UMBILICAL CORD

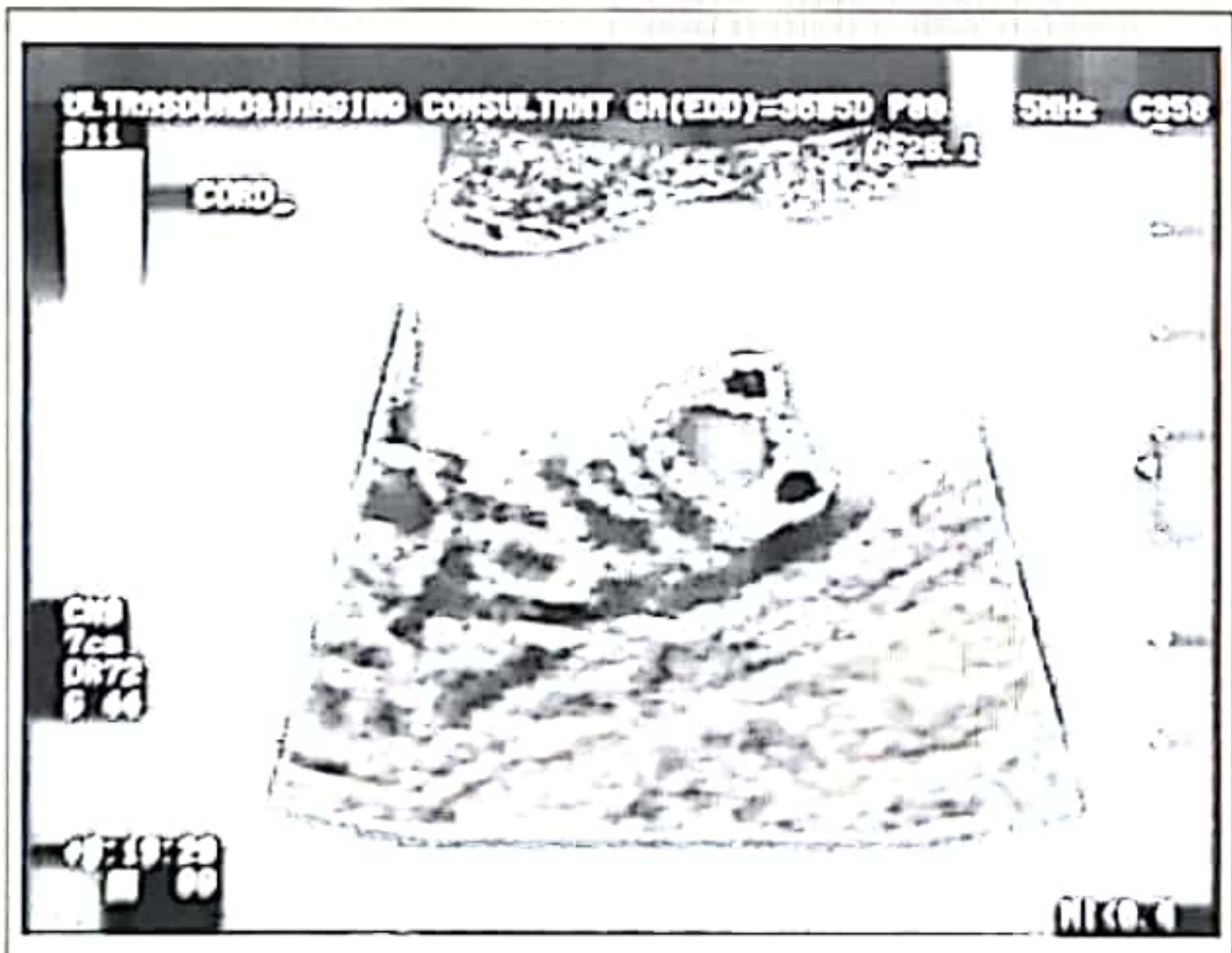
- Also called Funis.
- Connects the fetus and placenta
- Extends from the fetal umbilicus to the fetal surface of placenta

Structure of umbilical cord:

- The umbilical cord contains 2 Umbilical Arteries and one Umbilical Vein, which are embedded in Wharton's jelly.
- Wharton's jelly consists of mucoid ground substance and a network of fibroblasts.
- Wharton's jelly protects the blood vessels from Mechanical trauma.
- Wharton's jelly is derived form Primary Mesoderm
- Wharton's jelly is made of Mucopolysaccharides – mainly **Hyaluronic Acid** and **Chondriotin Sulphate.**

Length of umbilical cord:

- At birth, Normal Umbilical Cord is 50 to 60 cm in diameter
- It is about 12mm in diameter
- A long cord is more than 100cm
- A short cord is less than 30 cm
- Complete absence of umbilical cord is called acordia



Normal umbilical cord showing three vessels:

- **2 Umbilical arteries and 1 umbilical vein**
- **Typical Appearance – Mickey Mouse appearance**

Most common congenital anomaly of the cord is single Umbilical Artery

Notes on single Umbilical Artery:

- Incidence is about 1% of all pregnancies.
- The most common cause is primary agenesis of one umbilical artery.
- Twin pregnancies show a higher incidence of single umbilical artery than singleton pregnancies.
- USG – normal three vessel cord – appears as **MICKEY MOUSE Pattern**.
- Confirmation of single umbilical artery is by Colour Doppler.
- The incidence of congenital anomalies in single umbilical artery is about 20 to 50%
- The organ systems most commonly affected are

