

# REPRODUCTION

A child of one month age is brought to Pediatrician by his mother. Examination reveals Absence of both testies within Sacrotum. Ultrasonography reveals that both testies are located inguinal canal;

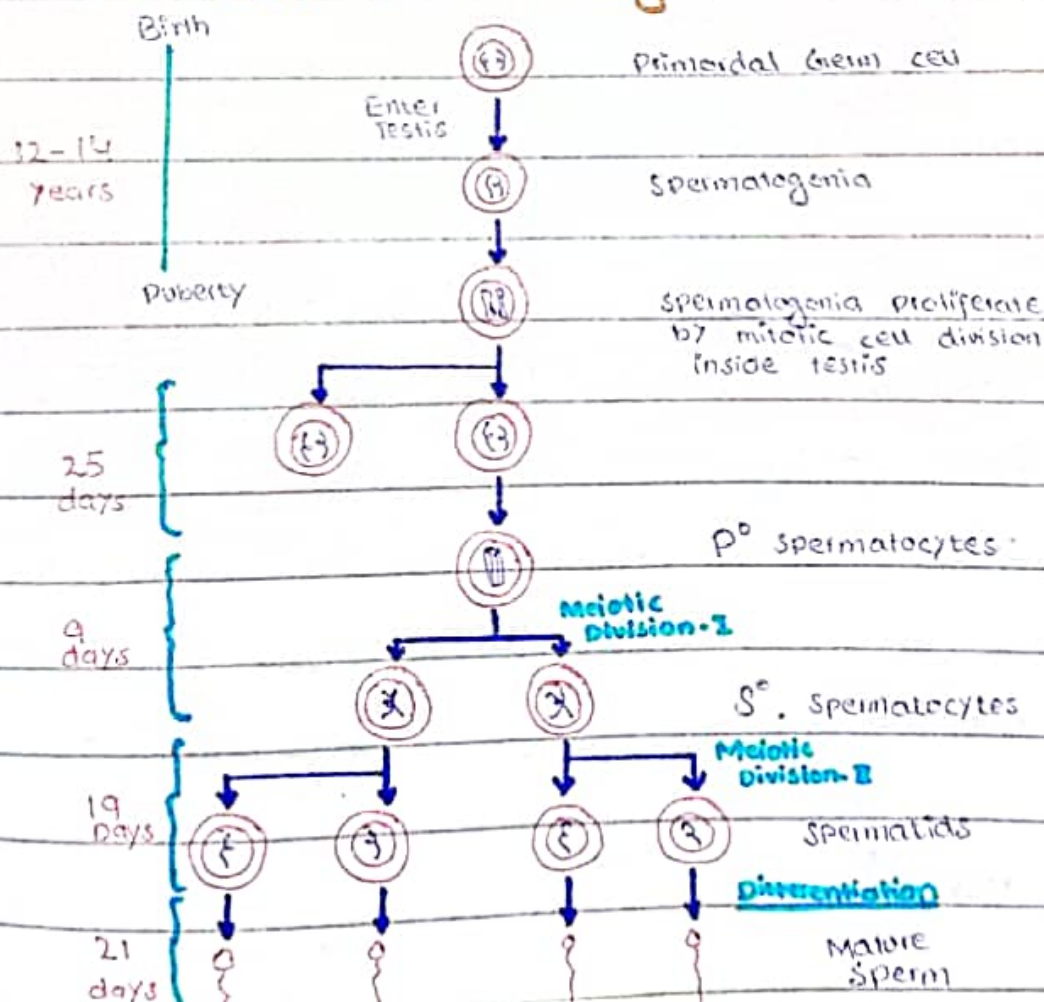
(i) What is your diagnose:

Cryptorchidism

(ii) Hormone cause testes descend in Sacrotum:

Testosterone

(iii) Steps OF Spermatogenesis:



## WHAT is Capacitation ?

Capacitation is the final step of maturation which occur in uterine tube.

"Capacitation is a period of conditioning in female reproductive tract that in human lasts for approximately 7 hours is called capacitation."

The capacitated sperm have the capability to easily penetrate barriers surround ovum.

## WHAT is Blood - Testicular Barrier ? Give importance!

Blood - Testis barrier is a physical barrier b/w the blood and germ cells present in albuminal compartments of seminiferous tubule.

A tight junction present b/w Sertoli cell & establish permeability barrier called blood-testis barrier.

### Importance,

- (i) Due to the presence of this barrier the germ cells receive their nutrition through Sertoli cells.
- (ii) Prevent the passage of Blood-borne toxin to the Albuminal compartments
- (iii) Sertoli cell act as scavengers & phagocytize the excess cytoplasm of over seminiferous germ cells.

Describe the mechanism of ovulation along with luteal phase of ovarian cycle?

