Lecture #3

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NORMAL PREGNANCY

What are the physiological and psychological changes in pregnancy

Lecture contents:

1. Diagnosis of Pregnancy.
2. Physiological & psychological Changes in Pregnancy
3. Prenatal Care.

Lecture Objectives: At the end of this lecture the students will be able to:

1-Identify the diagnosis of pregnancy.

2-Discuss the normal physiological changes in pregnancy.

3-Enumerate the most common minor discomforts during pregnancy.

4-Interpret the danger signs that occur with pregnancy.

5-Explain the nursing role in prenatal care.

6-Formulate nursing diagnoses related to the psychological

and physiologic changes of pregnancy.

The Diagnosis of Pregnancy

1-Presumptive

- Breast changes
- Nausea, vomiting
- Amenorrhea
- Frequent urination
- Fatigue
- Uterine enlargement
- Quickening

2-Probable

Serum laboratory tests.

- **Chadwick's sign (Color change of the vagina from pink to violet).**
- **Goodell's sign (Softening of the cervix).**
- **Hegar's sign (Softening of the lower uterine)**
- **Evidence on ultrasound of gestational sac**
- **Ballottement (When lower uterine segment is tapped on a bimanual examination, the fetus can be felt to rise against abdominal wall).**
- **Braxton Hicks contractions**

Chadwick's sign

Pregnant:

Goodell's sign

- **Cervical signs:**
- **(a) Cervix becomes soft as early as 6th week (Goodell's sign), a little earlier in** multiparae. The pregnant cervix feels like the lips of the mouth, while in the non-pregnant state, like that of tip of the nose.
- (b) On speculum examination, the bluish discoloration of the cervix is visible. It is due to increased vascularity.

Hegar's sign

- UTERUS
- Hegar's sign: It is present in two-thirds of cases.
- It can be demonstrated between 6 and 10 weeks, a little earlier in multiparae.
- This sign is based on the fact that:
- (1) upper part of the body of the uterus is enlarged by the growing fetus
- (2) lower part of the body is empty and extremely soft and
- (3) the cervix is comparatively firm. Because of variation in consistency, on bimanual examination (abdominal fingers behind the uterus and two fingers in the anterior fornix), the abdominal and vaginal fingers seem to appose below the body of the uterus
- Examination must be gentle to avoid the risk of abortion.

