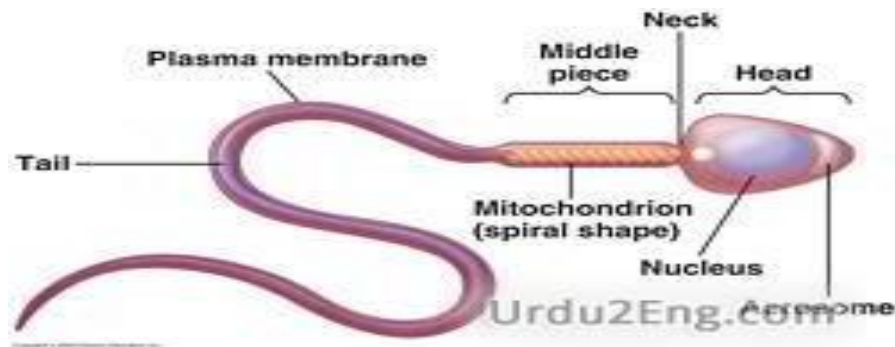
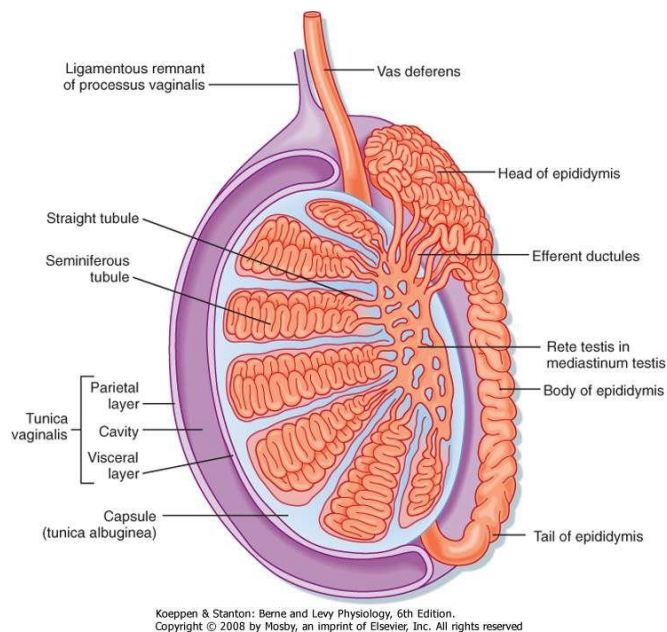


SPERMATOGENESIS

★ **Definition:** It is the processes of *production of sperms* from the male primordial germ cells.



★ **Site :** *seminiferous tubules* which are the structural unit of the testis .



★ **Age incidence :** It occurs from **puberty** (12 – 14 years) **to old age** .

★ **Condition :** low temperature (35°C) , so the testes lie outside the body .

★ **Hormonal control :** Follicular stimulating hormone (FSH) secreted by pituitary gland .

