

Human Reproduction

classmate

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Introduction! -

Type of reproduction! - Sexual & viviparous

↓
(child giving birth)

What is Gametogenesis! - Formation of gametes
(either ♂'s or ♀'s gametes)

♂ gamete - sperms

♀ gamete - ovum/eggs.

Reproduction! - Fusion of ♂'s and ♀'s gametes is called fertilization.

Zygote! - Fertilization leading to the formation of Zygote.

Q: What is implantation?

Implantation is the event, in which Zygote develop into blastocyst and this blastocyst attached to the Uterine wall. ~~of ♀'s genital tract.~~

Gestation! - Embryonic develop^t.

Parturition! - issues/delivery of baby/child.

NOTE! - * ♂ reproductive age - After puberty throughout life.

* ♀ reproductive age - After puberty around age of 50 years.

♂'s Reproductive System

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Reproductive function of ♂ can be divided into

3 major subdivisions:-

- ① spermatogenesis, formation of sperm;
- ② Performance of ♂ sexual act;
- ③ Hormonal regulation by ♂ reproductive organs.

PHYSIOLOGICAL ANATOMY OF ♂ SEXUAL ORGANS:-

Location:- Pelvis region

* ♂ reproductive system produced sperm or sex cells or germ cells.

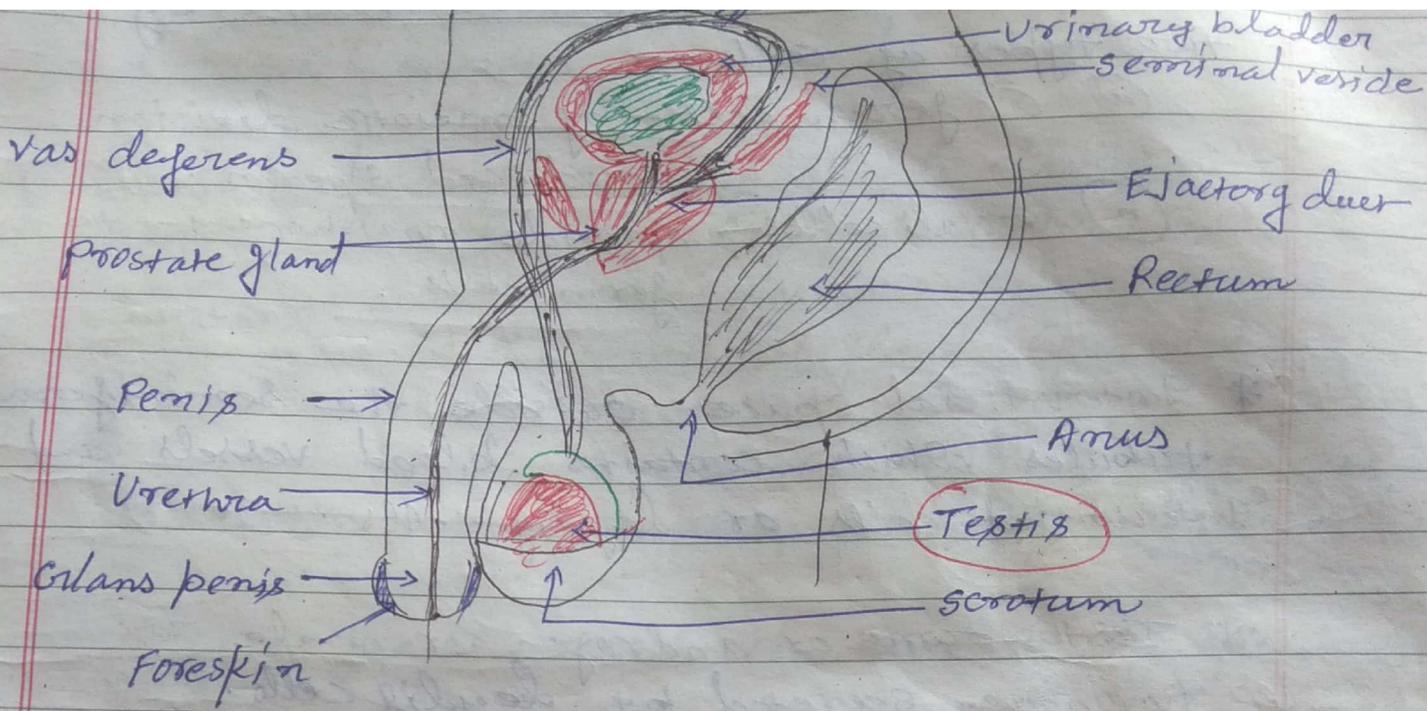
{ NOTE:- cells are of two type -

① somatic cell - differentiate to form organs

② germ cell - differentiate to form sperm and ovum also called sex cells.