1)	Musculoskeletal system	23%
2)	Genitourinary tract	20%
3)	Cardio vascular system	20%
4)	Gastrointestinal system	10%
5)	Central nervous system	5%

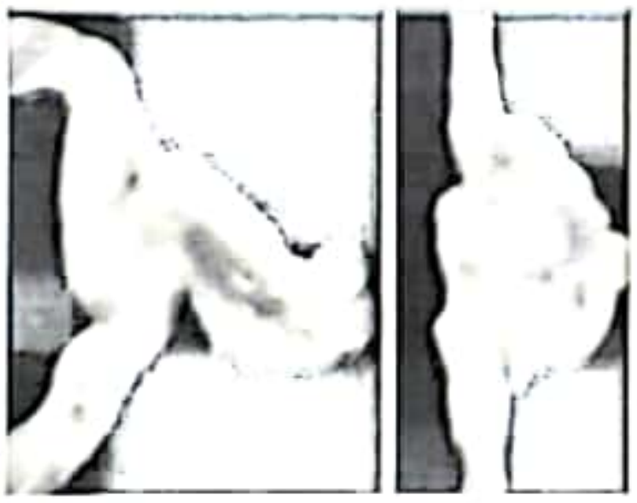
- MC chromosomal anomaly associated with single umbilical artery is trisomy 13.
- Fetuses with Single Umbilical Artery have increased incidence of Intra Uterine Growth Retardation and Increased Perinatal Mortality.

Knots of the umbilical cord:

True knot

- Umbilical cord is tied in the form of a true knot
- True knot arises as a result of Fetal movement
- Incidence of True knot is higher around 32 weeks of gestation as there is more liquor and more fetal movement
- Highest incidence of true knotting is seen in monoamniotic twins.
- There is a 4 fold increases in fetal loss – due to kinking of umbilical vessels in knot
- Loose knots do not affect circulation
- Tight knots affects umbilical cord blood circulation

False knot



- It is of no clinical significance.
- Local ectasia of the umbilical blood vessels

Questions & Answers

1. Wharton's jelly of umbilical cord is derived from (DNB 2008)

a) Ectoderm b) Endoderm

c) Mesoderm d) All

Ans: c (Mesoderm)

2. Length of umbilical cord is (DNB 2009)

a) 40 – 50 cms b) 60 – 120 cms

c) 30 – 100 cms d) 25 – 40 cms

Ans: c (30 – 100 cms)

- Usual length is 50 to 60 cms
- Length of umbilical cord = length of the baby.
- Less than 30 cms is a short cord.
- More than 100 cms is a long cord.
- So the range is 30 cms to 100 cms
- Option 'C' is correct.

3. The umbilical cord normally contains (UPSC 2010)

a) Two arteries and two veins

b) One artery and one vein

c) Two arteries and one vein

d) One artery and two veins

Ans: c (Two arteries and one vein)

4. Umbilical cord length at birth is (AI 2001)

a) 25cm b) 50 cm

c) 75 cm d) 100 cm

Ans: b (50 cm)

5. The finding of single umbilical artery on routine ultrasound in an antenatal woman indicates (UPSC 2007)

a) This finding is very common and does not indicate any abnormality

b) Is an indication that the baby may have congenital anomalies

c) Equally common in babies of diabetic and non diabetic mothers

d) Occurs in 50% of fetuses

Ans: b (Is an indication that the baby may have congenital anomalies)

Physiological changes in pregnancy

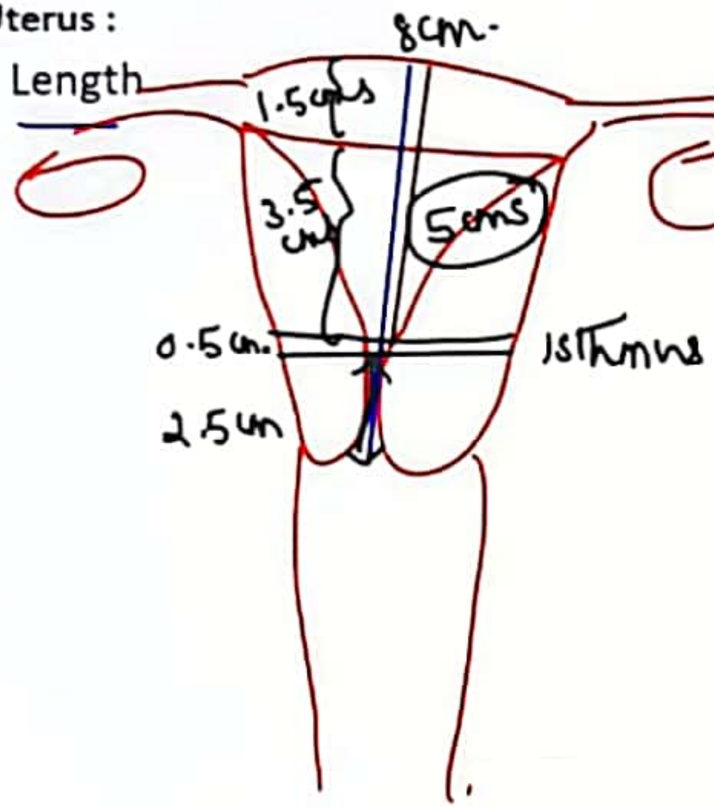
Dr.REVATHI RATHAN

25th ed Williams
Handbook of obs. Medicine
C N P
Catherine Nelson Piercy.

