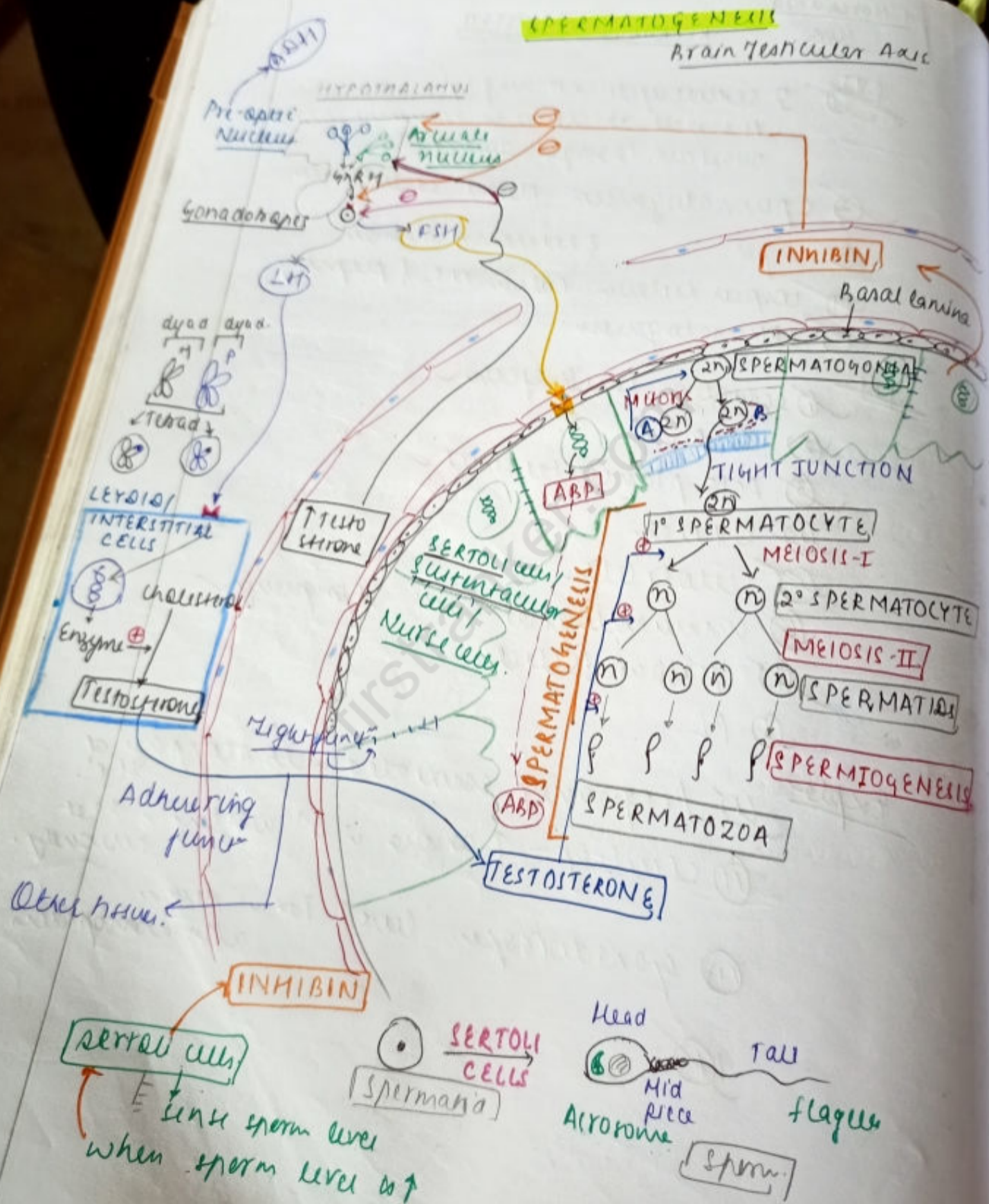
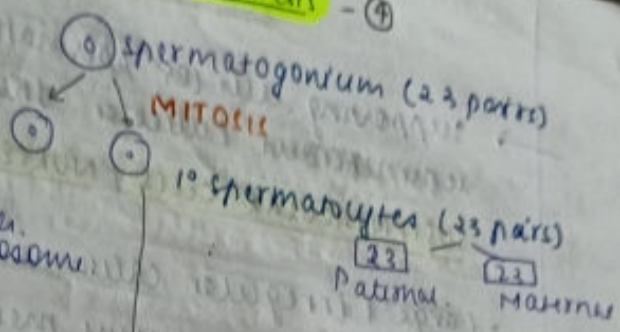




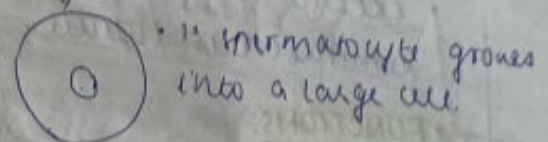
STAGES OF SPERMATOGENESIS - ④

① Proliferation



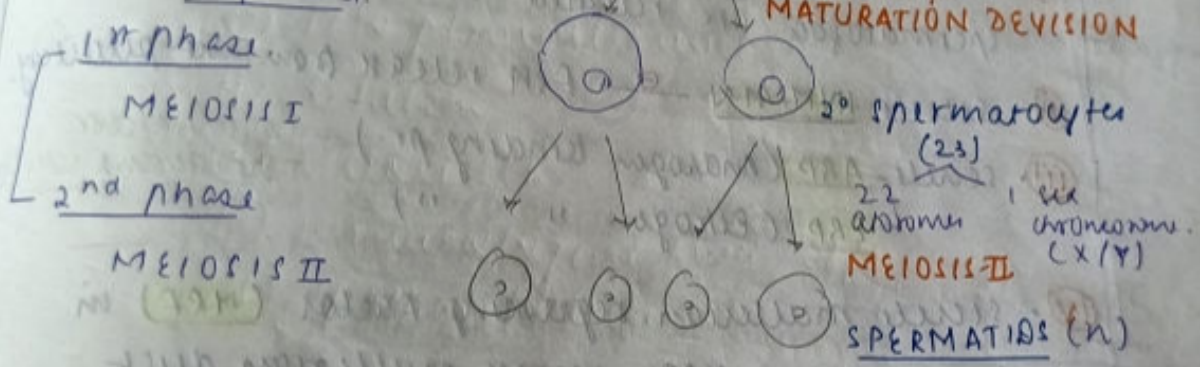
22 pairs - Autosomes.
1 pair - sex chromosome.