There are four main parts of male reproductive system:-

- ① Testes
- ② sperm duct (Vas deferens)
- ③ Glands
- ④ Penis



Fig! - Human ♂ reproductive system.

① Testes! - No. - one pair
 Shape - oval

Location - outside the abdominal cavity
 occurring - within the cavity called scrotum.

↓
 Maintain temp^r (2 - 2.5°C
 lower the normal temp^r for spermatogenesis)

Length - 4 to 5 cm.

Width - 2 to 3 cm.

Testicular lobules - compartments of testis about 250.

* Each lobules has one to 3 seminiferous tubules

* Sperms are produced by seminiferous

* These tubules are covered inside by

two types of cells —

(a) ♂ germ cell:— by meiotic division produced sperm

(b) Sertoli cells:— provide nourishment to germ cells.

* Interstitial spaces outside the seminiferous tubules which contains blood vessels and interstitial cells or Leydig cells.

* Testosterone or androgen or male sex hormone secreted by Leydig cells.

(2) sperm duct or Accessory duct or Vas deferens :— It has four parts

(a) Rete testis

(b) Vasa efferentia

(c) Epididymis

(d) Vas deferens.

(a) Rete testis :— Through the help of rete testis seminiferous tubules are open into vasa efferentia

(b) Vasa efferentia :— open into epididymis.

(c) ~~epididymis~~ Epididymis :— leading to vas deferens
It has a duct i.e. seminal vesicle that open into urethra as the ejaculatory duct.

- * These ducts store and transport sperm.
- * Urethra originate from urinary bladder and extended through the penis.
- * Urethral meatus - opening of urethra.

③ Glands :- ♂ accessory glands having —

- seminal vesicle (paired),
- Prostate glands (single),
- Bulbourethral gland (paired).

① Seminal vesicle secretes white fluids that acts as lubricants and nutritive for sperm transport.

② Prostate gland provide the medium of sperm to swim.

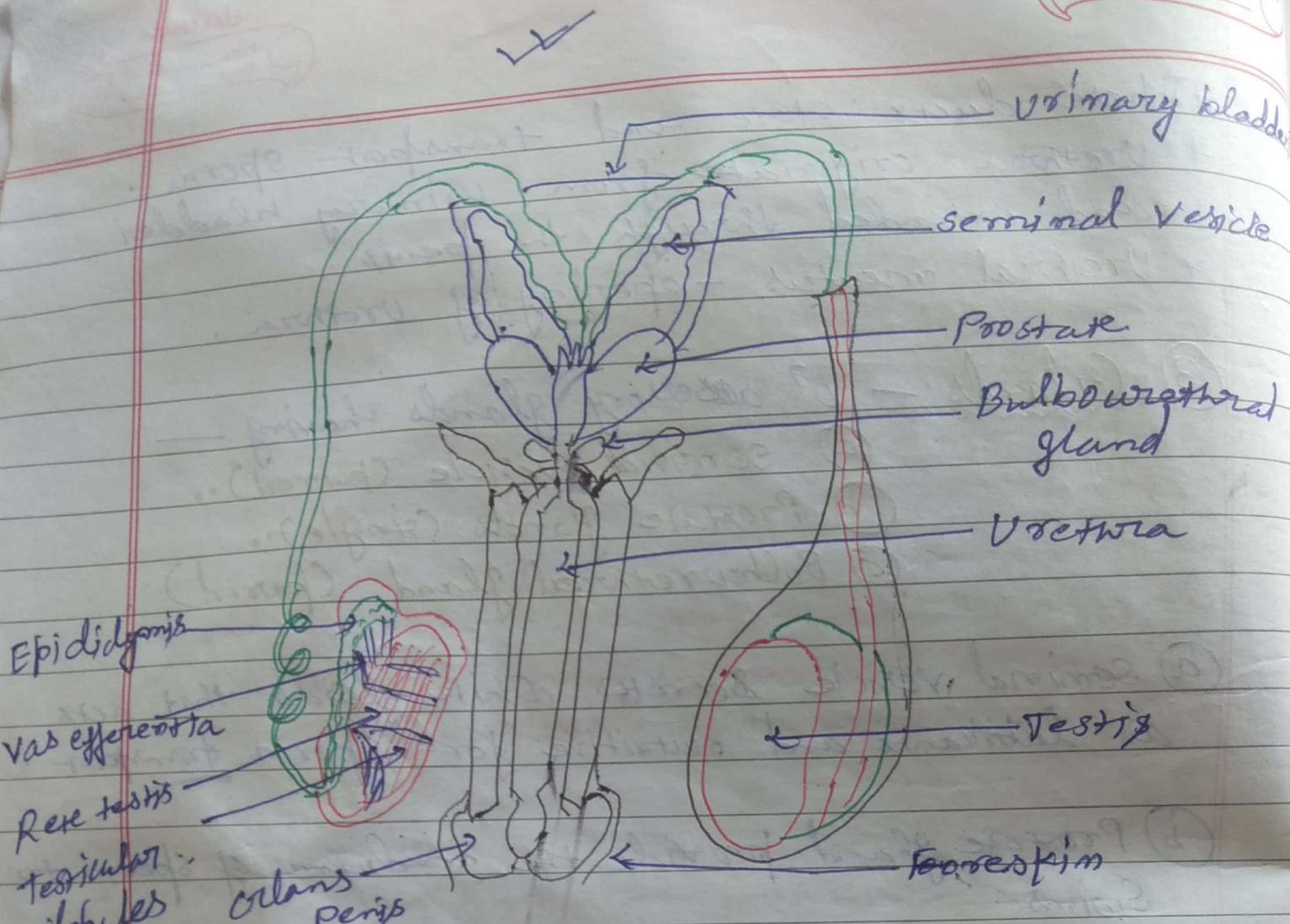
③ Bulbourethral glands also helps in the lubrication of penis.

