

Chapter 11

Reproduction

"The ability of organism to produce new offspring of its own type is called reproduction."

- It's functional at a certain age → Puberty
- reproduction is not necessary for survival of individual
- Necessary for the survival of species.

Human Reproduction:

- Human is dioecious (unisexual) specie
 - Major steps of sexual reproduction
- ① Gametogenesis → formation of gametes
 - sperm → spermatogenesis
 - egg/oovum → oogenesis
 - ② Fertilization: → fusion of gametes that leads to zygote formation
 - ③ Development of zygote (simplex) into adult (very complex)
- Internal fertilization lead to complete internal development.

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Male reproductive System:-

- Structure and function of male reproductive system → Male
- A pair of testis (Gonads) Genitalia
- Accessory duct
- Accessory gland
- Copulatory organ

Gonads (testes)

- Present outside body
- present in sac $\rightarrow$ scrotum
- 250 - 300 lobules/testis
- In each lobule 1-4 seminiferous tubules
- Each testis contain 1000 seminiferous tubules

$\rightarrow$ Accessory Glands:-

$\rightarrow$ Prostate gland $\rightarrow$ Provides lubrication for sperms

$\rightarrow$ Bulbourethral gland (Cowper's gland) $\rightarrow$ release alkaline solution to neutralize acid

The length of seminiferous tubules is 50 cm how it is fitted into testis?
 $\rightarrow$ They are highly coiled

Q: Why pair of testes is situated outside the body?

Ans: Human body temperature = 37°C

- Production of sperms needs 35°C temp that's why they are present

Q: What is the site of spermatogenesis?

