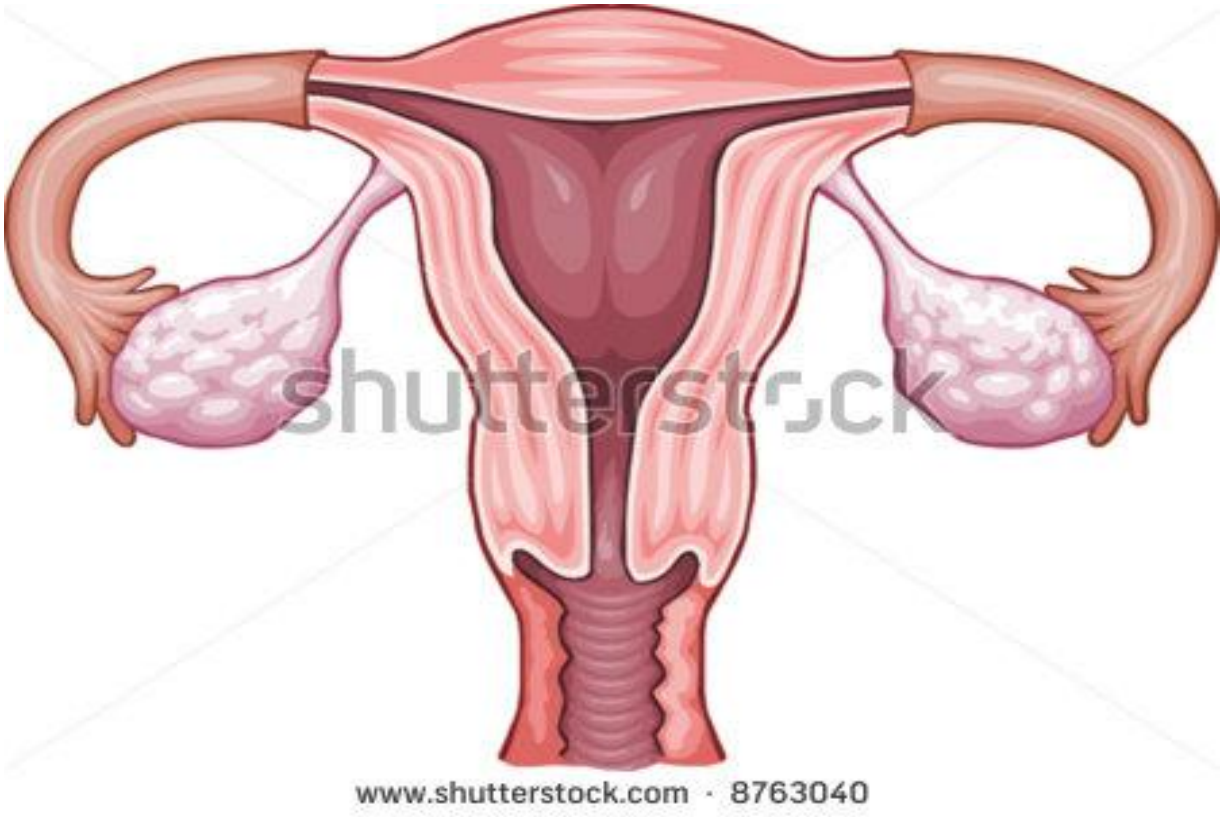
Female Reproductive System



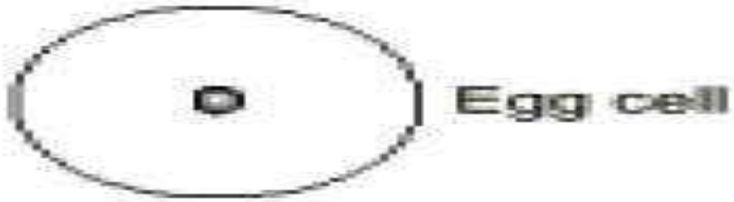
Female Reproductive System

Sperm

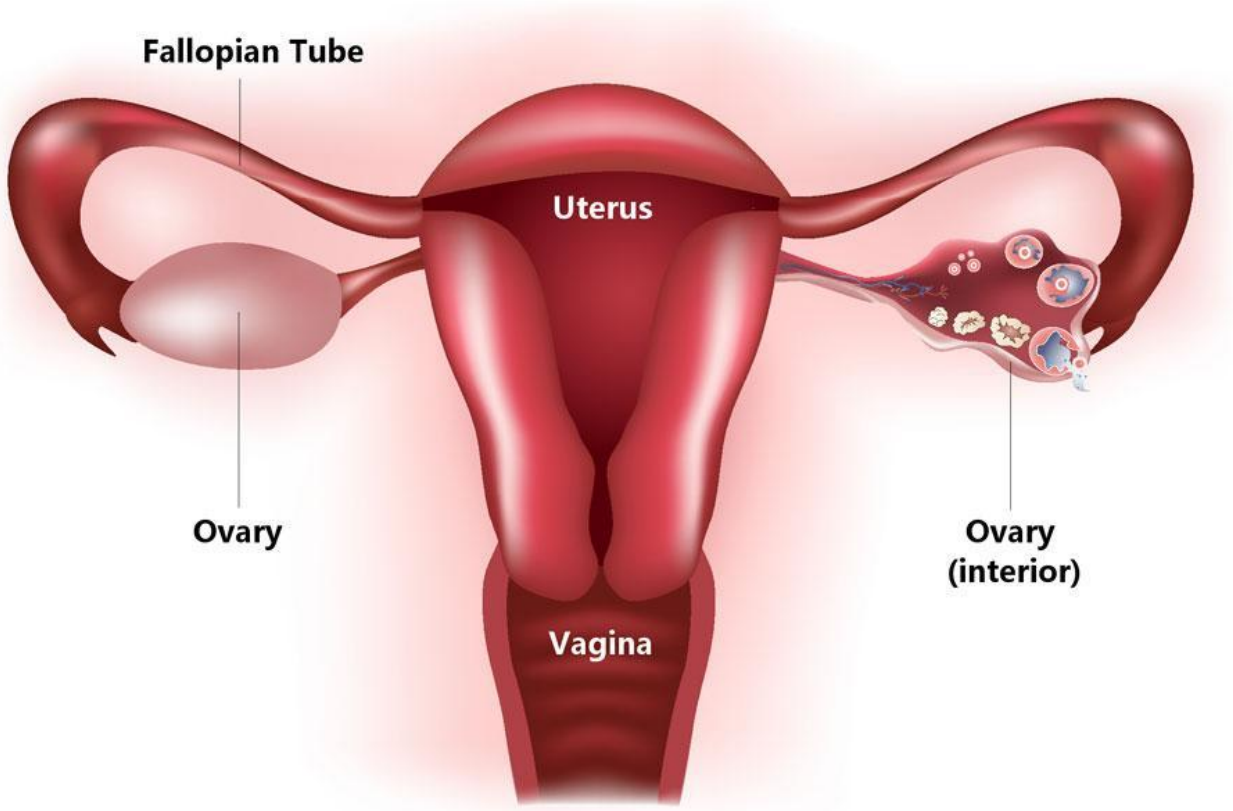
- Smaller
- Little cytoplasm
- Motile/ move