Reproductive tract :

Uterus :

- Length



Nonpregnant $3' \times 2' \times 1'$

$\times 2.5$

$= (7.5) \times 5 \times 2.5$ cm.

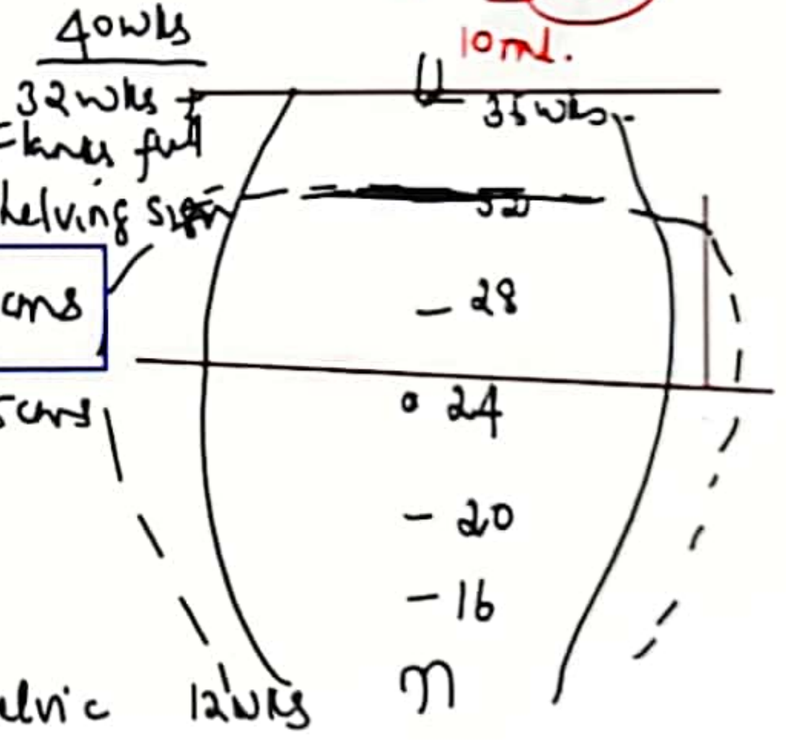
8 cm

8 cm → 36 cms

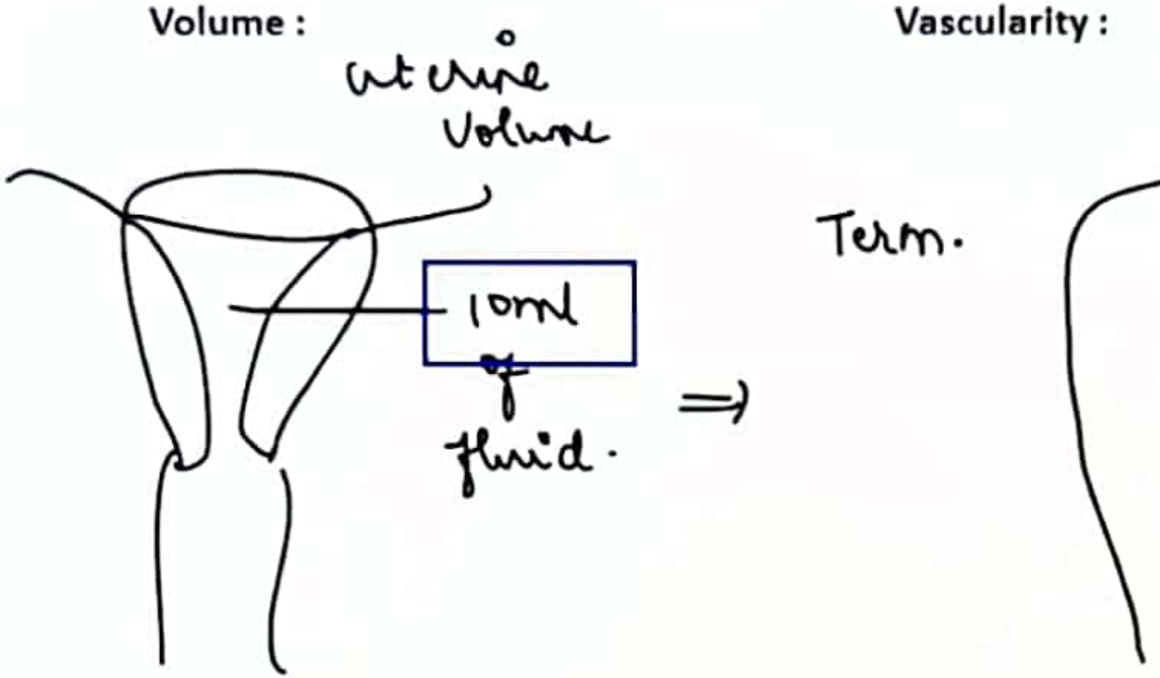
≈ 35 cms

= 6 ml.

