



جامعة الأزهر - غزة
AL-AZHAR UNIVERSITY-GAZA



Male reproductive system





Functions of Sertoli cells

- Nourishing and protective role: For sperms Nutrient is Glycogen
- Phagocytic role: engulf residual debris of spermatogenesis
- Formation of blood testis barrier: It is the tight junction of Sertoli cells & function to:
 - ❖ Keep composition of seminiferous tubular fluid formed by Sertoli cells
It differs from plasma:
 - ✓ More K^+ , androgen & estrogen
 - ✓ Less protein & glucose
 - ❖ Prevent antigenic products of spermatogenesis to pass to blood → immune response
 - ❖ Prevent toxic and noxious agent from blood to pass to tubular fluid





Functions of Sertoli cells

- Secreting role:

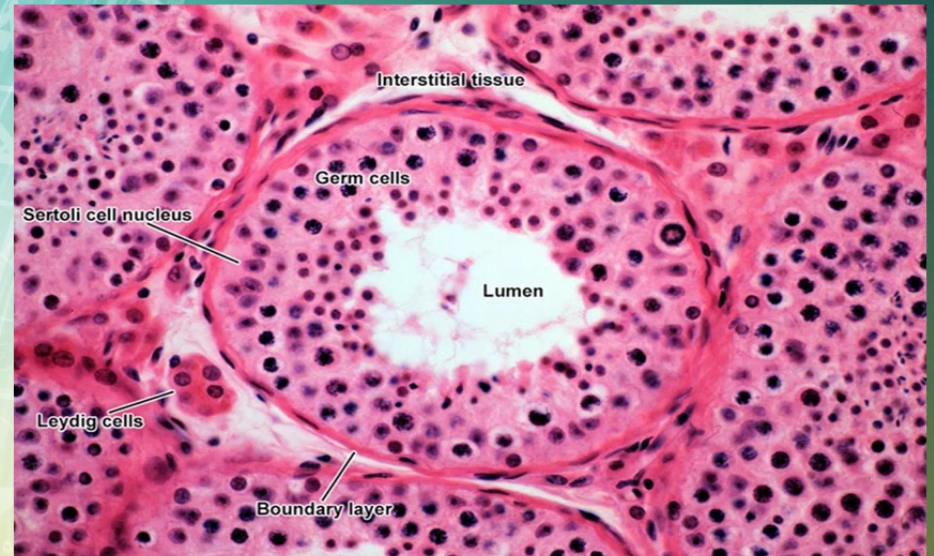
- ❖ Hormones

- ✓ Androgen binding protein ABP
 - ✓ Mullerian inhibiting substance MIS
 - ✓ Activins ++ FSH
 - ✓ Inhibin – FSH
 - ✓ Estrogen

- ❖ Aromatase enzyme: converts androgen to estrogen

- ❖ Proteolytic enzymes: dissolve tight junctions

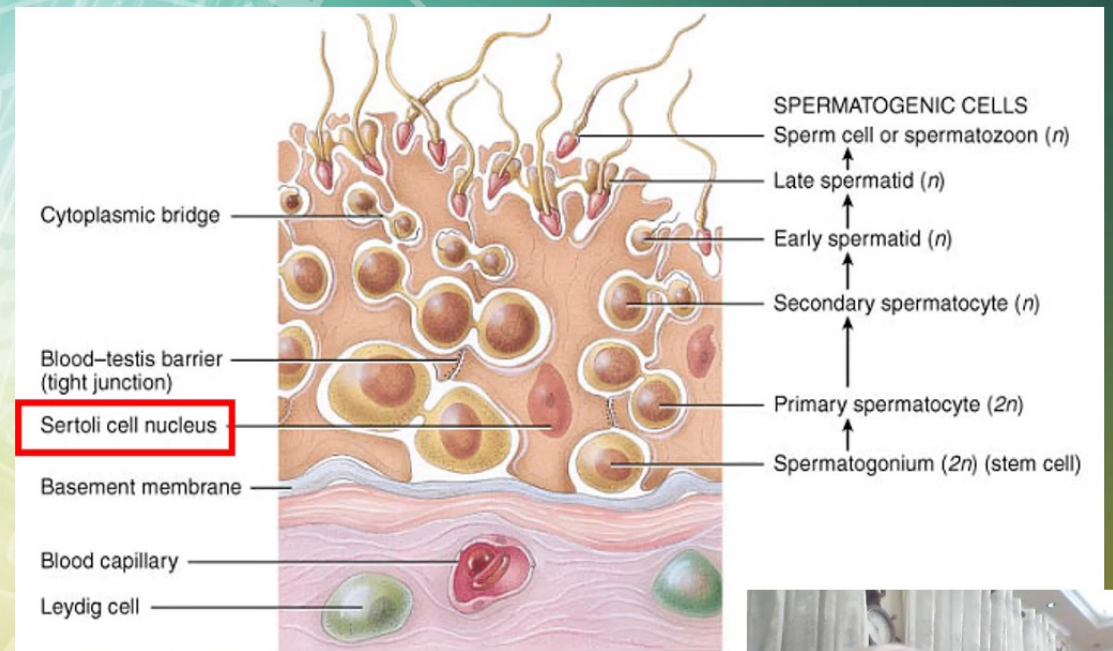
- ❖ Tubular fluid rich in K^+ .





