- Liquor Folliculi.



Ovarian follicle -- Now called -- Graafian follicle.

Corona Radiata -- granulosa cells lying in the close to the zona pellucida.

- Q2.** Immediately after ovulation, the mammalian egg is covered by a membrane called as
- A. chorion
  - B. corona radiata
  - C. zona pellucida
  - D. none of these

**Ans. D.**

Immediately after ovulation, mammalian eggs are covered by vitelline membrane.

**Q. Antrum is**

- 1) Fluid filled follicle cavity**
- 2) The mature follicle**
- 3) An Inner theca interna**
- 4) Fluid less follicle cavity**

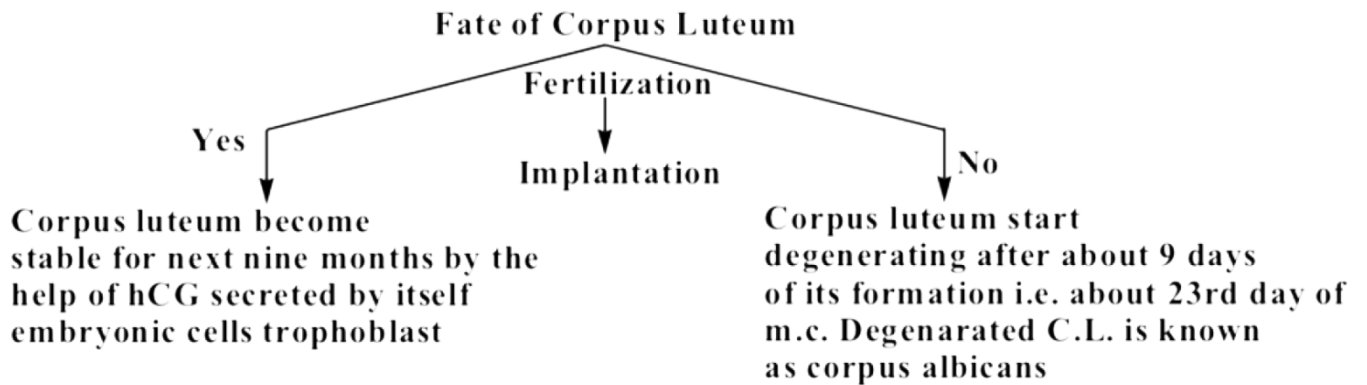
### **FORMATION OF CORPUS LUTEUM**

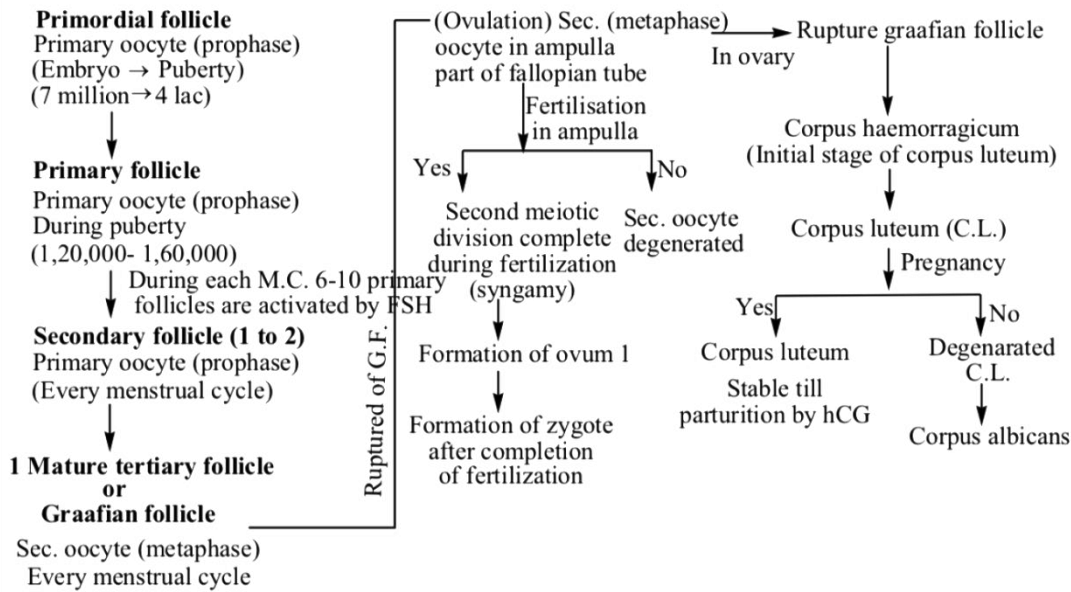
Granulosa cells of ruptured graafian follicle proliferate

Cells become yellow due to accumulation of pigment called lutein. Lutein cells secrete progesterone.

