

CHAPTER -3: HUMAN REPRODUCTION

1. Define gametogenesis?
The process of formation of gametes.
2. What is insemination?
The transfer of sperms into the female genital tract.
3. What is fertilization?
Fusion of male and female gametes leads to the formation of zygote.
4. What is implantation?
Attachment of blastocyst itself to the inner uterine wall (endometrium).
5. What is gestation period?
The period of development between fertilization to parturition (child birth)
6. What is parturition?
Birth of the infant called parturition.
7. Name the pouch in which testes are present.
Scrotum.
8. Mention the significance of scrotum.
The scrotum helps in maintaining the low temperature of the testes (2–2.5o C lower than the normal internal body temperature) necessary for spermatogenesis.
9. What are seminiferous tubules?
Seminiferous tubules are highly coiled structures present in a testicular lobule or structural and functional units of testis.
10. What are spermatogonia?
Spermatogonia are the diploid male germ cells that give rise to spermatozoons.
11. Name the cell that provides nutrition to the male germ cells.
Sertoli cells provide nutrition to the germ cells.
12. Name the cell that secretes androgen or testosterone.
Leydig cells or interstitial cells.
13. Name the duct through which seminal vesicle opens into the urethra.
Ejaculatory duct.
14. Name the finger shaped projections of fallopian tube near the ovary.
Fimbriae.
15. Name the layer of uterus that undergoes cyclical changes or shedding during menstrual cycle.
Endometrium.
16. Name the cluster of cells in mammary lobes.
Alveoli.
17. What is spermatogenesis?
The process of formation of functional haploid male gametes or sperms in the testis of males.
18. What is spermiogenesis?
The process of conversion of haploid, non-motile and non-functional spermatids into functional motile sperms.
19. What is spermiation?
The process of release of sperms from the seminiferous tubules.
20. Name the hormone that stimulates spermatogenesis.
LH –Luteinizing hormone.
21. Mention the function of LH?
LH acts on Leydig cells and stimulates synthesis and secretion of androgens.
22. What is semen?
The seminal plasma along with the sperms constitutes the semen.
23. What is acrosome?
The anterior portion of sperm is covered by a cap-like structure, acrosome.
24. Mention the function of acrosome?
The acrosome is filled with enzymes that help fertilization of the ovum.

25. Name the fluid filled cavity of Graafian follicle.
Antrum.
26. What is menarche?
Menarche is the first menstrual period of young woman.
27. What causes rupturing of Graafian follicle and release of ovum?
Increased concentration of LH.
28. What is corpus luteum?
Yellow coloured body developed by the ruptured Graafian follicle .
29. What is the function of corpus luteum?
Secrete progesterone hormone
30. Name the hormone that is essential for maintenance of the endometrium.
Progesterone
31. What is menopause?
Menstrual cycles cease around 50 years of age
32. In which part of the fallopian tube does fertilization occur?
Ampullary-isthmic junction
33. What is monospermy?
Only one sperm can fertilize an ovum
34. What is cleavage?
Repeated rapid mitotic cell division of diploid zygote
35. What is morula?
The embryo with 8 to 16 blastomeres stage
36. Name the outer layer of cells in blastocyst.
Trophoblast
37. Where does the implantation of blastocyst occur?
Endometrium of the uterus
38. What is placenta?
Placenta is a connection between developing embryo and mother.
39. Name the structure that connects placenta to the embryo.
Umbilical cord
40. What is the function of umbilical cord?
It helps in the transport of substances to and from the developing embryo.
41. What are stem cells?
Stem cells which have the potency to give rise to all the tissues and organs.
42. Name the hormone produced from the ovary in later phase of pregnancy.
Relaxin
43. What is foetal ejection reflex?
Mild uterine contractions from the placenta during parturition called foetal ejection reflex
44. What is colostrum?
The milk produced during the initial few days of lactation is called Colostrum