② GROWTH



③ STAGE OF MATURATION

2 phases.



④ STAGE OF TRANSFORMATION

- **SPERMIOGENESIS**: → process by which spermatids are transformed into spermatozoa.
 - Formation of **Acrosome**.
 - mitochondrial** spiral filaments.
 - tail** structure.
 - removal of extra volume of non essential cytoplasm.
 - condensation of nuclear material.

Sertoli cells.

④ → **SPERMIIATION**: process of release of mature sperm from Sertoli cells into the lumen of seminiferous tubules.

SUSTENTACULAR CELLS / NURSE CELLS

- extend from basement membrane to lumen of seminiferous tubule.
- FUNCTIONS:**

FUNCTIONS:

- ①. support & nourish spermatogenic cells till spermatozoa are released from them (SPERMATION)
- secretes **INHIBIN** $\xrightarrow{-}$ FSH release
- secretes **ABP** (Androgen Binding Protein)

- (ii) secretes INHIBIN → FSH release from ant pituitary.
- (iii) secretes [ABP (Androgen binding pr.) - essential for
[ERP (Estrogen " ") Testosterone activity]
- secretes mullerian regressing
- fetal HSTIS

- (iii). secretes INHIBIN → FSH release from ant pituitary.
secretes ABP (Androgen binding pr.) - essential for
ERP (Estrogen " ") Testosterone activity
- (iv). secretes müllerian regressing factor (MRF) in
fetal HSTIS. MRF - regress müllerian duct
during sex determination.

- ④. secretes mullerian regressing factor (**MRF**) in fetal HSTIS. MRF - regress mullerian duct during sex determination in fetus.
- ⑤. release sperms into the lumen of seminiferous tubules (**SPERMATION**).

→ BLOOD-TESTES BARRIER

- mechanical barrier that separates the blood from seminiferous tubules of the testes.
- it is formed by tight junctions between adjacent peritubular cells, near basal membrane of seminiferous tubules.

FUNCTIONS:

- ① Protection of seminiferous tubules:- prevents the entry of toxic substances from blood & fluid of surrounding tissue into the lumen of seminiferous tubules. It permits substances essential for spermatogenesis.
- ② The fluid in lumen of seminiferous tubules is quite different from that of plasma.
 - it contains very little protein & glucose,
 - rich in Androgen, estrogen, K^+ , inositol, Glutamine Acid & Aspartic Acid. It is maintained by B-T barrier.
- ③ It protects germ cells from blood-borne noxious agents.
(spermatozoa)
- ④ It prevents autoimmune disorders:- it prevents the movement of antigenic products of spermatogenesis, from testis into blood.
- ⑤ It helps to establish an osmotic gradient, that facilitates the movement of fluid into tubular lumen.