Egg

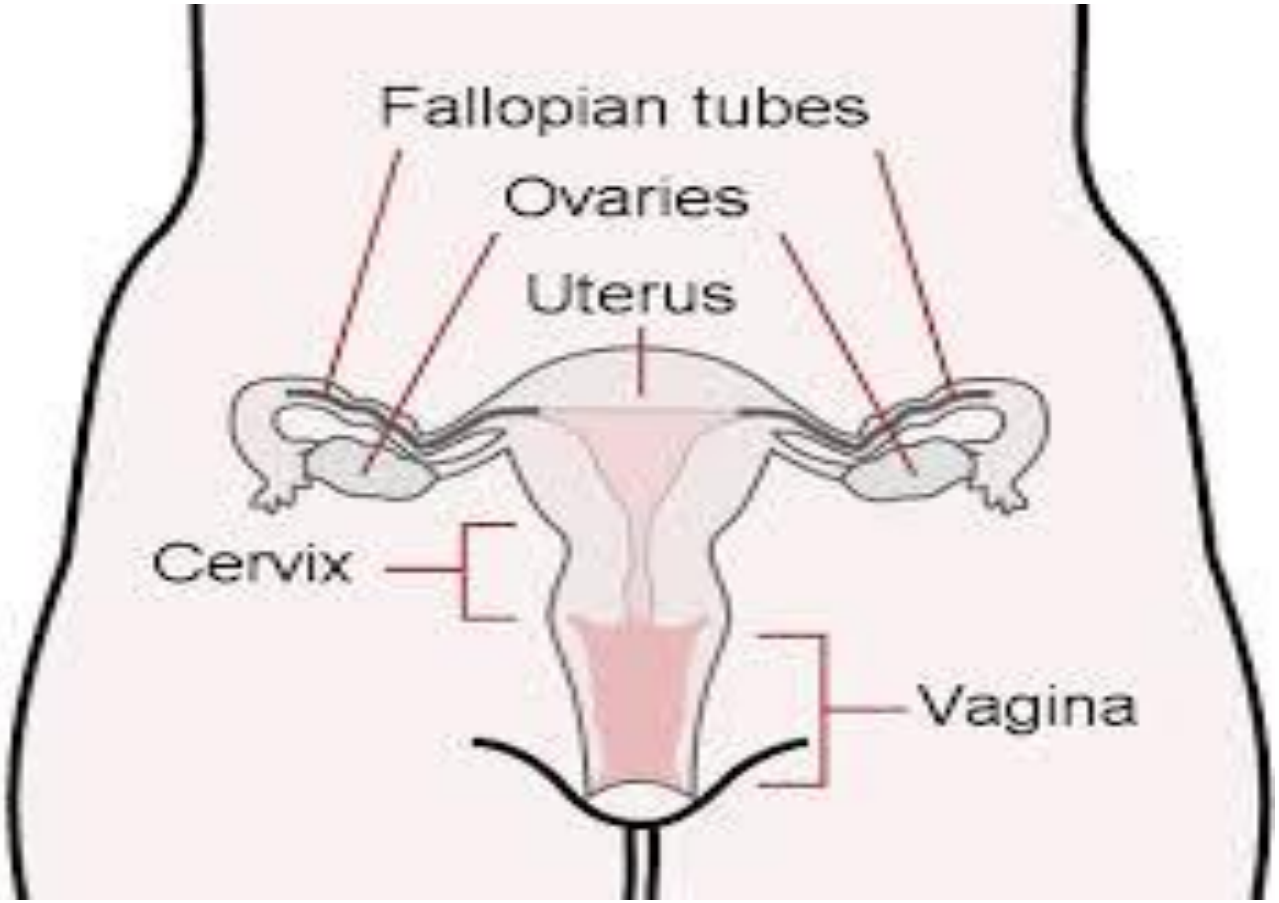
- Larger
- More cytoplasm
- Immotile



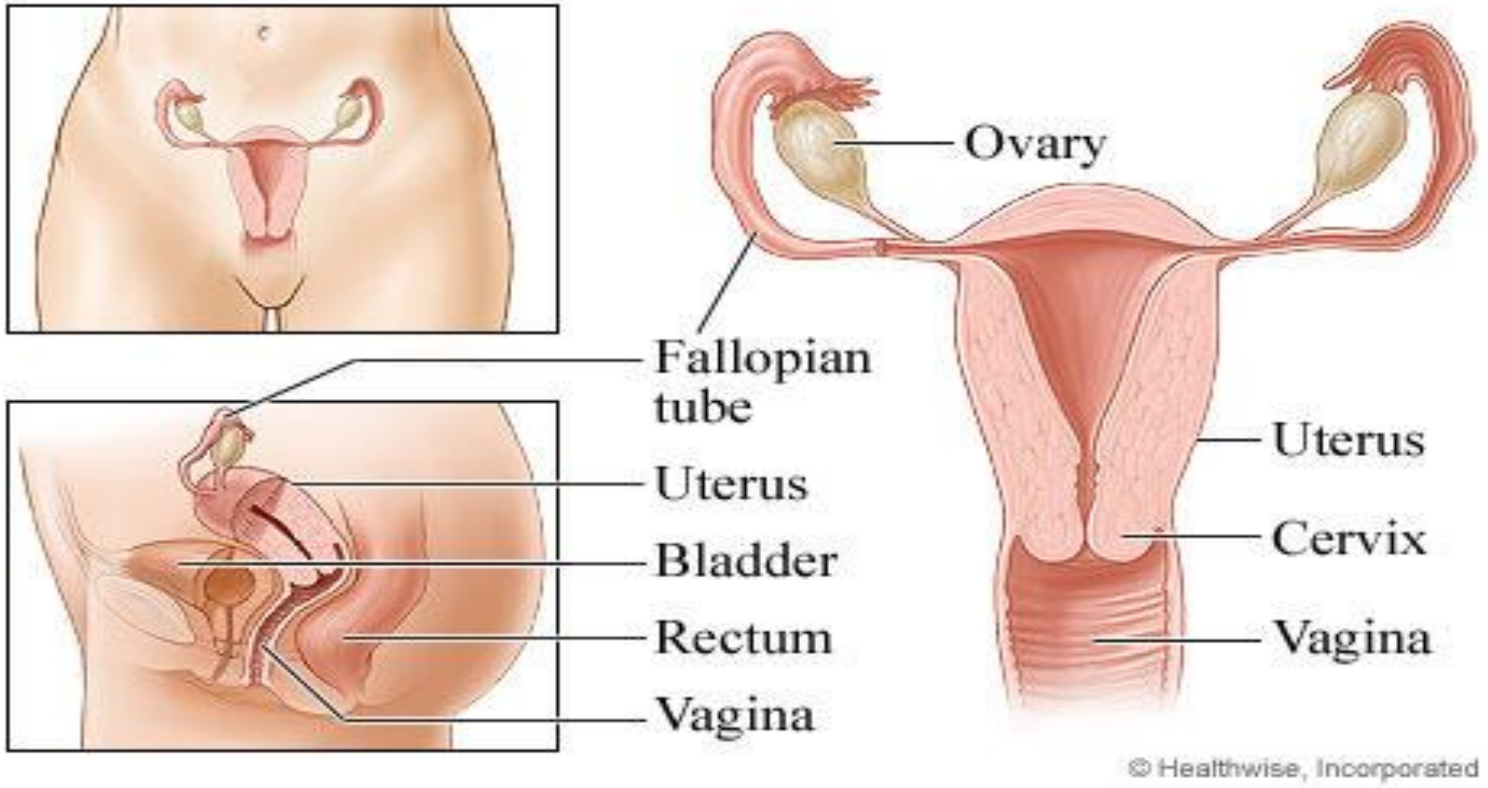
Female Reproductive System



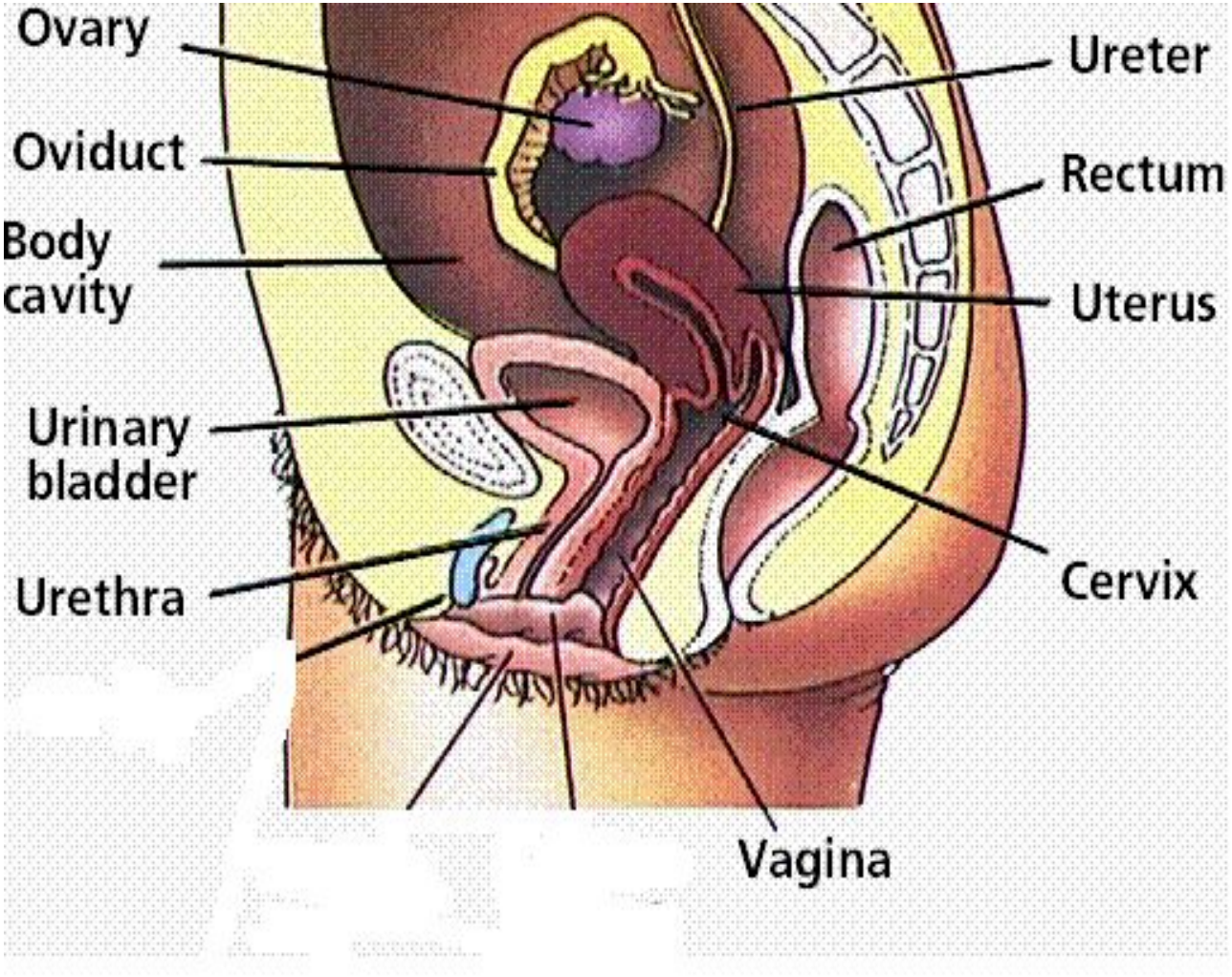
Female Reproductive System



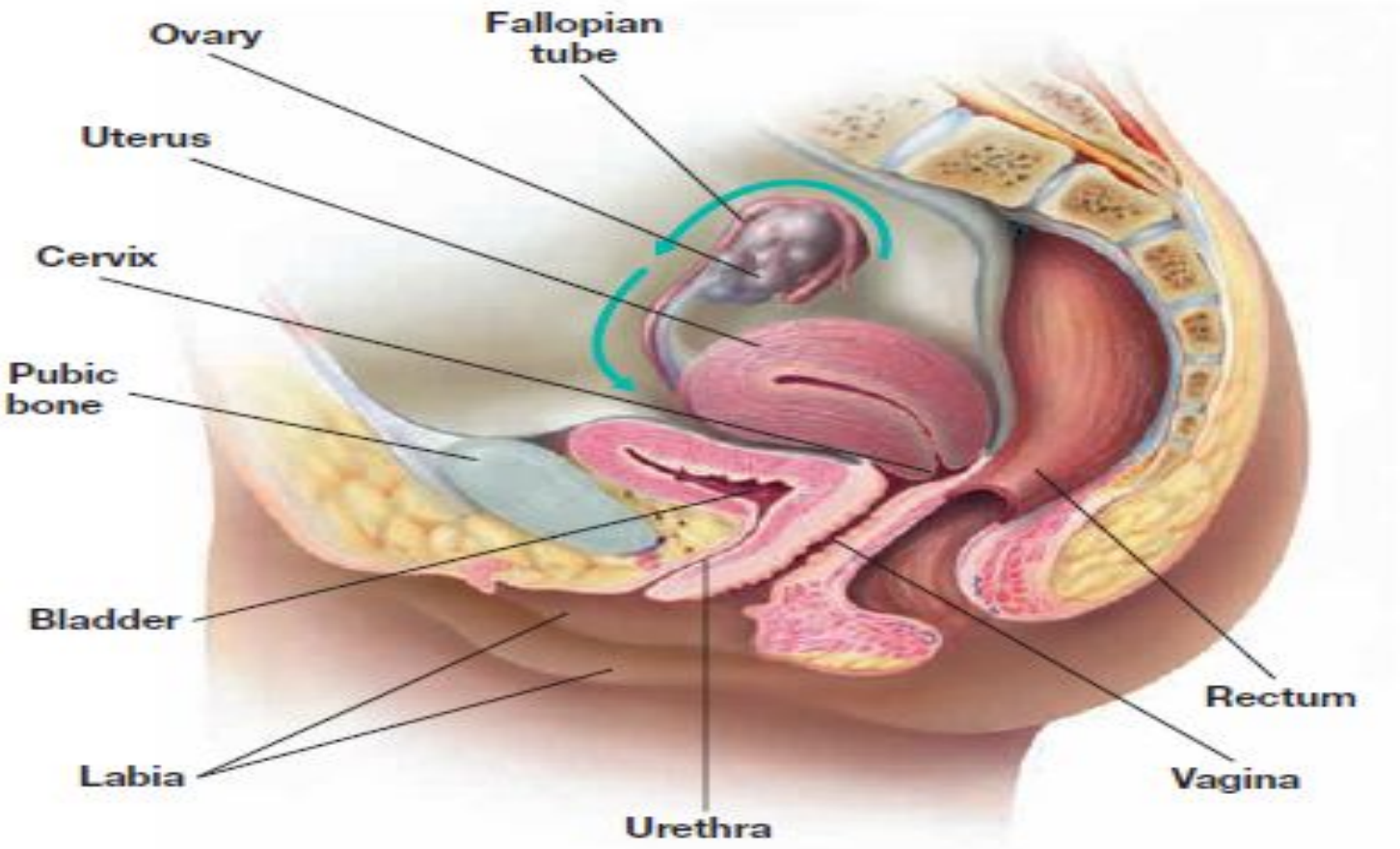
Female Reproductive System



Female Reproductive System



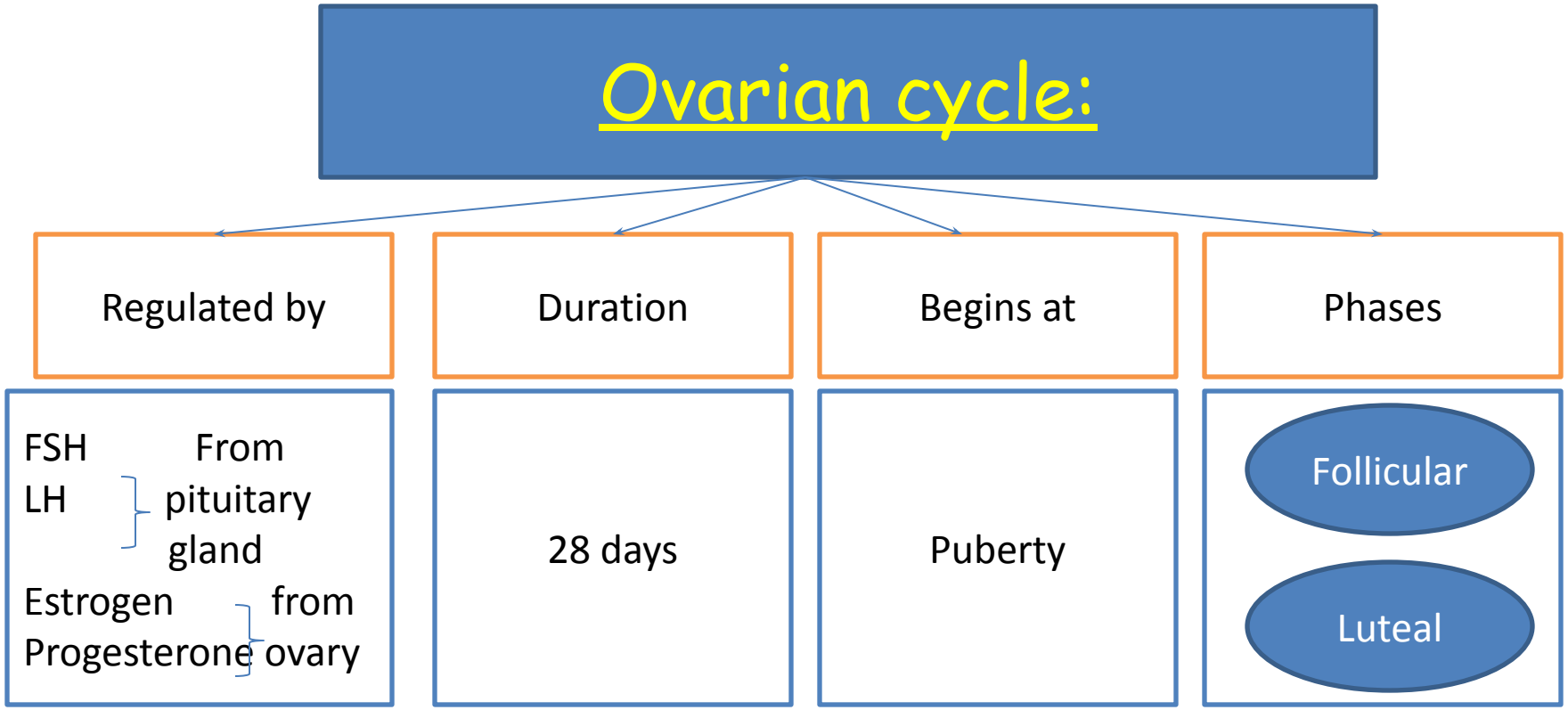
Female Reproductive System



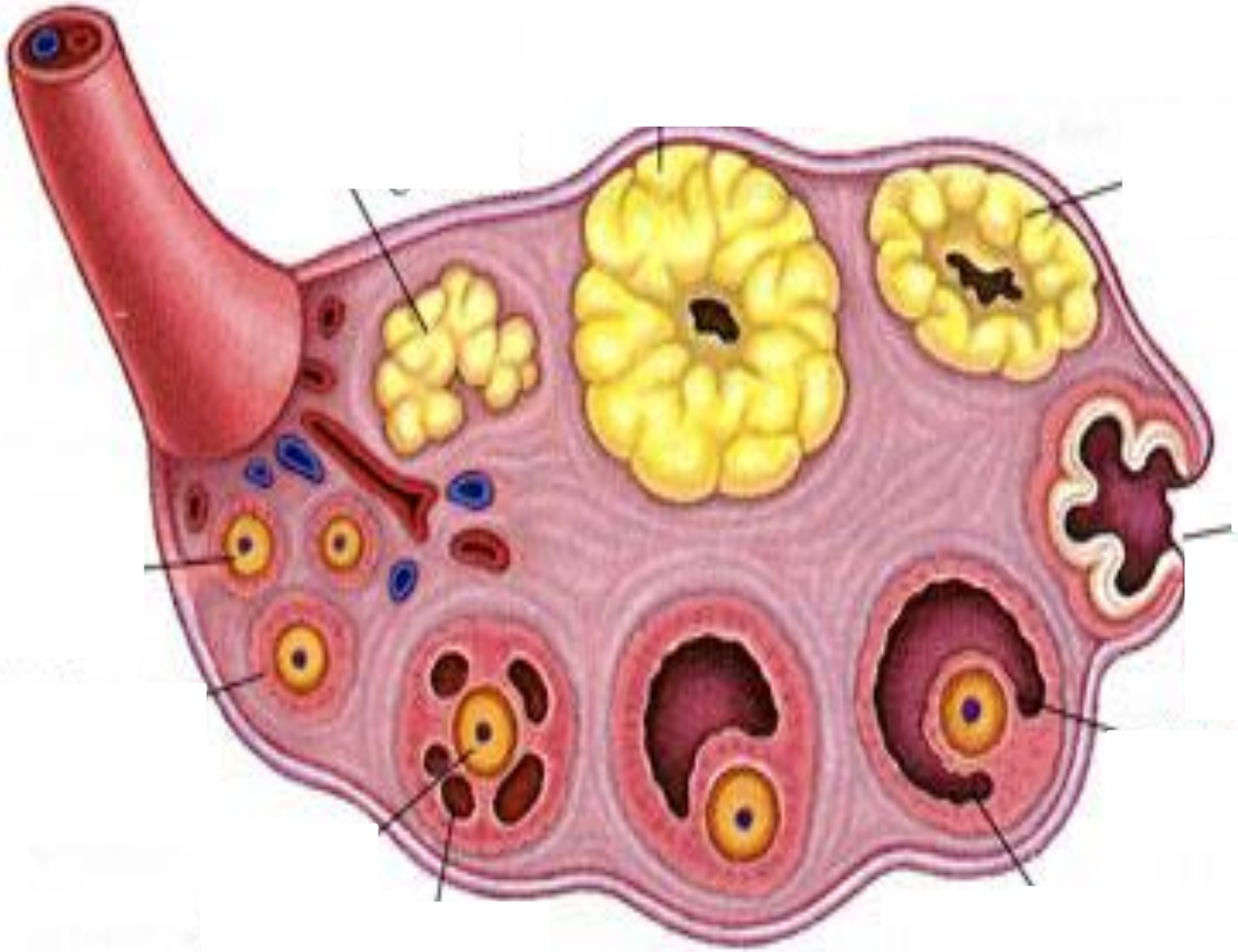