Estrogen is also secreted by corpus luteum.

### **FATE OF CORPUS LUTEUM**





Total number of follicles in the two ovaries -- four lakhs.

#### Follicular Atresia

After copulation oxytocin hormone is secreted From pituitary gland.

Promotes the Peristalsis in the fallopian tube & uterus.

Due to this the semen is sucked into fallopian tube.

Q. Which part of ovary in mammals acts as an endocrine gland after ovulation ? [1] [SEP]

- 1) Vitelline membrane
- 2) Graffian follicle
- 3) Stroma
- 4) Germinal epithelium



**Q. The main function of mammalian corpus luteum is to produce :**

- 1) estrogen only**
- 2) progesterone**
- 3) human chorionic gonadotropin**
- 4) relaxin only**

**Q. Which of the following events is not associated with ovulation in human female?**

- 1) LH surge**
- 2) Decrease in estradiol**
- 3) Full development of Graafian follicle**
- 4) Release of secondary oocyte**

**Q. In human females, meiosis-II is not completed until?**

- 1) birth**
- 2) puberty**
- 3) fertilization**
- 4) uterine implantation**

**Q3. Cumulus covers**

- A. ovary**
- B. ovum**
- C. embryo**
- D. sperm**

**Ans. B.**

Cumulus covers the ovum. The ovum at the matured conditions has a massy cloud formed with a flat base and rounded outlines piled up like a mountain. A granulosa cell is a somatic cell found closely associated with the developing female gamete (oocyte or egg) in the ovary of mammals. Granulosa cells form a single flattened layer around the oocyte in the primordial ovarian follicle and later in follicle development they advance to form a multi layered cumulus surrounding the oocyte.

**Q6. Assertion:** Corpus luteum degenerates in the absence of fertilization.

**Reason:** Progesterone level decreases.

**Ans. B.**

In female, Graafian follicle forms corpus luteum after ovulation. The cells of corpus luteum are called luteal cells. The cytoplasm of luteal cells have yellow granules called lutein which secrete the hormone progesterone to maintain pregnancy if fertilization takes place. In the absence of fertilization, corpus luteum degenerates and forms corpus albicans and there is decrease in progesterone level as well.

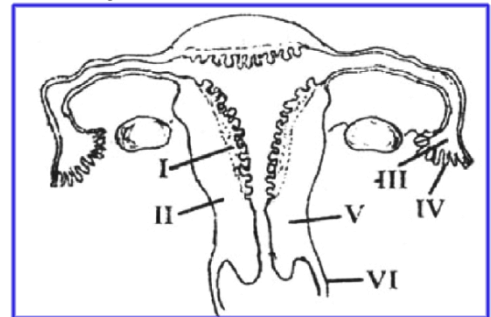
**Q7. Assertion:** Mammalian ova produces hyaluronidase.

**Reason:** The eggs of mammal are microlecithal and telolecithal.

**Ans. D.**

Hyaluronidase, a hydrolytic enzyme is an acrosomal content in mammalian sperm. It helps at the time of fertilization during the penetration of the sperm into the ovum. Based on the amount of yolk mammalian eggs are alecithal means egg without yolk. Microlecithal eggs contain very little yolk e.g., sea urchin, starfish. On the basis of distribution of yolk telolecithal eggs are those eggs in which the yolk is concentrated towards the vegetal pole and cytoplasm and nucleus lie near the animal pole, e.g., birds and reptiles.

**Q8.** The figure given below depicts a diagrammatic sectional view of the female reproductive system of humans. Which one set of three parts out of I – VI have been correctly identified?