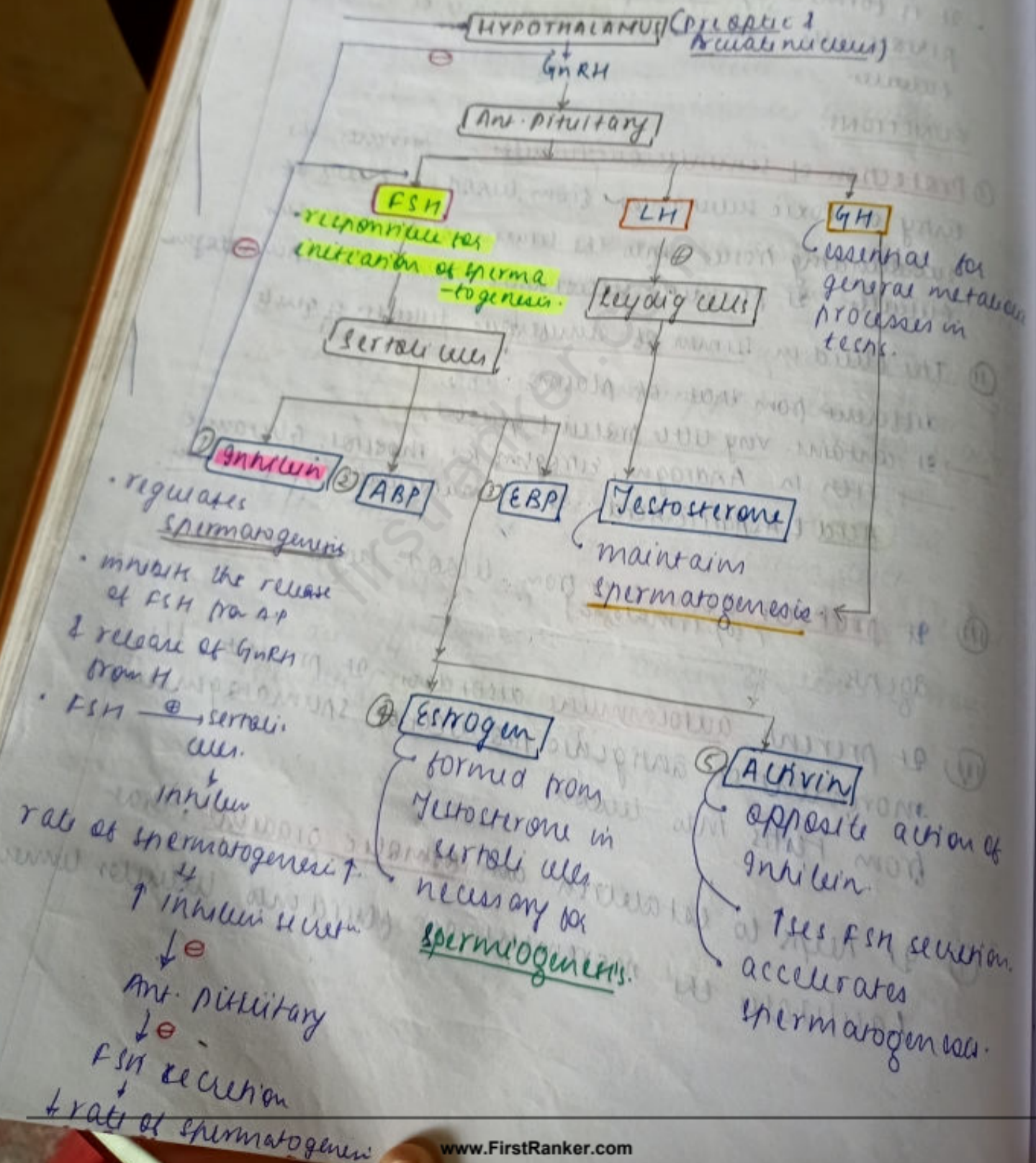
03 Nov 2019
Wed

FACTORS AFFECTING SPERMATOGENESIS

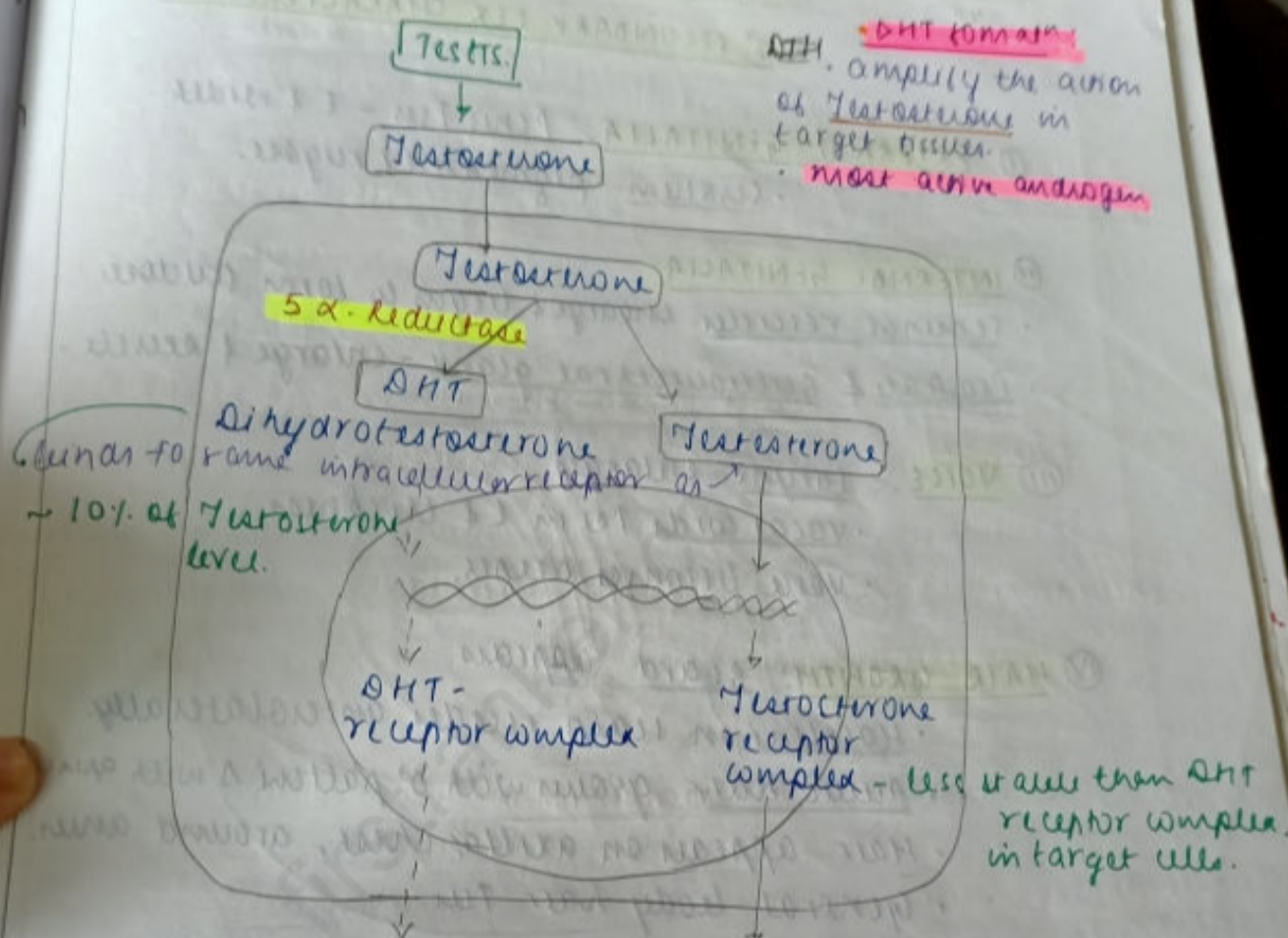
(1) TESTIS cells

(2) HORMONES

HORMONAL CONTROL OF SPERMATOGENESIS



METABOLISM OF TESTOSTERONE



DHT formation
DHT amplifies the action of Testosterone in target tissues.
• **most active androgen**

i) 1^o responsible for enlargement of prostate and proliferation of penis at the time of puberty

ii) ↑ in muscle mass
iii) development of ♂
sex drive & libido

iii) maturation of Wolffian duct structures & formation of ♂ internal genitalia during development.

ii) form ♂ external genitalia
iii) sexual maturation at puberty.

12 March 2019

12/3

• CHANGES IN PUBERTY IN M

• M SECONDARY SEX CHARACTERISTICS

(i) EXTERNAL GENITALIA: Penis increases in length & width.
• Scrotum - pigmented & rugose.

(ii) INTERNAL GENITALIA

- Seminal vesicles enlarge & begin to form fructose.
- Prostate & Bulbourethral gland - enlarge & secrete.

(iii) VOICE: - Larynx enlarges,
• Vocal cords increase in length & thickness,
• Voice becomes deeper.

(iv) HAIR GROWTH: Beard appears

- Hairline on scalp recedes anterolaterally.
- Pubic hair grows with M pattern & with growth.
- Hair appears on axilla, chest, around anus.
- General body hair increases.