Ans: Seminiferous tubules

- one ejaculation $\rightarrow$ 2-5 ml of semen release

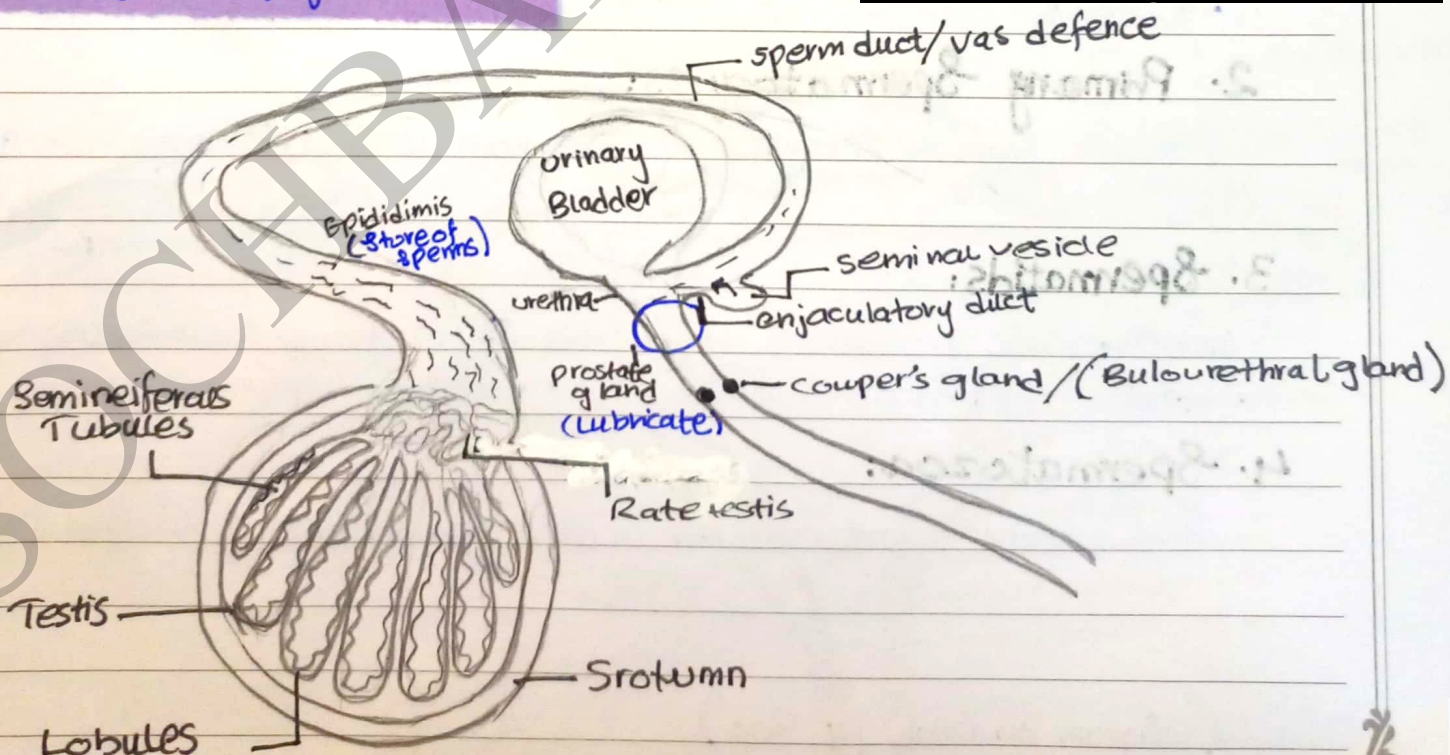
- 1 ml contains 20-150 million sperms

- Less than 20 million condition called oligospermia $\rightarrow$ Infertile

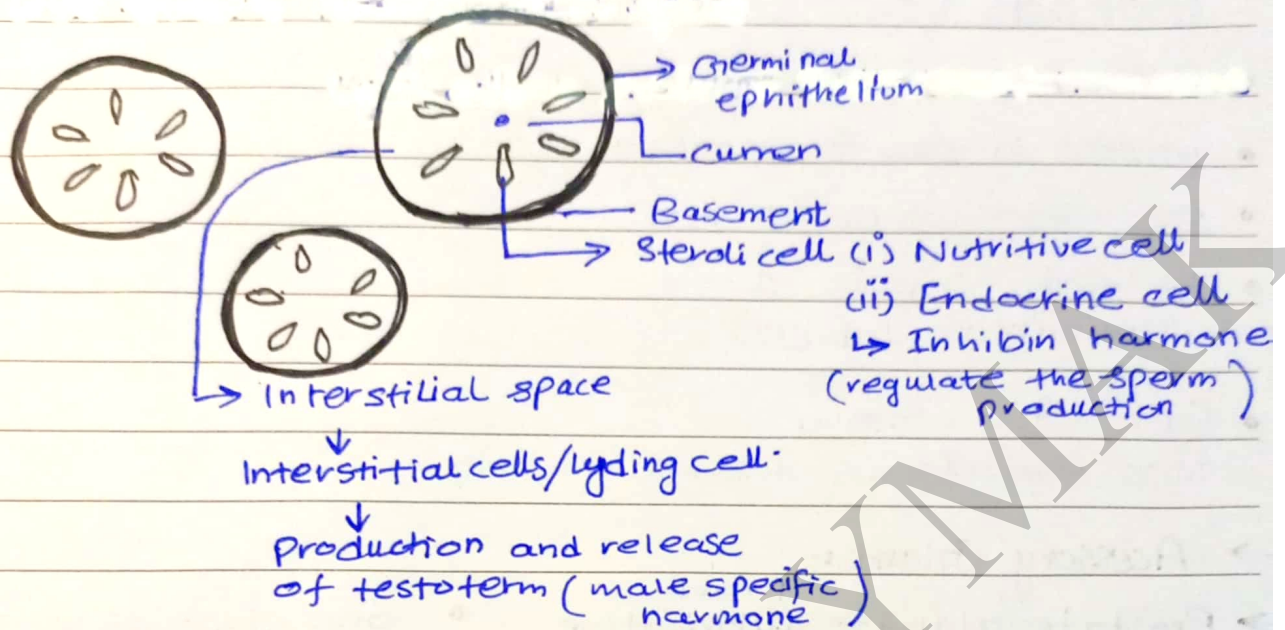
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Structure of Semiferous tubules:-



Spermatogenesis:-

Spermatogenesis is the process of sperm cells development, occurring in the testis. It involves several stages.

1. Spermatogonia (Stem cells):

these are initial germ cells $\rightarrow$ seminiferous tubules
 $\rightarrow$ undergo mitosis $\rightarrow$ more spermatogonia/spermatocytes

2. Primary Spermatocytes:

Formed from spermatogonia $\rightarrow$ meiosis I (n) $\rightarrow$ meiosis II
 $\downarrow$
four haploid (n) spermatids

3. Spermatids:

Intermediate products of meiosis II $\rightarrow$ trans. spermatogenesis
 $\rightarrow$ develop into mature cells. sperm cells $\rightarrow$ (spermatozoa)

4. Spermatozoa:

Final mature sperm cells $\rightarrow$ with head, midpiece and tail.

