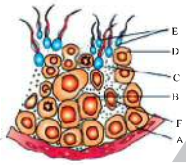


Chapter - 3

Human Reproduction

Blastula : A stage of embryogenesis which comes after morula and has a hollow fluid filled space called blastocoel.

Gestation Period : A period between fertilisation of ovum and the birth of a baby.

Implantation : Fixing of ernbryo/fertilized egg in uterus. It leads to pregnancy.

Menarche : The beginning of first menstruation in female on attaining puberty.

Menopause : Permanent ceasation of menstrual cycle in female. It occurs between the age 45 to 50 years in human female.

Ovulation : Process of release of mature ovum (Secondary oocyte) from the ovary.

Parturition : Process of delivery of the foetus (Child birth), through birth canal.

Puberty : A stage at which immature reproductive system of boy or girl becomes mature. Period of puberty is 10-14 years in girls and 13-16 years in boys.

Spermiogenesis : Transformation of spermatids into sperms.

Spermiation : A process by which spermatozoa are released from the seminiferous tubules.

Spermatogenesis : Process of formation of sperm from male germ cell in the testes.

Lactation : The fluid secreted by mammary glands soon after birth is called colostrum.It contains proteins, lactose and antibodies (e.g.IgA). This provides nutrition and help the new born baby to develop resistance for healthy development.

Ootid (Ovum) : A haploid cell formed by meiotic division of a secondary oocyte, espicially the ovum, as distinct from the polar bodies.

Cleavage : The mitotic division in which the zygote undergoes to form morula and then blastocyst.

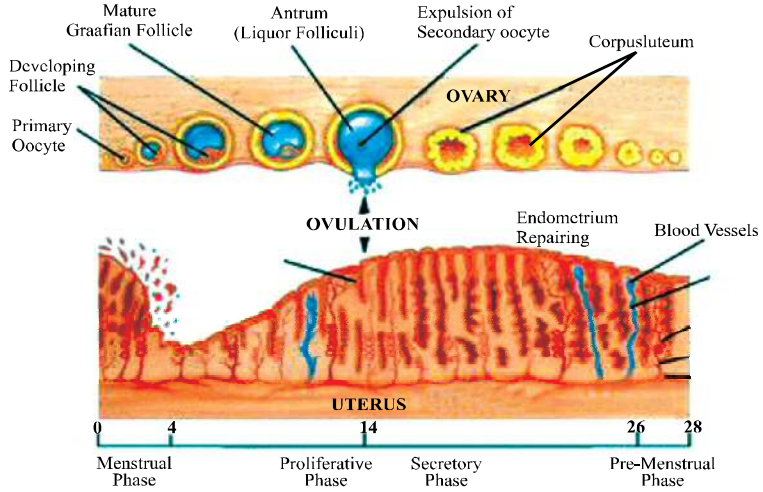
Insemination : The process in which the male transfers the sperms into the genital tract of the female.

Leydig Cells : (Interstitial Cells)—Present in connective tissue outside the seminiferous tubules. They are endocrine in nature and produce androgens e.g. testosterone.

Sertoli Cells : (nurse cells) : Present in the lumen of the seminiferous tubules. They provide nutrition and help in differentiantion of cells undergoing spermatogenesis. They also secrete ABP (Androgen Binding Proteins) and inhibin.

Accessory Male Genital Glands :

- Seminal Vesicles—Produce seminal fluid which forms 60-70% of semen. The fluid activates the sperms and have fructose, citrate, inositol and proteins for nutrition of sperms.
- Prostate Gland : The gland secretes thin, milky and alkaline secretion which neutralises the acidic secretion in female vagina.
- Cowper's Gland : (Bulbourethral gland)—helps in secretion of mucus which provides lubrication of urinogenital tract.



Menstrual Cycle

Spermatogenesis : Process of formation of sperms in testis.

Germinal epithelium — 46 (2n)

differentiation ↓ Mitosis

Spermatogonia — 46 (2n)

↓ Mitosis

Primary spermatocyte — 46 (2n)

Ist Meiotic division ↓

Secondary spermatocyte — 23 (n)

2nd meiotic division ↓

Spermatid — 23 (n)

Spermiogenesis ↓

Spermatozoa/sperm — 23 (n)

Oogenesis : Process of formation of ova in ovary.