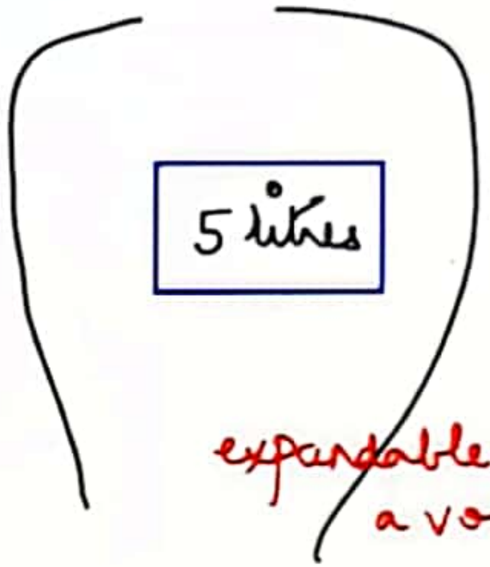
- > PCOS



Volume :



⇒ Term.



expandable to accomodate a volume of 20 litres

Non pregnant

Pregnant - Term

Vascularity :

50ml/min.

2% of

750ml/min

15% of

Uterine musculature

Hypertrophy > hyperplasia

Primi > Multi.

Atonicity is more common.

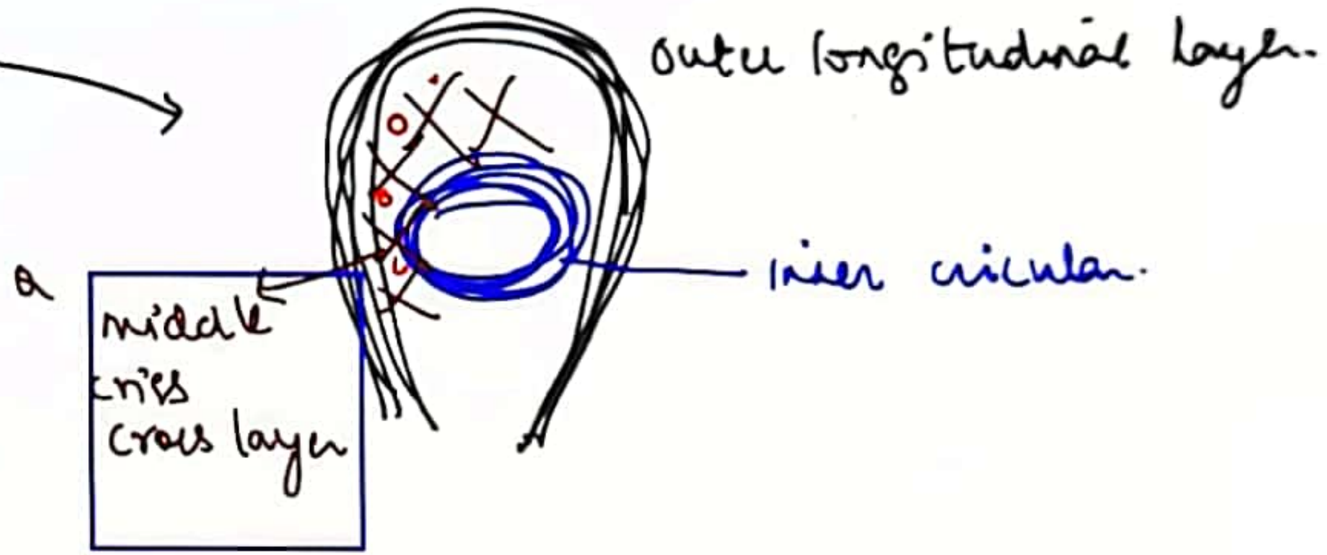


figure of 8 stitch

Living ligatures.

5 to 25 mm Hg.

Uterine contractility - Braxton Hicks contractions

from the II trimester.

- Irregular
- Unpredictable
- Sporadic
- Nonrythmic
- Can be detected by bimanual examination
- Intensity varies between 5 to 25 mmHg

Q.

4 wks

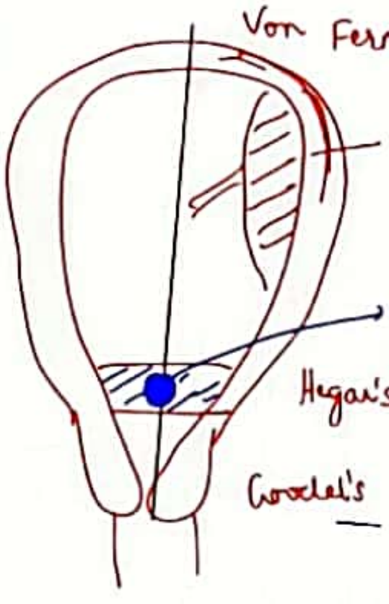
Bimanual palpation

Palmer's sign

Softening of the reproductive tract

- effect of progesterone
- accumulation of water.

5 signs



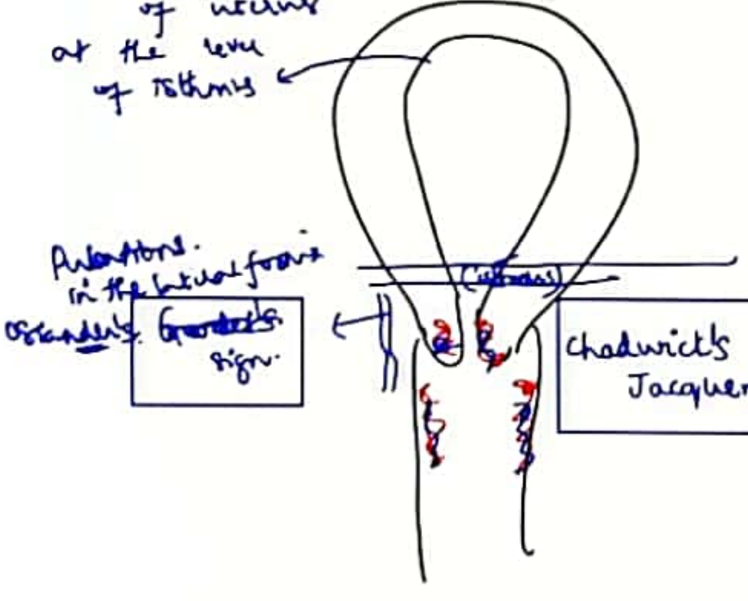
Von Fernwald sign : softening of fundus.

