Gametogenesis: The process of formation of gametes. It is of two types:

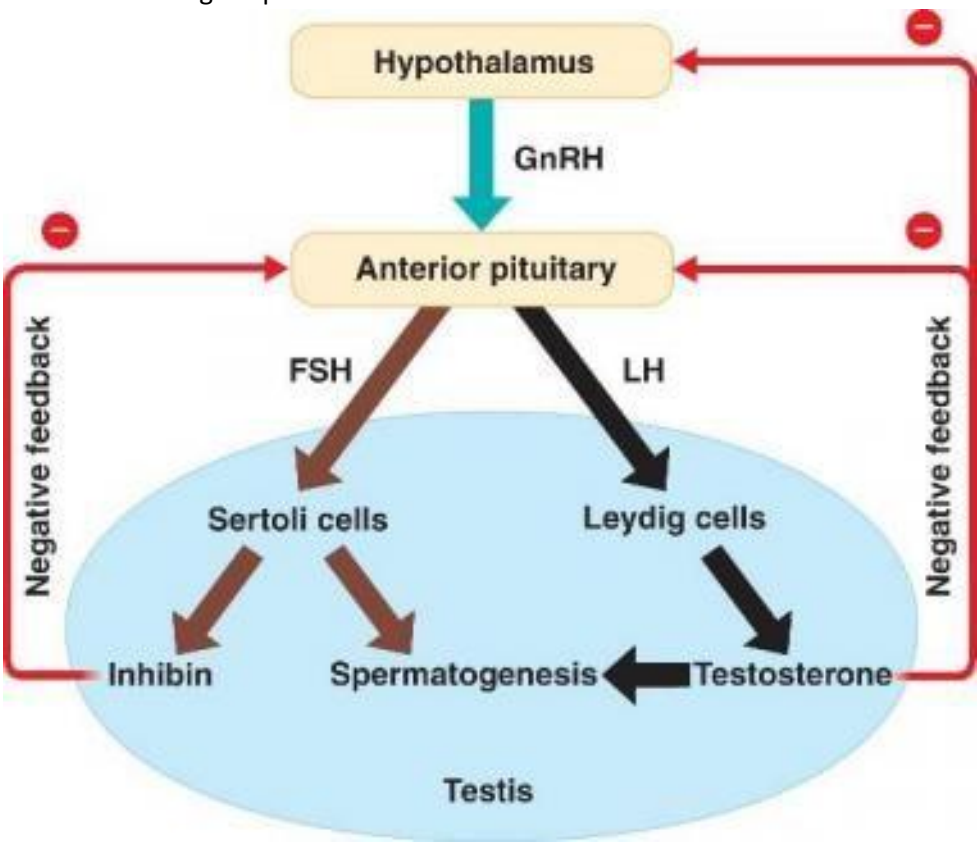
1. **Spermatogenesis (**in males) 2. **Oogenesis (**in females)

Spermatogenesis- In testes male germ cells (spermatogonia) produce sperm by spermatogenesis that begin at puberty (12-14).

- The spermatogonia (46 chromosomes) present at the inner side of seminiferous tubules multiply by mitotic division and increase in number.
- Spermatogonia forms spermatocyte that undergo meiotic division to reproduce secondary spermatocytes having (23 chromosomes).

The spermatids with head embedded inside Sertoli cells takes up nutrition from Sertoli cells and are metamorphosed into spermatozoa this process is called **Spermiogenesis**.

- Releasing of sperm in lumen of seminiferous tubules that were embedded in Sertoli cells is called **spermiation.**



Structure of sperm- sperm is a microscopic and is about 60 micro meter. The structure composed of:

1: Head: Contains Haploid Nucleus and **Acrosome** formed from Golgi Complex **& contain enzymes- Zona lysin, Corona penetrating enzyme and Hyaluronidase enzyme.**