Germinal epithelium — 46 (2n)

↓

Fetal life — Oogonia

↓ mitosis, defferentiation

Primary oocyte — 46 (2n)

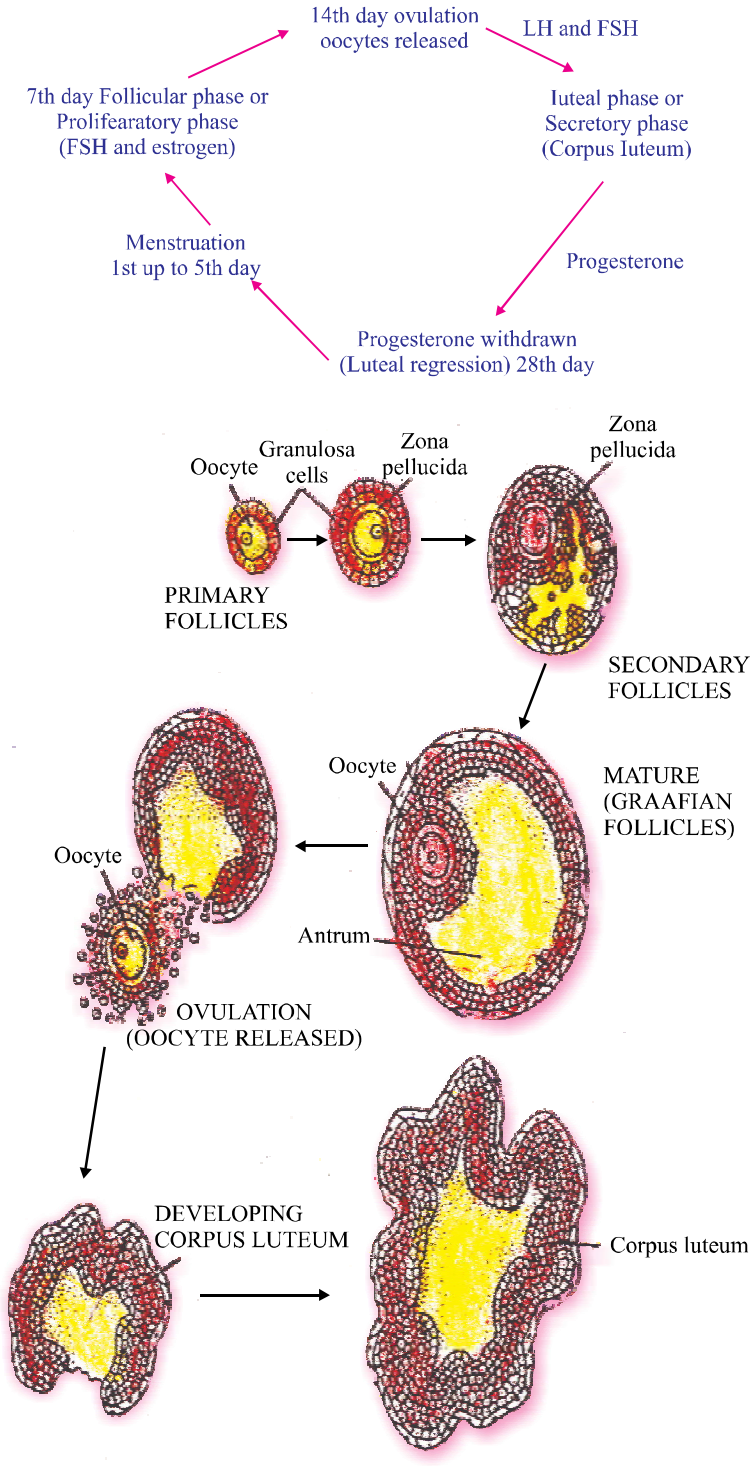
(At puberty) First polar body 23 (n) — Ist meiotic division completed prior to ovulation

Secondary oocyte — 23 (n)

Second polar body 23 (n)