Structure	Function
Ovaries	Produce ova Produce female sex hormone (estrogen and progesterone
Fallopian tubes	Fertilization occurrence Passageway for ovum from ovary to uterus
Uterus A hollow muscular organ	Development of the embryo/ fetus
Cervix { a narrow tube, the entrance of the uterus}	Passageway of sperm to uterus Baby emerges through it during birth
Vagina A muscular tube	Site for sperm deposition in the female body Passage for baby during birth

Ovarian cycle

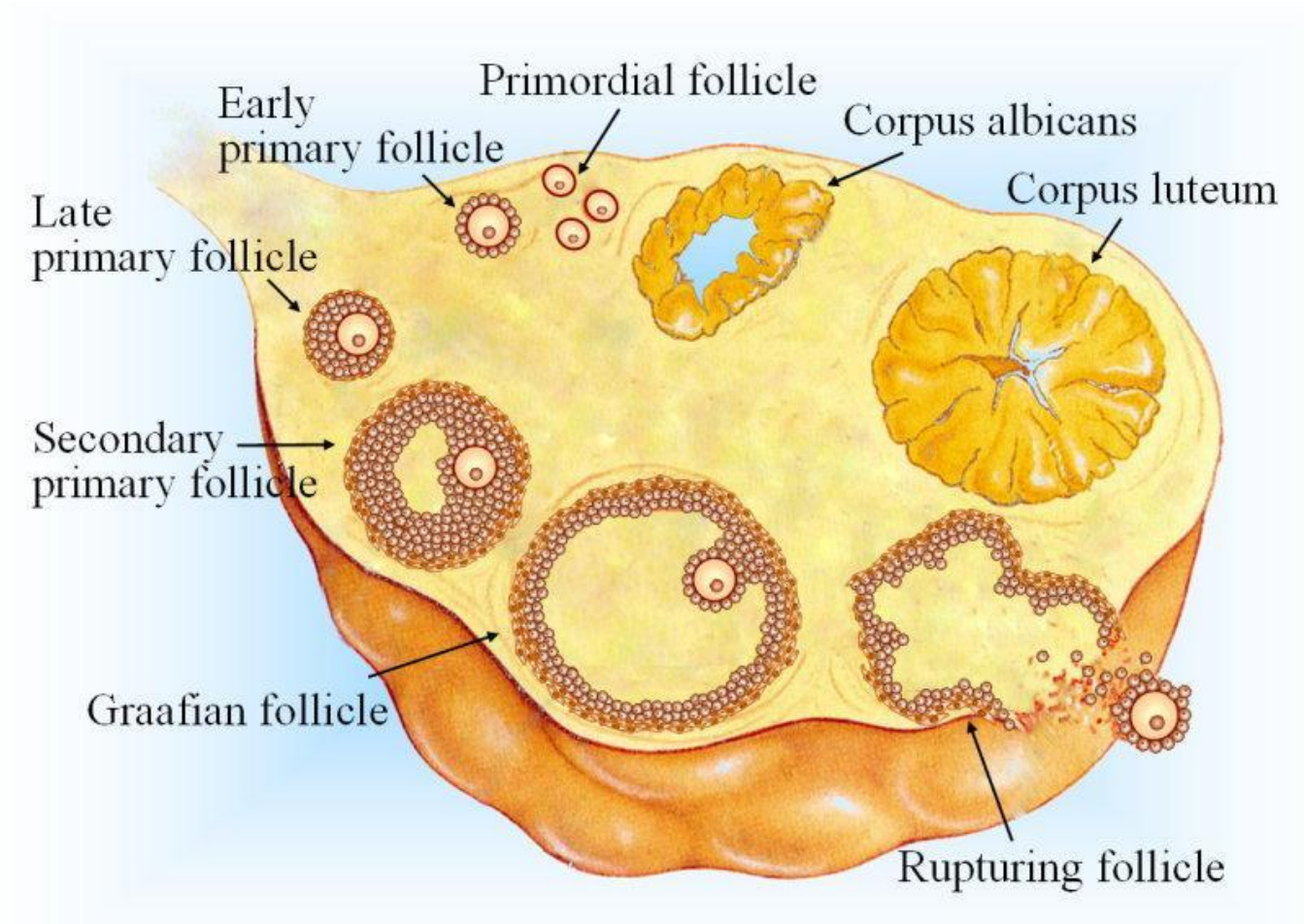
- Ovarian cycle:
- A series of events by which the ovaries prepare and release an ovum



Ovarian cycle



Ovarian cycle

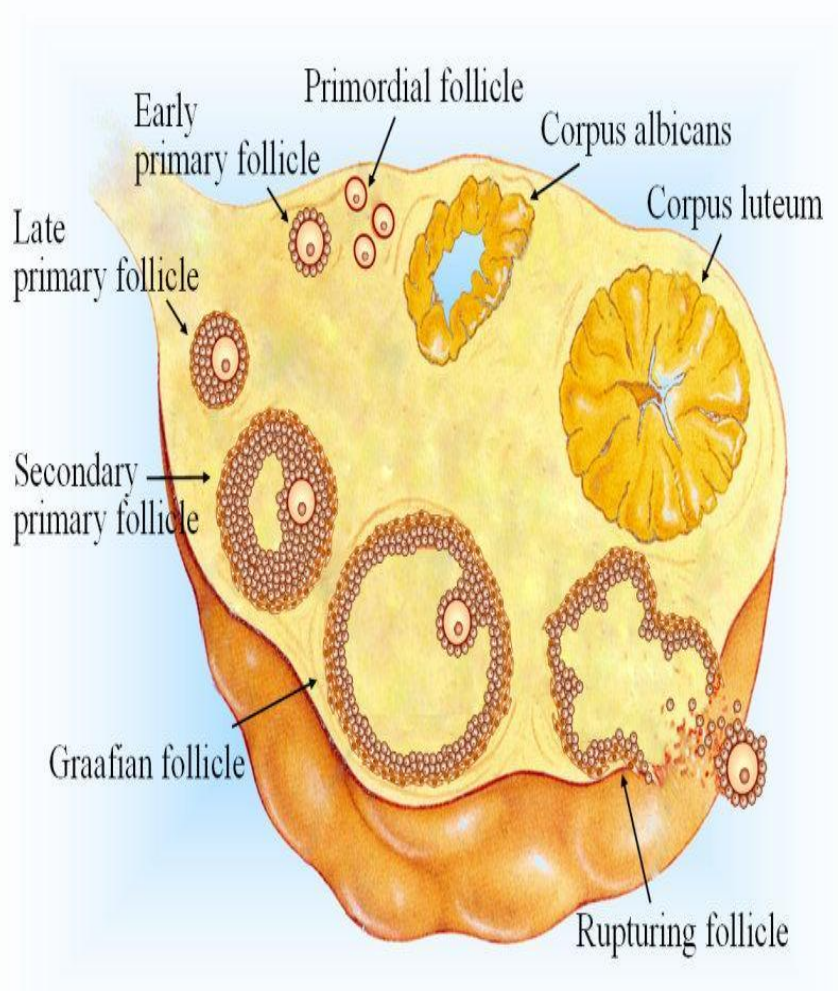


Ovarian cycle

- <u>Steps of follicular phase</u>

1. Pituitary gland secretes FSH hormone (follicle stimulating hormone) which causes the [Graafian Follicle] to develop around the ovum.