(Diagram on book pg 300)

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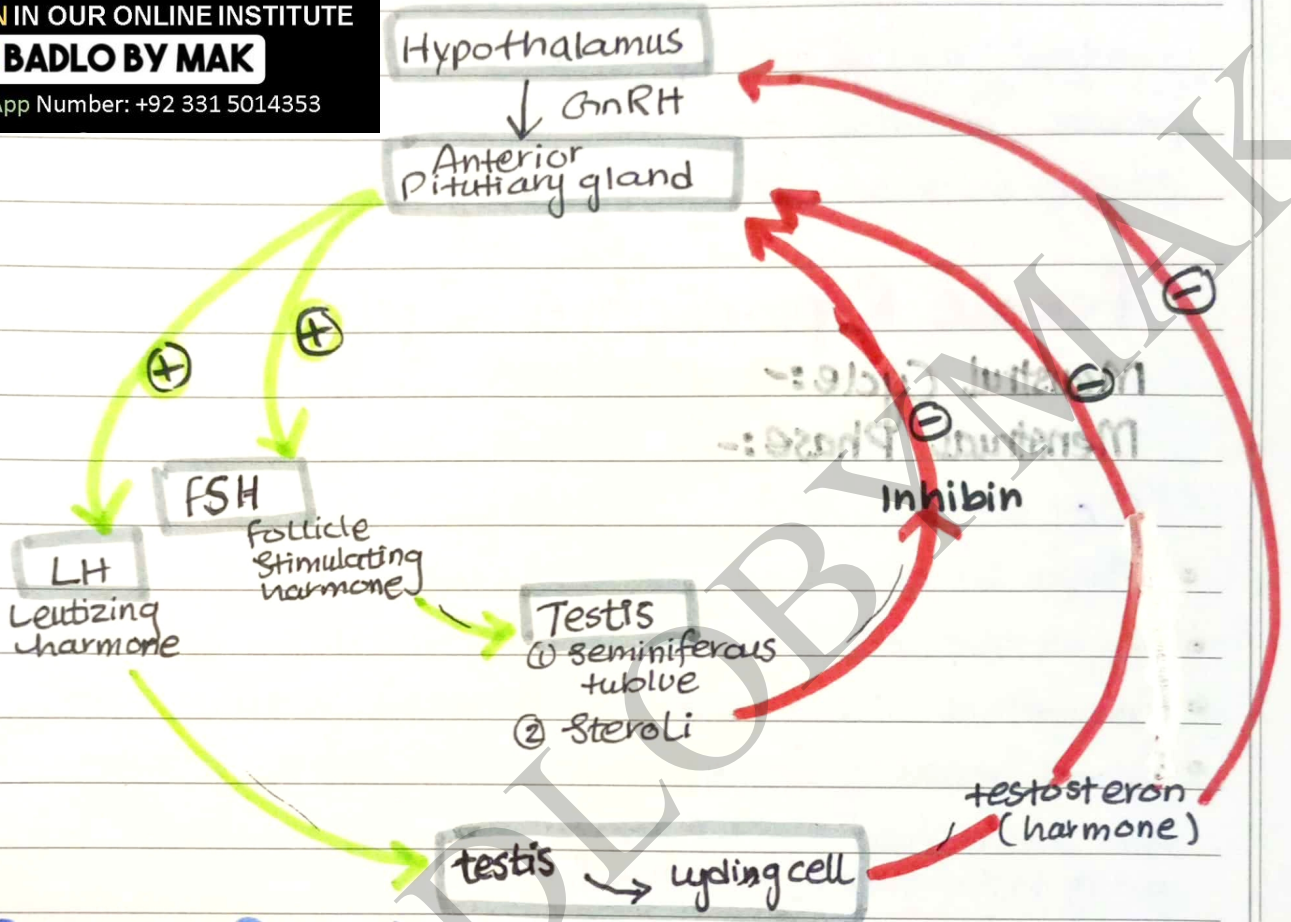
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Harmonal Control of Male Reproductive Function