## Ovarian Cycle

Rhythmic cyclic changes in ovaries and its secretions are called ovarian cycle.

Period: 28 days (20-45 days)

### PHASES:

#### (1) Follicular Phase (Pre-ovulatory)

Hormone responsible: FSH  $\rightarrow$  mainly & LH Partly

#### Stages of Development of Graafian Follicle:

P<sup>o</sup> Follicle

P<sup>o</sup> Follicle (under influence of FSH & LH)

vesicular follicle

Mature Graafian follicle

#### Structure of Graafian Follicle:

Theca Externa: Form capsule

Theca interna & Granulosa cell: secrete Estrogen

Cumulus ophorus: Surround ovum

Antrum: contain Follicular Fluid & Estradiol.

→ Blood vessels and gland become tortuous

→ Endometrium thickness is doubled (4-6mm)

### 3) Menstruation Phase (5 days)

During this phase all superficial layers of Endometrium are desquamated thru vagina.

#### Cause of Menstruation:

↓ Estrogen & Progesterone secretion 2 days before menstruation.

→ ↓ stimulation of Endometrial wall

→ loss of Hormonal stimulation initiate Blood vessels,

→ outer layer of endometrium separate from the uterus 400ml Blood release

→ 4-7 days after menstruation starts loss of blood cease Endometrium re-epithelized.

### (3) Luteal Phase (Post-ovulatory)

After ovulation Granulosa Follicle converts into Corpus luteum, which is a yellowish mass of lutein cells filled with lipid inclusions.

#### Hormone Responsible:

LH & (Human Chorionic Gonadotropin)

#### Structure of Corpus luteum:

Lutein cell: secrete Progesteron & small amount Estrogen, and also inhibin  $\rightarrow$  inhibit FSH secretion

Strands of Theca cell: Secrete Androgens  
 $\downarrow$   
much of androgen converted estrogen & Progesteron

Well developed: In Blood supply

#### Fate of corpus luteum:

In Pregnancy occur: Corpus luteum  $\uparrow$  is size  
 $\downarrow$   
under influence of HCG  
 $\downarrow$   
called Corpus luteum of pregnancy  
 $\downarrow$   
secrete progesteron until end of 4 month

#### IF pregnancy is not occur:

Corpus luteum involute  
 $\downarrow$   
 $\downarrow$  FSH & LH  
Replaced by c.T after 12 days  
 $\downarrow$   
called corpus Albicans.

## 2) Ovulation

It is a process of rupture of mature Graafian follicle to set free ovum into peritoneal cavity near mouth of fallopian tube.

Time: occur (14 days) after onset of menstruation (28d)

Hormone responsible: ↑ LH secretion from Ant. Pituitary

### MECHANISM:

LH cause Progesterone secretion by theca interna and Granulosa cell that cause.

(a) Theca externa to secrete proteolytic enzyme

↓  
Dissolve capsular wall

(b) Rapid growth of new blood vessels in follicle wall & secretion of prostaglandins → vasodilation