{ Follicle: a cluster of cells that surround an immature egg cell and provides it with nutrients.}

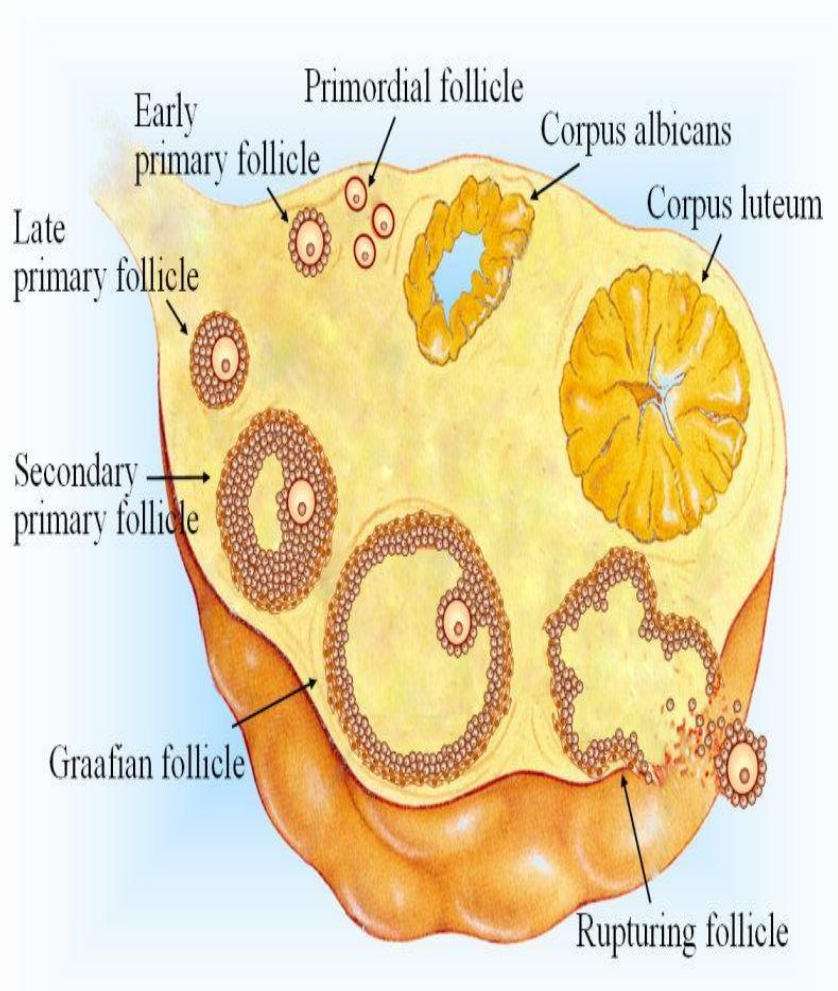


Ovarian cycle

- <u>Steps of follicular phase</u>

2. Graafian follicle secretes estrogen hormone

3. High estrogen level (when egg nears maturity) stops FSH production and stimulates LH (luteinizing hormones) from the pituitary gland.



Ovarian cycle

- <u>Steps of follicular phase</u>

4. LH causes the egg cell to mature and the follicle and ovary to rupture

5. Ovulation occurs when the ovum is released from the ovum to fallopian tubes

*a current of fluids sweep the egg into fallopian tube.

*help of cilia and muscle contractions of the tube moves the ovum in fallopian.

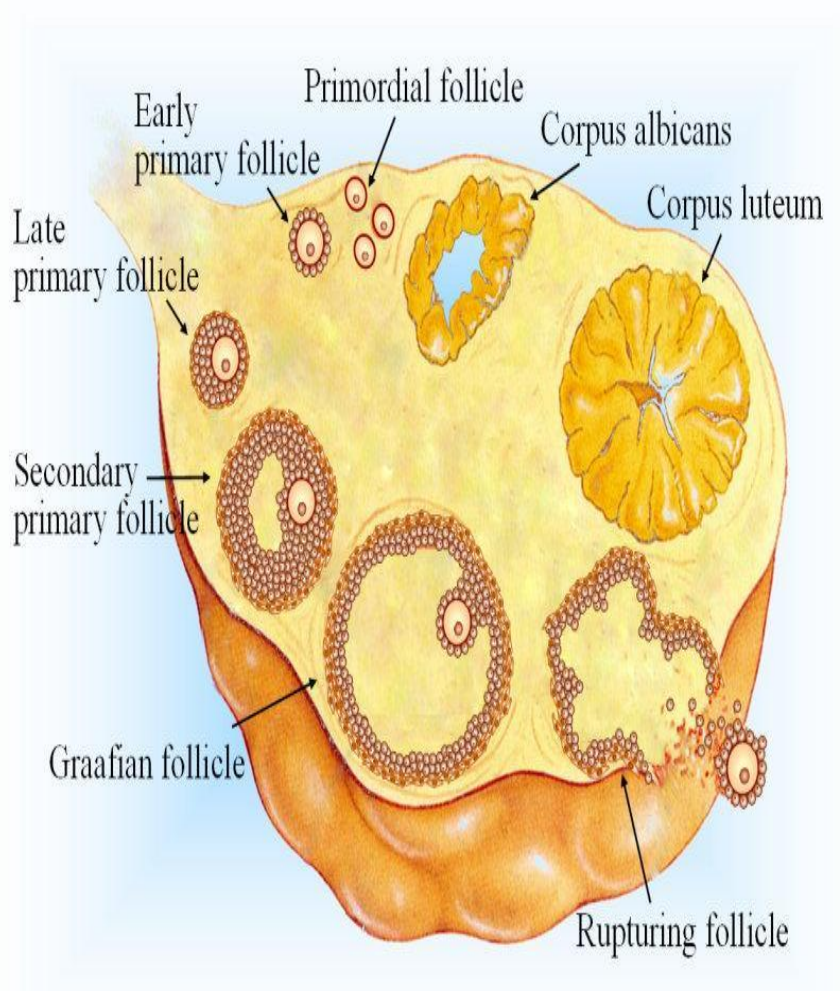
Ovarian cycle

- Steps of lutealphase

1- After ovulation, continued secretion of LH stimulates the growth of the corpus luteum **(a yellowish mass of cells that function as endocrine gland)**

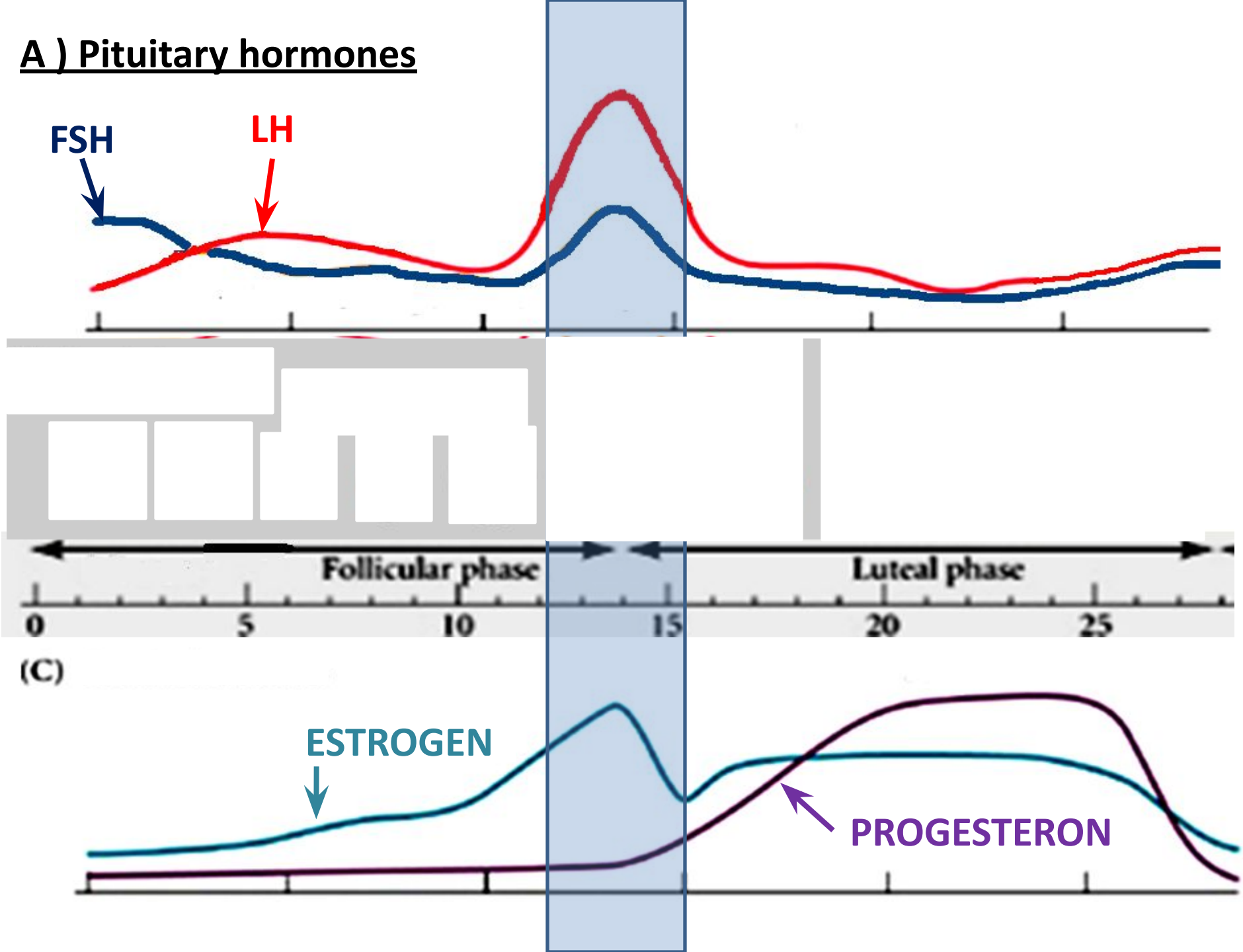
2- Corpus luteum secretes estrogen and progesterone which:

