

CHAPTER 3

HUMAN REPRODUCTION

POINTS TO REMEMBER

Acrosome : A small, sheathy structure at the end of a sperm.

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

Endometrium : Innermost glandular layer lining the uterine cavity.

Fetus : An advanced stage of embryo within the uterus.

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

Hymen : A thin membrane partially covering the vaginal aperture.

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

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

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

Oogenesis : Formation and development of ova in ovary.

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

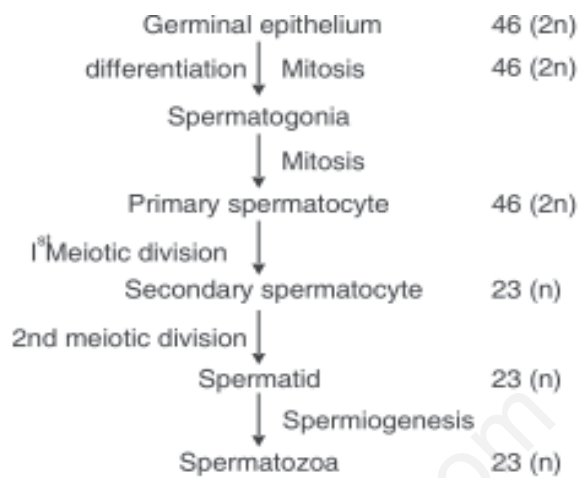
Parturition : Process of delivery of the foetus (Child birth).

Puberty : A stage at which immature reproductive system of boy or girl becomes mature.

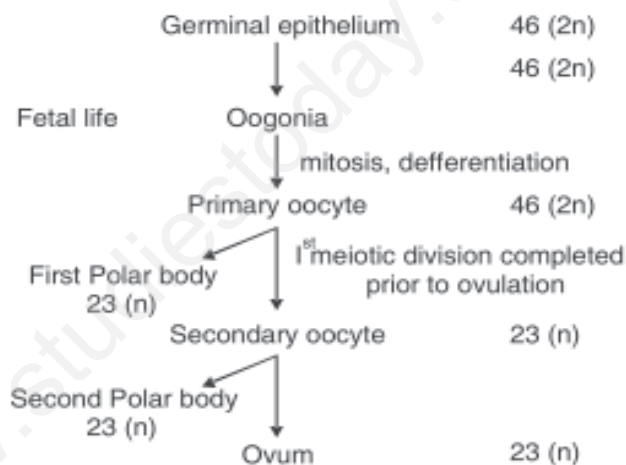
Scrotum : A muscular pouch which houses two testes.

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

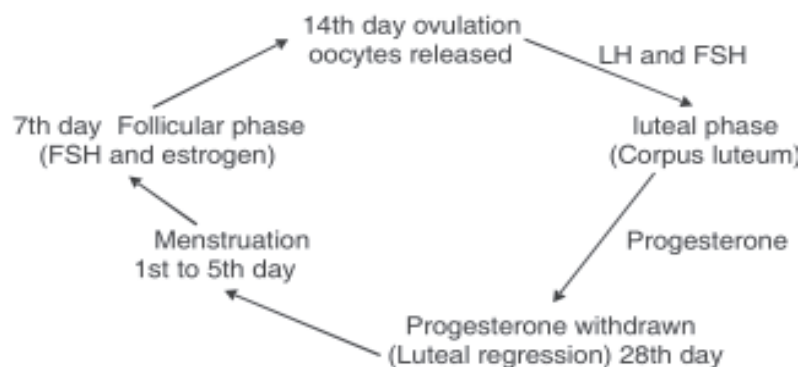
Spermatogenesis : Process of formation of sperm from male germ cell in the testes.



Oogenesis : Process of formation of ova in ovary



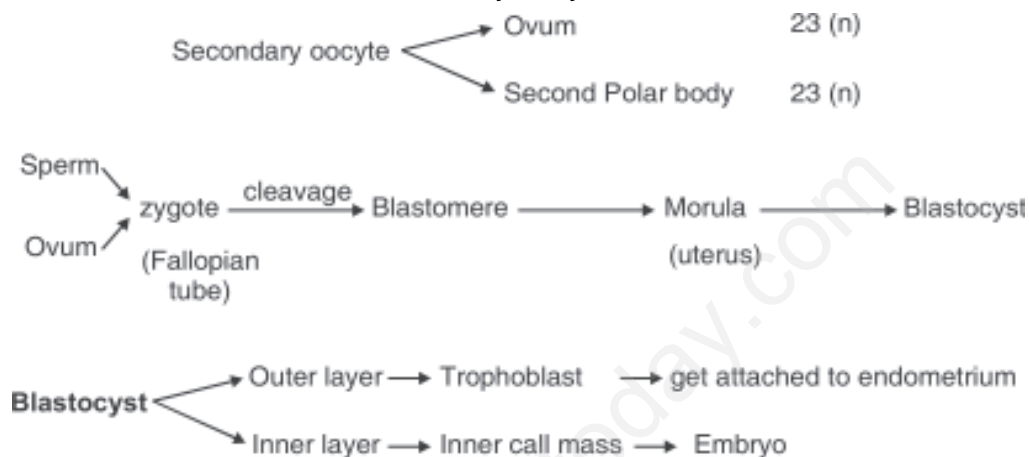
Phases of Menstrual Cycle : Menstrual phase, Follicular (Proliferative) Phase, ovulatory phase and Luteal (secretory) phase



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 of Placenta : Nutrition, Respiration, Excretion, as barrier, Endocrine function.