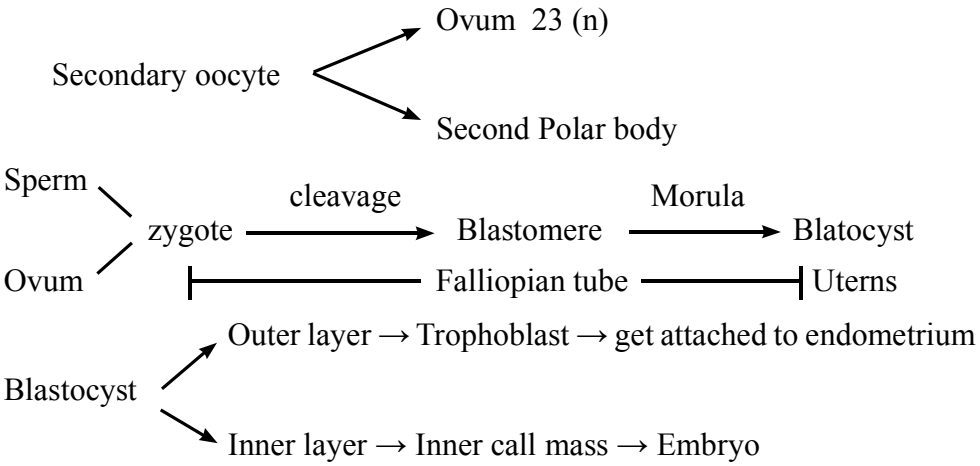
Ovum — 23 (n)

Phases of Menstrual Cycle : Menstrual phase, Follicular (Proliferative) Phase, ovulatory phase and Luteal (secretory) phase



Fertilisation : Process of fusion of sperm with ovum

Site of fertilisation in human female : Ampullary—isthmic junction. Secretion of acrosome helps the sperm entry into cytoplasm of ovum through zona pellucida and plasma membrane. Sperm entry induce the completion of the 2nd meiotic division of secondary oocyte.



Placenta : An intimate connection between foetus and uterine wall of the mother to exchange materials.

Function : Nutrition, Respiration, Excretion, as barrier, Endocrine function, shock absorber.

Placenta as Endocrine tissue : Placenta Produces several hormones such as Estrogen, hCG, hPL, Progesterone.

In late phase of pregnancy—relaxin hormone is released by ovary.

Progesterone is called 'Pregnancy hormone'.

Embryonic Development : (at various month of pregnancy) After 1 month = Heart, 2 months = Limbs and digits, 3 months = External genital organ, 5 months = First movement, 6 months = body covered with fine hairs, eye lid, eye lashes, 9 months = Fully developed and ready for delivery.

Questions

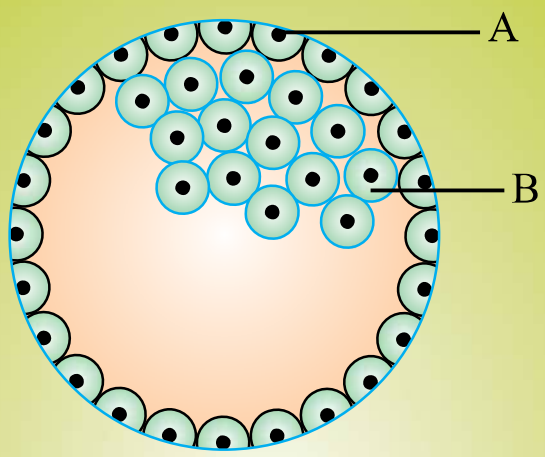
VSA **(I Mark)**

1. Failure of testes to descend into sacrotal sacs leads to sterility. Why ?
2. How many sperms will be produced from 10 primary spermatocytes and how many eggs will be produced from 10 primary occytes ?