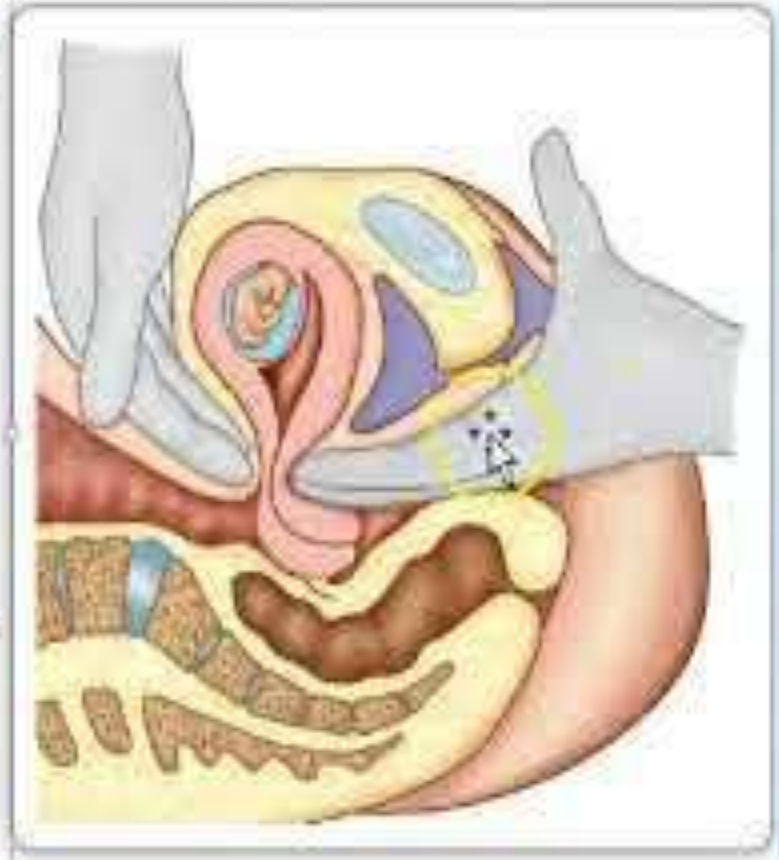


Fig. 7.2: Demonstration of Hegar's sign

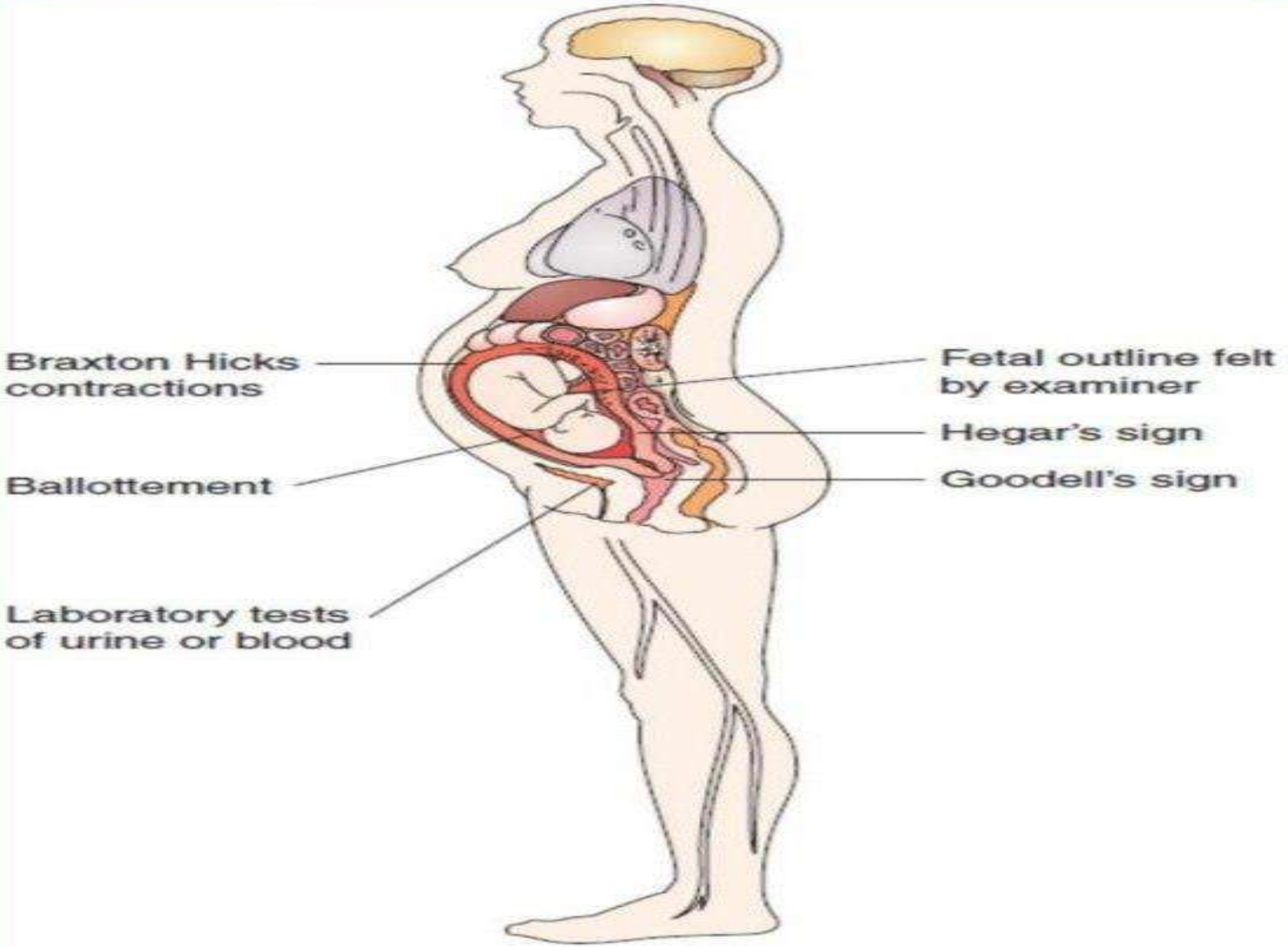
3-Positive

Evidence on US of fetal outline

- Fetal heart audible
- Fetal movement felt by examiner

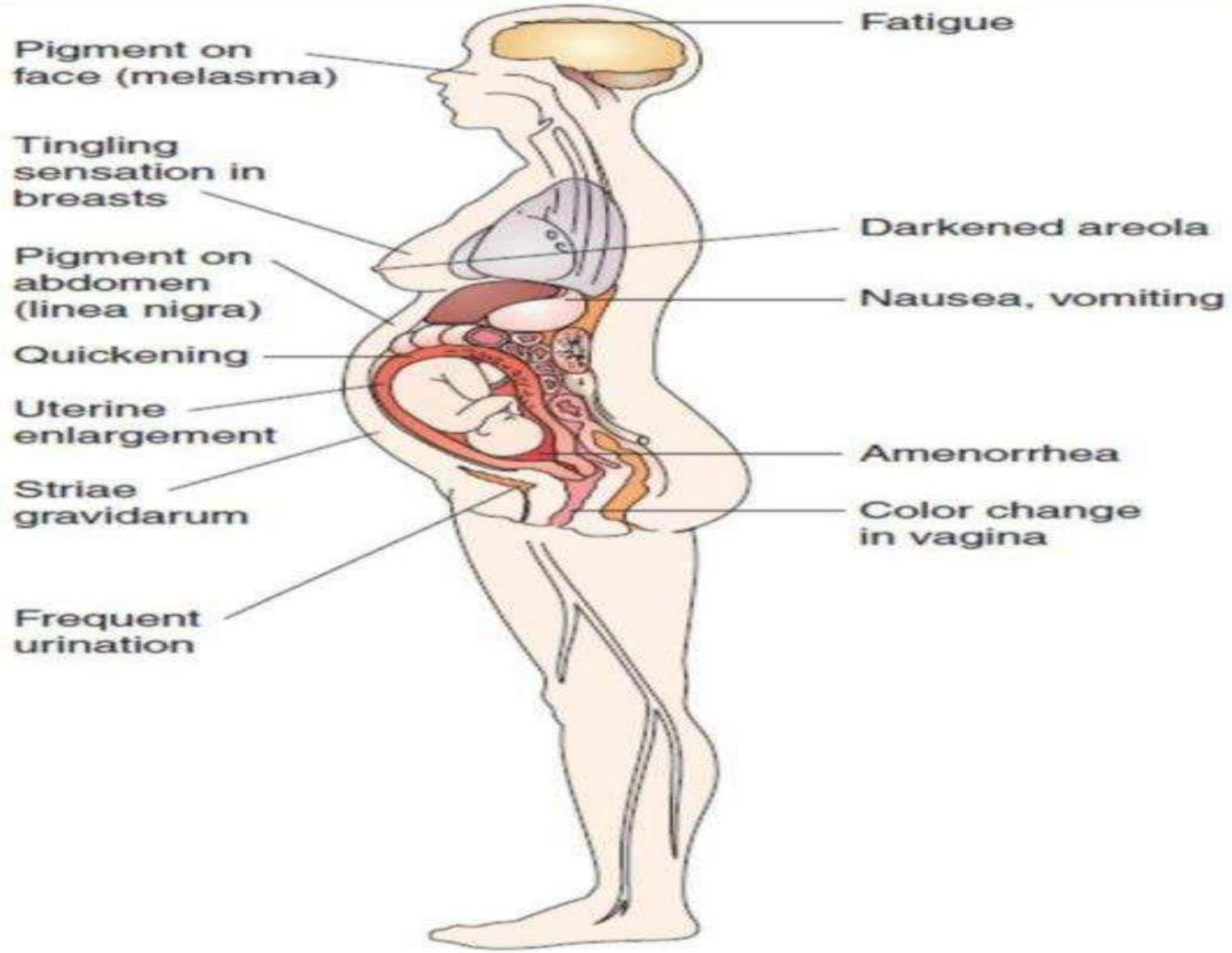
Box 10.7 Assessment

Assessing the Client for Probable Signs of Pregnancy



Box 10.6 Assessment

Assessing the Client for Presumptive Signs of Pregnancy



Urine pregnancy test

Reacts with human chorionic gonadotropin (hCG)
Useful in monitoring expected pattern of progression of hCG;
detects hCG as early as 9 days post conception.

Ultrasound

o Confirms presence of gestational sac, fetal pole, and fetal cardiac activity
o Validates location of pregnancy (intrauterine versus ectopic).

Serum pregnancy test

For these tests, hCG is measured in international units. In the no pregnant woman, no units are detectable because there are no trophoblast cells producing hCG. In the pregnant woman, trace amounts of hCG appear in the serum as early as 24 to 48 hours after implantation.

Home Pregnancy Tests

Reacts with hCG.

A woman dips a strip into her stream of urine. A color change on the strip denotes pregnancy.

Home tests can detect as little as 35 mIU/mL of hCG.

They take 3 to 5 minutes to perform.

Women wait until the day of the missed menstrual period to test.