Piskacek's sign : Softer + asymmetrically enlarged.

LADIN's sign : softest part of the uterus.

Hegar's sign : Softening of isthmus (6) wks.

Goodell's sign : softening of cervix (8) wks.



Cervix :

- Vascularity increased – Bluish tones – Chadwick's Jacquemier's.

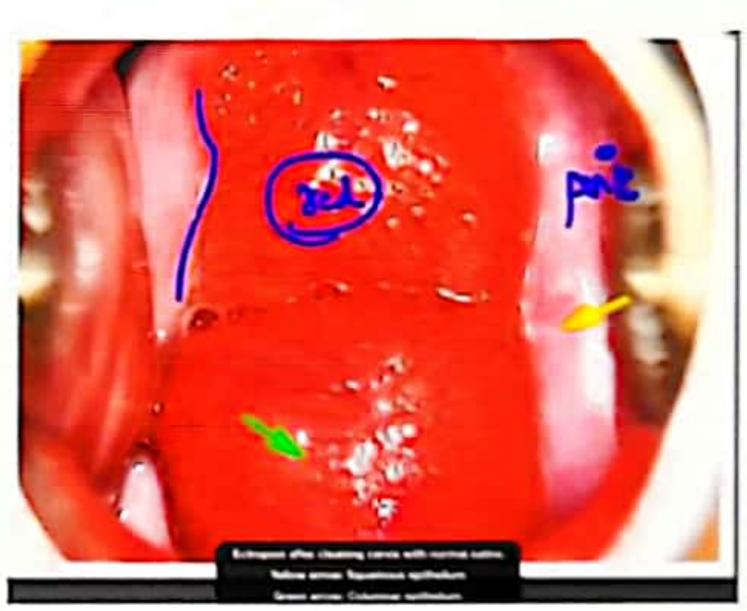
- Cervical glands undergo marked proliferation,and by the end of pregnancy,they occupy upto one half of the entire cervical mass.

50%.

↓

mucous plug.

Extension of the normal columnar endocervical glands into the ectocervical portio.- ECTROPION