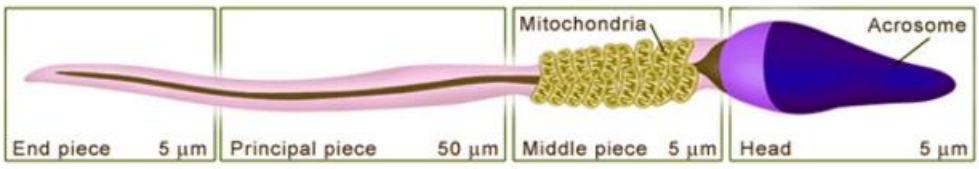
2: Neck: Contains Proximal Centriole (helps in division of zygote) & Distal Centriole (helps to develop Axial filament of tail)

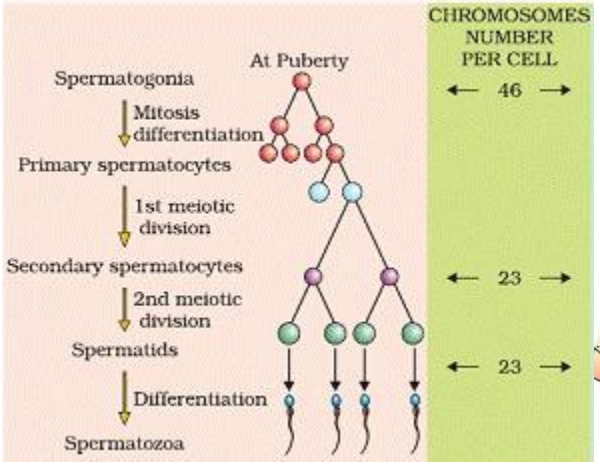
M**iddle piece:** Mitochondria (provide energy)

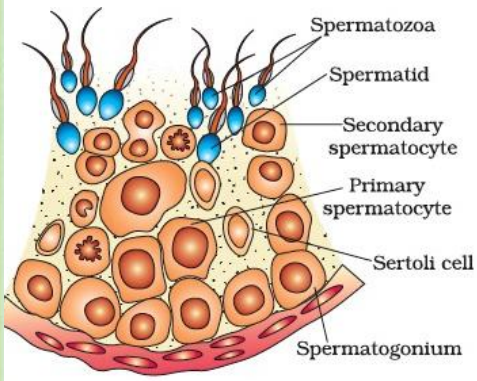
Tail: Helps sperm to swim

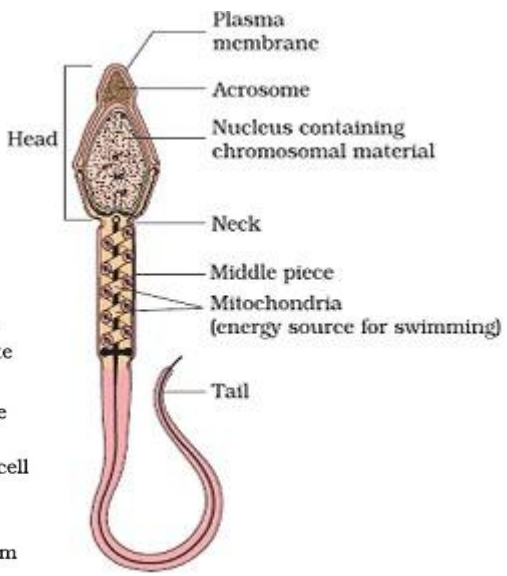
- Life span of sperm is 4-5 days.
- In one ejaculation approximately 250-300 sperms are produced.

- For normal fertility 60% should have normal shape & size and 40% should have vigorous movement.
- The seminal plasma along with the sperms constitutes the **semen**.
- The function of male sex secondary ducts and glands are maintained by **androgen hormones**.