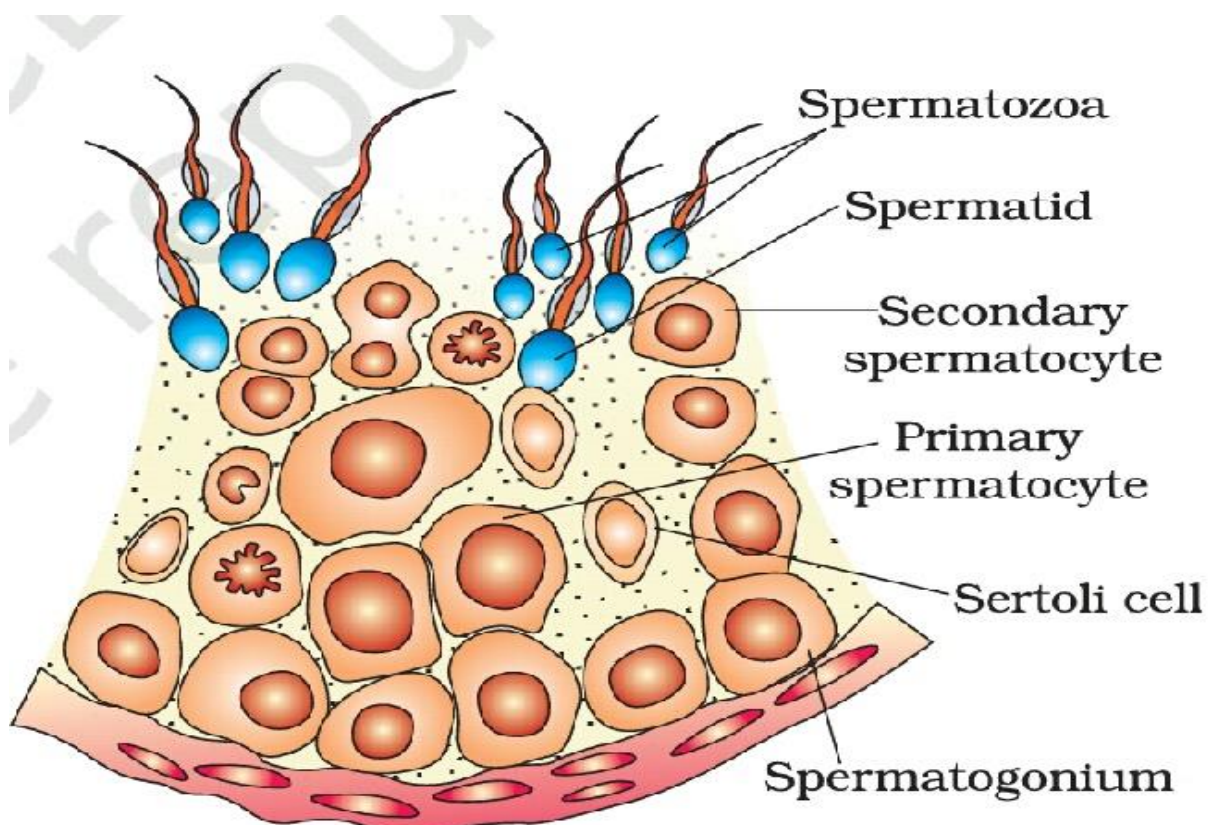
★ **Aim :**

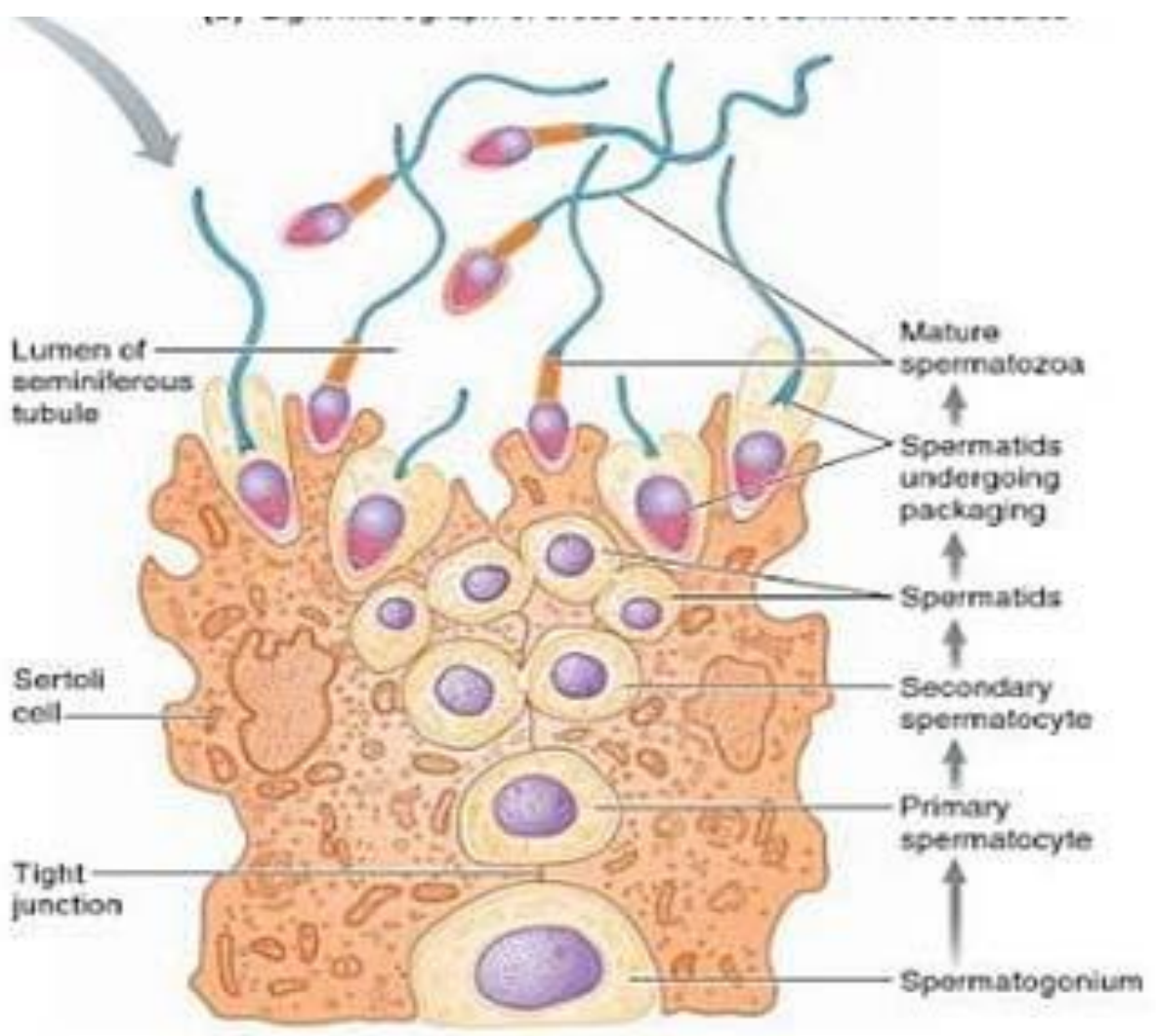
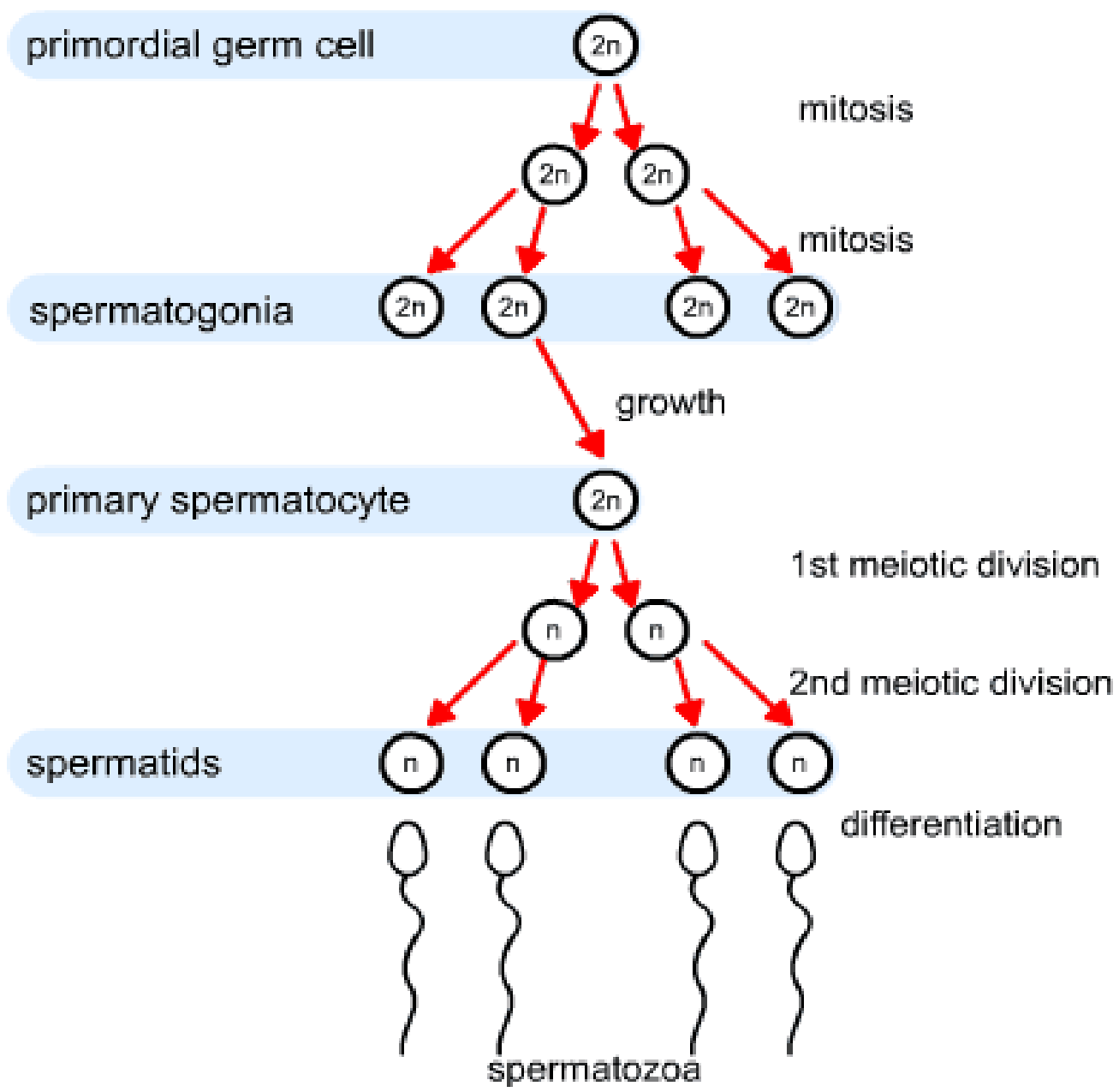
1. **Reduction** of the diploid number of chromosomes (46) to haploid number (23) by meiotic division .
2. **Morphological** changes in male primordial germ cell to produce sperm ready for fertilization of the ovum .
3. **Increase number** of cells so that each spermatogonium produce 8 -16 sperms .
4. Determination of **sex of sperms**.

