

# Spermatogenesis

## At Puberty,

- Hypothalamus - Produce Gonadotropin releasing hormone (GnRH)
- Pituitary Gland - Anterior Lobe
  - ↳ the GnRH will affect this lobe
  - affect testes & ovaries

Release two hormones:

- 1) Follicle Stimulating Hormone (FSH)
  - ↳ target Sertoli Cells
  - the Sertoli cells will express Androgen binding protein receptors (ABP)
  - Stimulate spermatogenesis
- 2) Luteinizing Hormone (LH)
  - ↳ target Leydig cells
  - secrete testosterone

## Negative Feedback Mechanism

- Testosterone - Signal to the Anterior pituitary gland to stop production of testosterone when concentration is high
  - Signal to the hypothalamus to stop releasing the GnRH which triggers the Pituitary glands to stop producing FSH & LH.

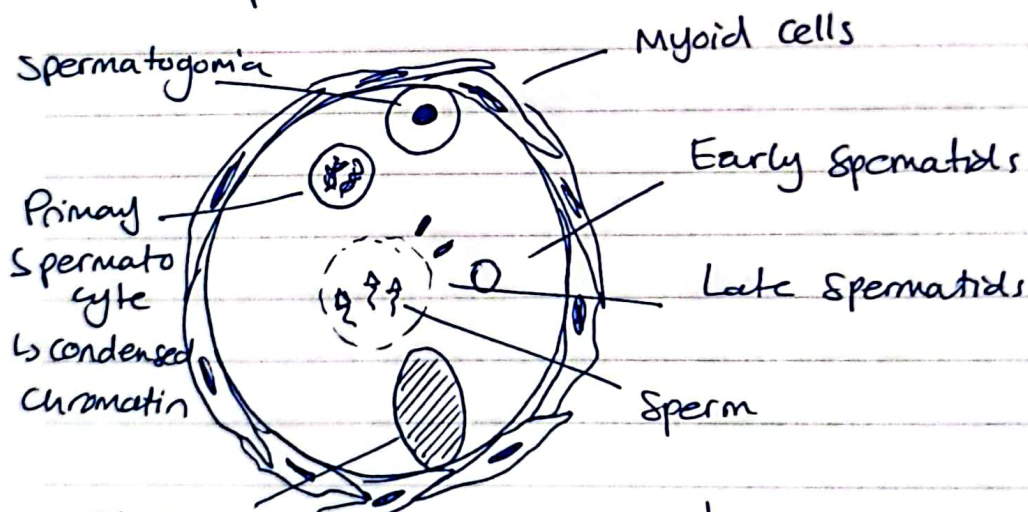
- Sertoli Cells - signal to the anterior pituitary gland ONLY
  - ↳ release inhibin that inhibits the release of FSH

## Wall of Seminiferous Tubules

- ↳ thick basal lamina made of
  - ↳ Collagen
  - ↳ reticular fibers
- ↳ 3-4 layers of smooth muscle cells
  - Myoid cells
    - ↳ help in transferring sperms
    - ↳ can express ABP

## How to identify Myoid Cells?

by the Nuclei, have elongated, dark flat shaped nuclei



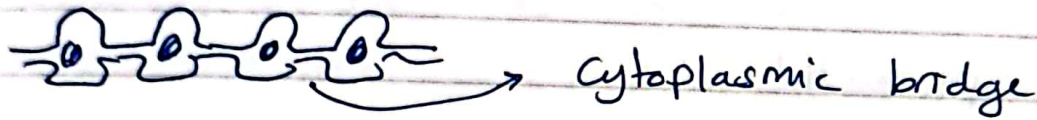
Sertoli Cells  
 ↳ Euchromatin  
 ↳ produce ABP

Leydig Cells - found between the seminiferous tubules  
 → eccentric nuclei  
 ↳ produce testosterone

1) Synchronous maturation of sperms

2) Exchange of Signals

→ the cytoplasmic connection between the cells due to the incomplete cytokinesis



→ act as sperm cells

### Spermatogonia Types & Morphology

↳  $2n$ , can differentiate to sperm cells

↳ rest directly on the seminiferous tubules

- Type A<sub>s</sub> - both have peripheral nuclei
  - ↳ round & oval
  - ↳ have cavities

1) A dark

↳ maintain cell reservoir by mitosis

2) A Pale

↳ undergo mitosis

↳ differentiate to B Pale

↳ undergo Apoptosis

- Type B<sub>s</sub> - have centered nuclei

↳ round & oval

1) B dark

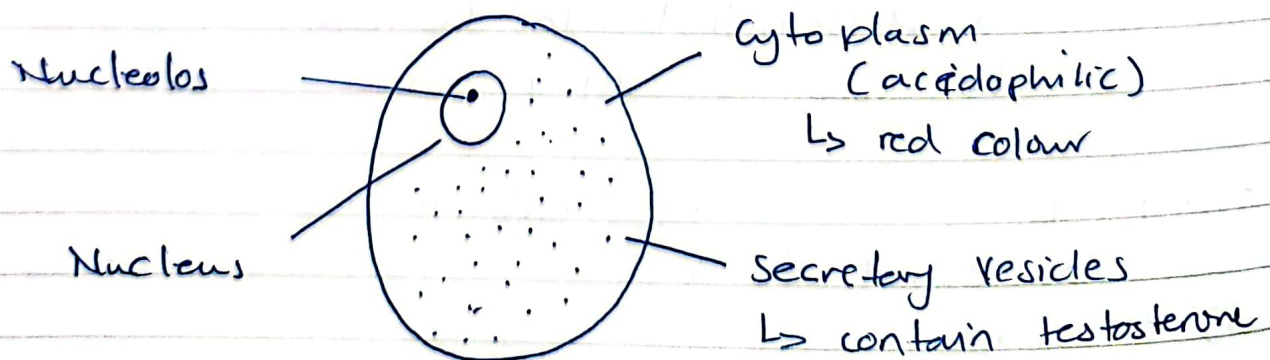
2) B Pale - grow in size & stimulate spermatogenesis  
↳ grow to become primary spermatocyte

## Spermatogenesis Phases

- 1) Proliferation & differentiation of spermatogonia  
↳ increase in # by mitosis
- 2) Meiosis → the spermatocytes will enter the 1<sup>st</sup> mitotic division & produce spermatids
- 3) Spermiogenesis - differentiation of spermatids into sperms

## Leydig Cells (Interstitial)

- ↳ found in interstitial tissue
- ↳ produce testosterone
- ↳ polygonal shape
- ↳ cytoplasm acidophilic w/ fine granular appearance
- ↳ nucleus is large, round w/ prominent nucleolus & eccentric
- ↳ appear in clusters, blood capillaries found between them



## Pre Pubertal

↳ only spermatogonia found on the seminiferous tubules

↳ have Sertoli cells  
→ produce Anti-Müllerian hormone

↳ prevent the development of female genitalia

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## Adult

↳ Spermatogonia proliferate & differentiate

↳ Spermatocyte → Spermatids → Sperms

## Senile Testis (old age changes)

1) Interstitial fibrosis

2) Peritubular fibrosis

3) Decreased \* of spermatocytes

4) Loss of spermatocytes architecture

5) Complete tubular fibrosis