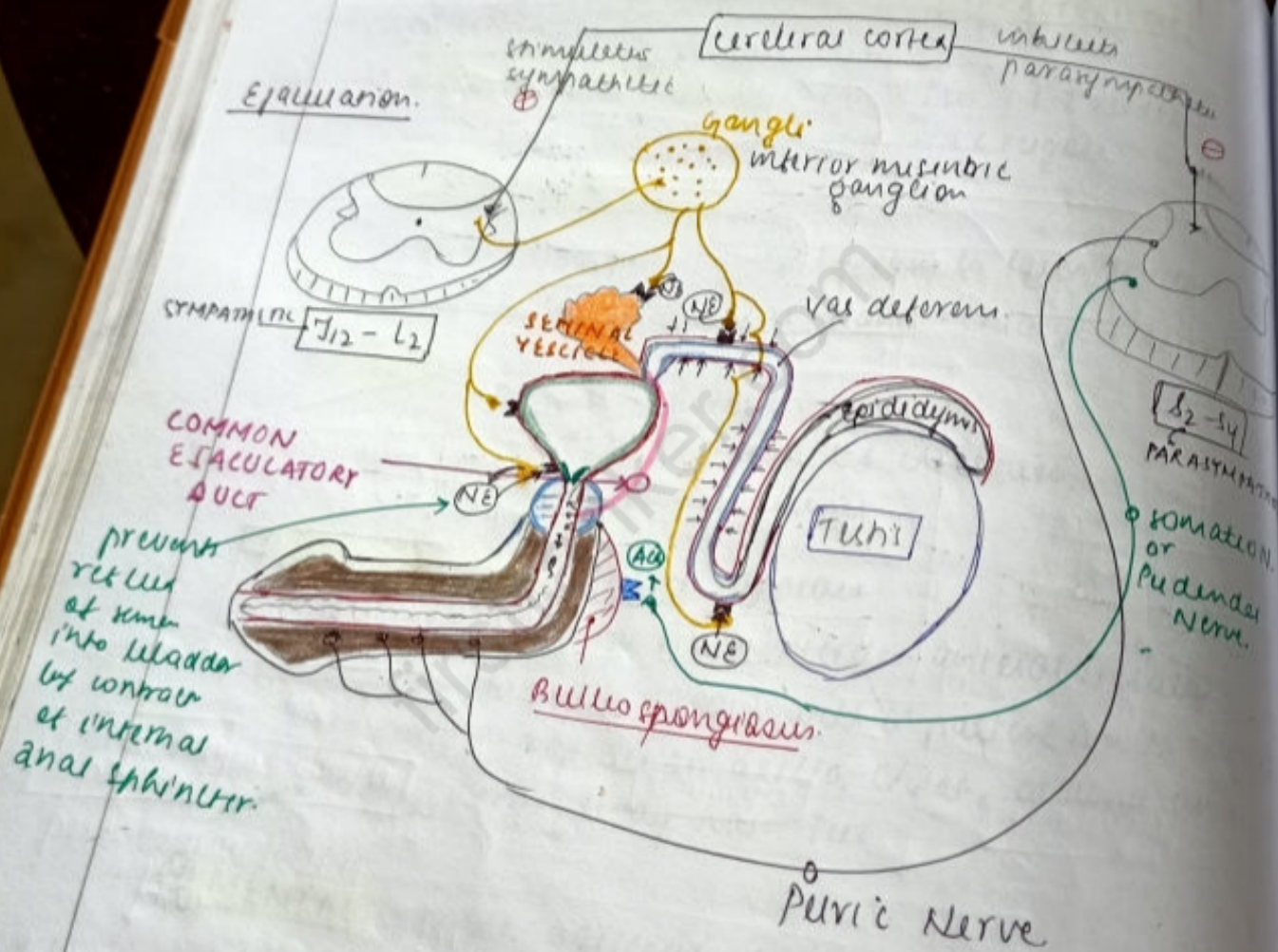
(v) MENTAL: • more aggressive, active attitude.
• interest in opp. sex develops.

(vi) BODY CONFIRMATION:

- Shoulder broadens,
- Muscles enlarge.

(vii) SKIN: Sweat glands secretion thickens & increases
(predisposing to acne).