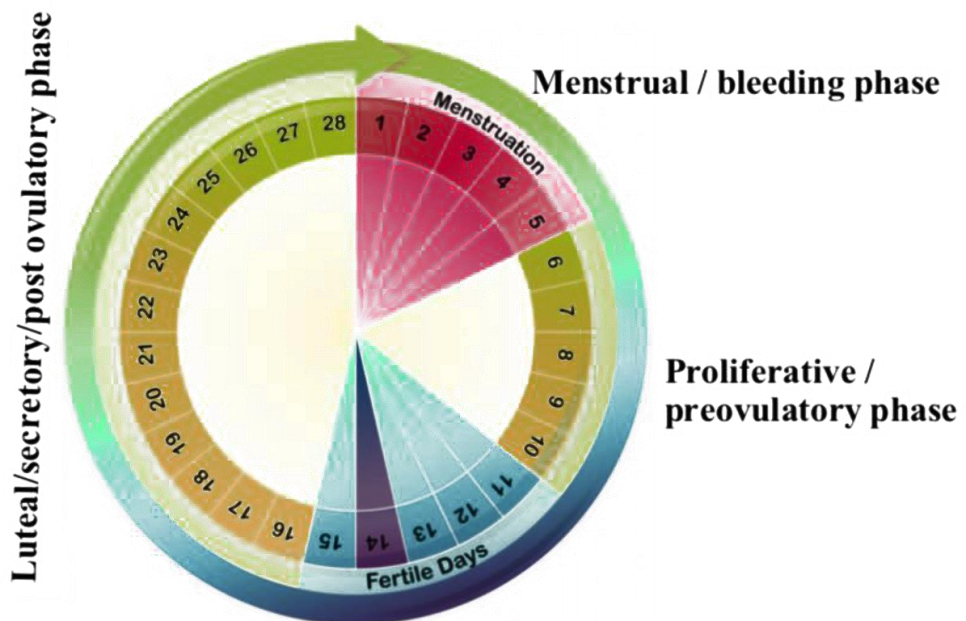


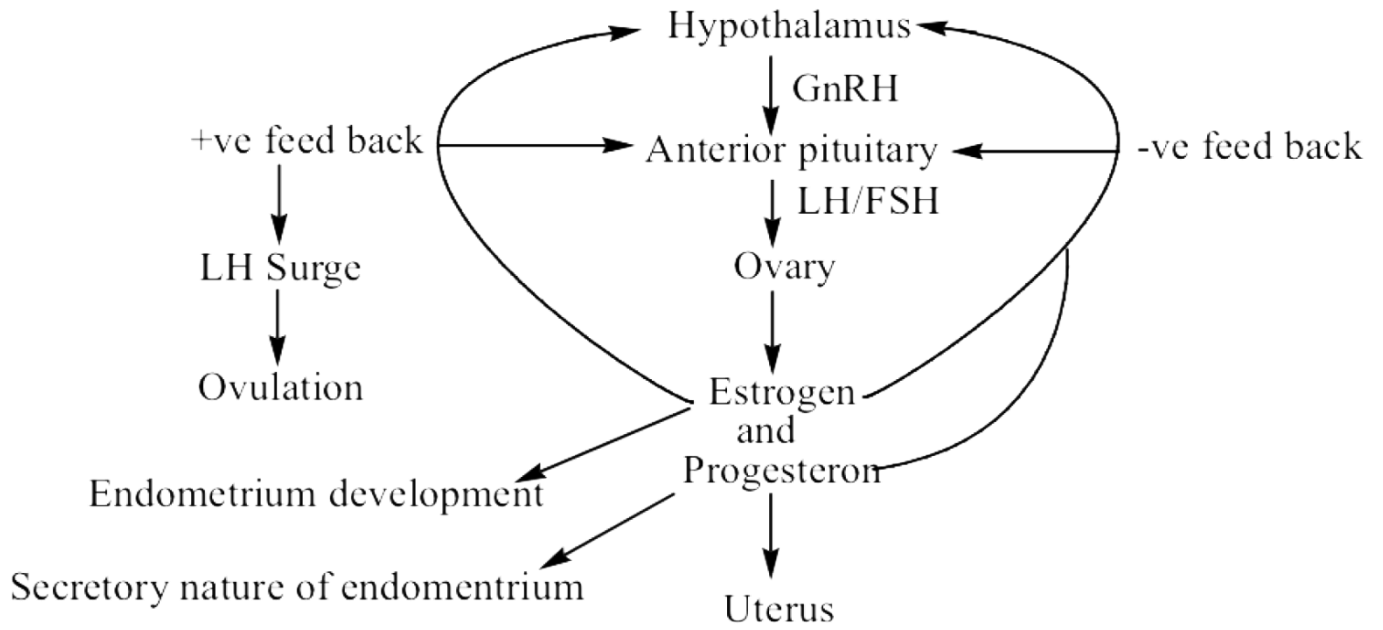
- A. (I) Perimetrium, (II) Myometrium, (III) Fallopian tube
- B. (II) Endometrium, (III) Infundibulum, (IV) Fimbriae
- C. (III) Infundibulum, (IV) Fimbriae, (V) Cervix
- D. (IV) Oviducal funnel, (V) Uterus, (VI) Cervix

Ans. C.

## MENSTRUAL CYCLE

Duration - 28 days Ideally (Range-22 to 32 days)





**Menstrual cycle has three main phases**

- i) Bleeding phase or menstruation phase
- ii) Proliferative/preovulatory/follicular phase or oestrogenic phase.
- iii) Secretory/post ovulatory/luteal phase or progesteronic phase.