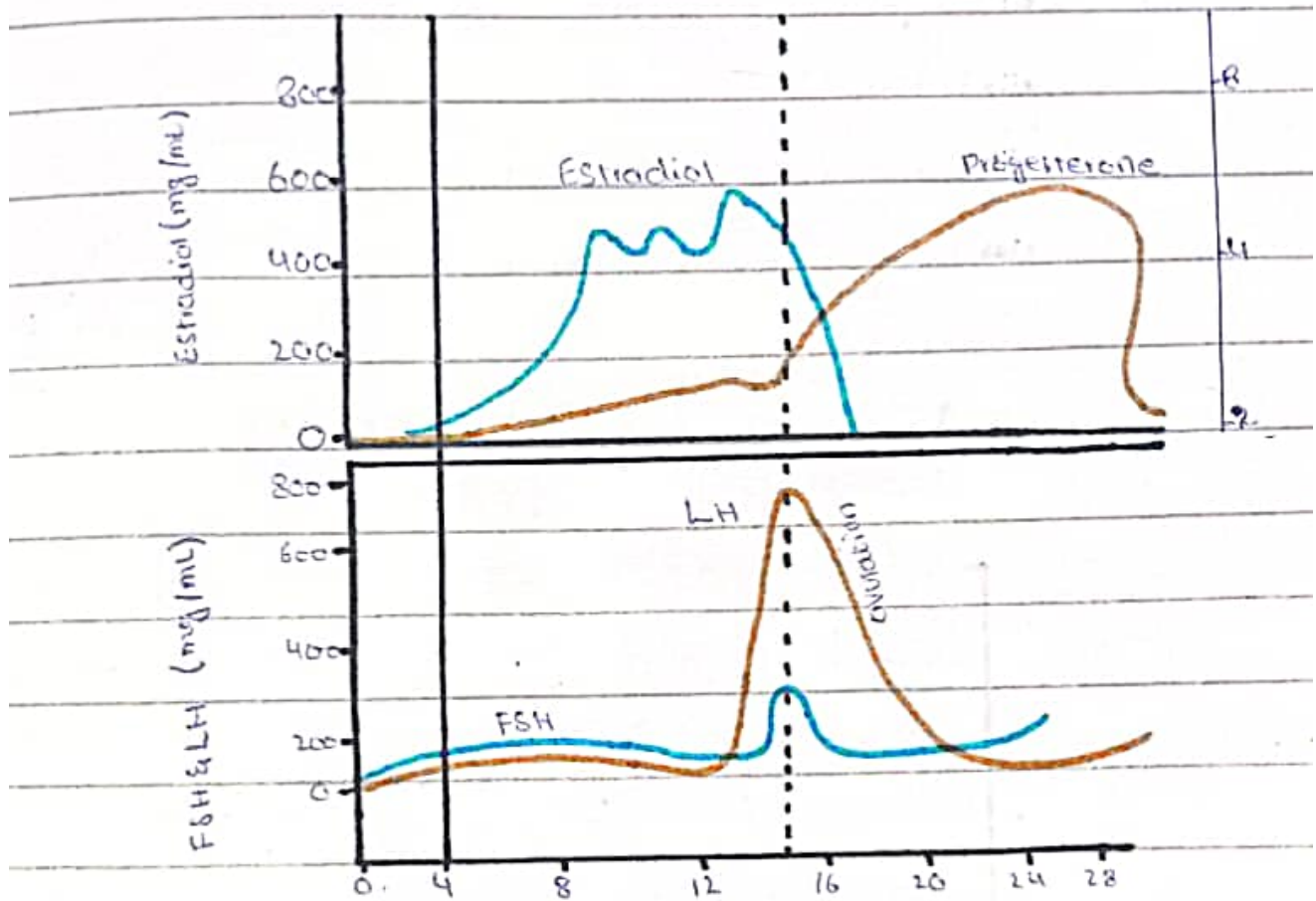
(c) Plasma transude into follicle

↓  
Follicle swell

↓  
Follicle rupture at stigma

↓  
ovum released

## Draw and label PHASES OF Female ovulation cycle?



## list the changes occur during pregnancy?

- Uterus ↑ in size
- ↑ vascularity
- vagina become more Elastic
- Cervix become congested
- ↑ in size Breast
- Blood volume ↑ by 25%
- ↑ RBC count
- ↑ oxygen consumption
- ↑ BMR
- ↑ Appetite

Write down different Phases of Endometrial cycle,

## Menstrual cycle

Rhythmic cyclic changes in mucosa membrane of uterus and associated with cyclic production of Estrogen & Progesterone.

### PHASES:

#### (1) Proliferative Phase (Estrogen Phase) (11 Days)

under the influence of Estrogen hormone which release in ovary.

- The stromal cell & Epithelial cell proliferate rapidly
- ↑ Endometrium in thickening
- ↑ No. of stromal cell
- ↑ Growth of endometrial gland
- ↑ Growth of blood vessels
- ovulation when Endometrium thickening is (3-5 mm)

#### (2) Secretory Phase (Progesterone Phase) (12 days)

Corpus luteum is formed & ↑ Estrogen & Progesterone

This phase occurs after ovulation

- Proliferation is more and more
- ↑ permeability of vessels
- ↑ Stromal cell
- ↑ Lipid - Glycogen contents



## LH Surge:

Two days before ovulation, rate of secretion of LH from Ant. Pituitary markedly ↑ and peaks about 18 hours before ovulation. FSH also increase. This is called LH Surge.

## Importance:

Essential for ovulation to occur.

Menarch: onset of menstruation.

Menopause: Cessation of menstruation in old age is called menopause.

## Caused by:

Cessation of female sex hormone secretion.

## Causes of infertility:

- (i) lack of FSH & LH
- (ii) Endometriosis
- (iii) Salpingitis
- (iv) Abnormal mucous secretion by cervix.

## Enlist hormone secreted by placenta?

(i) Human chorionic Gonadotropin

(ii) Human chorionic Somatotropin

(iii) Estrogen

(iv) Progesterone

## Give functions of HCG?

(i) Prevent menstruation During Pregnancy

(ii) Prevent <sup>shrinkage</sup> involution of corpus luteum

(iii) It help in decent of Testes to secrete Testosterone

(iv) Causes Corpus luteum to secrete more progesterone and Estrogen.

(v) It Causes ↑ Growth of Endometrium

(vi) It is essential for maintenance of Pregnancy.

A 25 years old woman presents to Gynaecologist & told that she was married 2 years back, but still she is not having any pregnancy. Her menstrual history is normal. The doctor is thickening of absence of ovulation. In your opinion.

