Unit 6 · Reproductive System – Notes

1 · Introduction

The reproductive system is responsible for **generation of new life**, involving production of gametes, fertilization, and development of offspring. It is tightly regulated by **endocrine control (hypothalamic–pituitary–gonadal axis)** and exhibits **sexual dimorphism**.

PART A · MALE REPRODUCTIVE SYSTEM

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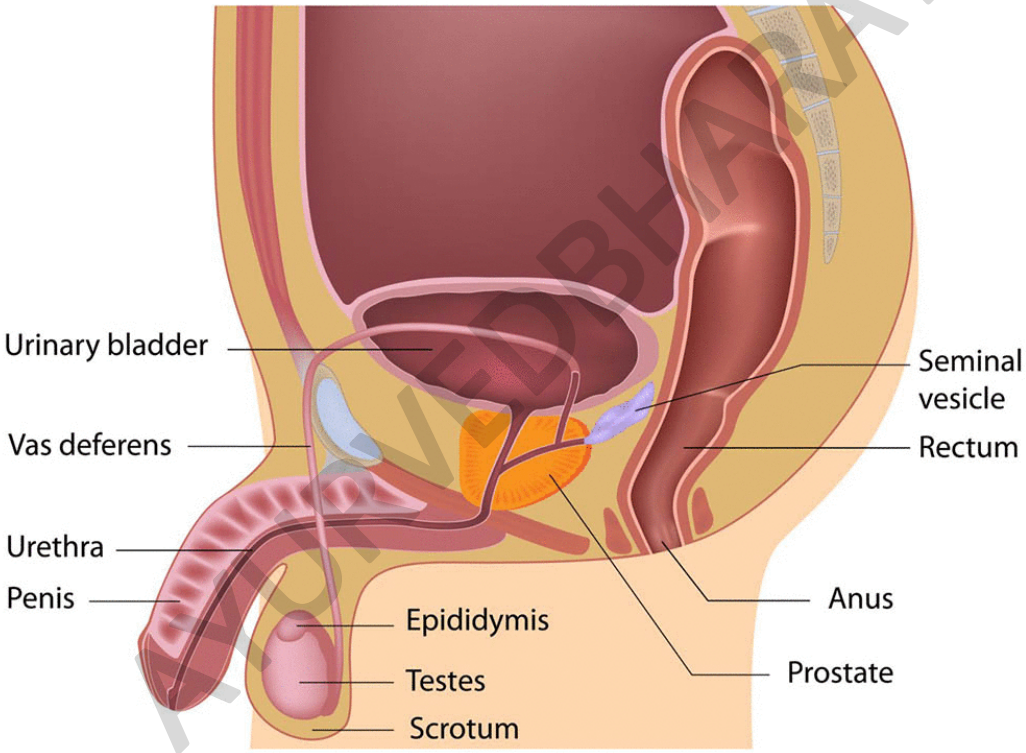
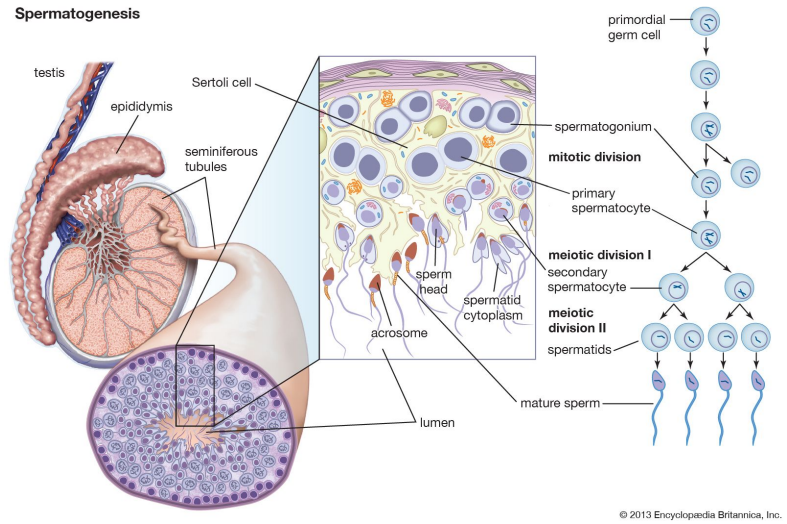
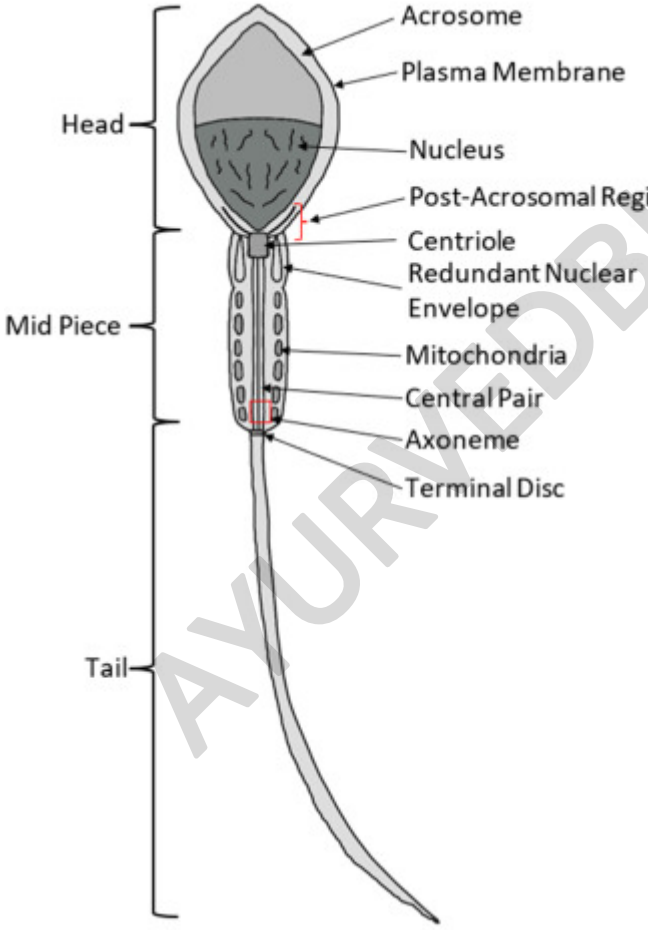
2 · Structure