④ Penis :- ♂ external genitalia

→ It is formed by special type of tissue that erect and enlarge the size of penis during mating due to blood flow.

→ The erection of the penis to facilitate insemination.

→ The penis end with glans penis and covered by foreskin.

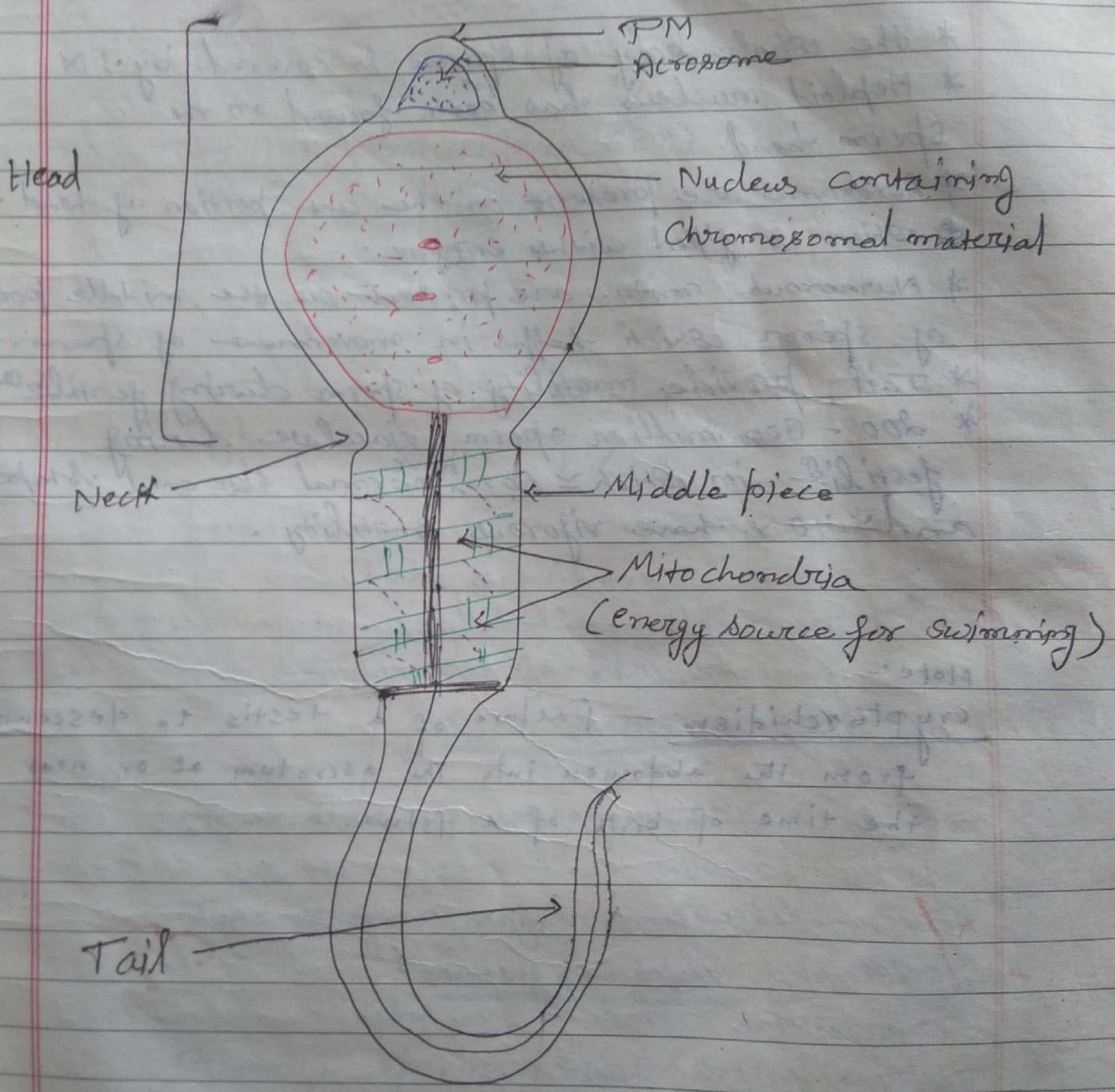


Fig! - Diagrammatic view of ♂ Reproductive system

SPERMATOGENESIS! —

* Primordial germ cells / immature germ cell produce sperm called spermatogenesis

STR. OF SPERM!



sperm has been divided into 4 parts: —

- ① Head
- ② Neck
- ③ Middle piece
- ④ Tail

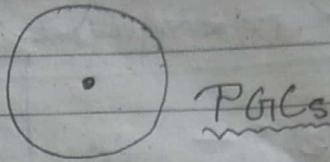
- * The whole body of sperm is covered by PM.
- * Haploid nucleus has been found on the sperm head.
- * Acrosome are present on the ant. portion of head which is filled with enzymes.
- * Numerous mito. are present on the middle part of sperm which helps in movement of sperm.
- * Tail provide motility of sperm during fertilizⁿ.
- * 200 - 300 million sperm ejaculate during fertilizⁿ in which $\approx 60\%$ have normal size and shape and $\approx 40\%$ have vigorous motility.

Note:-

cryptorchidism - Failure of a testis to descend from the abdomen into the scrotum at or near the time of birth of a fetus.

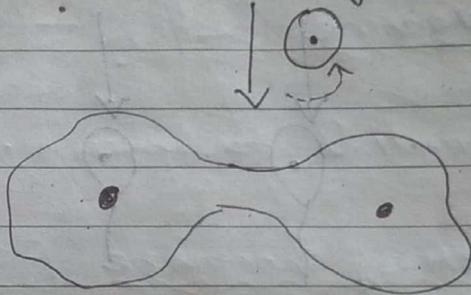
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STEPS OF SPERMATOGENESIS: —



↓
Type A spermatogonia

↓
Type A₁ Spermatogonia (2n)



↓
Type A₃ (2n)

↓
Type A₄ (2n)

↓ differentiation

Intermediate spermatogonia (2n)

↓
Type B spermatogonia (2n)