★ STAGES OF SPERMATOGENESIS:

1-Spermatocytogenesis

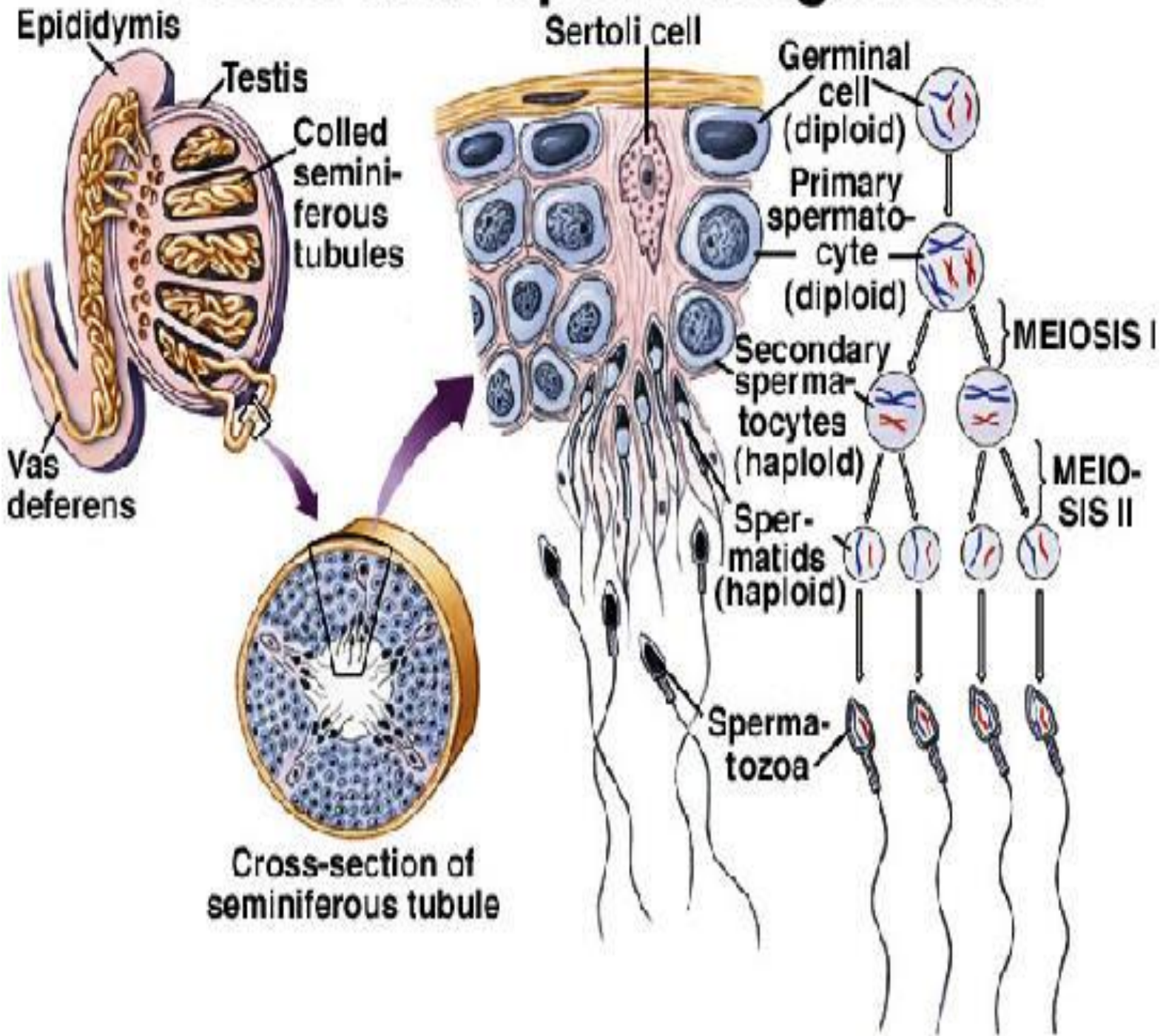
- It is the process of transformation of the male primordial germ cells to **spermatids**.
- At **puberty**, under the effect of **FSH**, the male **primordial germ cells** differentiate to **spermatogonial stem cells** which divide by **mitosis** (to increase their number of cells) to produce 2 **daughter type A spermatogonia**.
- The latter cells divide by mitosis to produce 4 **daughter type B spermatogonia**.
- Type B spermatogonia **grow** to form **primary spermatocytes** which are larger in size containing diploid number of chromosomes (44 autosomes and 2 sex chromosomes XY).
- The primary spermatocytes undergo **1st meiotic** (reduction) division and give rise to **secondary spermatocytes** which have the haploid number of chromosomes (22 autosomes and 1 sex chromosomes which may be X or Y).
- The **secondary spermatocytes** rapidly complete the **second meiotic** division to form **spermatids** which have the haploid number of chromosomes (22 autosomes and 1 sex chromosomes which may be X or Y).





