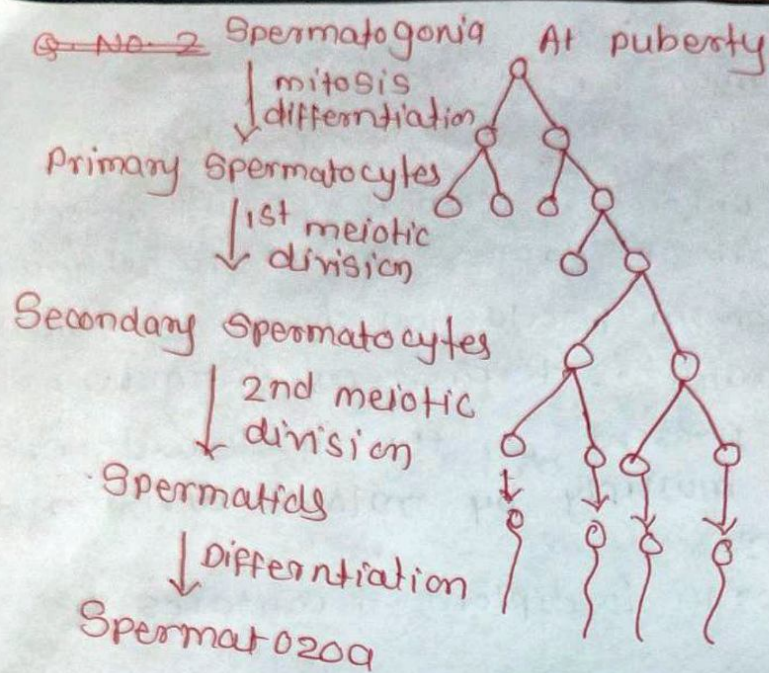


Chapter No. 3

Human Reproduction

Q. No. 1 what is spermatogenesis & describe briefly process of spermatogenesis?

- ⇒ In man testis & ovaries in female produce gametes i.e. sperm & ovum. these process called gametogenesis.
- The phenomenon of sperm production from the immature germ cell in males is termed as spermatogenesis.
 - The spermatogonia present on the inside wall of seminiferous tubules multiply by mitotic division & increase in numbers.
 - Each spermatogonia is diploid & contains 46 chromosomes.
 - A primary spermatocyte complete the first meiotic division leading to formation of two equal haploid cells called secondary spermatocytes, which have only 23 chromosome. each.
 - Secondary spermatocytes undergo the second meiotic division to produce four equal, haploid spermatids.
 - The spermatids are transformed into spermatozoa by the process called spermiogenesis.
 - After spermiogenesis, sperm heads become embedded in the Sertoli cells & are finally released from the seminiferous tubules by the process called spermiation.
 - Spermatogenesis starts at the age of puberty due to significant increase in the secretion of gonadotropin releasing hormone.



• representation of Spermatogenesis.

Q. No. 2 Explain oogenesis process briefly?

→ The process of formation of mature female gametes is called oogenesis.

- Oogenesis is initiated during the embryonic development stages, when a couple of million gamete mother cells are formed within each fetal ovary. no more oogonia are formed & added after birth.

- These cells start division & enter into the prophase-I of the meiotic division & get temporarily arrested at that stage, called primary oocytes.

- Each primary oocyte gets surrounded by a layer of granulosa cells & is called the primary follicle.

← large numbers of these follicles degenerate during the phase from birth to puberty.

- Therefore at puberty only 60,000 - 80,000 primary follicles are left in each ovary.
- The primary follicles get surrounded by more layers of granulosa cells & a new theca face called secondary follicles.
- Secondary follicle transforms into tertiary follicle which characterised by a fluid filled cavity called antrum.
- The theca layer is organised into an inner theca interna & an outer theca externa.
- At this stage primary oocyte within tertiary follicle grows in size & completes its first meiotic division.
- It is an unequal division resulting in the formation of large haploid secondary oocyte & a tiny first polar body.
- Secondary oocyte obtain bulk of the nutrient rich cytoplasm of the primary oocyte.
- The tertiary follicle further changes into the mature follicle or Graafian follicle.
- Secondary oocyte forms a new membrane called zona pellucida surrounding it.
- The Graafian follicle now ruptures to release the secondary oocyte from the ovary by the process called ovulation.