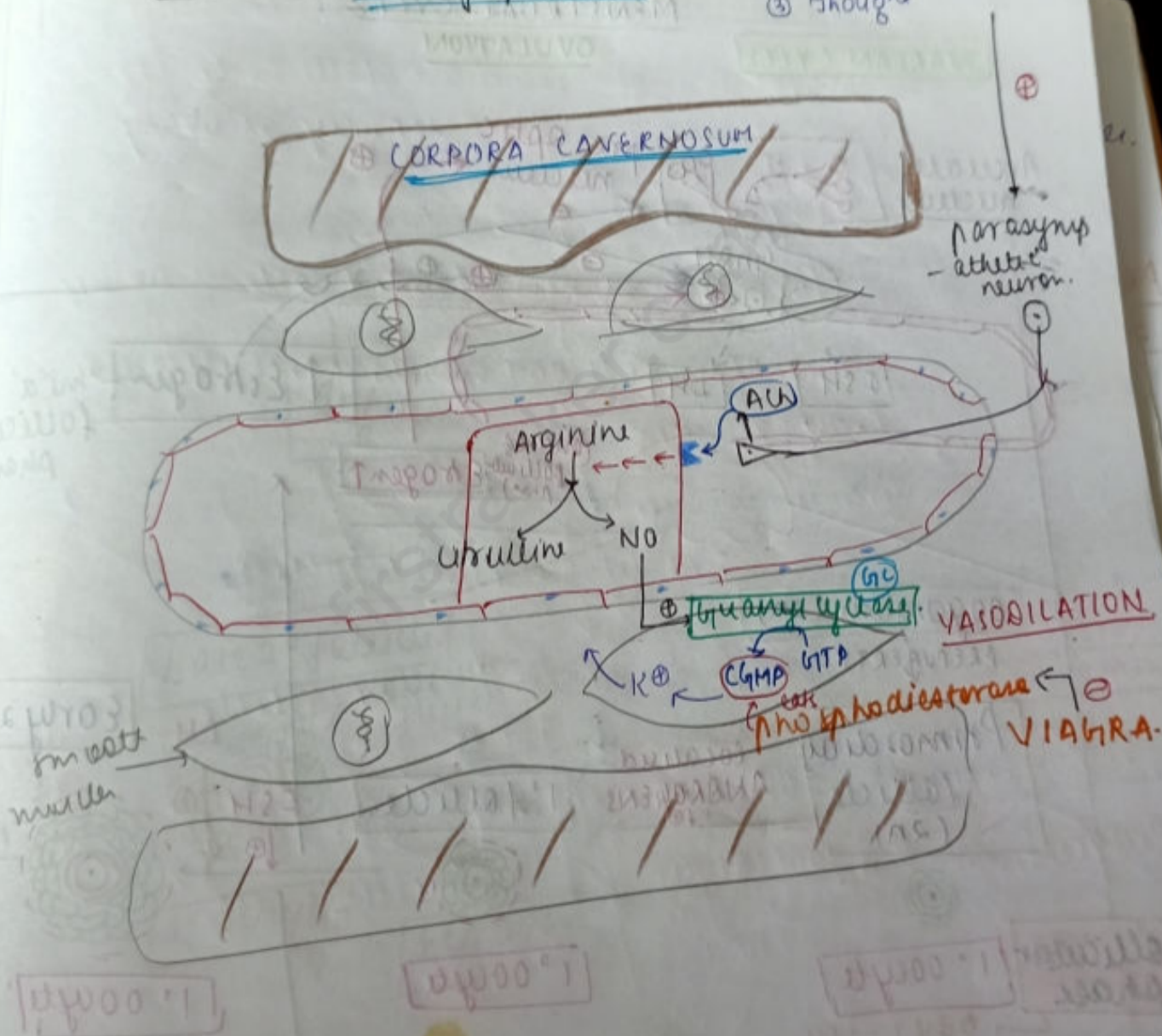
Erection & Ejaculation

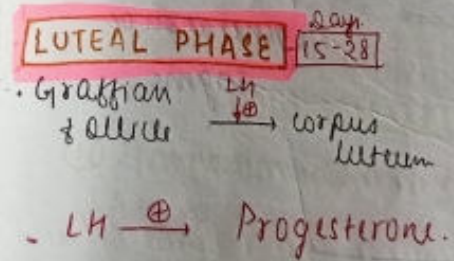


→ SEMEN - sperm + seminal fluid.