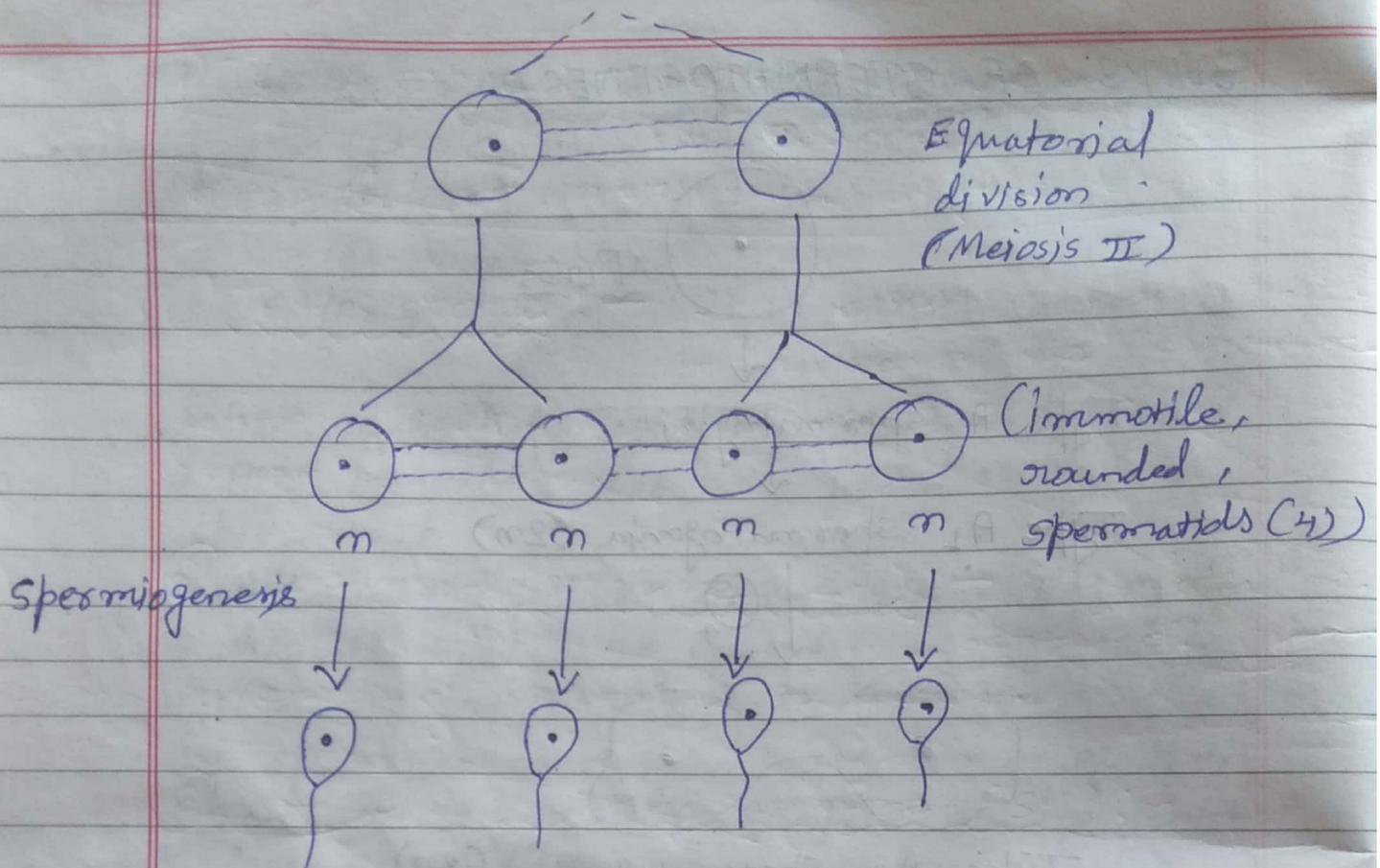
↓ Mitosis completes

Primary spermatocytes (2n)



MEIOSIS I / Reductional division

↓
2° Spermatocytes (n)



→ Spermatogenesis begins at puberty i.e. age of 13. Sperms are produced by immature male germ cells called spermatogonia, present on the inside wall of seminiferous tubules multiply by mitotic division.

→ Type A spermatogonia divide to form Type A₁ spermatogonia that differentiate to form Intermediate and Type B spermatogonia. Each spermatogonia are diploid and contain 46 chromosomes. Finally mitosis complete and 1^o spermatocytes forms.

→ Resulting 1^o spermatocytes undergoes two meiotic division. In 1st meiotic division 2 equal haploid 2^o spermatocytes produced, that

contain only 23 chromosomes. After 2nd meiotic division 4 haploid spermatid formed which are connected with cytoplasmic bridge.

→ During differentiation of spermatid into spermatozoa these cytoplasmic connection disappear.

→ After spermiogenesis, sperm heads become embedded in the Sertoli cells, and release from the seminiferous tubules and this process is called spermiation.