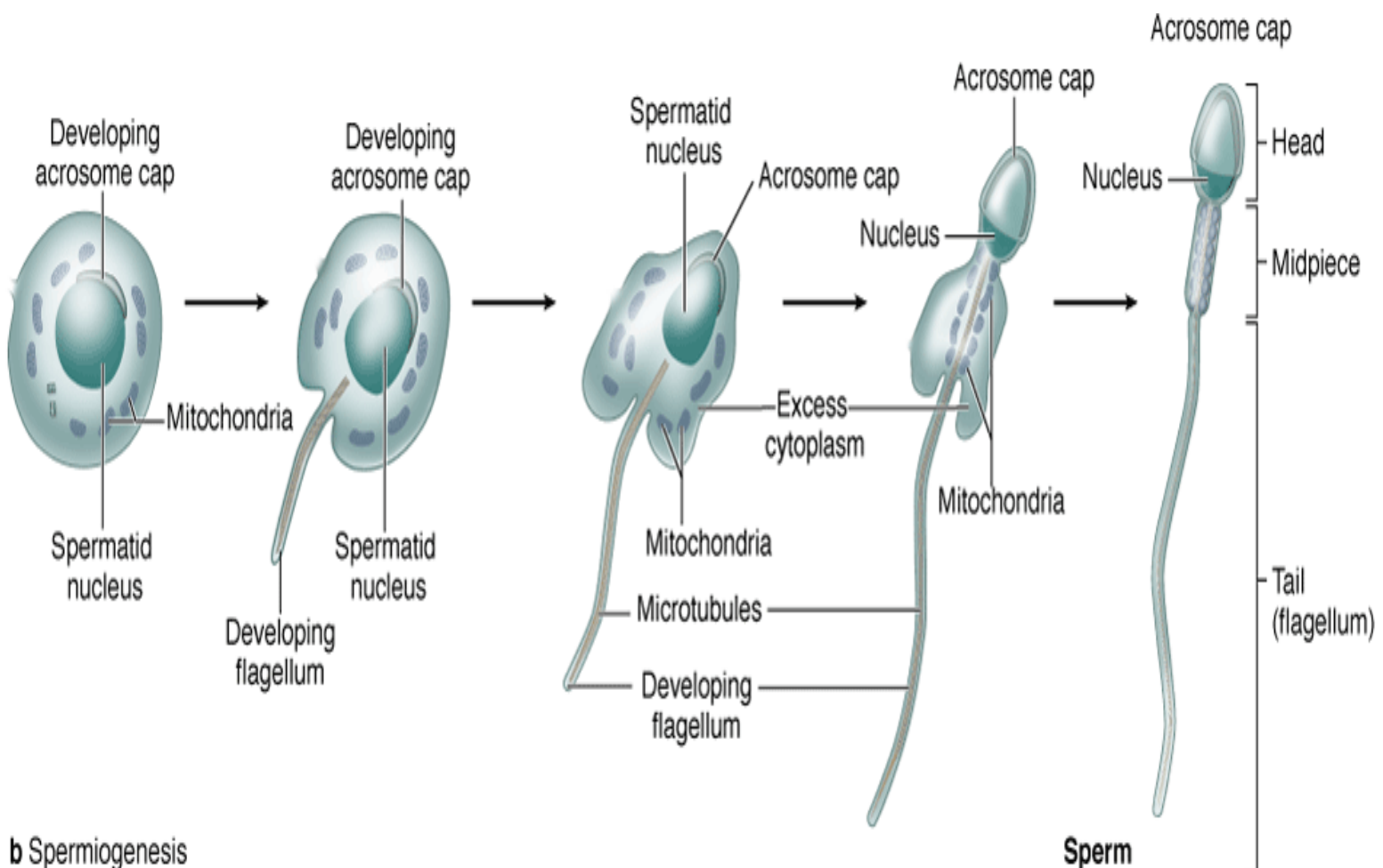
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Testis and Spermatogenesis