TWO MARKS QUESTIONS

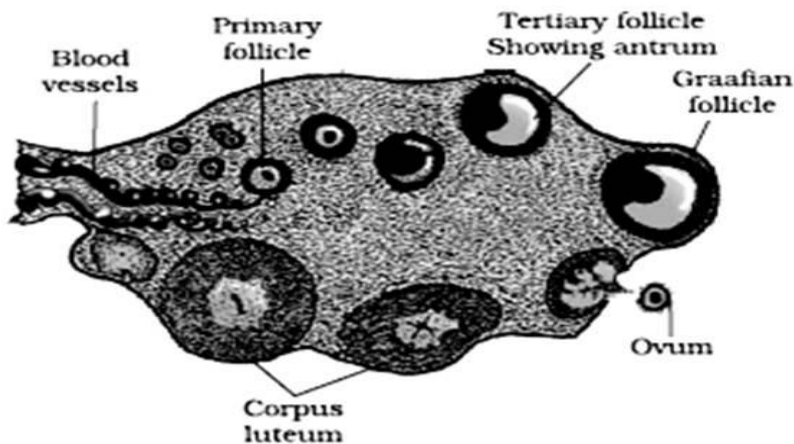
45. Name the two types of cells present on inner lining of seminiferous tubules.
Sertoli cells and gonial cells
46. Mention two female sex hormones.
FSH AND LH
47. Write any four functions of placenta.
- Transport of oxygen and nutrients from mother's blood to the developing foetus.
 - Transportation of carbon dioxide and nitrogenous wastes from the foetal blood into the mother's blood.
 - The storage of food materials like glycogen, fat, iron etc., All these contents are utilized by the foetus before the formation of functional liver
 - The transportation of antibodies from mother's blood into the foetal blood.

- It acts as a barrier and prevents the entry of microorganisms and some harmful materials like blood proteins and sex hormones from mother's blood into the foetal blood.
- It also acts as an endocrine gland and secretes several hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL) progesterone, estrogen, and relaxin (secreted more at the later stages of pregnancy) & helps to maintain pregnancy.

48. List the hormones that are secreted only during pregnancy in women.
Estrogen, progesterone, prolactin and thyroxin

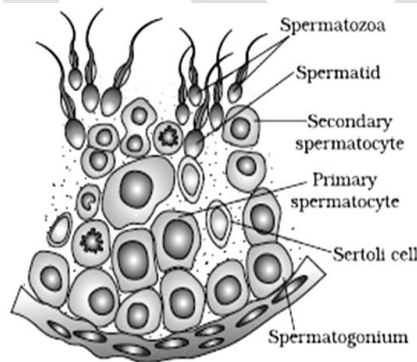
49. List any four reproductive events in humans.
Gametogenesis, insemination, fertilization, implantation, gestation and parturition
THREE MARKS QUESTIONS

50. Draw a neat labeled diagram of section view of ovary



Diagrammatic section view of ovary

51. Write diagrammatic enlarged sectional view of a seminiferous tubule showing spermatogenesis.



DIAGRAMMATIC SECTIONAL VIEW OF SEMINIFEROUS TUBULE (ENLARGED)

52. List the different parts of the male reproductive system and mention their specific function each

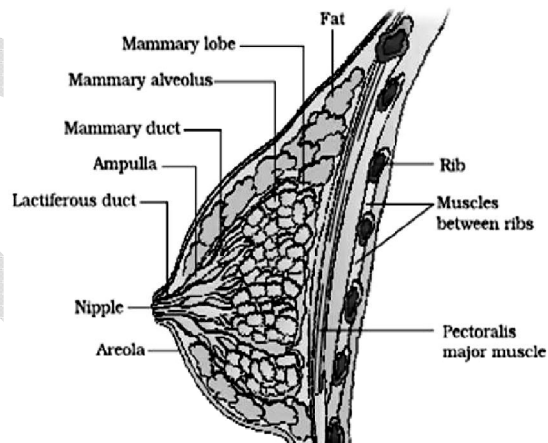
PARTS OF MALE REPRODUCTIVE SYSTEM	FUNCTIONS
Testes	Productions of sperms and male sex hormone
Epididymis	Storage and maturation of sperms
Vas deferens	Transportation of sperms
Ejaculatory duct	Conduction of sperms
Penis	Organ of copulation

Accessory glands: Seminal vesicle	Fructose rich secretions provides energy source Citric acid rich secretions and helps in sperm motility Mucus rich secretions provide lubrication
Prostate gland	
Bulbourethral gland/ Cowper's glands	

53. List the different parts of the female reproductive system and mention their specific function.

PARTS OF THE FEMALE REPRODUCTIVE SYSTEM	FUNCTIONS
Ovary	Production of ova and female sex hormones
Oviduct	Transportation of ova from the ovary to uterus
Uterus	Site of menstruation, implantation of a fertilized ovum, development of the foetus and labor
Cervix	Secretes mucus that enhances sperm movement into uterus and prevents the embryo from bacterial infection
Vagina	Organ of sexual intercourse and birth canal
Lesser and greater vestibular glands	Secrete mucus that provides lubrication during sexual intercourse