ROLE OF HORMONES DURING SPERMATOGENESIS

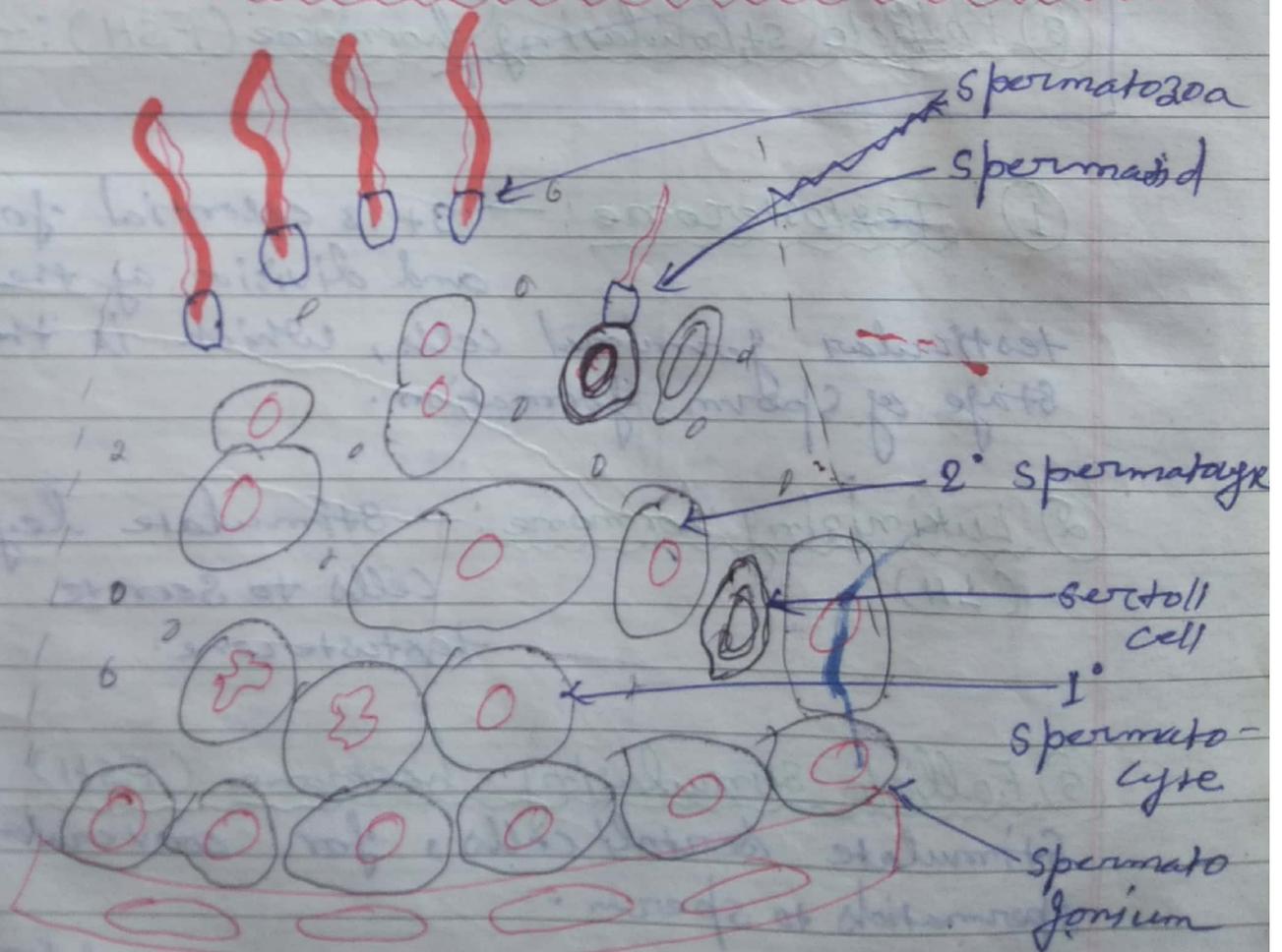


Fig: - sectional diagram of seminiferous tubules.

① Testosterone : — It is essential for growth and division of the testicular germinal cells, which is the 1st stage of sperm formation.

② Luteinizing hormone (LH) : — Stimulate Leydig's cells to secrete testosterone.

③ Follicle Stimulating hormone (FSH) : — Stimulate Sertoli cells, for conversion of spermatids to sperm.

Estrogen : — Formed by testosterone of Sertoli cells. It is also essential for spermiogenesis.

⑤ Growth hormone (GH) :- GH promotes early division of spermatogonia.