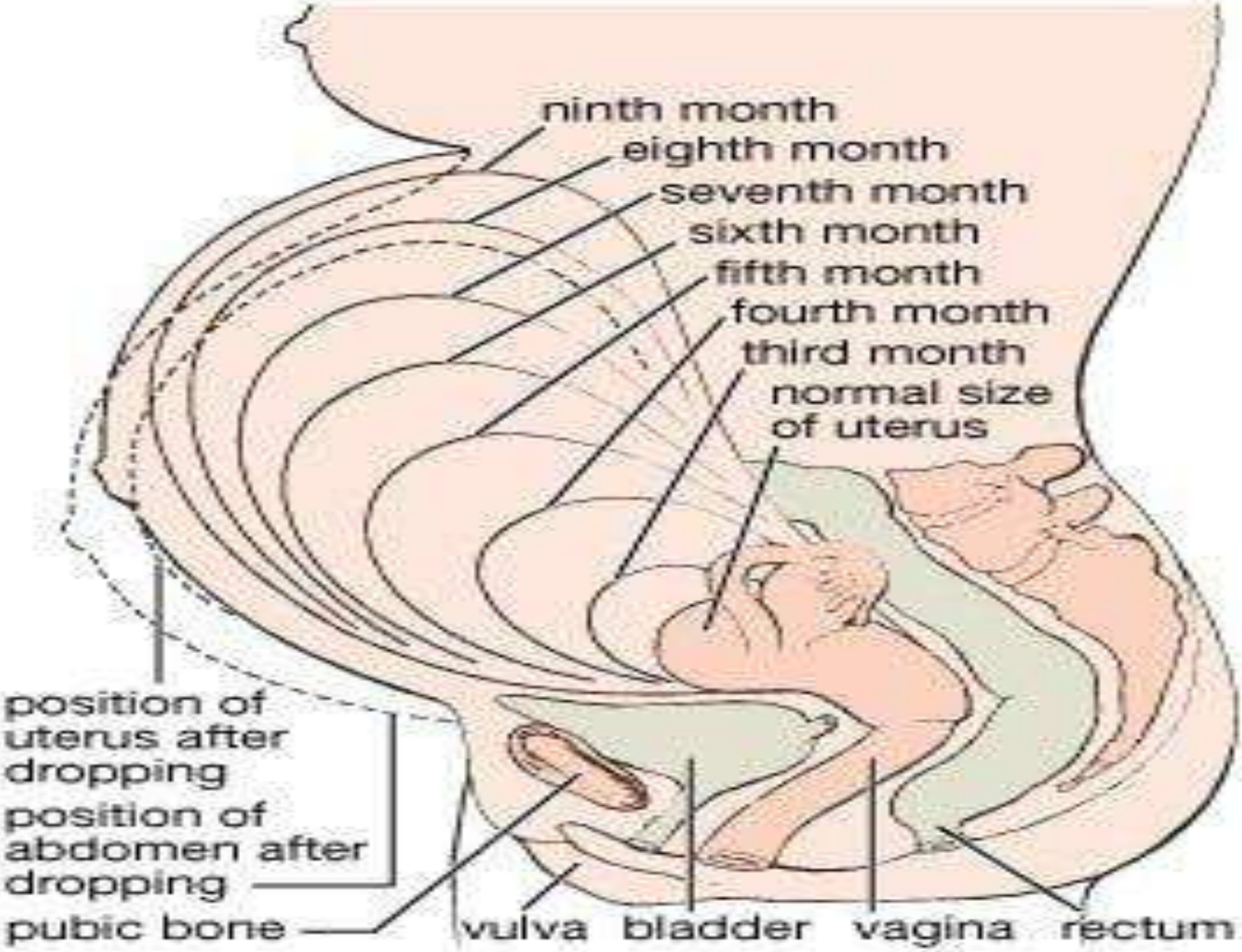
Advise any woman who thinks she might be pregnant but gets a negative result from a home pregnancy test to repeat the test 1 week later if she is still experiencing amenorrhea.