Method / confirmatory test: (i) urine Examination

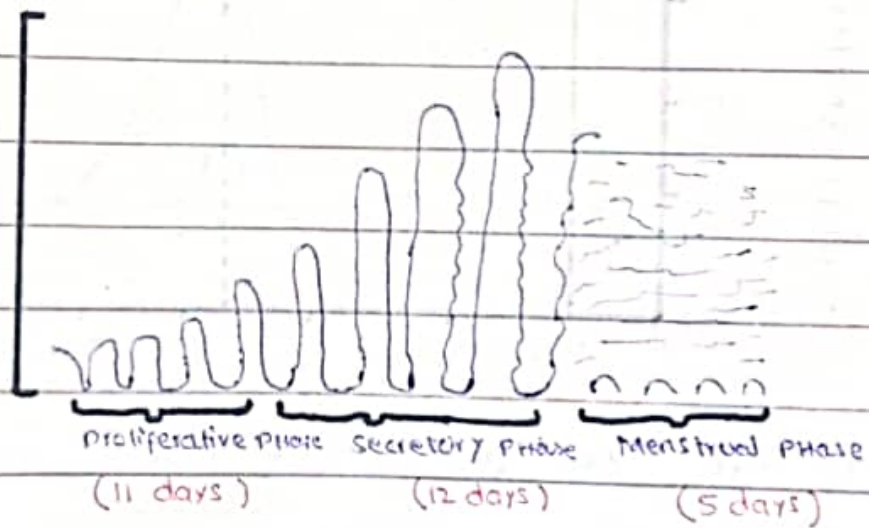
(ii) Temperature chart

(iii) Effect of Progesterone.

## Enumerate function of Placenta ?

- (i) Diffusion of  $O_2$
- (ii) Diffusion of  $CO_2$
- (iii) Diffusion of Foodstuffs
- (iv) Excretion of waste product

## Draw and label Endometrial cycle?



## Write down difference b/w Estrogen & Progesterone?

### Estrogen

(i) ↑ size of vaginal wall masculinise

(ii) ↑ Fat deposition on mons pubis

(iii) Slightly Enlargement of cervix

(iv) ↑ size of uterus

(v) Proliferation of Glandular tissue on Fallopian tube

(vi) Broader Pelvis

(vii) Cause ↑ osteoblastic activity

(viii) ↑ Fat Synthesis

(ix) General Growth of uterus

(x) Responsible for proliferative phase of menstrual cycle.

### Progesterone

(i) Promotes secretory changes in uterine Endometrium during secretory phase of menstrual cycle in uterus.

(ii) Promote secretory changes in mucosal lining needed for fertilized ovum in Fallopian tube.

(iii) Promotes development of lobules & Alveoli in breast.

(iv) Causes Alveolar cells to proliferate & enlarge & become secretory

(v) Causes breast to swell due to secretory development

(vi) Inhibit ovulation by inhibiting release of LH & FSH.

(vii) Mobilize protein during pregnancy to be used by fetus

(viii) Slightly retention of H<sub>2</sub>O, Na & Cl<sup>-</sup> from renal tubules.

## Basic intracellular mechanism of Action of Testosterone ?

Most of the Effect of Testosterone result basically from increased rate of Protein Formation in target cell.

### In Prostate gland:

Testosterone enter Prostatic cell within a few minutes after secretion

Then it is converted under influence of under enzyme -  $5\alpha$ -reductase to Dihydrotestosterone

Which in turn bind with cytoplasmic "Receptor protein"

This combination migrate to cell nucleus

Bind with nuclear protein & induces DNA-RNA Transcription.

Within 30 mins. RNA Polymerase has become activated & conc. of RNA begin  $\uparrow$  in prostatic cells.  $\rightarrow$   $\uparrow$  in cellular

After several days, the quantity of

DNA in Prostate gland also  $\uparrow$  &

a Simultaneously  $\uparrow$  in no. of Prostatic cell occurred.

## Write down Functions of Testosterone?

### (i) Before Birth:

- (i) Causes development of penis, sacrotum, prostate, seminal vesicles and male genital duct.
- (ii) Suppresses the formation of female genital organ.
- (iii) Causes descent of testes through inguinal canal into scrotum during last 2 months to gestation.

### (ii) After Puberty:

It causes appearance of body character of sex under influence of testosterone.

- (a) Body Hair:
  - (i) chest
  - (ii) face
  - (iii) back

(b) Baldness: Testosterone cause ↓ hair growth on top of head causes baldness

(c) Skin: ↑ thickness of skin.

(d) Voice: Testosterone → hypertrophy of laryngeal mucosa & enlargement of larynx which cause cracking voice & typical masculine bass voice.