54. Draw a neat labeled diagrammatic sectional view of mammary gland. [3/5m]



A diagrammatic sectional view of mammary gland

55. List the major features of embryonic developments in various months of pregnancy?

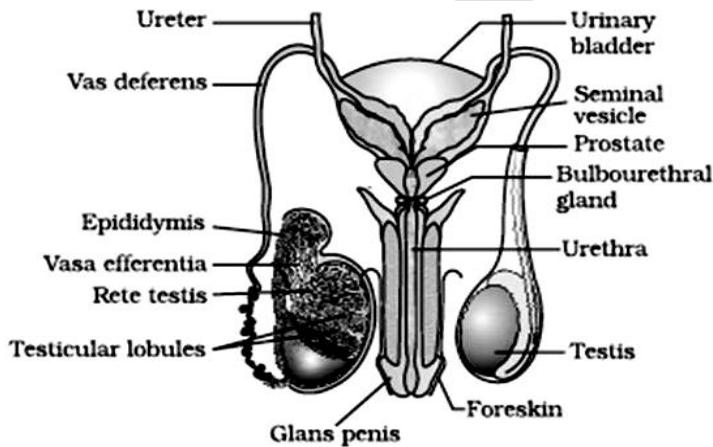
- The major features of embryonic development at various months of pregnancy are;
- The human pregnancy lasts 9 months
- In human beings, after one month of pregnancy, the embryo's heart is formed.
- By the end of the second month of pregnancy, the foetus develops limbs and digits.
- By the end of 12 weeks (first trimester), most of the major organ systems are formed, for example, the limbs and external genital organs are well-developed.
- The first movements of the foetus and appearance of hair on the head are usually observed during the fifth month.
- By the end of 24 weeks (second trimester), the body is covered with fine hair, eye-lids separate, and eyelashes are formed.
- By the end of nine months of pregnancy, the foetus is fully developed and is ready for delivery.

56. Differences between Spermatogenesis and oogenesis

Spermatogenesis	Oogenesis
1. Production of sperms called spermatogenesis	1. Production of ovum is called oogenesis.
2. Spermatogenesis occurs in testis	2. Oogenesis occurs in ovary.
3. Four functional sperms are produced	3. Only one functional ovum is produced.
4. There is no formation of polar body.	4. Three polar bodies are produced.
5. There is no vitellogenesis	5. There is vitellogenesis

FIVE MARKS QUESTIONS

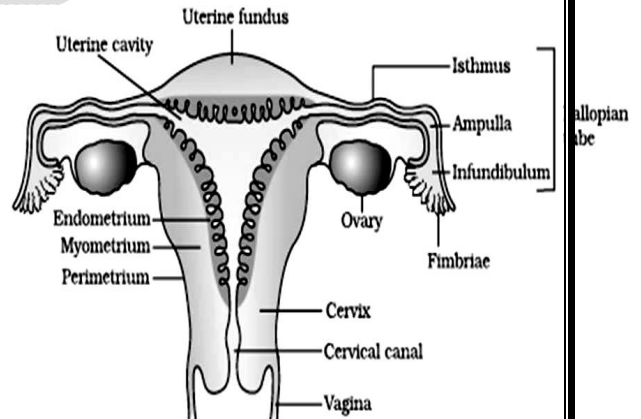
57. Write diagrammatic view of male reproductive system.



**Diagrammatic view of male reproductive system
(Part of testis is open to show inner details)**

diagrammatic sectional view of female reproductive system.[5m]

58. Draw a neat labeled



Diagrammatic sectional view of female reproductive system

59. Explain the process of oogenesis with the help of schematic representation .Oogenesis: The formation of functional haploid ovum in the ovary by meiosis is called oogenesis.

Phases of oogenesis: It occurs in three phases.