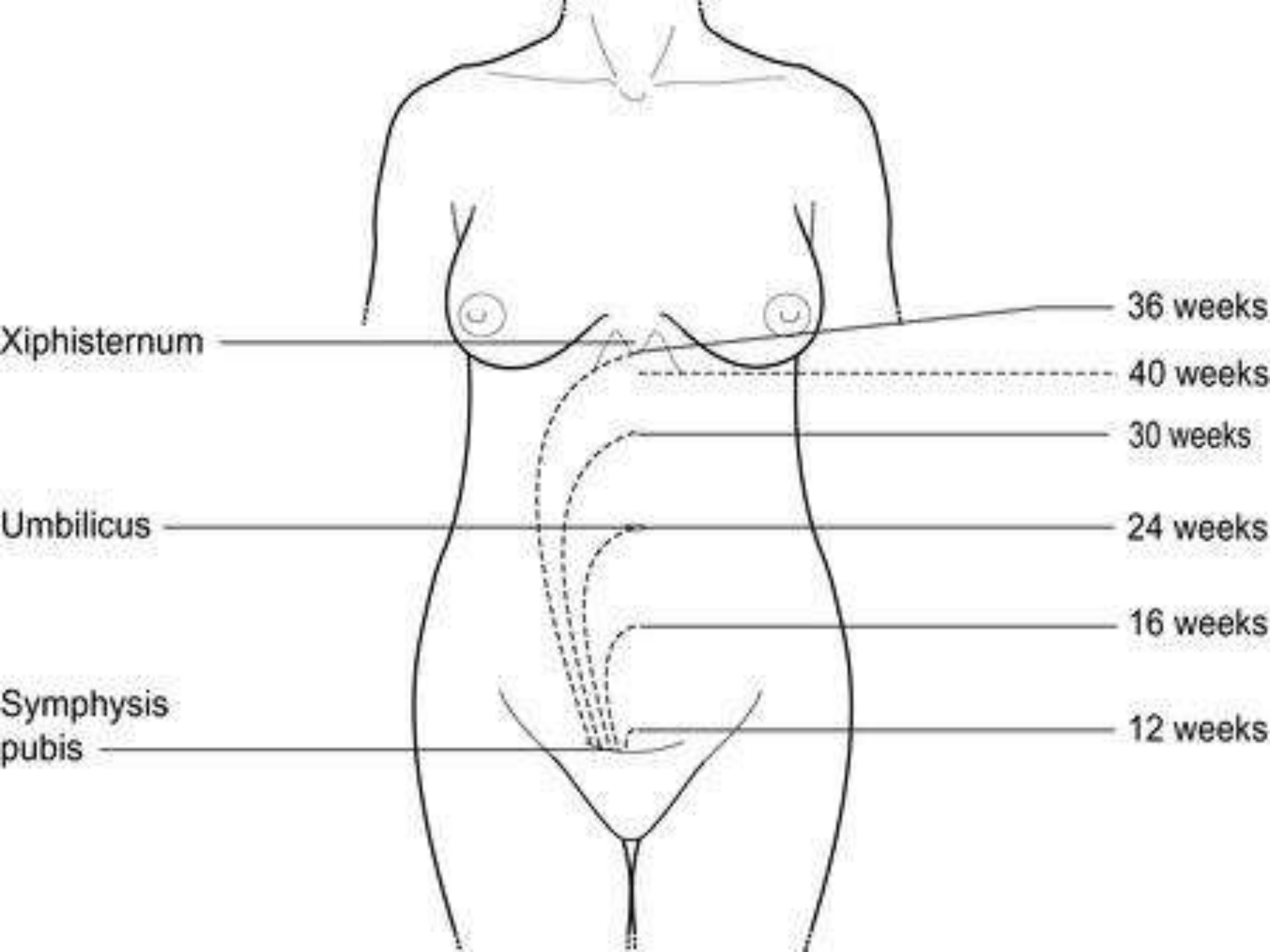
Physiologic changes

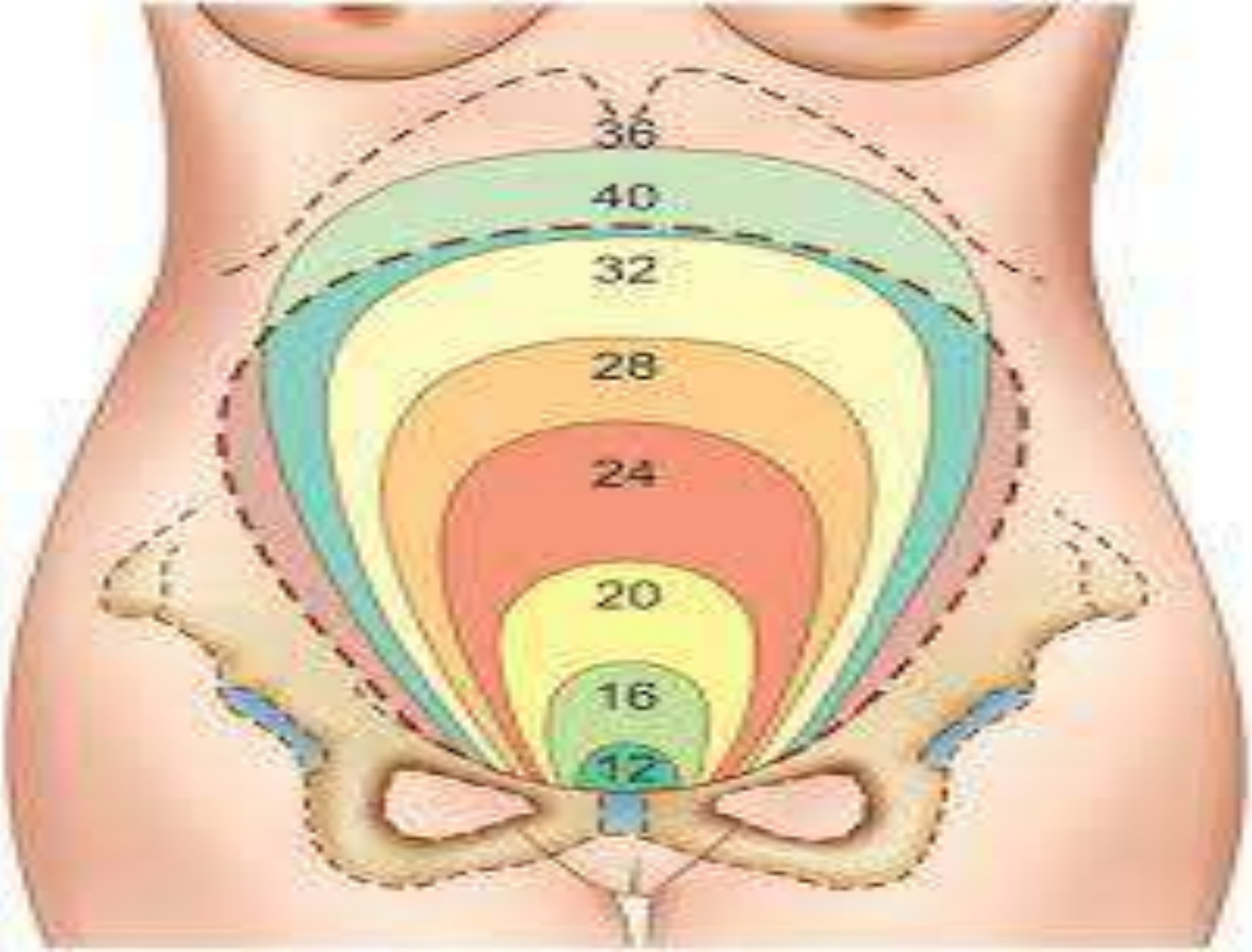
First: Reproductive System Changes

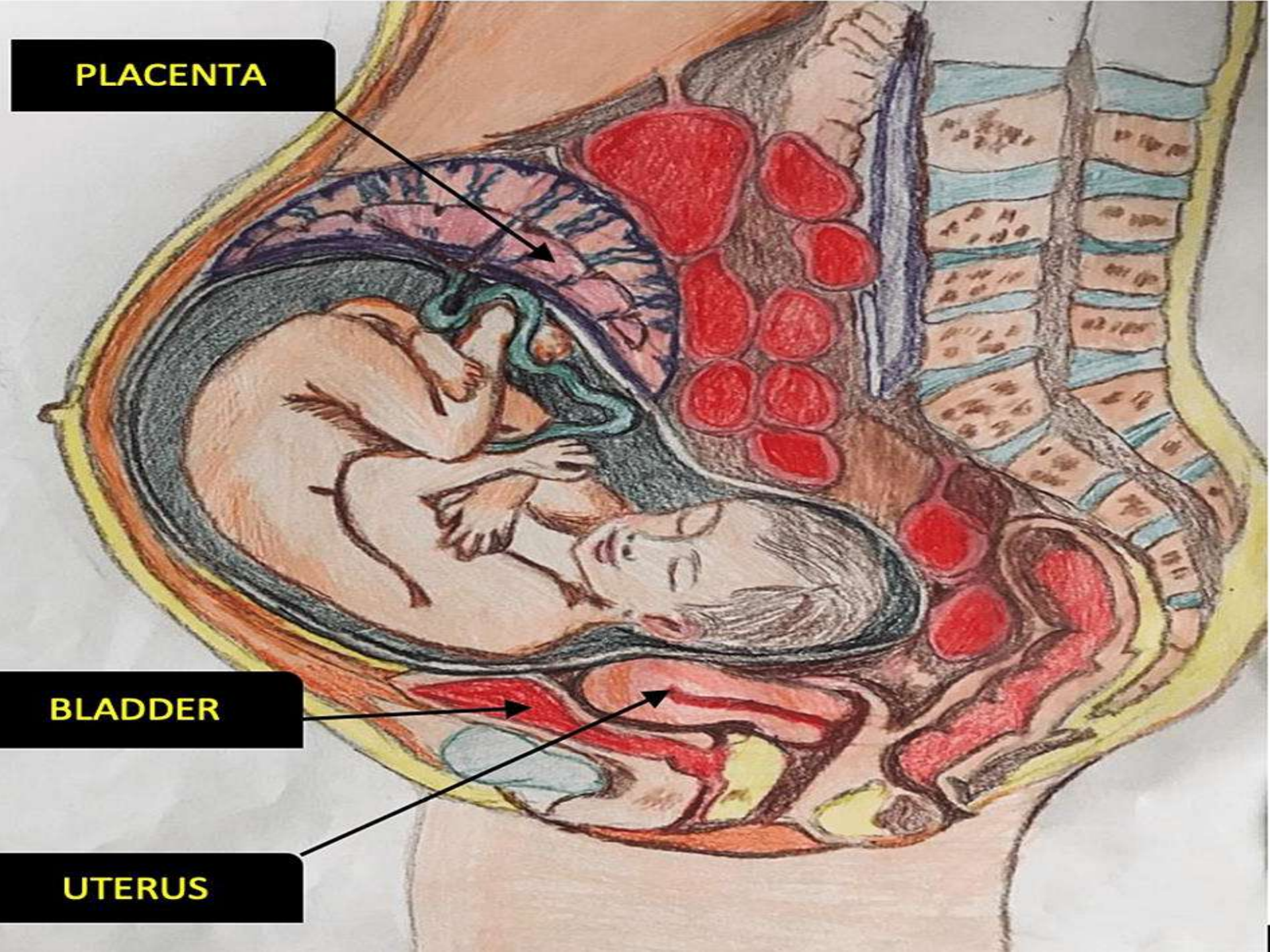
- Length increases from 6.5 to 32 cm.
- Depth increases from 2.5 to 22 cm.
- Width expands from 4 to 24 cm.
- Weight increases from 50 to 1000 g.
- Uterine wall thickens increases from about 1- 2 cm to about 0.5 cm thick.
- The volume of the uterus increases from about 2 mL to more than 1000 mL. 4000 g at term

Levels of the uterus during pregnancy




Xiphisternum
Umbilicus
Symphysis pubis
36 weeks
40 weeks
30 weeks
24 weeks
16 weeks
12 weeks


36
40
32
28
24
20
16
12


PLACENTA
BLADDER
UTERUS

Uterine

blood flow increases

- **Ballottement**
- **Braxton hicks contractions**
- **Amenorrhea**

ballottement. Balloon-mint. Around the 16th to 18th week of gestation, the fetus can be palpated by pressing a finger into the vagina and tapping gently. This action causes the fetus to move upward and then move back downwards to tap on the finger. This is known as ballottement