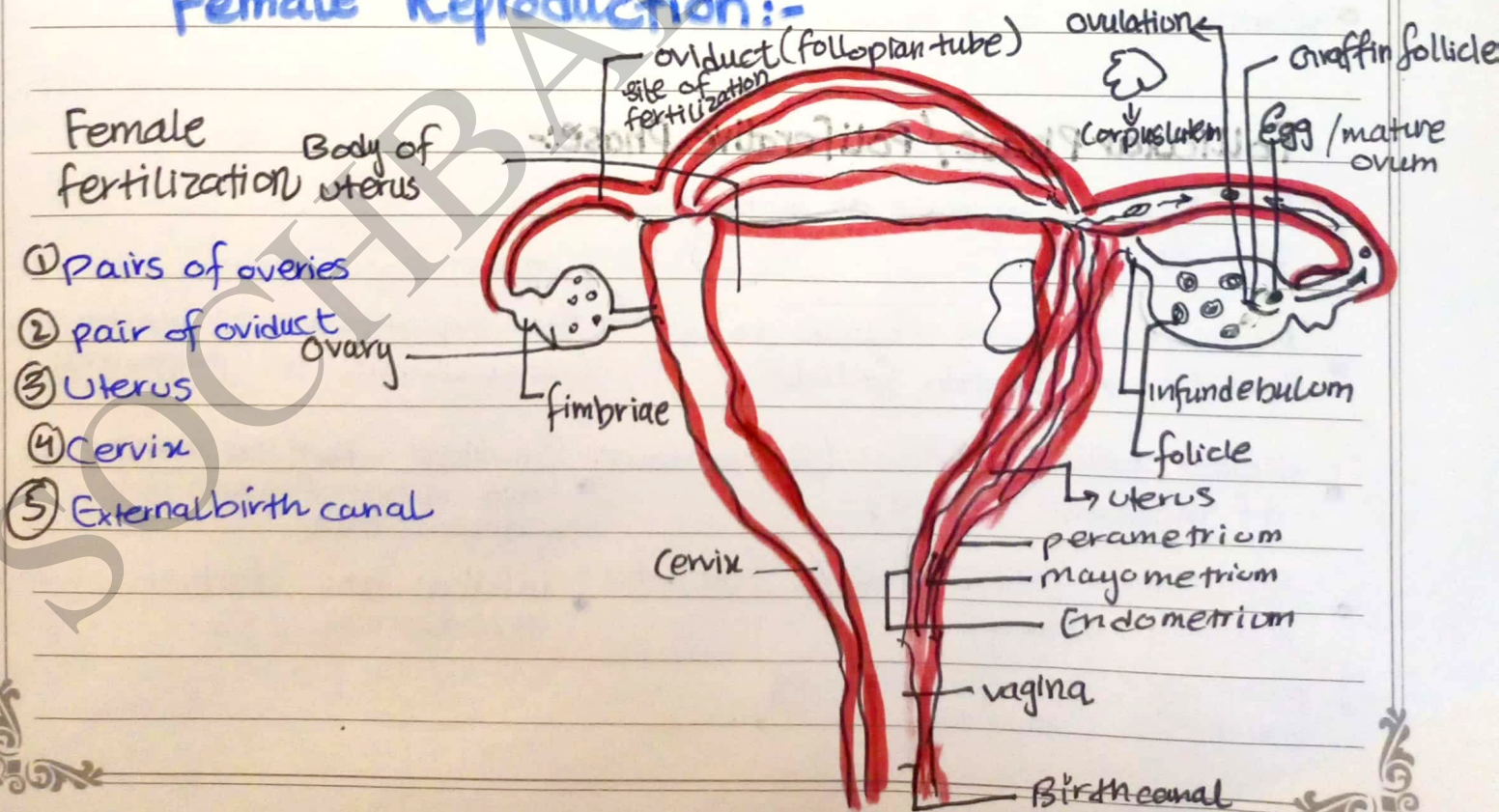
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Female Reproduction:-



Male Vs Female Reproductive Process:-

Male reproductive processes, such as spermatogenesis, continue throughout life, while female reproductive process, including oogenesis, have a finite lifespan, typically ceasing in the late 40's to early 50's.

Female Reproductive Cycle

Menstrual Phase:-

(Day 1-5)

- Corpus luteum degenerate
 - Progesterone secretion is dropped
 - Endometrial lining sheds
 - Blood vessels shed off
- and are release out of the body in the form of menstrual flow
- Continue to 3-7 days

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Follicular Phase / Proliferative Phase:-

- ① FSH • Stimulate the release of more than one follicle
 - Promote only one follicle to be mature → Graafian follicle
 - causes follicle atresia (Breakdown of immature follicle)
 - Stimulate Graafian follicle (GF) to secrete estrogen
 - ② Estrogen • promotes the process of oogenesis within GF
 - prepare the uterus wall for implantation of blastophyte (establishment of pregnancy)
 - Stimulate the vascularization and development of endometrium
 - Inhibit the further secretion of FSH.
- negative influence

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Ovulation Phase:-

Generally occurs at the mid of the cycle

- High concentration of estrogen } stimulate the anterior pituitary to secrete L.H
- Low concentration of FSH }
- L.H causes the G.F to be ruptured and the
- release of developing ovum (egg)

Luteal Phase / Post ovulatory phase :-

- It converts the ruptured follicle in yellow ~~aster~~ glandular mass (corpus luteum) → Luteinization
- L.H stimulate the corpus luteum to secrete progesteron
- Progesteron further prepare the endometrium for establishment of pregnancy (conception and maintain it)
- If fertilization does not occur corpus luteum degenerates