Placenta as Endocrine tissue : Placenta Produces several hormones such as – Estrogen, hCG, hPL, Progesterone and relaxin (in late phase of pregnancy).

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.

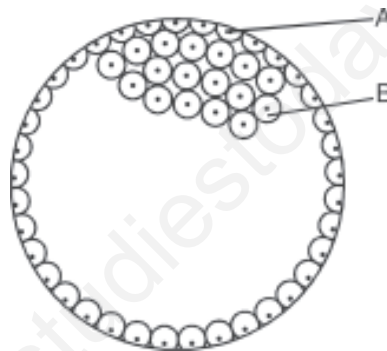
VSA (1 MARK)

1. Failure of testes to descend into scrotal sacs leads to sterility. Why?
2. Both vaccine and colostrum produce immunity. Name type of immunity produced by these.
3. How many sperms will be produced from 10 primary spermatocytes and how many eggs will be produced from 10 primary oocytes?

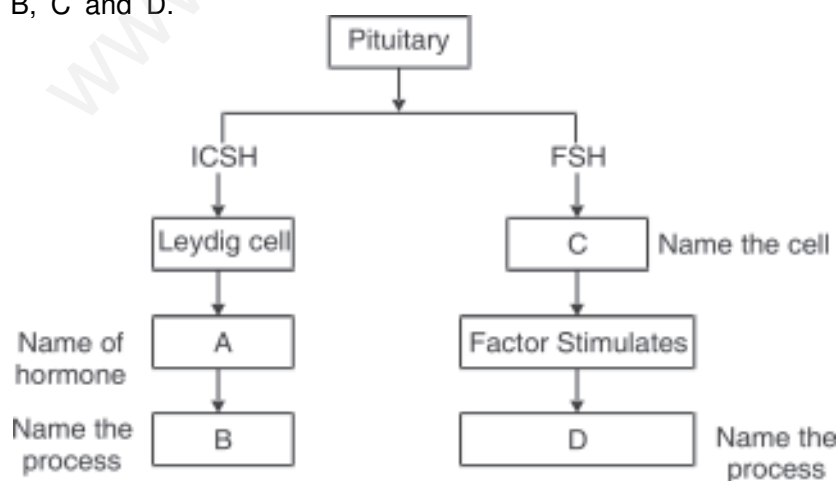
4. The spermatogonial cell has 46 chromosomes in human male. Give the number of chromosomes in –
 - (a) Primary spermatocyte
 - (b) Spermatid
5. In ovary which structure transforms as corpus luteum and name the hormone secreted by corpus luteum?
6. "Each and every coitus does not results in fertilisation and pregnancy". Justify the statement.

VSA-II (2 MARKS)

7. Give the function of
 - (a) Corpus luteum
 - (b) Endometrium
8. In the given figure, give the name and functions of parts labelled A and B.



9. 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.



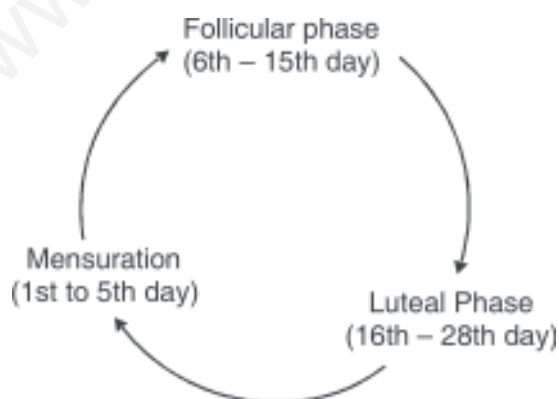
10. Give reason for the following :
 - (a) The first half of the menstrual cycle is called follicular phase as well as proliferative phase.
 - (b) The second half of the menstrual cycle is called luteal phase as well as secretory phase.
11. What is meant by L.H. Surge? Write the role of L.H.
12. Explain significance of the condition in which the testes remain suspended in scrotum outside the abdomen.

SA-I (3 MARKS)

13. Mention the name and role of hormones which are involved in regulation of gamete formation in human male.
14. Three of the steps of neuro endocrine mechanism in respect of parturition are mentioned below.

Write the missing steps in proper sequence.