Cervix

- Goodell's sign
- Mucous plug (operculum)
- Consistency change

Ovaries

- Ovulation stops

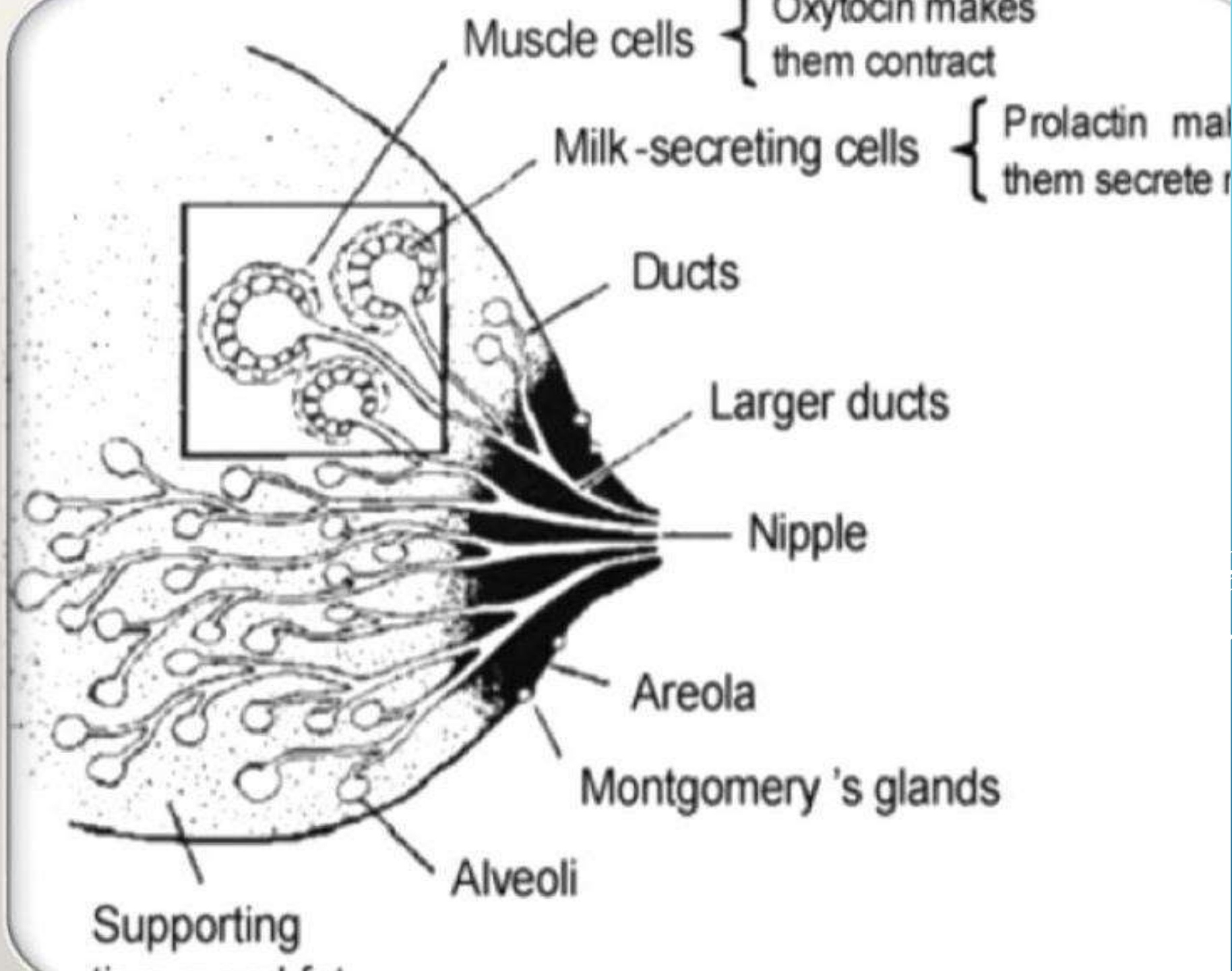
Vagina

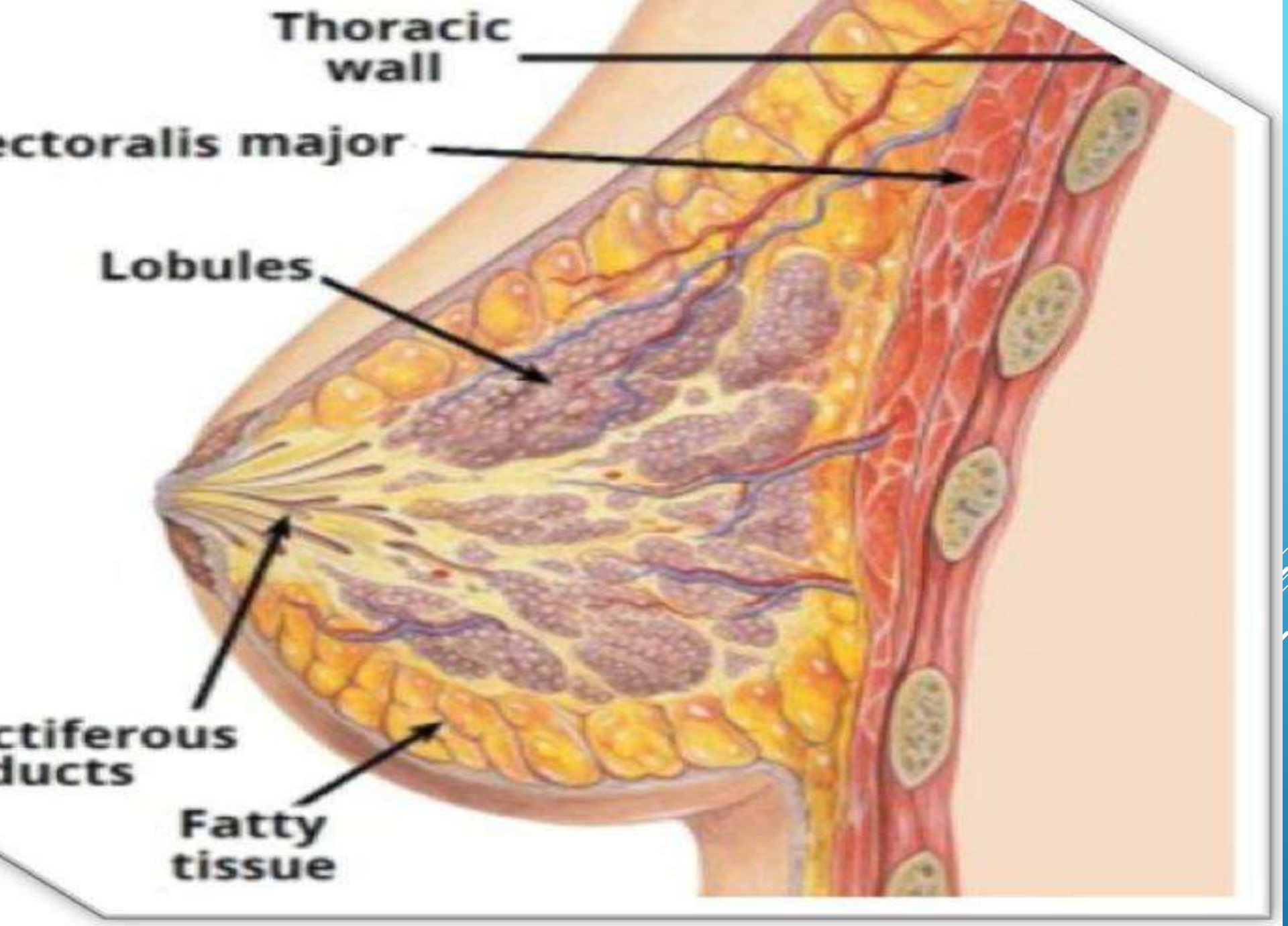
-Hypertrophic and enriched with glycogen

- Chadwick's sign
- Leucorrhea
- Vaginal PH is more acidic (4-5)
- Lactobacillus acidophilus

Breasts

- Size increases
- The areola of the nipple darkens
- Nipples become more erectile
- Montgomery's tubercles
- Blue network
- Striae gravidarum
- Colostrum


Muscle cells
Oxytocin makes them contract
Milk-secreting cells
Prolactin mal
them secrete
Ducts
Larger ducts
Nipple
Areola
Montgomery 's glands
Alveoli
Supporting


Thoracic wall
ectoralis major
Lobules
ctiferous ducts
Fatty tissue

Breasts: Fullness, heightened sensitivity, tingling, and heaviness of the breasts may occure in the early weeks of gestation. Nipples and areola become more pigmented; nipples become more erectile. The sebaceous glands of the areola (Montgomery's tubercles) enlarge. Blood vessels become visible as an intertwining blue network beneath the surface of the skin. Striata gravid arum appear at outer aspects of the breasts. Growth of the mammary glands and progressive breast enlargement at the second and third trimester.