2-Spermiogenesis

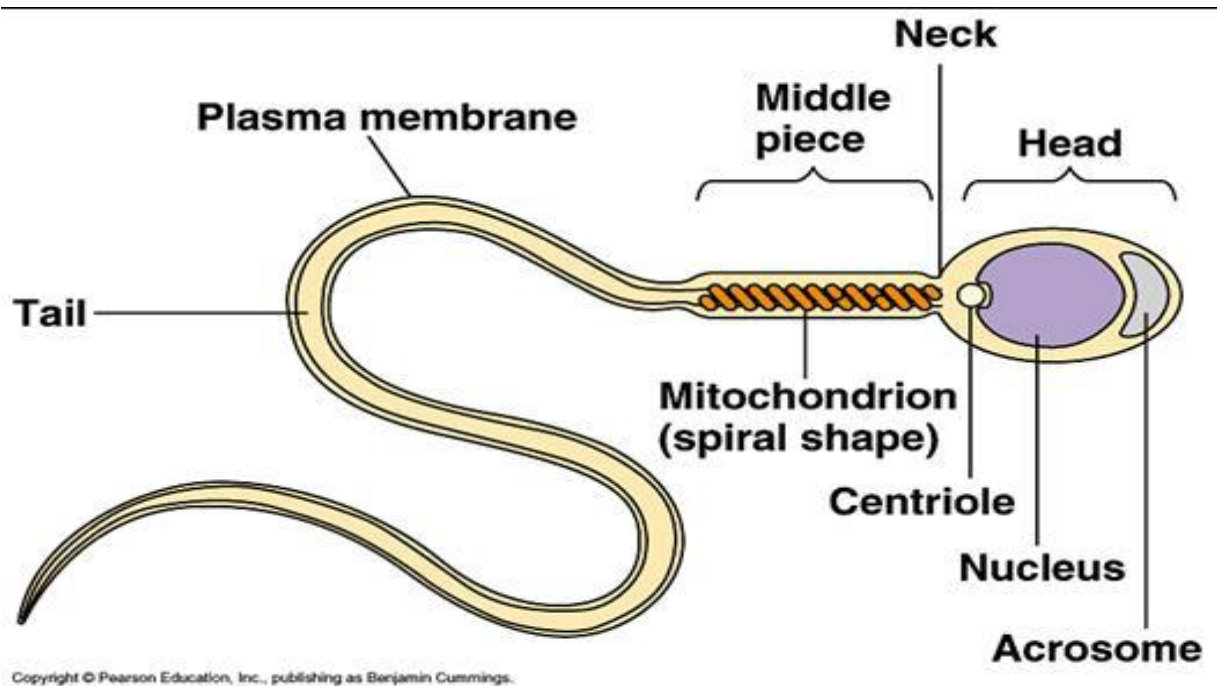
- It is the process of transformation of a **spermatid** to a **sperm**.
- The time required for spermiogenesis in man is **74 days**.
- The spermatid changes **morphologically** to be able to fertilize the ovum as follows :
 - Formation of **acrosomal cap** , which covers 1/2 of the nuclear surface , which contain enzymes to penetrate the coverings of the ovum .
 - Condensation of the nucleus, carrying genetic informations , in one end called the **head**.
 - Formation of the **neck, middle piece** (contain mitochondria give energy to the sperm) , and **tail or flagellum** (used for locomotion) .
 - Shedding of most of the **cytoplasm**.