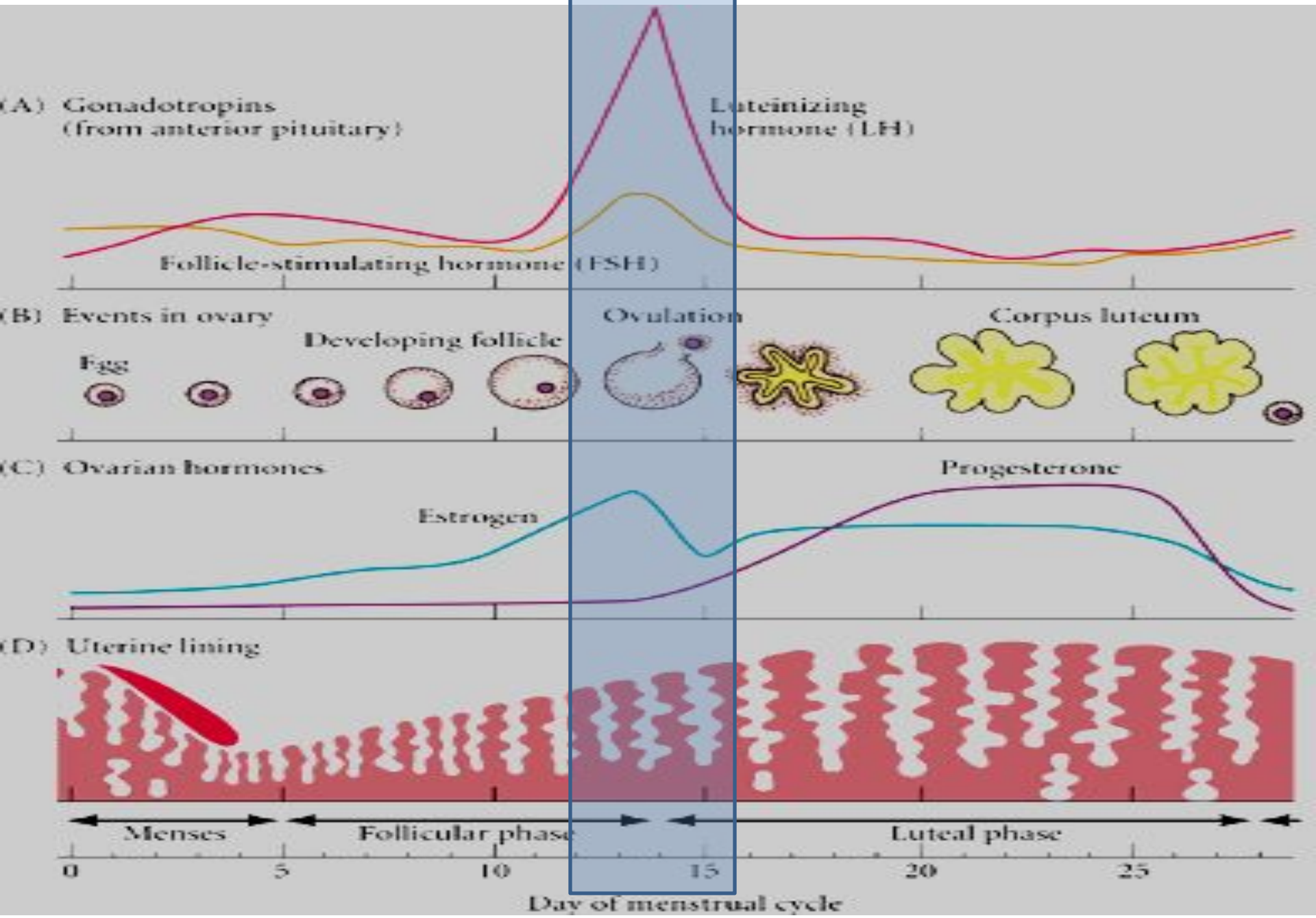
- prevent formation of another follicle in this phase
- inhibits further release of LH & FSH
- 3- Increasing progesterone prepare the body for fertilization:



If fertilization occur	If fertilization doesn't occur
Corpus luteum continues to produce progesterone for several weeks(then replaced by the placenta)	• The egg breaks down • Progesterone & estrogen production slows down then stops, marking the end of the ovarian cycle. • When estrogen & progesterone stops the pituitary again produces FSH & LH starting a new cycle.

A) Pituitary hormones




(A) Gonadotropins (from anterior pituitary)
Luteinizing hormone (LH)
Follicle-stimulating hormone (FSH)
(B) Events in ovary
Ovulation
Corpus luteum
Developing follicle
Egg
(C) Ovarian hormones
Progesterone
Estrogen
(D) Uterine lining
Menses
Follicular phase
Luteal phase
0
5
10
15
20
25
Day of menstrual cycle

Menstrual cycle

- **Menstrual Cycle:**
- changes occur in the uterus preparing it for
- pregnancy each month
- It lasts about 28 days
- It is influenced by the changing levels of estrogen and progesterone in the ovarian cycle, which means it occurs at the same time.

Menstrual cycle

- **<u>Events of the cycle:</u>**

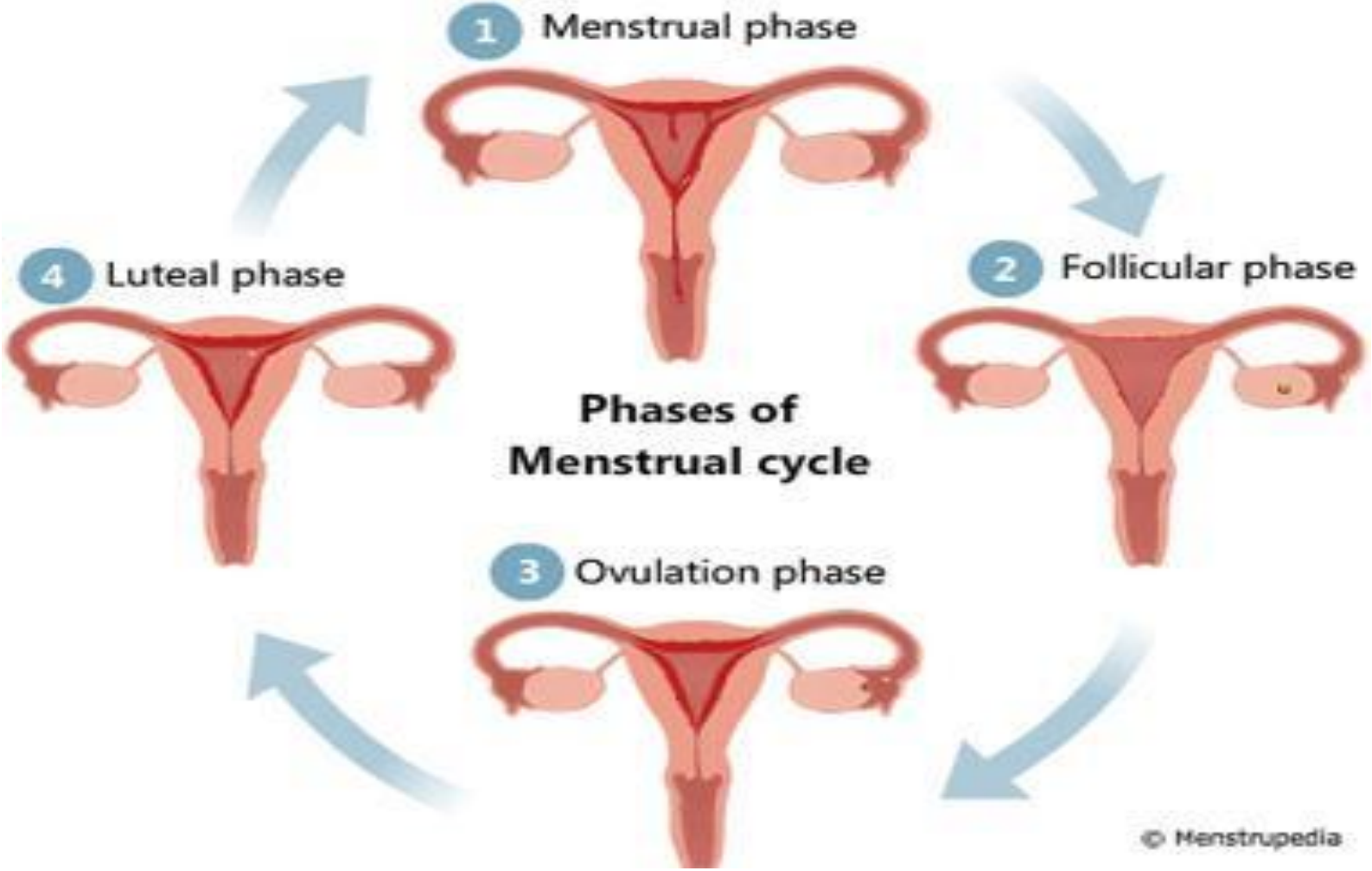
1. before ovulation when estrogen increases the lining of the uterus (endometrium) **<u>thickens</u>**
2. after ovulation when the levels of estrogen and progesterone increase ⟹ further development occur in the uterine lining.
3. if pregnancy doesn't occur

⟹ levels of estrogen& progesterone drops

⟹ this cause the uterine lining to shed.