Sertoli Cells and Sperm Cells

- Sertoli cells -- extend from basement membrane to lumen
 - form blood-testis barrier
 - support developing sperm cells
 - produce fluid & control release of sperm into lumen
 - secrete inhibin which slows sperm production





Spermatogenesis

- 4 phases each takes 16 days

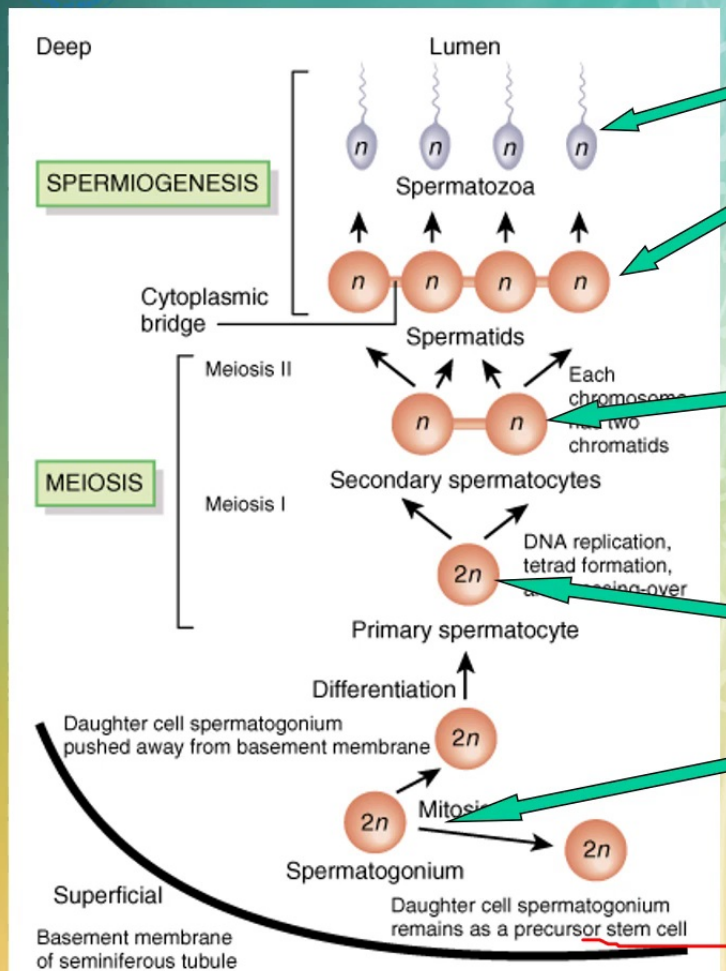
1. Proliferative: Primary spermatogonia → mitosis → 16 secondary spermatogonia
2. Growth: Secondary spermatogonia → Primary spermatocyte
3. Maturation: Primary spermatocyte → MEIOSIS → 2 secondary spermatocytes
4. Transformation (Spermiogenesis): spermatid → spermatozoa





Spermatogenesis

Sperm forming cells go through two meiotic divisions



- Each of four spermatids develop into a sperm
- Second meiosis division give four spermatids, each with 23 single stranded chromosomes
- First meiosis division give two secondary spermatocytes, each with 23 chromosomes that become double stranded.
- Primary spermatocyte with $2n=46$ chromosomes
- Spermatogonium with $2n=46$ chromosomes multiply by mitosis.





Spermiation

- Extrusion & maturation of immotile spermatozoa from Sertoli cells → mobile sperm in epididymisForward motility hormone (FMH)

Aided by:

- 1-Myoepithelial cells: Contractility
- 2-Sertoli cells: proteolytic enzymes
- 3-Prostate: Relaxin hormone





Sperm capacitation

- Time needed by spermatozoa in female tract to acquire the capacity to fertilize the ova (7H)
 - ❖ ++ motility of sperm
 - ❖ prepare for acrosomal reactions:
 - Acrosome is a cap (lysosome like organell)
 - ✓ which covers the sperm head & helps the penetration of the ovum + removal of glycoprotein to express receptors
 - ✓ Facilitatory & not obligatory as fertilization occurs [in vitro](#).





Factors affecting spermatogenesis

- 8 factors: 5 Hormones & 3 Others)

- Hormonal factors:

1.LH

Early stages

secretes Testosterone

2.FSH

Late stage

++ ABP (androgen binding protein)

++ LH receptors

on Leydig cells

3. Testosterone

Maturation phase

early stages are androgen independent

Complete meiosis

Germinal epith

Develop. & Function

N.B. High conc. is caused by:

- ✓ Location secretion by: Leydig cell
- ✓ ABP
- ✓ Counter current blood supply





Factors affecting spermatogenesis

4. Activin ++ FSH & Inhibin -- FSH

5. Other hormones

- ✓ GH & prolactin early stages

- ✓ Thyroxine

- ✓ Leptin

 - Puberty

- ✓ Estrogen

 - in small amount

 - mediates action of FSH





Factors affecting spermatogenesis

6. Temperature Optimum temp. 32 C
(+) temp. (-) temp
Cremasteric ms thin skin & no SC **fat**
Dartos ms Testicular vessels counter current system
7. Diet:
Protein
Vitamins: A,B,C & E
8. a- prolonged exposure to x-ray & radiation
b- Bacterial, chemical toxins
c- Hypoxia
Inhibit spermatogenesis