b Spermiogenesis

Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition*: <http://www.accessmedicine.com>

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▪ **Abnormalities of the sperms:**

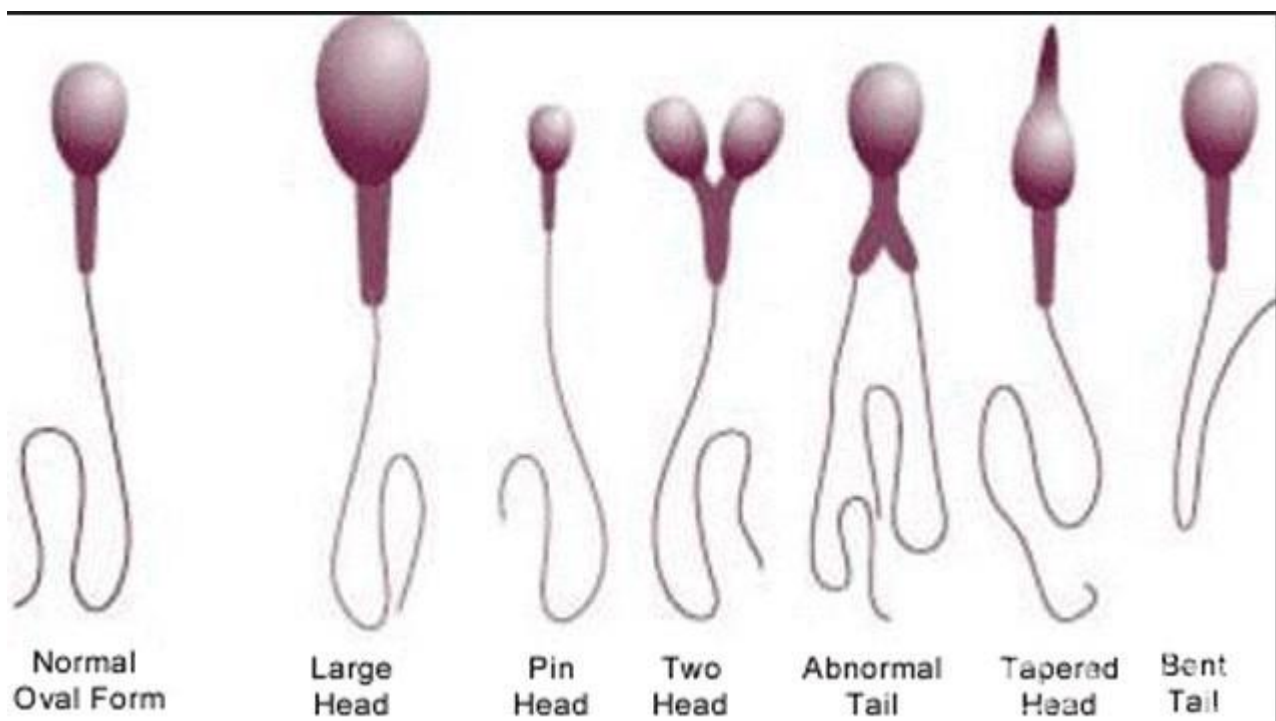
1. Abnormalities in **shape** of the sperms (double heads, large head, pin head, taper head, double tails, dwarf sperm).

2. Abnormalities in the **motility** (normally it is actively motile).

3. Abnormal sperm **count**:

- **Oligospermia** : less than 20 million/ml
- **Azospermia**: complete absence of sperms in the semen .

4. **Necrospermia** : dead sperms in the semen .