Organ	Function
Testes	Sperm production, testosterone secretion
Epididymis	Sperm maturation & storage
Vas deferens	Transport of sperm
Seminal vesicles	Seminal fluid (fructose rich)

Organ	Function
Prostate gland	Alkaline secretion
Penis	Copulation and sperm delivery

3 · Spermatogenesis

- Occurs in seminiferous tubules
- Duration: ~64–74 days

Stages:

1. Spermatogonia →
2. Primary spermatocytes →
3. Secondary spermatocytes →
4. Spermatids →
5. Spermatozoa

4 · Hormonal Regulation (Male)

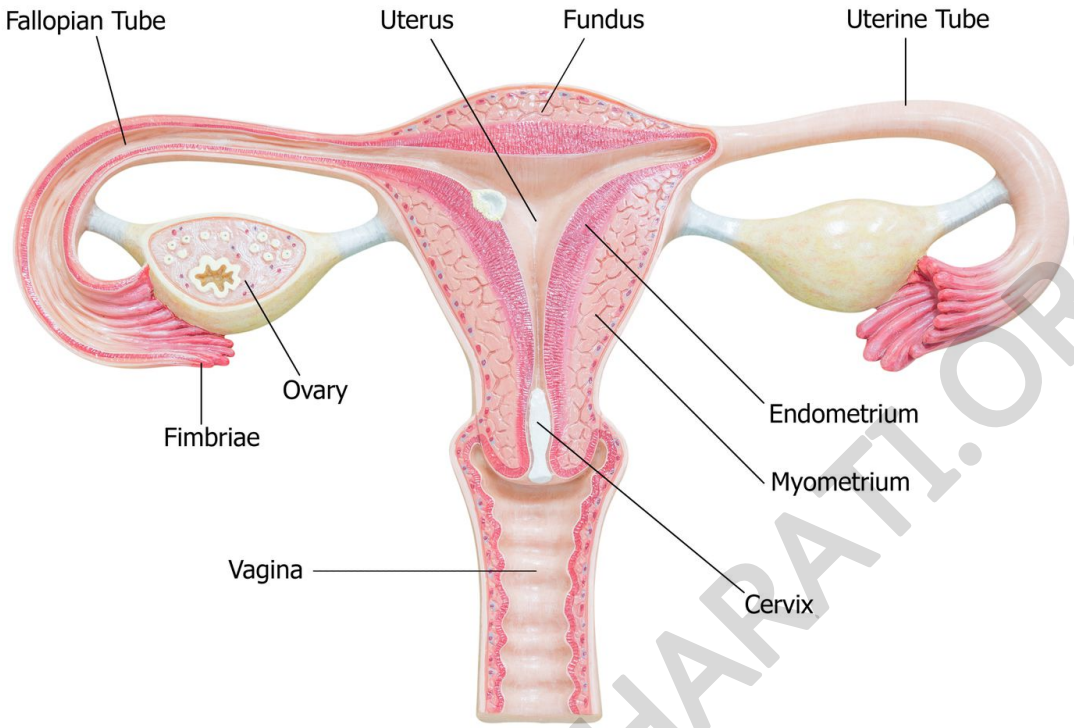
Hormone	Source	Function
GnRH	Hypothalamus	Stimulates pituitary
LH	Pituitary	Stimulates Leydig cells → Testosterone
FSH	Pituitary	Stimulates Sertoli cells
Testosterone	Testes	Secondary sexual characters, spermatogenesis

5 · Semen

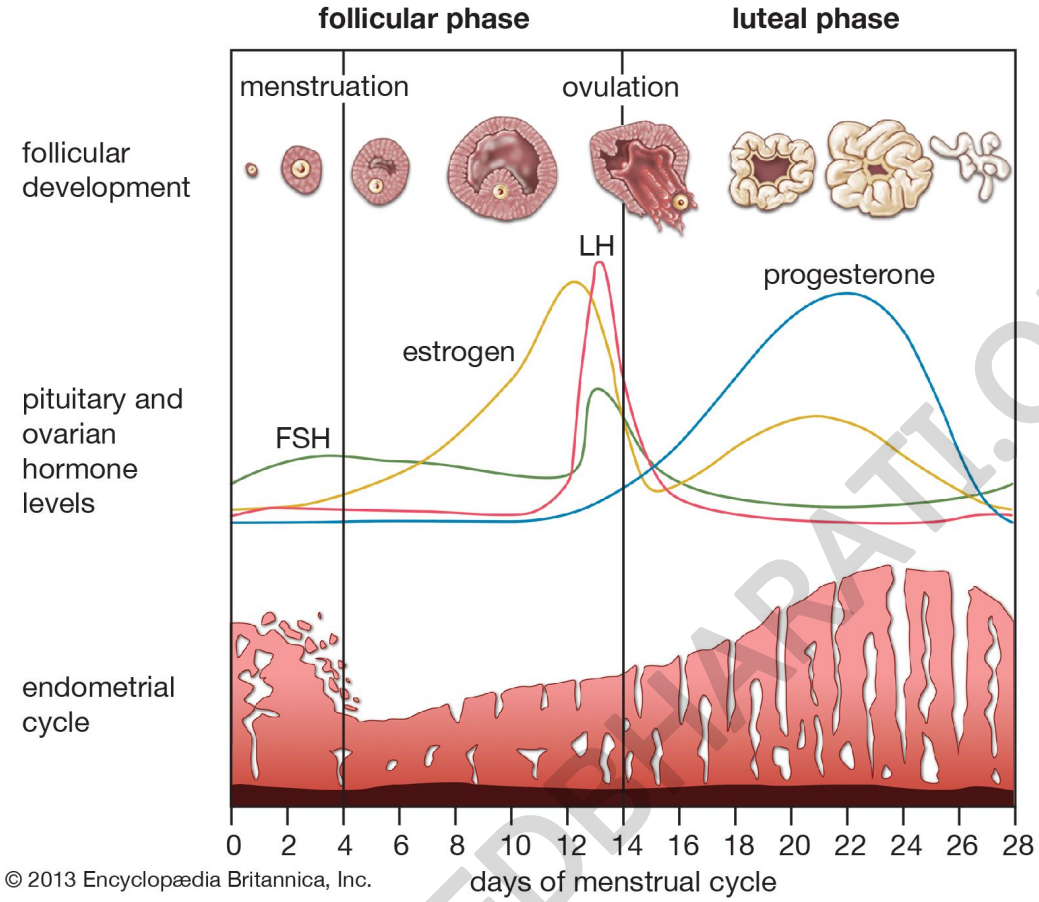
- Volume: ~2–5 mL
- Components: sperm + seminal plasma
- Functions:
  - Nutrition (fructose)
  - Protection (alkaline pH)
  - Mobility