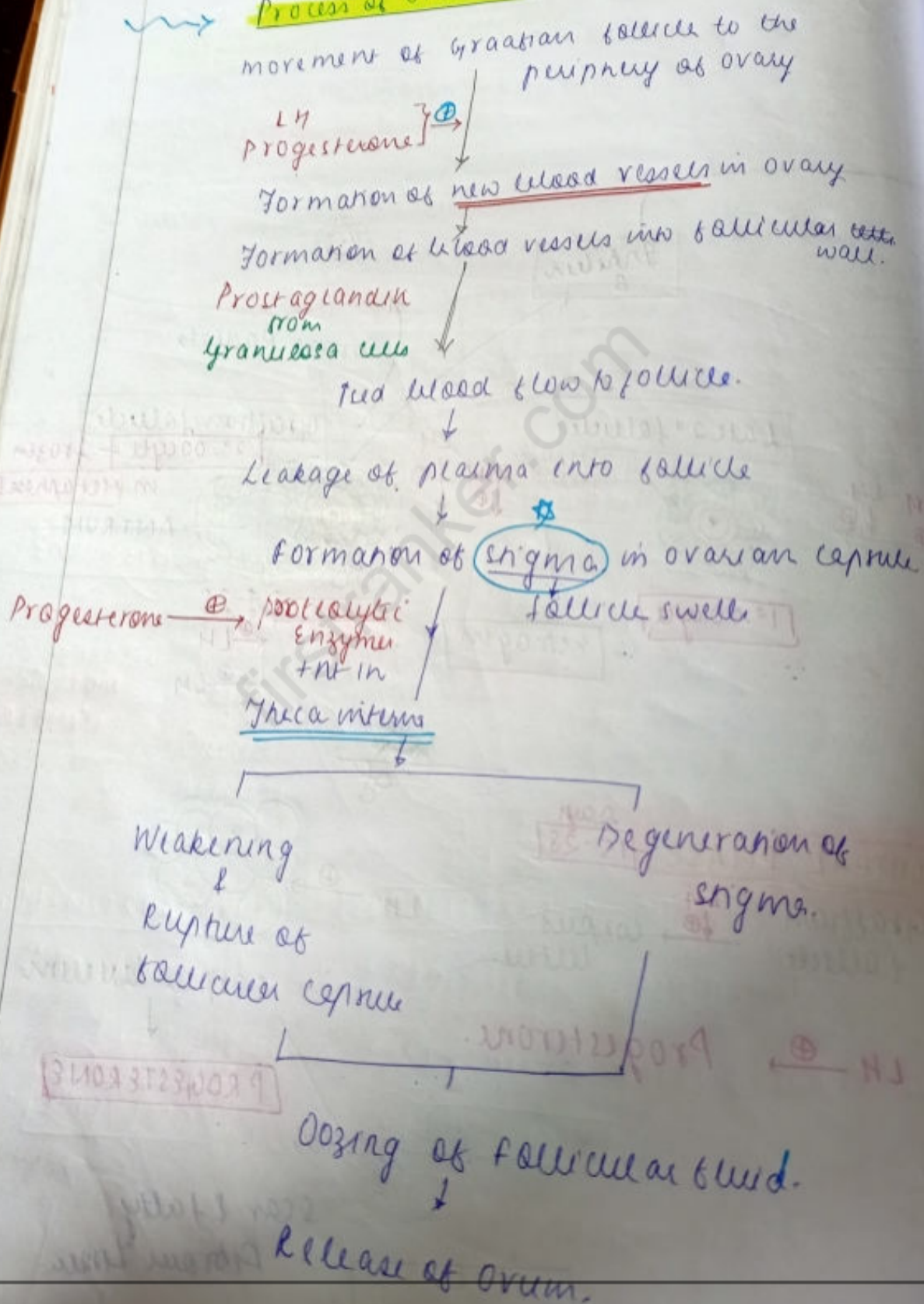
Erection - Parasympathetic

- 1) Locus coeruleus
- 2) smell
- 3) thought



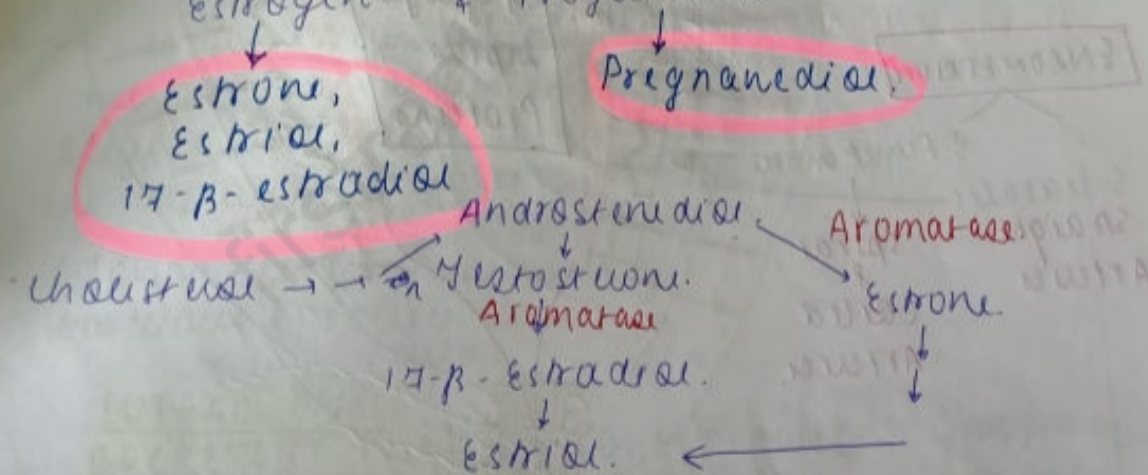


Process of ovulation:-



14 Feb. 2018
Mum

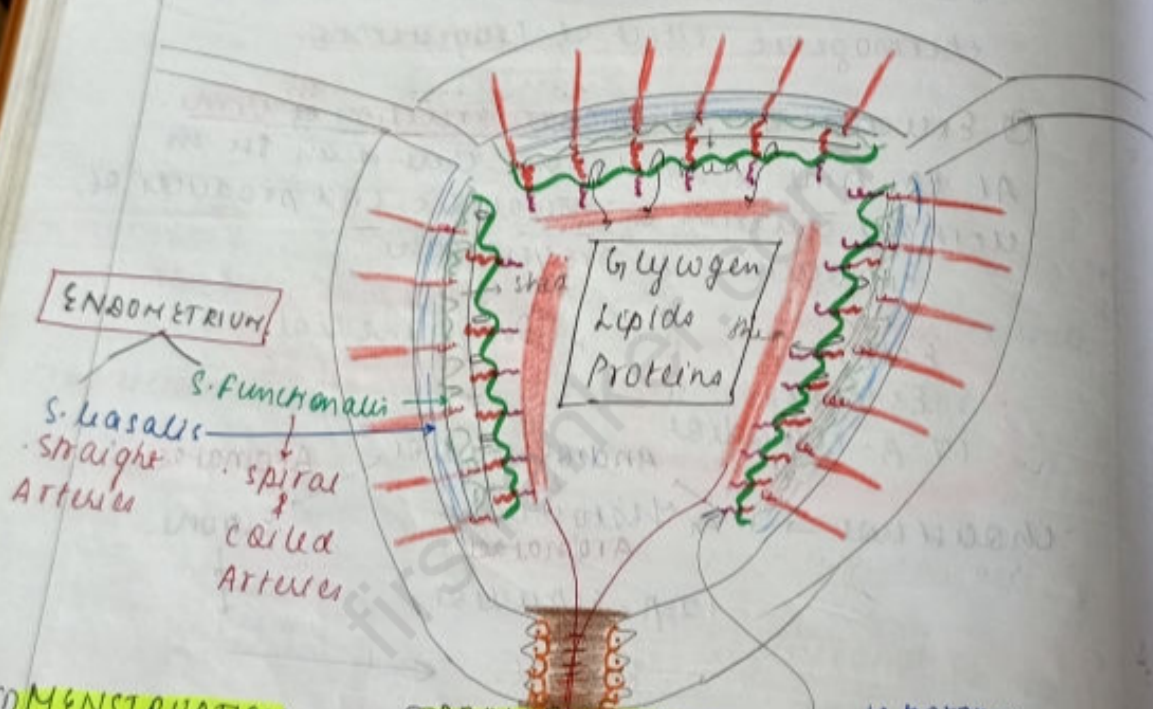
- ① Excretion of Hormonal excretion ⁱⁿ Urine.
At the time of ovulation, there is an rise in urinary excretion of metabolic end products of Estrogen & Progesterone.



- (iv) Cervical mucus pattern:-
↳ spread on a slide

→ **MENSTRUAL CYCLE** - cyclic events that take place in a rhythmic fashion during reproductive period of woman's life.
→ Avg. cycle - 28 days.

UTERINE CYCLE -



① MENSTRUATION

• "shedding"

• S. functionalis

• Days 1-5

③ PROLIFERATIVE PHASE

• hormone: **ESTROGEN**

• Regenerate S. functionalis

• Regenerate spiral & coiled arteries

• Days - 6-14

• making uterine glands

• Mucin cervical mucus production

• **Preovulatory / follicular phase**

Luteal

secretory
induration

PG

Prostaglandin

me
slugg
the

• Glyc
60

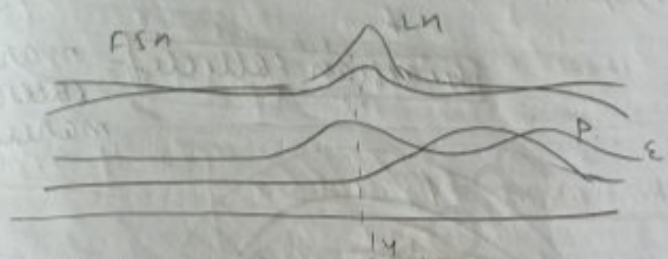
↓
Pathol

Luteal phase / secretory phase:

- endometrium thinner
- coiling of spiral Arteries
- spasm & degeneration of wall of spiral Arteries

CHW of FERTILISATION
corpus luteum regresses

prostaglandin → PG → ⊕ → Vasoconstriction

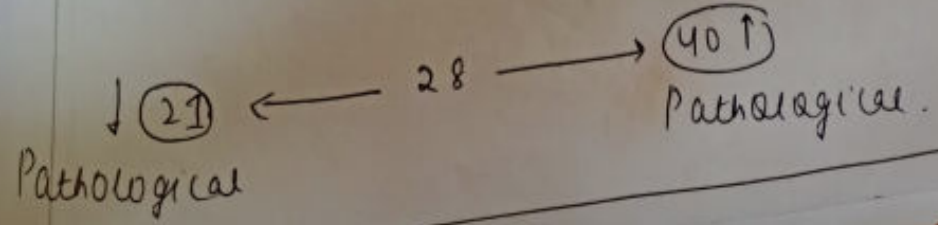


- endometrium becomes more highly vascularised & slightly edematous under the influence of $\downarrow$ Estrogen & Progesterone.
- Glands become coiled & tortuous & secrete clear fluid.