Abnormalities of sperms

Semen

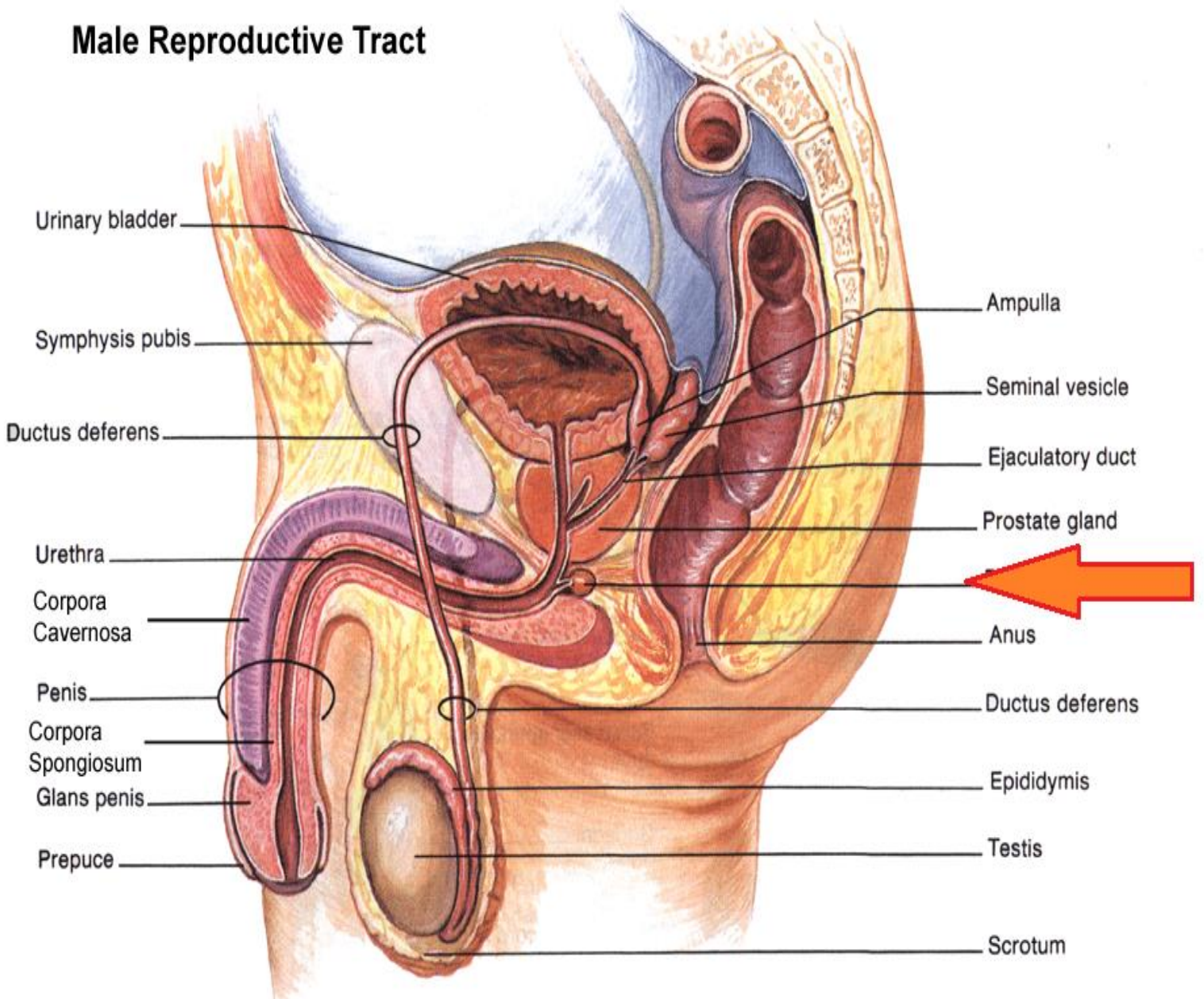
(Seminal fluid)

- ★ **Definition** : It is the fluid containing the sperms suspended in the secretions of seminal vesicles , prostate and bulbo-urethral glands .
- ★ **Characters** : thick , opaque , white , alkaline fluid which has characteristic odour .
- ★ **Volume** : 3-5 c.c per ejaculation .
- ★ **Number of sperms** : 200 -300 millions per ejaculation .
- ★ **Motility** : normally 60-70 % of sperms are motile .
- ★ Normally , **abnormal forms** of sperms do not exceed 10% of total sperm count (if more than 25 % fertility is impaired)

Transport and Fate of Sperms

- ★ The sperms leave the **testis** to reach the **epididymis** (for physiological maturation) then pass through the **vas deferens** to be **stored** in the **ampulla** of vas waiting for ejaculation .
- ★ If **ejaculation does not occur** , the stored sperms die and becomes absorbed .
- ★ When **ejaculation occurs** the semen pass through the ejaculatory ducts and **urethra** and become deposited in the **vagina** .Then the sperms ascend through the **cervix** to the **uterine cavity** to enter the **uterine tube** to reach its lateral 1/3 .
 - If **ovum** is found in the uterine tube , fertilization may occur .
 - If **no ovum** is found , the fertilizing power of sperms is lost about 48 hours after ejaculation .

Male Reproductive Tract



Modified from Van De Graaff, *Human Anatomy*, Wm. C. Brown: Dubuque, IA, 1988.

Female Reproductive System