⟹ marks the end of menstrual cycle.

Menstrual cycle



Menstrual cycle

- **<u>Menstruation:</u>**
- A process when blood and discarded tissue leave the body through the vagina.
- It is caused by the shedding of uterine lining.
- The bleeding is due to broken blood vessels.
- It occurs about 14 days after ovulation, if fertilization does not occur.

Menopause:

- It is when women stop menstruation (or the shutdown of ovarian & menstrual cycles)
- It happens usually between the ages of (45-55)
- The women stops ovulating and no longer can bear children.
- Women may experience symptoms of menopause, like hot flashes, because the estrogen decreases.

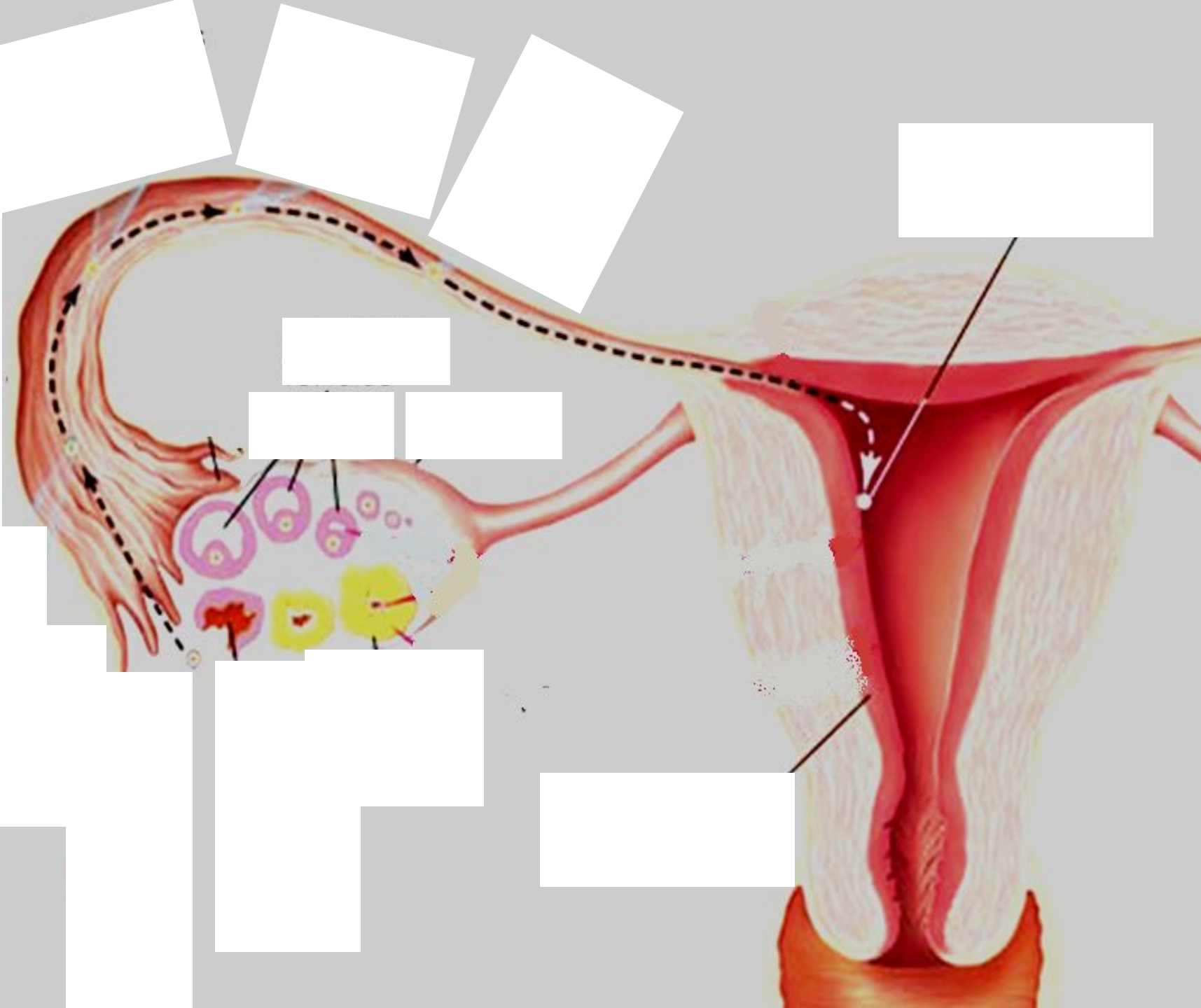
Development

- **Fertilization:**
- Ovulation occurs
- About the same time, sperm enter the vagina.
- Sperm swim up through the uterus, and along the fallopian tube
- Sperm head penetrates the ovum
- The nuclei of the ovum and sperm fuse together, this is fertilization

Development

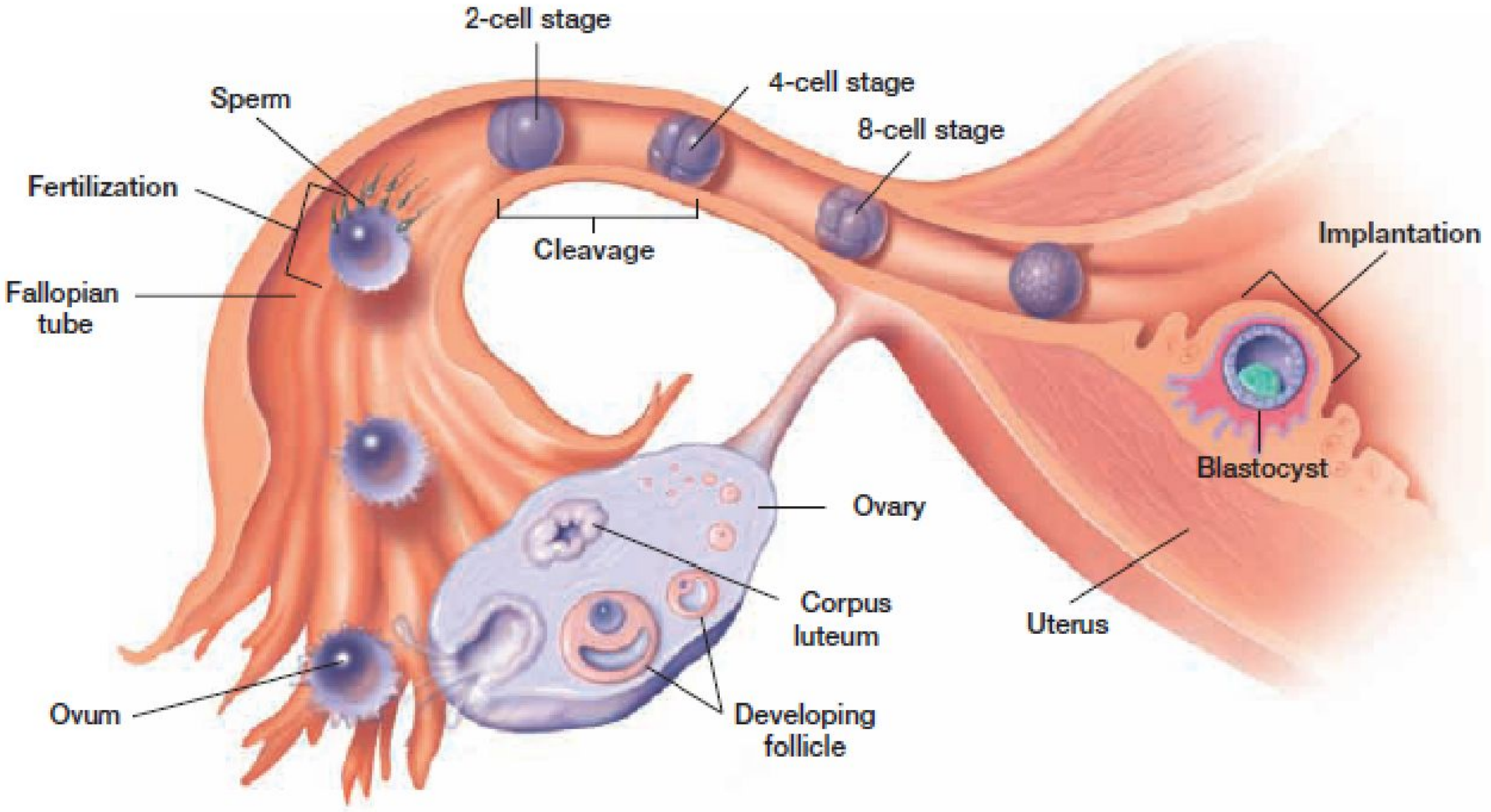
- The zygote is produced.
- **zygote** is the fertilized egg or the cell that is produced when the nuclei of egg & sperm fuse together
- (the zygote is a diploid cell)