1. Multiplication phase

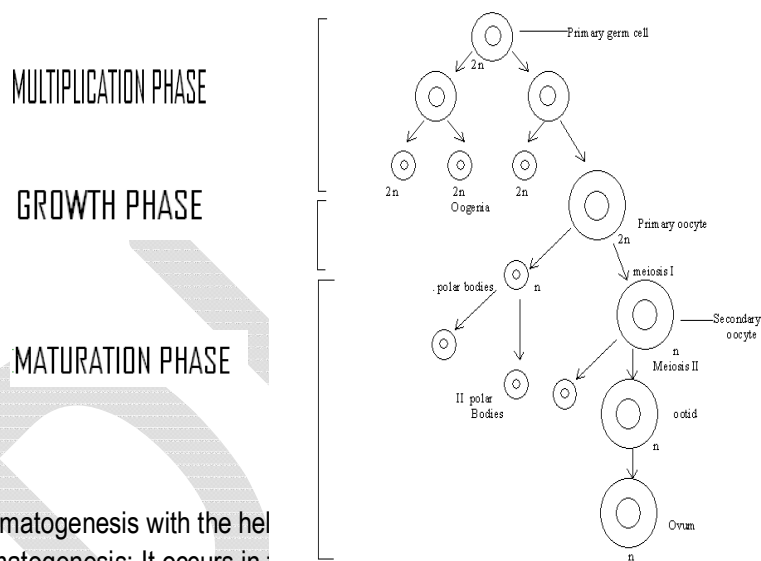
2. Growth phase
3. Maturation phase

Multiplication phase: The diploid oogonial cells of the ovarian follicles divide repeatedly by mitosis to produce more oogonium cells.

Growth phase: During this phase the diploid oogonium synthesizes (yolk reserve food material) or vitelline in the cytoplasm, increases in its size and volume to form primary oocyte. This process is called vitellogenesis.

Maturation phase: This phase involves two successive divisions namely meiosis I and meiosis II. The meiosis I is reductional and produces two unequal sized cells from each primary oocyte. In which one cell is smaller in size is often called I polar body, and the other one is larger in size called secondary oocyte.

They undergo meiosis II, resulting in the formation of four haploid cells, in which one is larger in size called ootid and other three are smaller in size called polar bodies. Finally the ootid is converted into functional ovum. So at the end of oogenesis one functional ovum and 3 polar bodies are formed. These polar bodies will not survive they undergo disintegration.

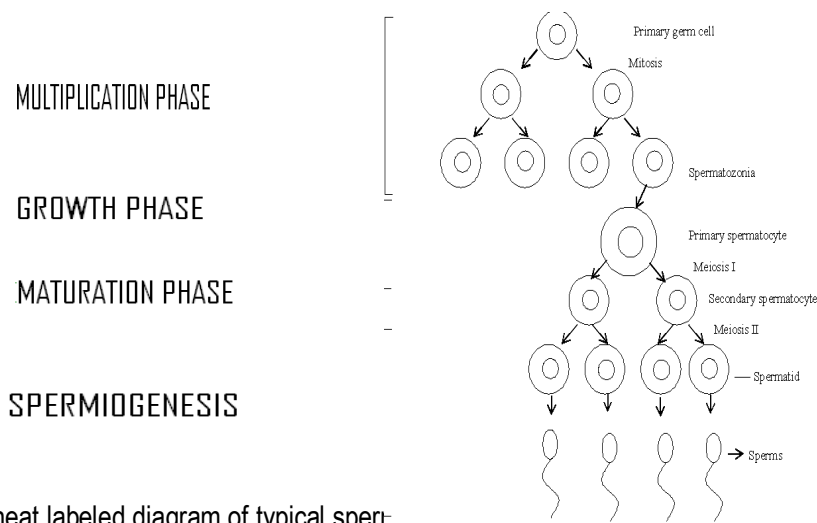


60. Explain the spermatogenesis with the help of diagram.
Phases of spermatogenesis: It occurs in

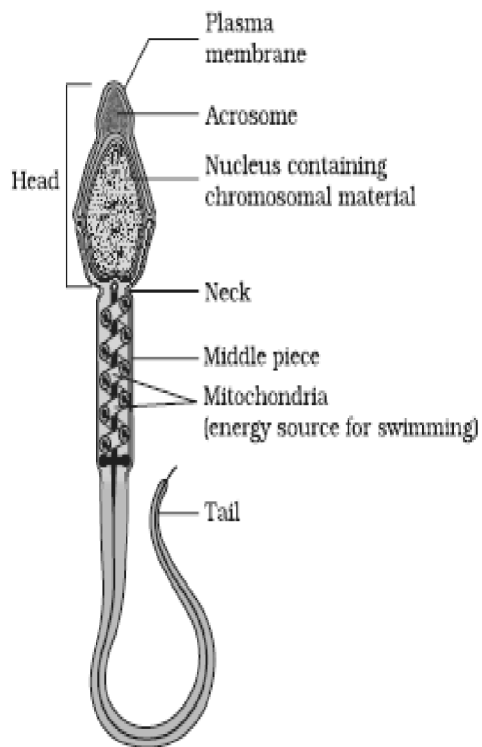
1. Multiplication phase
2. Growth phase
3. Maturation phase
4. Spermiogenesis or spermateliosis