Vagina

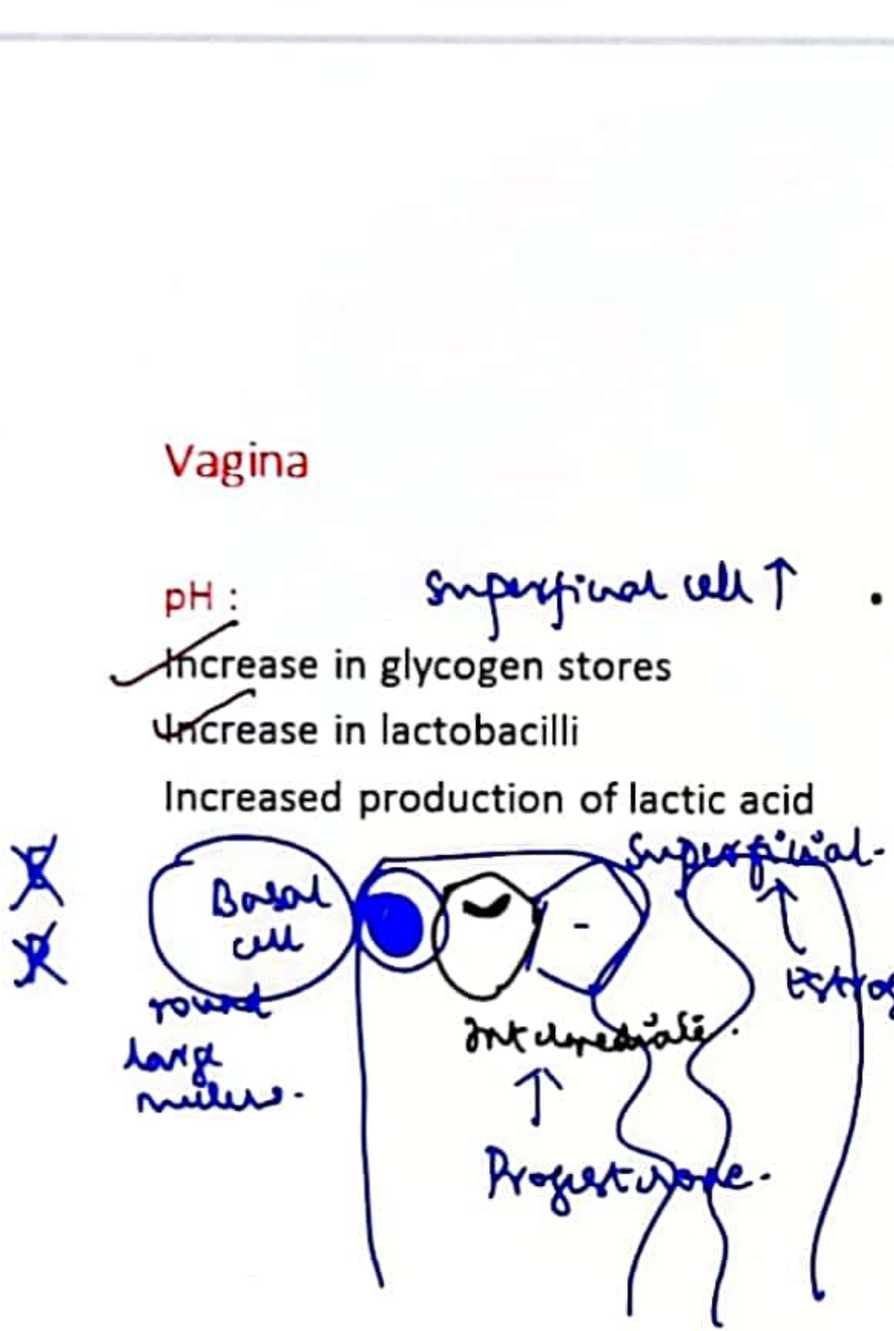
pH : superficial cell ↑

~~Increase~~ in glycogen stores

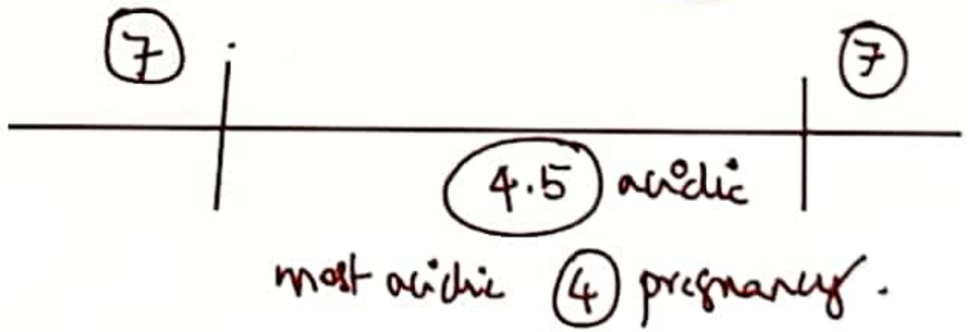
~~Increase~~ in lactobacilli

Increased production of lactic acid

- Pregnancy is associated with elevated risk of vulvo – vaginal candiasis, particularly during second and third trimesters – may be related to increased glycogen stores.



PH = 4



hCG

Produced by the Syncytiotrophoblast

Half life : 36 hours

Glycoprotein hormone.

Highest carbohydrate content compared to any other human hormone _____
Sweetest Hormone

Doubling : - 48 hrs.

bbj. rise in 48 hrs.

The maternal plasma hCG at the time of expected but missed periods is about 100 IU/ml. → 110

= 25 IU/ml

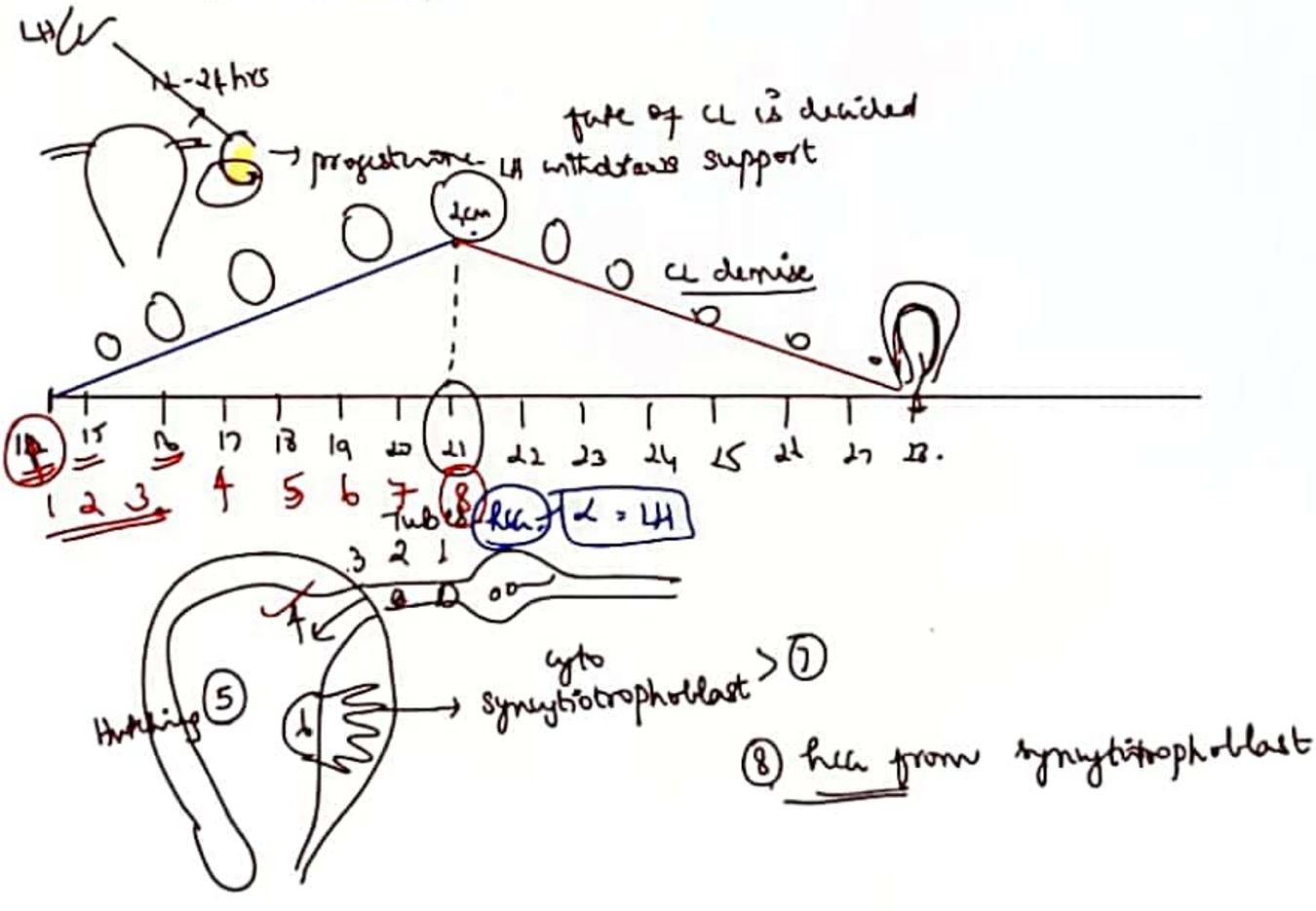
2 subunits :