Q. No. 3 what is menstrual cycle & which hormones regulates menstrual cycle?

→ The reproductive cycle in the female primates is called menstrual cycle.

- In human females, menstruation is repeated at an average interval of about 28/29 days. A cycle of events starting from one menstruation till the next one is called the menstrual cycle.

- The secretion of gonadotropins increase gradually during the follicular phase & stimulates follicular development as well as secretion of estrogens by growing follicles.

• Both LH & FSH attain a peak level in the middle of cycle.

• Rapid secretion of LH leading to its maximum level during the mid-cycle called LH surge induces rupture of graafian follicle & there by released of ovum.

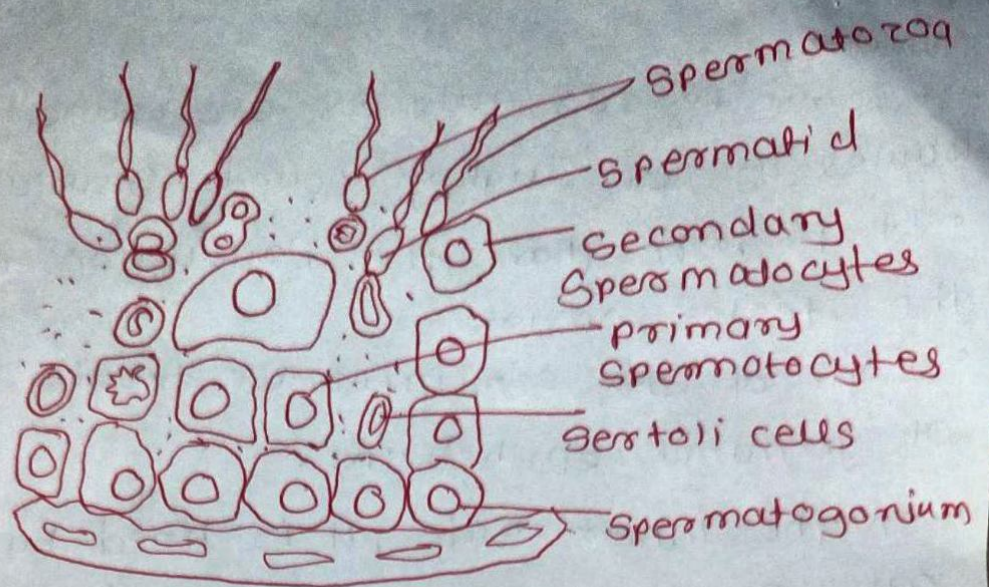
• The ovulation is followed by luteal phase during which the remaining parts of graafian follicle transform as corpus luteum.

• Corpus luteum secretes large amounts of progesterone which is essential for maintenance of endometrium.

• Such an endometrium is necessary for implantation of the fertilised ovum & other events of pregnancy.

Q.No. 4 Describe the Structure of Seminiferous tubules.

- Seminiferous tubules are found in the testicular lobules & are highly coiled structures.
- It is here that the production of Sperms in the testes occurs.
- Each of the Seminiferous tubule has a lining of germinal epithelium
- on the inner side, it is lined by two types of cells - Sertoli cells & spermatogonia.
- Spermatogonia - they are the male germ cells that produce the primary spermatocytes through the process of meiotic divisions.
- The primary spermatocytes further more undergo meiotic division for the formation of Secondary spermatocytes & ultimately Spermatis.
- Spermatis metamorphosize into the male gamete termed as spermatozoa.
- Sertoli cells are referred as nurse cells on the testes. It is because they nourish the germ cells.
- Just adjacent to Seminiferous tubules are large polygonal cells referred to as Leydig cells or interstitial cells which secretes testosterone - male hormone.



Seminiferous tubule.

Q. No. 5 what is parturition? which hormone involve in parturition?

→ vigorous contraction of the uterus at the end of pregnancy cause expulsion/delivery of the foetus. This process of delivery of the foetus is called parturition.

There are two critical hormones are involved in the induction of parturition they are.

- ① Oxytocin :- It directs the term foetus towards the birth canal, as it causes the contraction of the smooth muscles of myometrium of the uterus leading the baby to expelled out.
- Relaxin :- It relaxes the pelvic ligaments widening the pelvis to assist in an easier childbirth.

