GAMETOGENESIS

Gametogenesis is the process occurs in the sexually reproducing organisms. It is the process of formation of gamets. When it occurs in the female animal for the synthesis of ovum or egg, the process is known as **Oogenesis** and when occurs in male to produce spermatozoa, the process is called **Spermatogenesis**, ie. oogenesis and spermatogenesis both the process combinely called gametogenesis.

Spermatogenesis- This process occurs in the testes. In human being a pair of testes is located below the abdominal cavity inside the muscular scrotum. Inside the testes there are numerous tubular structures, called seminiferous tubule. The inner surface of these tubules are lined by germinal cells, which are the raw material for the formation of spermatozoa. The process occur in two steps-

a) Formation of Spermatid-
b) Spermeiogenesis-

Note:- Each testes covered with a tough connective tissue capsule called **Tunica albuginea.** Testes contain three main types of cells- **Germ cells-** present inside the seminiferous tubules, which are the primordial cell for spermatogenesis, the interstitial cell or **Sartoli cells**, which provide nutrition to the developing spermatozoa and the **Leydig cells** which secret hormone testosterone.

Formation of spermatid- this step can be further divided into three phases-

i) Multiplication phase- In this phase the germ cells present on the basement layer of inner side of the seminiferous tubule undergo repeated mitotic division. These newly formed cells are called **spermatogonia** or sperm mother cells.
ii) Growth phase- The spermatogonia formed as a result of repeated mitotic division, stops division and grows in size by accumulating nutrient and prepare for next phase. These cells are now called **primary spermatocytes.** During the growth phase the entire cell with the nucleus enlarges in size.
iii) Maturation division phase- In this phase the diploid primary spermatocytes undergo first reduction division and produce two haploid **secondary spermatocytes.** Then the secondary spermatocytes with half the number of chromosome undergo second maturation division and form four haploid cells. These are called **spermatids.**

Spermeiogenesis- The haploid spermatides**,** which are formed as a result of maturation division, attain locomotion power at the end of this phase. For that it undergoes several modifications, which are-

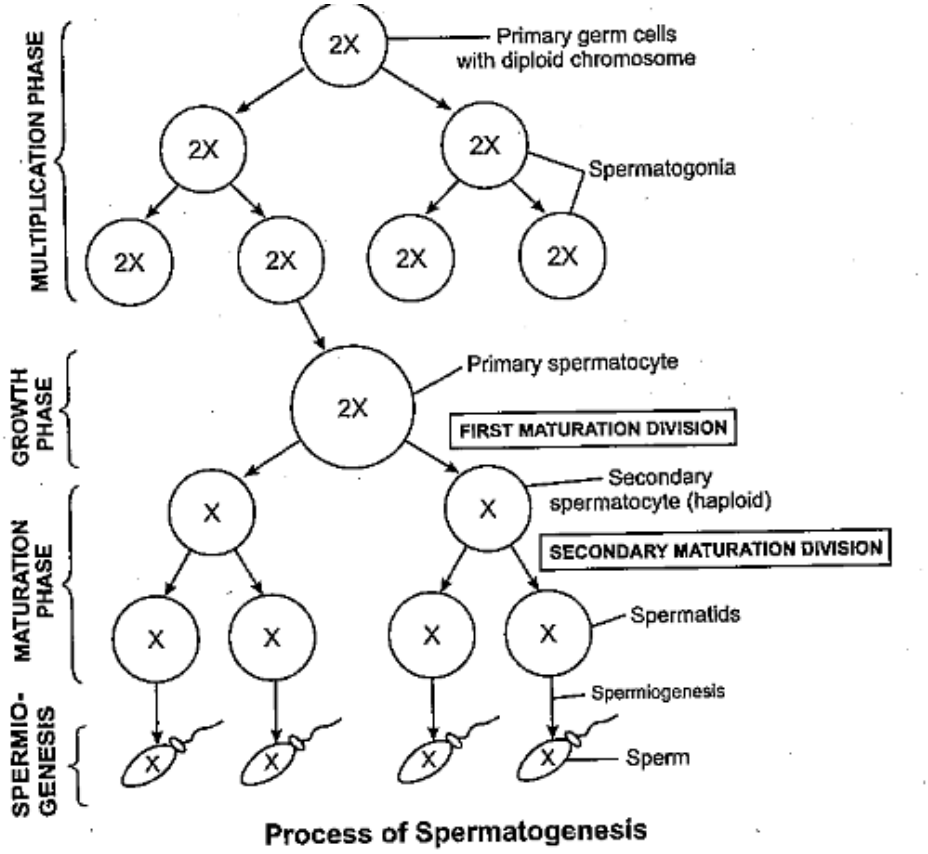

Fig- Spermatogenesis, showing the four phases

- The cell reduces its weight by losing excess water from the cytoplasm as well as from the nuclear sap.
- The nucleus undergoes shrinkage through closely packed DNA.
- Even the RNA and other accessory materials are removed from the cell.
- The Golgi complex move to one side of the cell and ultimately form the acrosome at the tip.
- The centrsome divide to form a proximal centriol and a distal centriol.
- The microtubules orient to form a long flagella and the distal centriol form the basal granule for the flagella.
- All the mitochondria of the cell are arranged spirally around the base of the flagella.

With these changes of spermeiogenesis, a non motile spermatid changes to spermatozoa, which is an active swimmer with a long flagella.

Points to be memorise-

- Spermatogenesis occurs in testes.
- From one diploid primary spermatocyte four haploid spermatozoa are formed.
- The acrosome of sperm is formed from the Golgi complex.
- The mitochondrial sheath form at the base of the flagella is called Nebenkern.
- A typical sperm has three part- Head, neck and tail