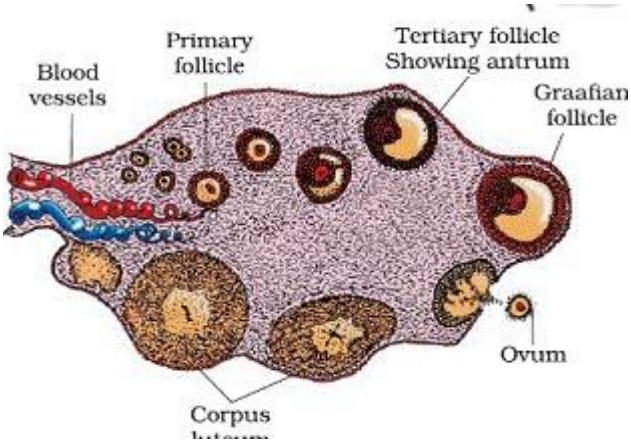




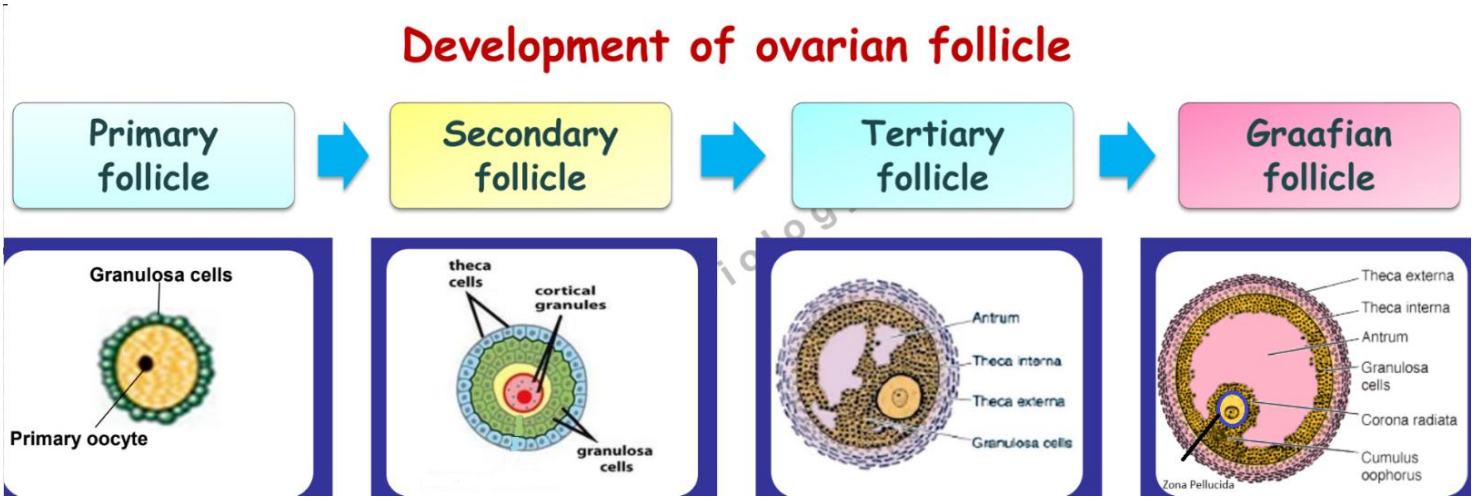


Oogenesis : The process of formation of mature female gametes is called oogenesis. It started during embryonic development stage when 2-millions of oogonia (gamete mother cells) are formed in each foetal ovary.

- No more oogonia are formed after birth.
- Oogonia multiply by Mitosis and form Primary Follicle (2n).
- In Embryonic stage only, primary oocyte starts Miosis division which is arrested at Prophase I (Diplotene) phase.
- During Embryonic period each ovary contains 2 million oocytes
- At puberty, about 60,000- 80,000 primary follicles are left in each ovary rest degenerate.



(After Puberty)- Prophase I is completed and Primary follicle divides to form secondary, tertiary and then to fully mature graafian follicle .



• Single Layer of Granulosa cells surrounding **Primary oocyte (2n)**	• Multiple layers of granulosa cells forms around **Primary Oocyte (2n).** • Single layer of theca cells starts forming. • Cortical granules starts developing in Primary Oocyte.	• Multiple layers of granulosa cells. • Zona Pellucida starts developing. • Theca start differentiating into interna and externa. • Fluid filled cavity Antrum develops. • Primary Oocyte divides into **Secondary Oocyte (n)** & first polar body (n) is formed and First Meiotic division is completed.	• Granulosa forms corona radiata around secondary oocyte. • Zona Pellucida developed. • Theca is differentiated into theca interna & externa. • Antrum increases in size. • Secondary Oocyte arrested at Metaphase II.

Fully Mature Graffian folllicle rupture on 14th Day when LH is high and release Secondary Oocyte (Ova) into fallopian Tube.