Q. NO. 6. Draw a labelled diagram of Sperm.

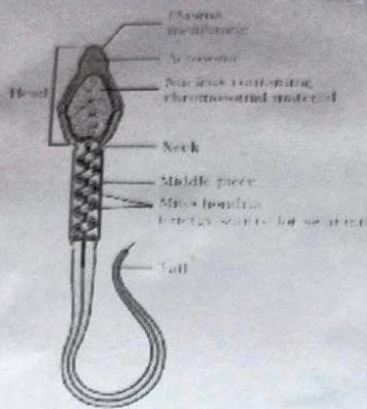


Figure 3.6 Structure of a sperm

Q. NO. 7 Draw a labelled diagram of female reproductive system.

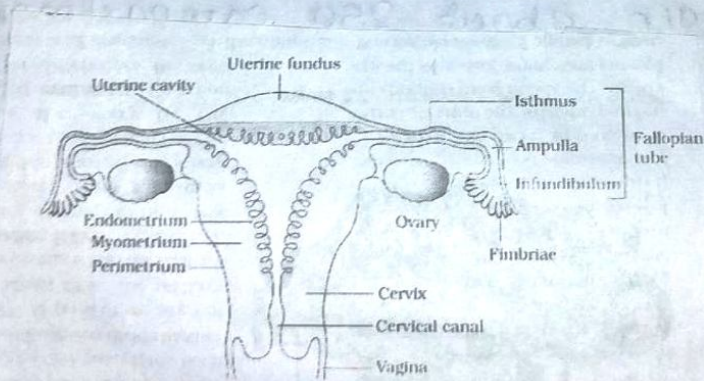


Figure 3.3 (b) Diagrammatic sectional view of the female reproductive system

Q. No. 7 Explain male Reproductive System.

There are four main parts of male reproductive system -

1. Testis
2. Accessory duct
3. Glands.
4. External Genitalia.

Testis :- Testis are situated outside the abdominal cavity within a pouch called scrotum.

- A small muscular sac is known as scrotum that contains & protects the testis.
- The scrotum is located behind the penis & is considered a part of the external male genitalia.
- The testes are sited outside the abdominal cavity to maintaining the low temp. of the testis nearly $2-2.5^{\circ}\text{C}$ lower than the average human body temperature. This condition necessary for synthesis of sperm.
- Testis is oval shape with in length 4-5cm & 2-3cm width.
- The testis contain about 250 compartment known as Testicular lobules.
- Each lobules normally comprises 1-3 highly coiled seminiferous tubules that play a significant role in sperm production.
- Seminiferous tubules are place that forms spermatozoa by the process of meiosis.
- Sertoli cells in seminiferous tubules provide nutrition to the spermatogonia.
- Interstitial spaces are region that present outside the seminiferous tubules that contain the small blood vessels, Leydig cells & some immunocompetent cells.

Q.No. Draw a labelled male Reproductive System.

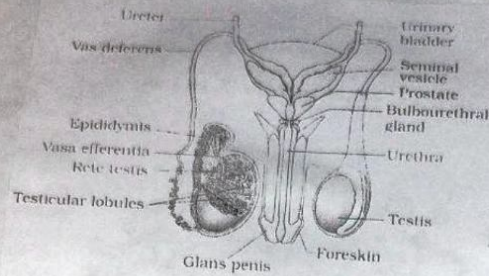


Figure 3.1(b) Diagrammatic view of male reproductive system (part of testis is open to show inner details)

• Leydig cells synthesize & secrete the testicular hormones called androgens.

Accessory duct : the accessory duct facilitate the transportation of the sperms from the testes to the urethra for their release outside the body.

- male reproductive system consist of four accessory duct

① Rete testis : - the semiferous tubules of the testis opens into vas efferentia through rete testis.

② Vaso efferentia : - These duct make a pathway to transport the sperm from the rete testis to the epididymis which is placed in the posterior surface of each testis.

③ Epididymis : It is long, coiled tube that connects a testicle to a vas deferens.

Vas deferens :- It is muscular duct that ascends into the abdominal cavity & make a loop over the urinary bladder.