- 1. Multiplication phase:** The diploid spermatogonial cells of the seminiferous tubules divide repeatedly by mitosis to form a large number of diploid spermatogonia. Among them only a few enter into growth phase and others are kept in reserve.
- 2. Growth phase:** The spermatogonium grows and increases the cell cytoplasm, volume and becomes larger called primary spermatocytes.
- 3. Maturation phase:** This phase involves two successive divisions namely meiosis I and meiosis II. The meiosis I is reductional by which primary spermatocytes produce two haploid daughter cells called secondary spermatocytes. These secondary spermatocytes undergo meiosis II, which is equational. As a result four equal sized haploid cells are produced called 'spermatids'.
- 4. Spermeogenesis (spermateliosis):** the differentiation of inactive, non-motile, spherical spermatids into active, motile and tadpole shaped sperms is called spermeogenesis. The discharge of spermatozoans from the seminiferous tubules is called spermiation.

Schematic representation of spermatogenesis



61. Draw a neat labeled diagram of typical sperm-



62. Describe the structure of human sperm. [5m]

Structure of a typical sperm: Sperm is a male gamete produced in the testis by spermatogenesis. The sperms are mature, haploid, microscopic, elongated and motile male gametes.

A typical sperm shows four regions. They are head, neck, middle piece and tail.

Head: Head is the anterior segment of the sperm which is oval in shape. Head includes a paternal haploid nucleus (n). Above the nucleus cap like structure present called Acrosome, which consisting hydrolytic enzymes like acrosin, hyalourinidase and proteinase. Acrosome helps in the penetration of sperm into ovum. Acrosome is formed by Golgi apparatus.

Neck: It is an indistinct part connects the middle piece. It includes a proximal centriole; it lies close to the sperm nucleus. It helps in the formation of spindle fibers in diploid zygote.

Middle piece: It contains distal centriole. It gives rise to a long slender axial filament. Around the axial filament double row of mitochondrial sheath is present called Neubenkern, which provides energy needed for the movement of the sperm, hence middle piece may also be referred to as engine room of the sperm.

Axial filament is also called Axoneme and arises from the distal centriole which forms the axis of tail.

Tail: It is divided into two parts namely, main piece covered by a cytoplasmic sheath and end piece and it is naked forms terminal part of the tail.

Human male ejects about 200 to 300 million sperms during coitus. For normal fertility at least 60% of sperms must have normal shape and size, about 40% of them must show vigorous motility.

63. What is menstrual cycle? Explain the phases of menstrual cycle.

A series of rhythmical changes that take place in female reproductive system from puberty (menarche) to menopause in woman is called menstrual cycle

Menstrual phase: it involves shedding off uterine endometrium. Hence there will be discharge of blood, tissue fluid, mucous and epithelial cells. This phenomenon is also called menses. It lasts from about 1st to 5th day of the cycle.

Pre-Ovulatory phase or proliferative phase: During this phase regeneration and thickening of endometrium of the uterus occurs. It lasts from about 6th to 13th day of the cycle. During this phase, the secretion of gonadotropins (LH and FSH) increases gradually during the follicular phase, and stimulates follicular development as well as secretion of estrogens by the growing follicles.

Ovulatory phase: It involves the release of ovum from the Graafian follicle called ovulation. It takes place on 14th day of menstrual cycle. During this phase, both LH and FSH attain a peak level in the middle of cycle (about 14th day).

Rapid secretion of LH leading to its maximum level during the mid-cycle called LH surge (increased concentration of LH) induces rupture of Graafian follicle and thereby the release of ovum (ovulation).

Post Ovulatory phase or secretory phase: During this phase Graafian follicle will be converted into yellow coloured body corpus luteum. The corpus luteum secretes large amounts of progesterone which is essential for maintenance of the endometrium. The endometrium is necessary for implantation of the fertilized ovum and other events of pregnancy. In the absence of fertilization corpus luteum degenerated into corpus albicans and leading to menstrual phase. In human beings, menstrual cycles cease around 50 years of age; that is termed as menopause. Post Ovulatory phase lasts for about 15th to 28th day of the cycle.