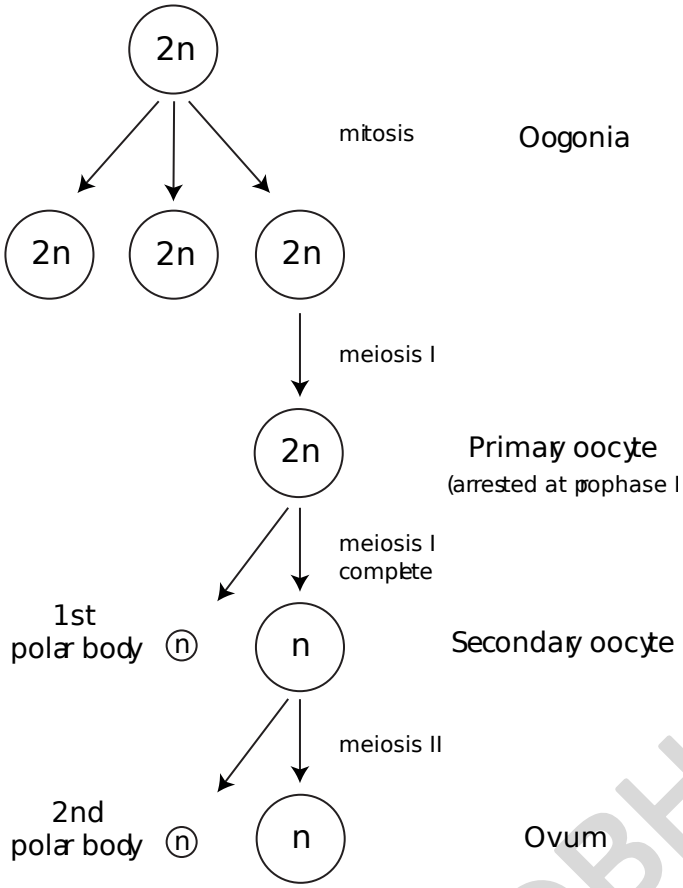
PART B · FEMALE REPRODUCTIVE SYSTEM

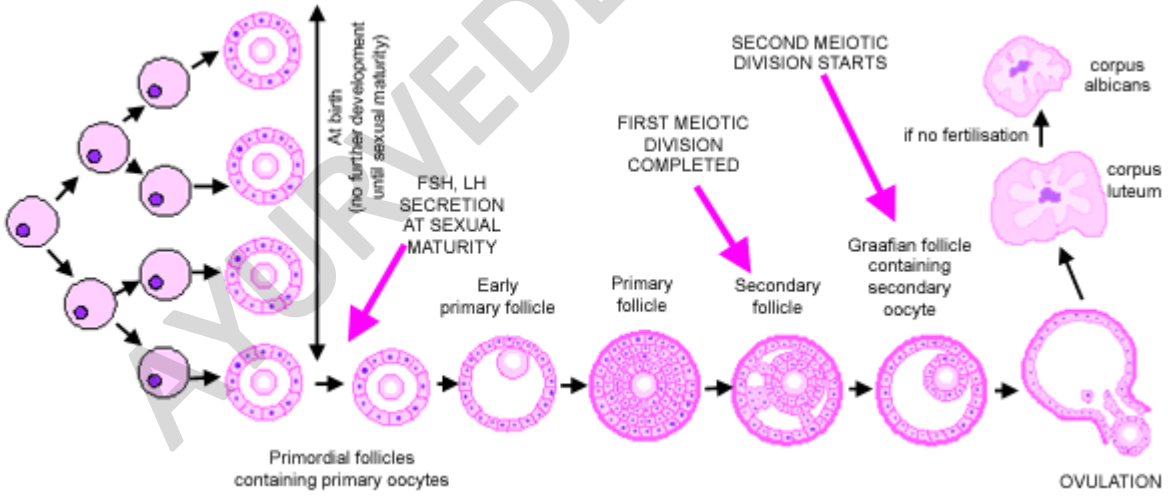
6 · Structure



The menstrual cycle







Organ	Function
Ovaries	Ovum production, hormone secretion
Fallopian tubes	Site of fertilization
Uterus	Fetal development
Vagina	Birth canal
External genitalia	Protection

7 · Oogenesis

- Begins before birth
- Primary oocytes arrested in prophase I

Stages:

1. Oogonia →
2. Primary oocyte →
3. Secondary oocyte →
4. Ovum

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8 · Menstrual Cycle

Phases:

Phase	Events
Menstrual (Day 1–5)	Shedding of endometrium
Follicular (Day 6–14)	Follicle growth
Ovulation (~Day 14)	Release of ovum
Luteal (Day 15–28)	Progesterone dominance

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9 · Hormonal Regulation (Female)

Hormone	Function
GnRH	Stimulates pituitary
FSH	Follicle development
LH	Ovulation
Estrogen	Secondary sexual characters
Progesterone	Maintains pregnancy

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10 · Fertilization & Pregnancy

- Fertilization occurs in **fallopian tube**
- Zygote → Blastocyst → Implantation in uterus

Placenta Functions:

- Nutrient exchange
- Hormone production
- Waste removal

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11 · Lactation

Hormone	Function
Prolactin	Milk production
Oxytocin	Milk ejection

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12 · Clinical Correlation

Condition	Cause
Infertility	Hormonal imbalance, structural defects
PCOS	Hormonal disorder
Endometriosis	Ectopic endometrial tissue
Erectile dysfunction	Vascular/neurological causes
Amenorrhea	Absence of menstruation

13 · Integration with Endocrine System

- Reproductive system is controlled by **HPG axis**
- Feedback regulation maintains hormonal balance
- Nutrition, stress, and lifestyle significantly influence fertility

14 · Key Takeaways

1. Reproductive system ensures **continuity of species**
2. Gametogenesis differs in males and females
3. Hormonal control is central to function
4. Menstrual cycle reflects **cyclical endocrine changes**
5. Fertilization and pregnancy require coordinated physiology

Self-Assessment

1. Explain spermatogenesis and its regulation.
2. Describe phases of menstrual cycle.
3. Explain hormonal control of reproduction.
4. Describe fertilization and implantation.
5. Discuss role of placenta in pregnancy.