Systemic Changes

Change in muscles

abdominal separation is a common condition. It is also called 'diastasis recti' or 'DRAM' (diastasis of rectus abdominis muscle).

The long muscles of your abdomen (rectus abdominis) run from your chest to your pelvis. They lie just under the skin, down the middle of your belly. Abdominal separation is when these 2 long muscles separate from each other

Musculoskeletal system changes
An increase in the normal lumbosacral curve (lordosis)
develops and a compensatory curvature of the cervicodorsal
region (exaggerated anterior flexion of the head) to help her
maintain her balance.

Aching, numbness and weakness of the upper extremities may
occur. .
Musculoskeletal discomforts occur especially in older women
or those with back disorder

Neurological System Changes

Compression of the pelvic nerves or vascular stasis. Carpal
tunnel syndrome during the last trimester; which characterized
by paresthesia, and pain in the hand radiating to the elbow.
lLight headedness, faintness and even syncope are common
during early pregnancy.

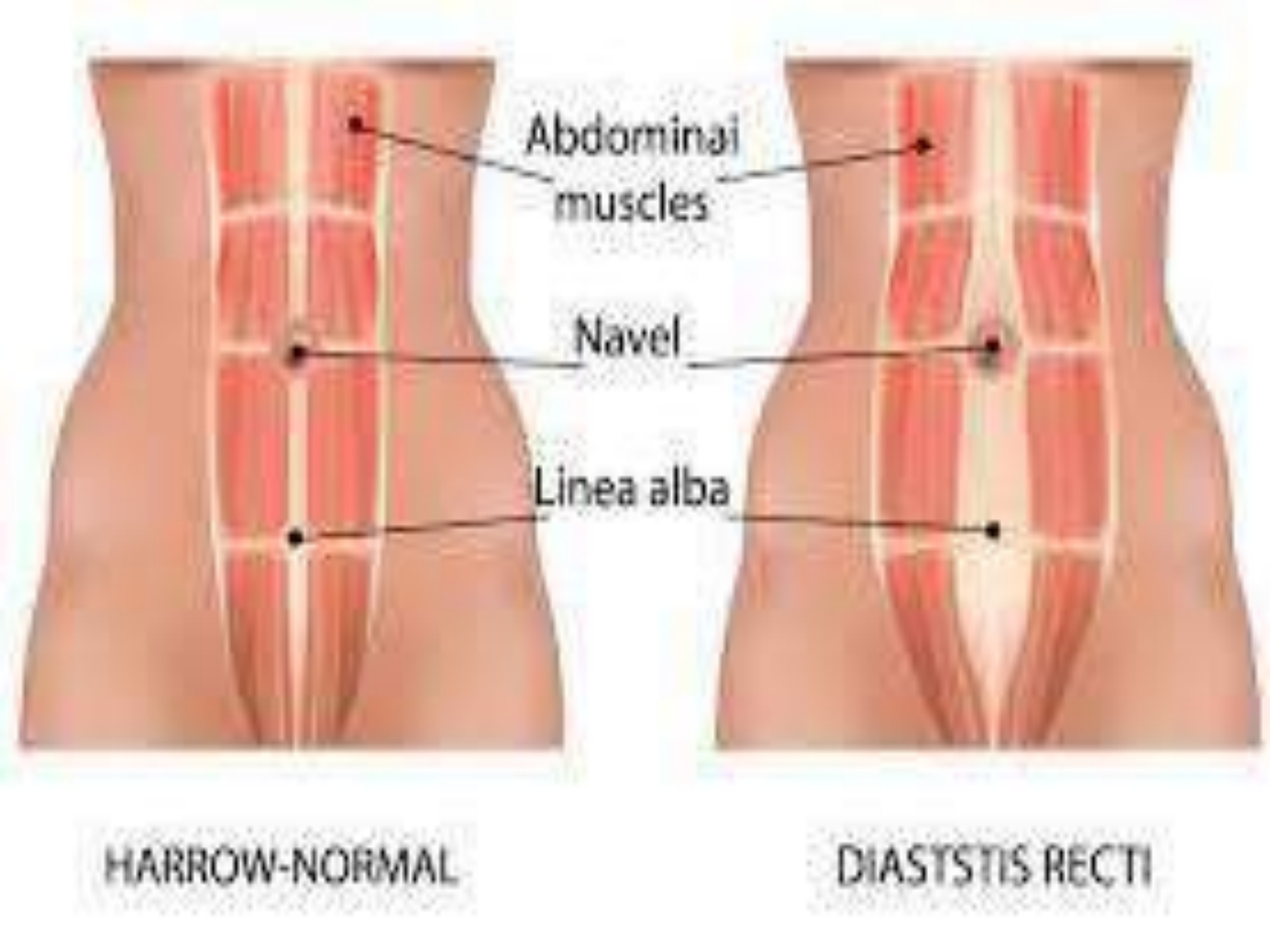
Gastrointestinal SystemChanges

At least 50% of women experience some nausea and vomiting
early in pregnancy "morning sickness" and it is usually
subsiding at the end of the first trimester of pregnancy. At the end of the second trimester, the appetite increased as a result of increased metabolic needs.
changes in the sense of
taste lead to cravings and changes in dietary intake