α — not specific

β — specific

LH
FSH
TSH

Function — CL rescue



RELAXIN

- Protein hormone
- Secreted by the corpus luteum, decidua and the placenta.
- Relaxin is also expressed in the heart, brain and kidney.

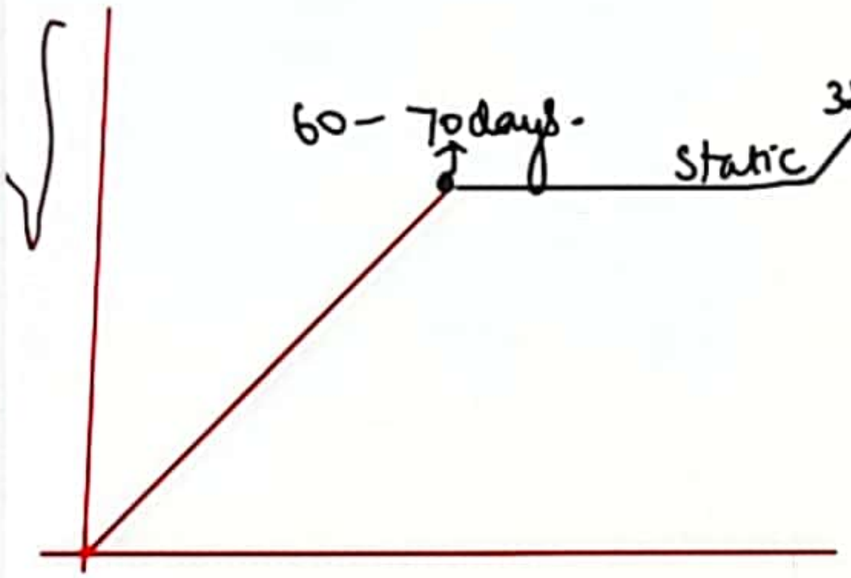
- Remodelling of the reproductive tract connective tissue to accommodate labour.
- Augments renal hemodynamics
- Increases arterial compliance.

Despite its name, serum relaxin levels do not contribute to greater peripheral joint laxity or pelvic girdle pain during pregnancy.

hcG peak

Maximum level of hCG is at ___10 - weeks

60 -70 days.