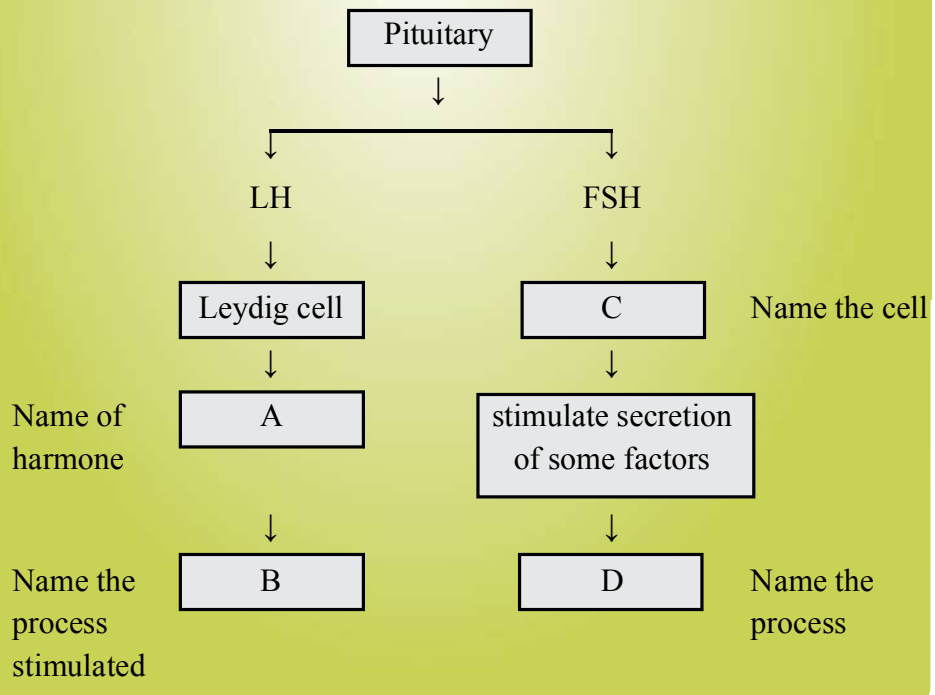
3. In ovary which structure transforms as corpus luteum and name the hormone secreted by corpus luteum ?

SA - I **(2 Marks)**

4. In the given figure, give the name and functions of parts labelled A and B.



5. Given below is an incomplete flow chart showing influence of hormone on gametogenesis in male, observe the flow chart carefully and fill in the blank A, B, C and D.



6. Give reason for the following :

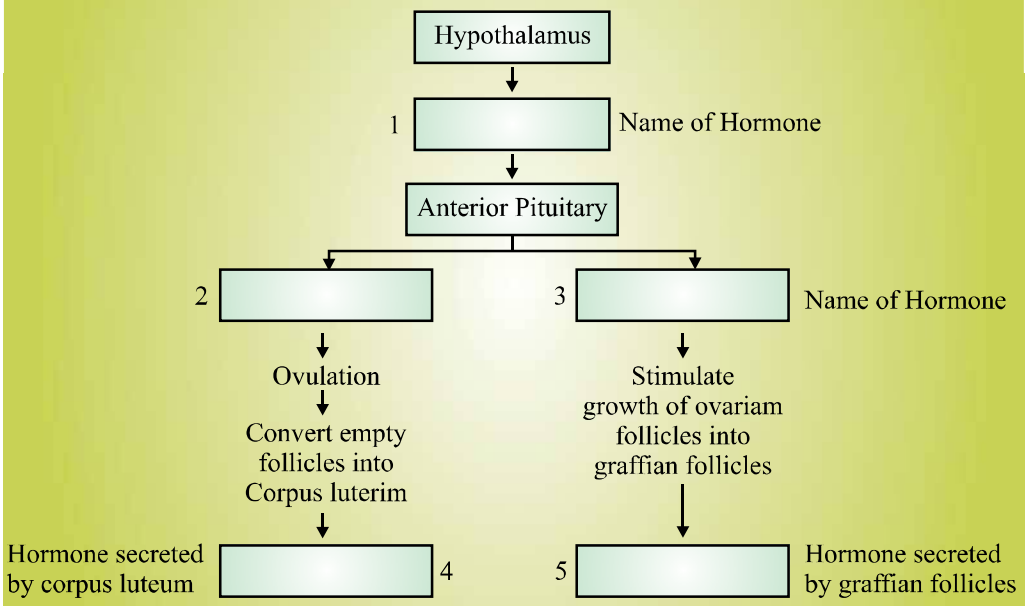
   (a) The first half of the menstrual cycle is called follicular phase as well as proliferative phase.

   (b) The second half of the menstrual cycle is called luteal phase as well as secretory phase.

7. What is meant by L.H. Surge ? Write the role of L.H.

SA-II **(3 Marks)**

8. Study the flow chart given below. Name the hormones involved at each stage and in human female.



9. Three of the steps of neuro endocrine mechanism in respect of parturition are mentioned below.

   Write the missing steps in proper sequence.

   (a) Signals originate from fully developed foetus and placenta.

   (b) ..... .