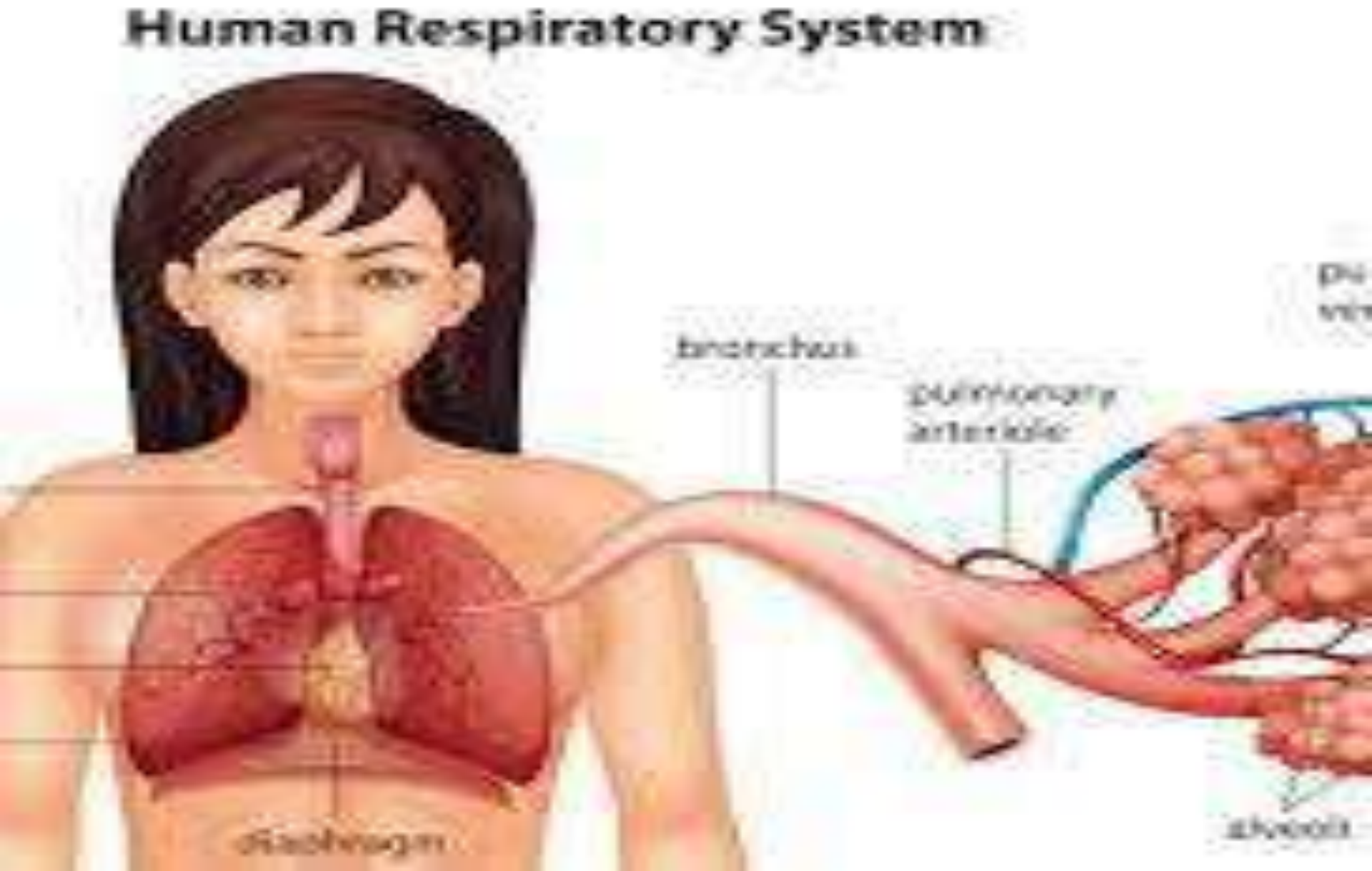
As the uterus increases in size, it pushes the stomach and intestines toward the back and sides of the abdomen. At about the midpoint of pregnancy, this pressure may be sufficient to slow intestinal peristalsis and the emptying time of the stomach, leading to increased heartburn, constipation, and flatulence. Relaxing may contribute to decreased gastric motility; this natural slowing can be helpful, because the blood supply may be reduced to the gastrointestinal tract

Pica"non-food cravings" as for ice, clay and laundry starch
which is low in nutritional value. Gums becomes hyperemic, spongy swollen and bleed easily. Ptyalism excessive salivation" due to the decrease in
unconscious swallowing by the women when nauseated, or
from stimulation of the salivary glands by eating starch.

Hormone		Functions
gen	↑	Increase uterine muscle mass Increase blood flow to uterus Prepare breasts for lactation
sterone	↑	Relax venous walls Inhibit uterine contractions
an chorionic nadotropin (hCG)	↑	Stimulate estrogen/progesteron production
in	↑	Discourage uterine contraction Remodeling of collagen
ctin	↑	Maturation of breast ducts/alve Stimulate lactation
an placental ogen	↑	Insulin antagonist Allow adequate glucose for feta


Abdominal muscles
Navel
Linea alba
HARROW-NORMAL
DIASTSTIS RECTI

Respiratory System Changes



Marked congestion, or “stuffiness,” of the nasopharynx, a
response to increased estrogen levels.
Maternal oxygen requirements increase 15%-20% in response
to the acceleration in the metabolic rate, the need to add to the
tissue mass in the uterus and Breasts and the fetus requirements of oxygen and a way to eliminate carbon dioxide.
20 Ligaments of the rib cage relax which increased chest
expansion.

As the uterus enlarges during pregnancy, the diaphragm is
displaced by as much as 4cm during pregnancy this causes an
acute sensation of shortness of breath late in pregnancy, until
lightening relieves the

ariable	Change
tal capacity	No change
dal volume	Increased by 30% to 40%
espiratory rate	Increased by 1–2/min
esidual volume	Decreased by 20%
asma Pco_2	Decreased to about 27–32 mm Hg
asma pH	Increased to 7.40–7.45
asma Po_2	Increased to 104–108 mm H
espiratory minute volume	Increased by 40%
xpiratory reserve	Decreased by 20%

body temperature in adults is maintained within narrow margins and is dependent on the balance between internal heat production, capacity for heat loss to the environment and environmental heat load (Kurz 2008). Pregnancy induces numerous physiological changes in women in addition to changes in body mass.

Cardiovascular changes occur gradually throughout pregnancy so that by the third trimester, plasma volume and cardiac output increase by almost 50%. The increase in cardiac output is initially due to increased stroke volume but by the end of the second trimester, a raised heart rate is the main component of this increase (Hall et al. 2011). Placental blood flow reaches 600–700 ml/min by the end of pregnancy and is not autoregulated; it is dependent on cardiac output and varies directly with systemic maternal blood pressure.

Changes in the Cardiovascular System During Pregnancy

Assessment Factor	Prepregnancy	Pregnancy
Cardiac output		25% to 50% increase
Heart rate (bpm)	70–80	80–90
Plasma volume (mL)	2600	3600
Blood volume (mL)	4000	5250
Red blood cell mass (mm^3)	4.2 million	4.65 million
Leukocytes (mm^3)	7000	20,500
Total protein (g/dL)	7.0	5.5–6.0
Fibrinogen (mg/dL)	300	450
Blood pressure		Decreases in second trimester, at prepregnancy level in third trimester

Slight cardiac enlargement due to increased blood volume (30% -50%).

Increase needs for Iron, Folic Acid, and Vitamins.

Heart is elevated upward and rotated forward to the left.

At 14-20 weeks of gestation, the pulse increased about 10-15 beat/minute.

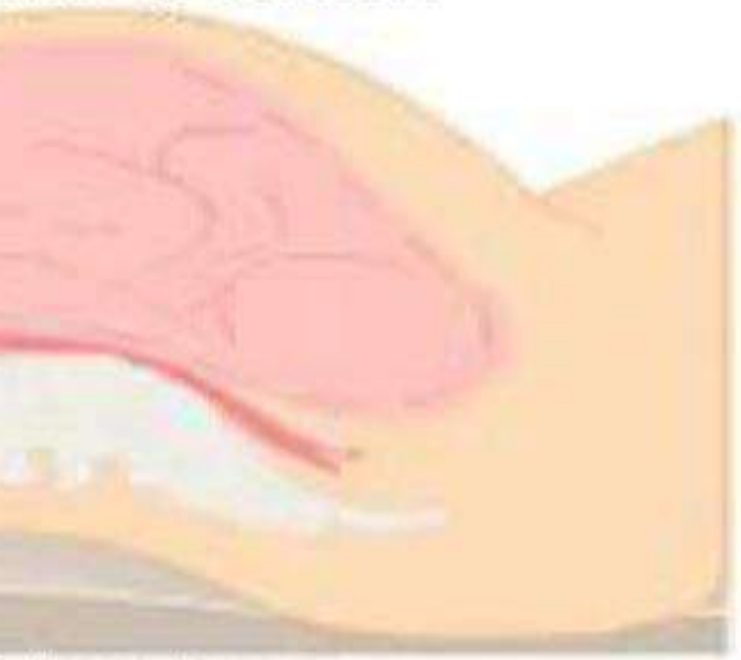
Palpitation may occur. .
Cardiac rhythm may be disturbed. . Blood pressure:
Despite the hypervolemia of pregnancy, the
blood pressure does not normally rise because the increased
heart action takes care of the greater amount of circulating
blood. blood pressure actually decreases slightly during the
second trimester after that maternal blood pressure gradually
increase and return to 1st .trimester level at term.