LUTEAL PHASE SECRETORY PHASE ⊕ PROGESTERONE

- proliferates functionalis & makes it thicker.
- secretion of uterine glands.
- Thick cervical plug.
- Days 15-28

↓ Progesterone
↓ PGE₂ → spasm
↓ weak capillaries rupture
↓ functionalis & nutrition for ischaemic regions. enough off

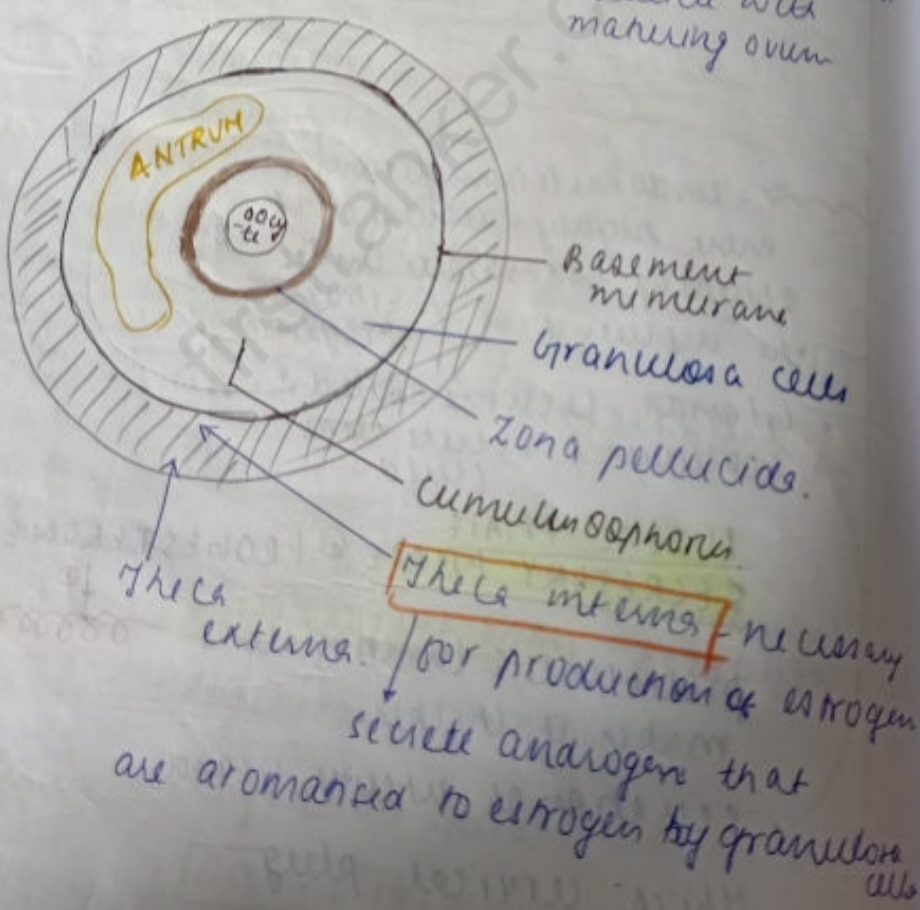


OVARIAN CHANGES

FOLLICULAR PHASE

Primordial follicles - At the time of birth
↳ contains immature ovum
↓
Antral follicle
↓
Apoptosis
1° follicle - dominant
↓
2° follicle
↓

Graafian follicle - matured ovarian follicle with maturing ovum



- **FETOPLACENTAL UNIT:-** interaction b/w fetus & placenta in the formation of steroid hormones
- This interaction occurs because some of the enzymes involved in steroid synthesis are -nt in fetus, are -nt in placenta & those enzymes which are -nt in fetus are -nt in placenta.