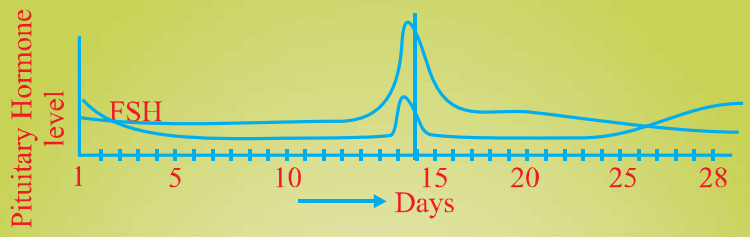
   (c) ..... .

   (d) Oxytocin causes strong uterine contraction

   (e) Uterine contraction stimulates further secretion of oxytocin.

   (f) ..... .

10. (a) Read the graph given below. Correlate the ovarian events that take place in the human female according to the level of the pituitary hormone during the following day.



(i) 10th – 14th days (ii) 14th – 15th days

(iii) 16th – 23th days (iv) 25th – 29th days

(If the ovum is not fertilised)

(b) What are the uterine events that follow beyond 29th day if the ovum is not fertilised.

11. T.S. of mammalian testis revealing seminiferous tubules show different types of cell.

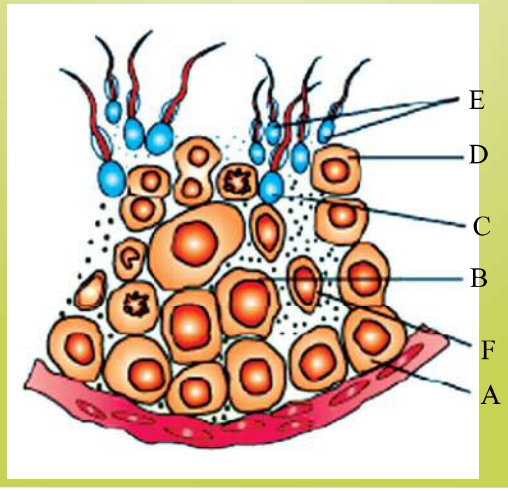
(i) Name the two types of cells of germinal epithelium.

(ii) Name of cells scattered in connective tissue and lying between seminiferous tubules.

Differentiate between them on the basis of their functions.

LA **(5 Marks)**

12.



Study the figure given :

(i) Pick out the name the cells that undergo spermiogenesis.

(ii) Name A, B, C and F.

(iii) Give ploidy of B and E.

(iv) Mention the function of 'F' cell.

Answers

VSA **(I Mark)**

1. High temperature of abdomen kills the spermatogenic tissue of the testes, so no sperm are formed.
2. 40 sperms, 10 eggs.
3. • Follicular cells of empty Graafian follicle.
   • Progesterone.

SA - I **(2 Marks)**

4. A = Trophoblast – Gets attached to endometrium and draws nutritive material material secreted by uterine endometrium gland.

   B = Inner cell mass – Differentiates as Embryo.

5. A = Testosterone; B = Spermatogenesis

   C = Sertoli cells; D = Spermiogenesis

6. (a) During this phase, primary follicles transform into Graafian follicle under FSH stimulation. Graafian follicles secrete Estrogens with stimulate enlargement of Endometrium of uterus.

   (b) During this phase, Corpus luteum is fully formed and secretes large quantity of Progestrone.

7. LH surge refers to maximum level of luteihising hormone living middle of menstrual cycle. LH couses ovulation.

SA-II **(3 Marks)**

8. Hypothalamus → 1. GnRH → Anterior pituitary — 2. LH, 3. FSH

4. Progesterone 5. Estrogen

9. (b) Foetal ejection reflex

(c) The reflex triggers release of oxytocin

(f) Expulsion of the baby out through birth canal.

10. (a) (i) Gonadotropins and FSH increase

(ii) LH attains peak level but FSH decrease

(iii) LH and FSH level decrease

(iv) LH remains low and FSH increases.

(b) After 29th day there is a mentrual flow involving discharge of blood and cast off endometrium lining.

11. (i) Germinal epithelium have two types of cells. 1. Spermatogonium. 2. Sertoli cells

(ii) Leydig's cell or Interstitial cells.

Functions

Spermatogonium undergoes meiotic division leading to sperm formation.

Sertoli cell : Nourishes germ cells

Leydig cell : Synthesise and Secrete hormone androgen.

LA **(5 Marks)**

12. (i) D—Spermatids

(ii) A—Spermatogonium; B—Primary spermatocyte
C—Secondary spermatocyte F—Sertoli cells

(iii) B—Diploid E—Haploid

(iv) Provide nourishment to germ cells.