women who lie flat on their backs during the second half of
pregnancy compression of the venacava, decrease in systolic
blood pressure >30mmhg, reflexive bradycardia, cardiac output
is reduced by half, so women fells faint

Uterus enlargement compression of the iliac veins and inferior
venacava increased venous pressure and reduced blood flow
in the legs, which will lead to dependent edema, varicose veins
in the legs and vulva and hemorrhoids at the latter part of term
pregnancy. Decrease in normal hemoglobin values (>11mg/dl) and
hematocrit values (> 33mg/dl)

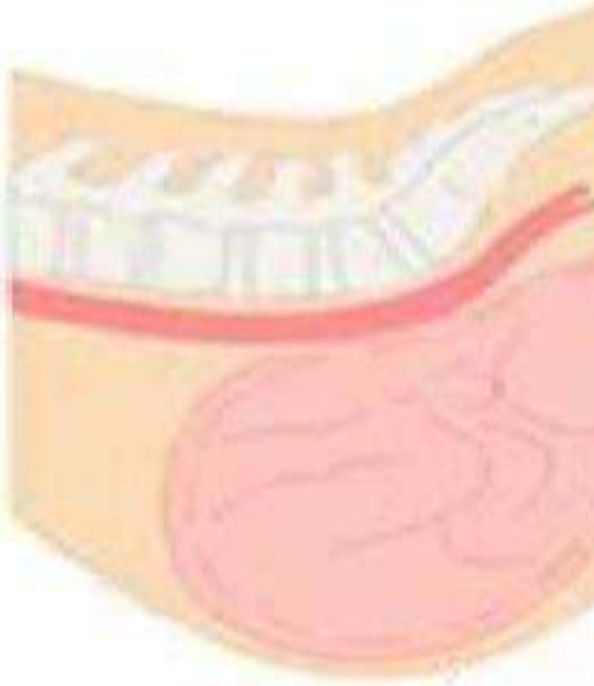
physiologic anemia which is most noticeable during the
second trimester.
Total WBCs increased during the second trimester and peaks
during third trimester specially the granulocytes.
Cardiac output increase about 30%-50% at 32 wks., then it
decline a 20% at 40 wks. cardiac output in late pregnancy is
higher when the women is in the lateral recumbent position
rather than in the supine position.

ine position



de view

B Lateral posit

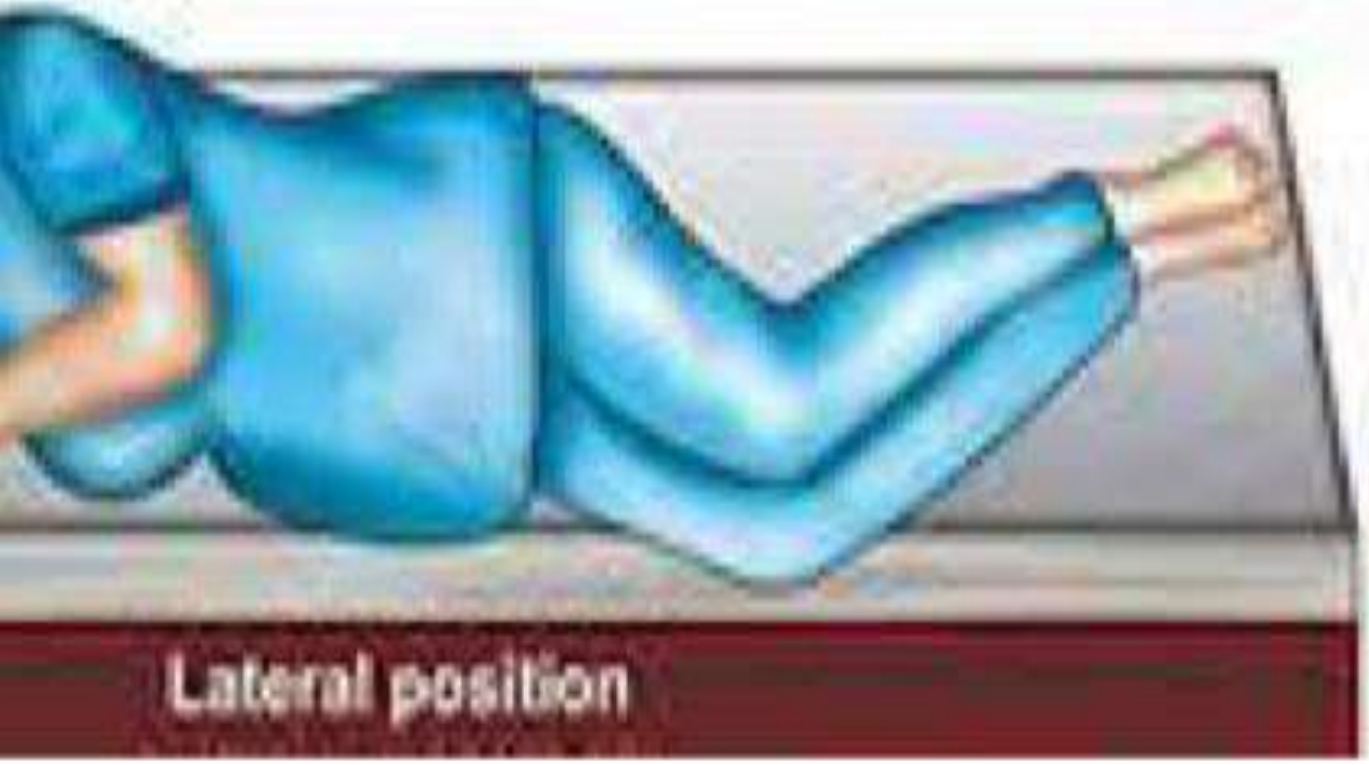


Top view

position

Fig 2 Lateral positio


Supine position


Lateral position

Renal system changes

Changes in renal structure during pregnancy related to hormonal activity as estrogen and progesterone, pressure from enlarging uterus, and increased blood volume. At 10 weeks gestation, renal pelvis and ureters dilate.

Smooth muscle wall of the ureters develops to hyperplasia,
hypertrophy, and muscle tone relaxation. So ureters elongate,
tortuous, and form single or double curves. Because of these
changes, a large volume of urine is held in the pelvis and
ureters, so urine flowed is slowed which leads to urinary stasis
or stagnation. This is an excellent media for the growth of
microorganism also the urine of the pregnant women contains
more nutrients as glucose, and elevated PH more alkaline

Integumentary systemchanges

Hyper-pigmentation (such as darkening of nipples, areolae,
axillae and vulva at 16 weeks) occurred as a result of
increased anterior pituitary melanotropin hormone.
Melasma or chloasma (mask of pregnancy) is a brownish
hyper-pigmentation of skin over cheeks , nose and forehead.
Appears 50-70% in pregnant women. It begins at 16 weeks
and increased gradually until term.