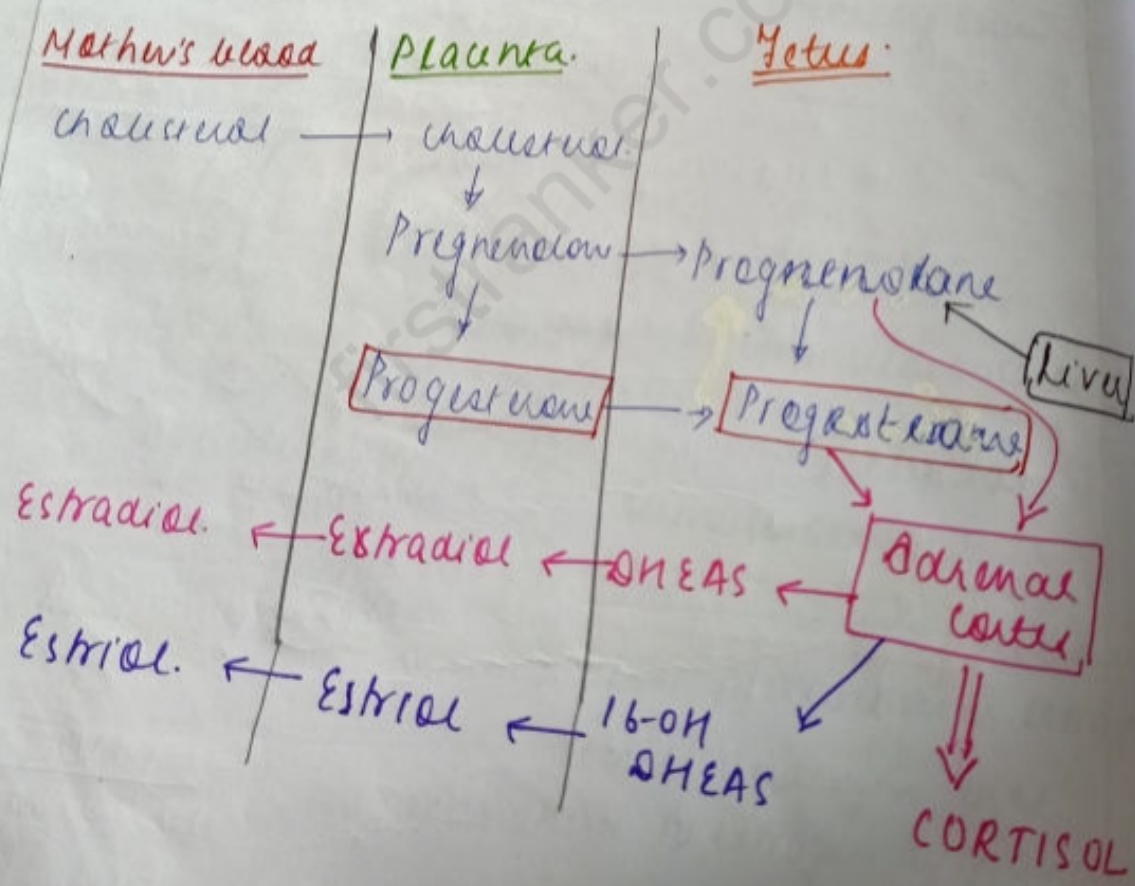


Fig: Fetoplacental unit

Function

- ① Cholesterol
- ② Placenta
- ③ Liver
- ④ Adrenal cortex
- ⑤ Estrodiol
- ⑥ Estriol

Function of Feto-placental unit:-

- ① cholesterol - which is the precursor for synthesis of steroid hormone.
 ↳ obtained from mother's blood.
- ② Placenta synthesises progesterone from cholesterol + pregnenolone
- ③ Liver of fetus synthesises pregnenolone.
 ↳ synthesis of progesterone
- ④ Adrenal cortex of fetus synthesises
 - (i) dehydroepiandrosterone DHEAS
 - (ii) 16-DHEAS
 - (iii) cortisol
- ⑤ transported to placenta &
 - ↳ estradiol & estrone is synthesised
 - ↳ transported to mother's blood

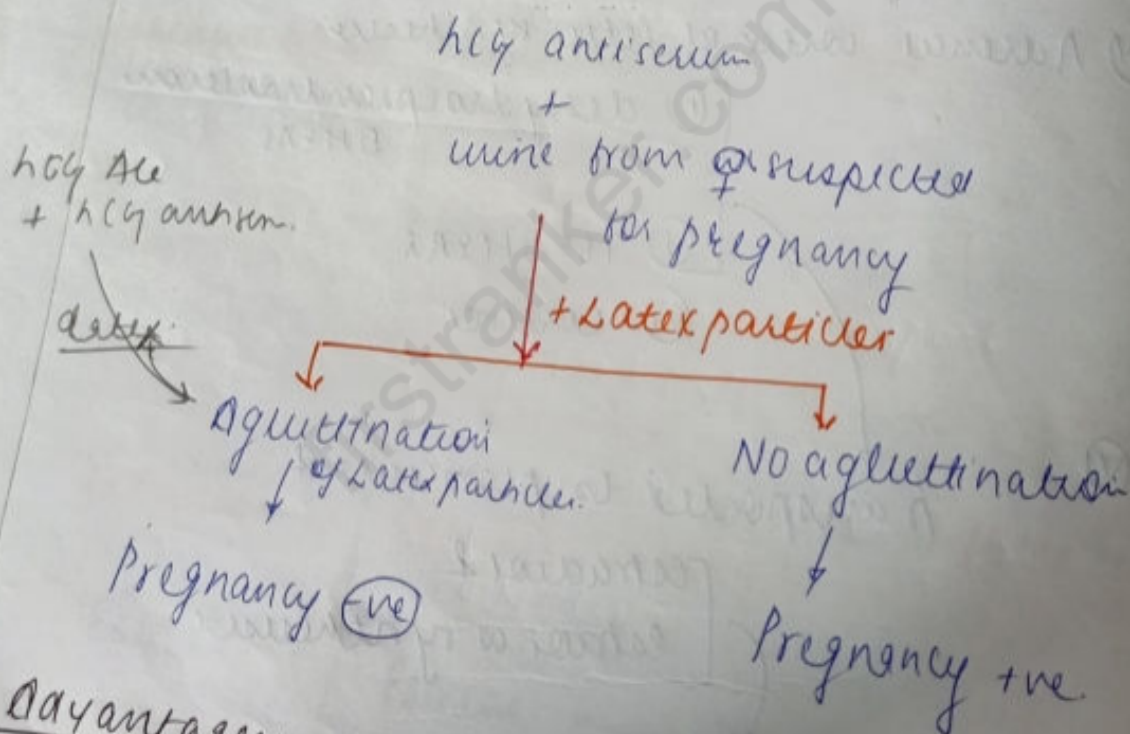
PREGNANCY TESTS

→ Immunological Tests:-

↳ the of hCG is determined

by immunological tests.

- Immunological tests are based on double antigen-antibody rxn.
- Commonly performed immunological tests are known as Gravindex test.



→ Advantages:-

- (i) more accurate.
- (ii) I.T - carried out very easily.
- (iii) IT - can be performed on 5th day of conception.
- (iv) Result is obtained quickly within min.

Lactation

- L means synthesis, secretion & ejection of milk.
- ② processes:
- ① Milk secretion
 - ② milk ejection

Lactation

(i) Milk secretion

Lactogenesis
initiation of
milk secretion

↑
Prolactin

Galactopoiesis
maintenance
of milk
secretion

- ↑
- ant. pituitary: ① PRL
② GH
- thyroid: ③ Thyroxine
- Adrenal cortex: ④ cortisol

(ii) Milk ejection

Milk ejection reflex

↑
OXYTOCIN.

↓
P.N.L.

→ Oral contraceptive pills (OCP):-

↓ ⊖
maturation of follicles
↓ ⊖
ovulation

⑦ Classical / Combined pills:-

↳ moderate dose of synthetic estrogen
+
mild dose of progestin.

→ have to be taken daily starting from
1st 5 days of M.C.

Mechanism of action:-

↓ ⊖
release of gonadotropins
↓ LH & FSH.
↓
prevents maturation of follicles
↓
~~ovulation~~

② sequential pills:-

high dose of estrogen
+
moderate dose of progestin

↓
ovulation

taken in 2 courses:-

① during last 5 days of M.C

② for 15th day ~~days~~
5th → 20th day of M.C

③ Minipills / Minopills:-

↳ low dose of only progestin.

→ taken throughout M.C

→ ≠ affects ovulation

→ thickens cervical mucus.

↓
transport of sperm
↓
implantation