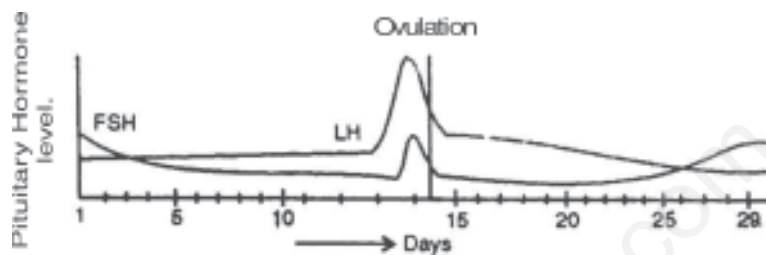
- (a) Signals originate from fully developed foetus and placenta.
 - (b) _____.
 - (c) _____.
 - (d) Oxytocin causes strong uterine contraction
 - (e) Uterine contraction stimulates further secretion of oxytocin.
 - (f) _____.
15. The events of the menstrual cycle are represented below. Answer the following questions.



- (i) State the levels of FSH, LH and Progesterone simply by mentioning high or low around 13th and 14th day and 21st to 23rd day.

- (ii) In which of the above mentioned phases does egg travel to fallopian tube?
- (iii) Why there is no mensuration after fertilisation?

16. (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?

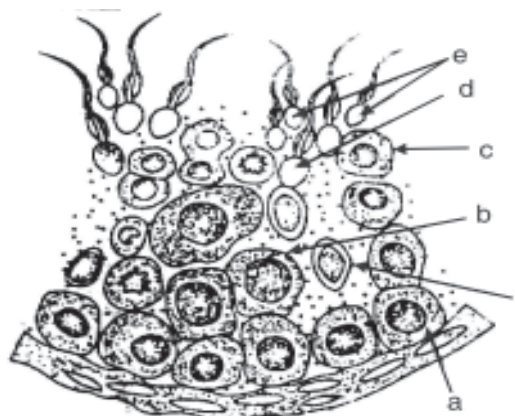
17. T.S. of mammalian testis revealing seminiferous tubules show different types of cell.

- (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)

18.



Study the figure given :

- (i) Pick out and name the cells that undergo spermiogenesis.
- (ii) Name 'A' and 'C' cells.
- (iii) Give ploidy of 'B' and 'E'
- (iv) What are the cells marked as 'F'? Mention their function.
- (v) Mention the type of cell division in A and B.

ANSWERS

VSA (1 MARKS)

1. High temperature of abdomen kills the spermatogenic tissue of the testes, so no sperm are formed.
2. Vaccine – Active immunity Colostrum – Passive immunity.
3. 40 sperms, 10 eggs.
4. (i) 46 in Primary spermatocyte
(ii) 23 in spermatid.
5. ☐ Follicular cells of empty Graafian follicle.
☐ Progesterone.
6. Ovum and sperm should reach simultaneously to the ampullary - isthmic junction.

SA-II (2 MARKS)

7. **Corpus luteum** : It secretes progesterone which prepares endometrium of uterus for implantation and normal development of foetus.
Endometrium : It undergoes cyclic changes during menstrual cycle and prepares itself for implantation of blastocyst.
8. A = Trophoblast – Gets attached to endometrium and draws nutritive material secreted by uterine endometrium gland.
B = Inner cell mass – Differentiates as Embryo.
9. A = Testosterone; B = Spermatogenesis
C = Sertoli cells; D Spermiogenesis

10. (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 Progesterone.
11. Refer page 51 NCERT book
12. Refer page 43 NCERT book.

SA-1 (3 MARKS)

13. **GnRH** : Stimulates adenophysis to secrete gonadotrophins.
- GSH** : Stimulates Sertoli cells to secrete factors while help in spermatogenesis.
- ICSH** : Stimulates interstitial cells to secrete testosterone.
14. (b) Foetal ejection reflex
- (c) The reflex triggers release of oxytocin
- (f) Expulsion of the baby out through birth canal.
15. (i)
- | | | 13 – 14th day | 21st – 23rd day |
|--------------|---|----------------------|------------------------|
| FSH | → | High | Low |
| LH | → | High | Low |
| Progesterone | → | Low | High |
- (ii) End of follicular or proliferative phase.
- (iii) Menstruation does not occur during pregnancy upon fertilisation due to high level of progesterone secreted by persisting corpus luteum and Placenta.
16. (a) (i) Gonadotropins and FSH increases
- (ii) LH attains peak level but FSH decreases
- (iii) LH and FSH level decreases
- (iv) LH remains low and FSH increases.
- (b) After 29th day there is a menstrual flow involving discharge of blood and cast off endometrium lining.

17. (i) Germinal epithelium have two types of cell. 1. Spermatogonium.
2. Sertoli cells
- (ii) Leydig cells or Interstitial cells.

Functions

Spermatogonium undergoes meiotic division leading to sperm formation.

Sertoli cell : Nourishes germ cells

Leydig cell : Synthesise and Secrete hormone androgen.

18. (i) 'D' Spermatids = undergo spermiogenesis
- (ii) 'A' = Spermatogonium; B = Primary spermatocyte
- (iii) 'B' = Diploid E = Haploid
- (iv) 'F' = Sertoli cells – Nutrition to germ cells
- (v) Mitosis in Cell 'A', Meiosis in cell 'B'