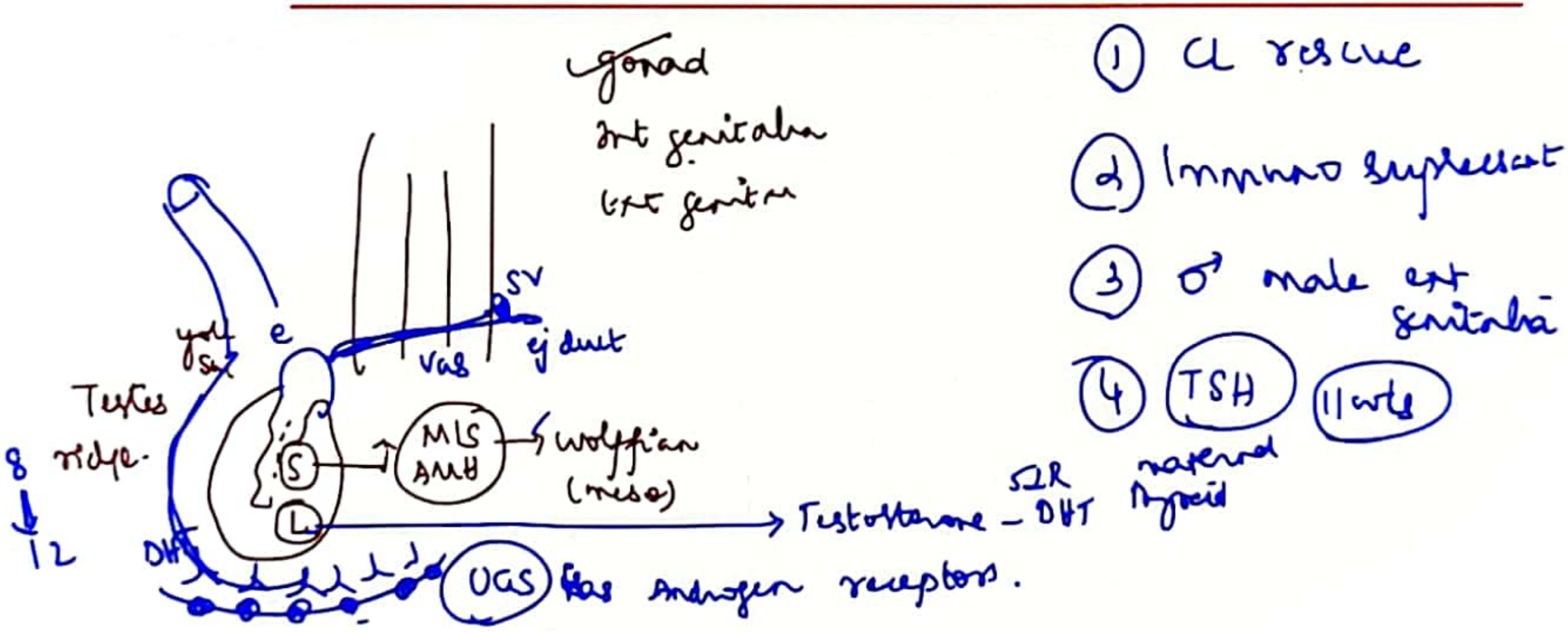


Slight secondary peak at ___32. weeks

hCG disappears from circulation following delivery.

2 wks

hCG helps in the development of male external genitalia



Partial mole

hCG is expected to disappear ---------7-- weeks following suction evacuation .

Complete mole

hCG is expected to disappear ---------9-- weeks following suction evacuation .

α placental mols.

hPL (human Placental Lactogen) — GH like / Prolactin.

polypeptide hormone

Antiinsulin hormone

diabetogenic hormone.

Produced by syncytiotrophoblast

Promotes lactation

Also called hCS.

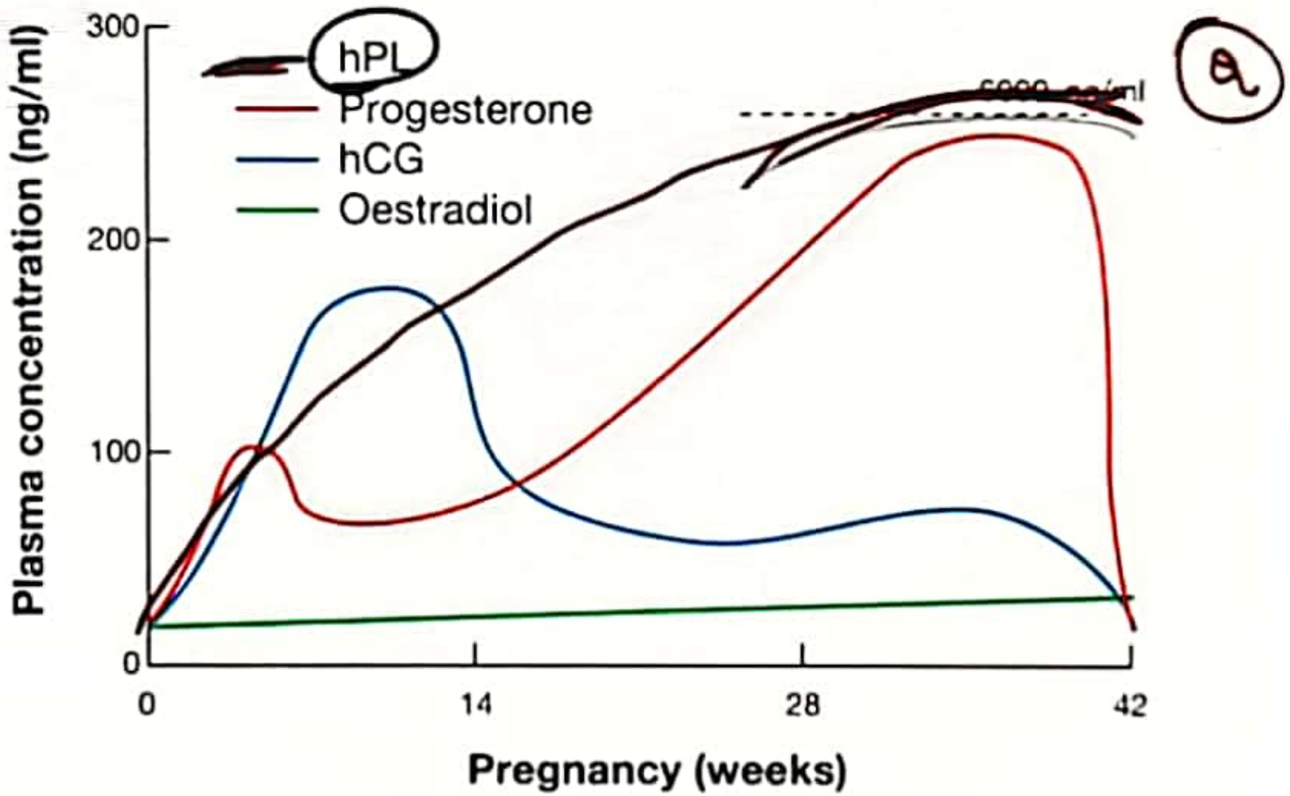
human chorionic somatotropin.

Unlike hCG, the levels progressively increase till 36 weeks

hPL: ∝ maximum rise in pregnancy.

Placental hormone levels through pregnancy

Placental hormone levels through pregnancy



hCG, human chorionic gonadotrophin; hPL, human placental lactogen.

Hematological changes in pregnancy