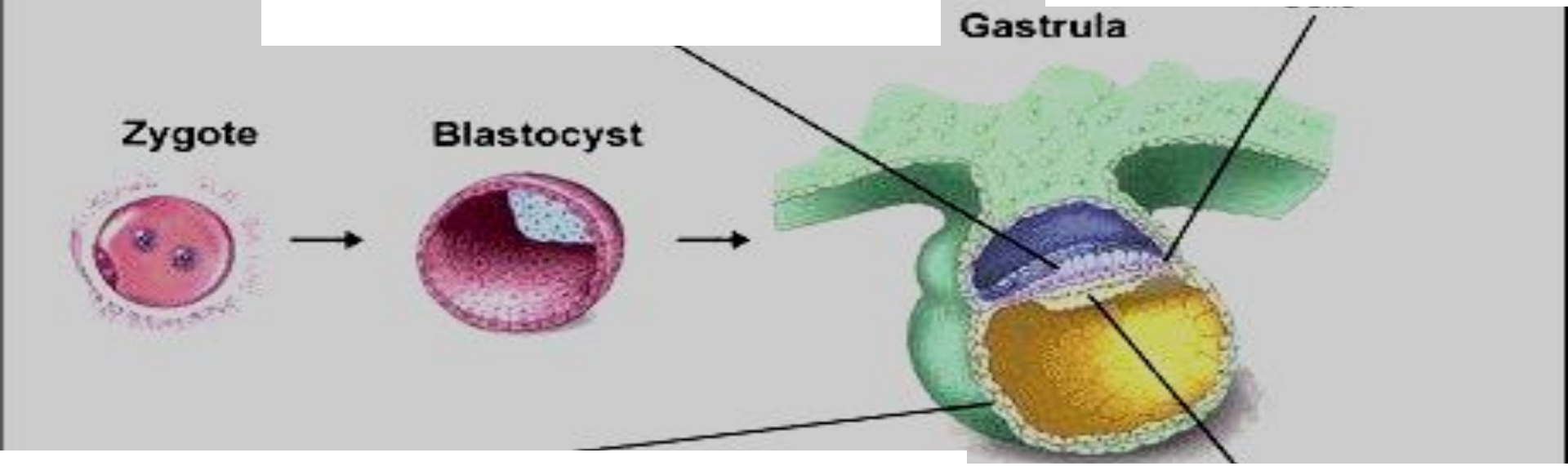
- **Cleavage**: a series of internal divisions occur in the zygote.



Cleavage

Development




Gastrula
Zygote
Blastocyst

Development

- - it produces many smaller cells within the zygote (1,2,4,8.16….)
- - it continues as the zygote moves through the fallopian tube toward the uterus.
- - When the zygote reaches the uterus after cleavage it is called **blastocyst**. (which is a hollow ball of cells)
- **Implantation**: when the blastocyst (in the uterus) is embedded in uterine lining.
- further development occur eventually forming a living human (embryo) then fetus

PREGNANCY

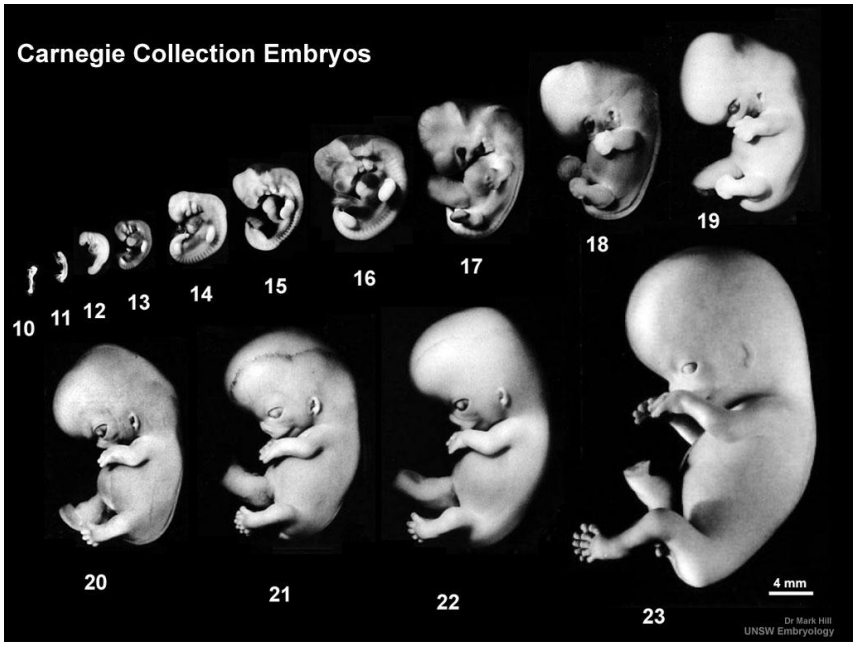
Pregnancy:

Gestation: the period of about 9 months (about 40 weeks) of humans developments inside the uterus, it is also called pregnancy.

Pregnancy

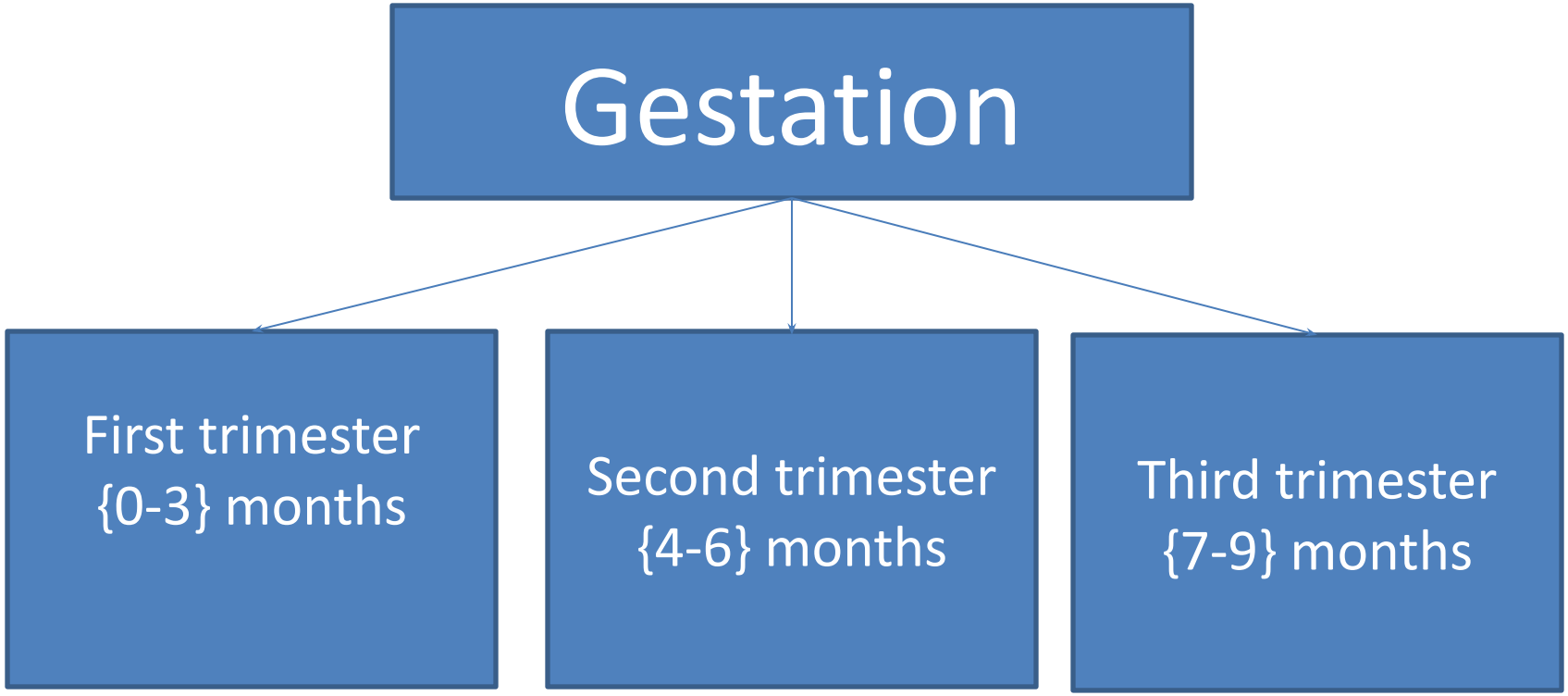
Embryo: **the developing human for first 8 weeks of pregnancy.**

Fetus**: the developing human after week 8.**



pregnancy

- The 9 months of **pregnancy** are often divided into three trimesters, or 3-month periods.



Stage	Major Events
First Trimester (0 to 3 months)	Fertilization, cleavage, implantation, gastrulation, neurulation, and organogenesis occur as the embryo becomes a fetus; all major organ systems are formed; the fetus begins to move, but movements cannot be felt
Second Trimester (4 to 6 months)	Skin and hair grow; eyes blink; fetal movements can be felt; arms and legs reach final proportions; heartbeat can be heard
Third Trimester (7 to 9 months)	Substantial increase in size; skin is red and wrinkled; development of the lungs is completed; fingernails and toenails grow; fetus can survive if born during this stage

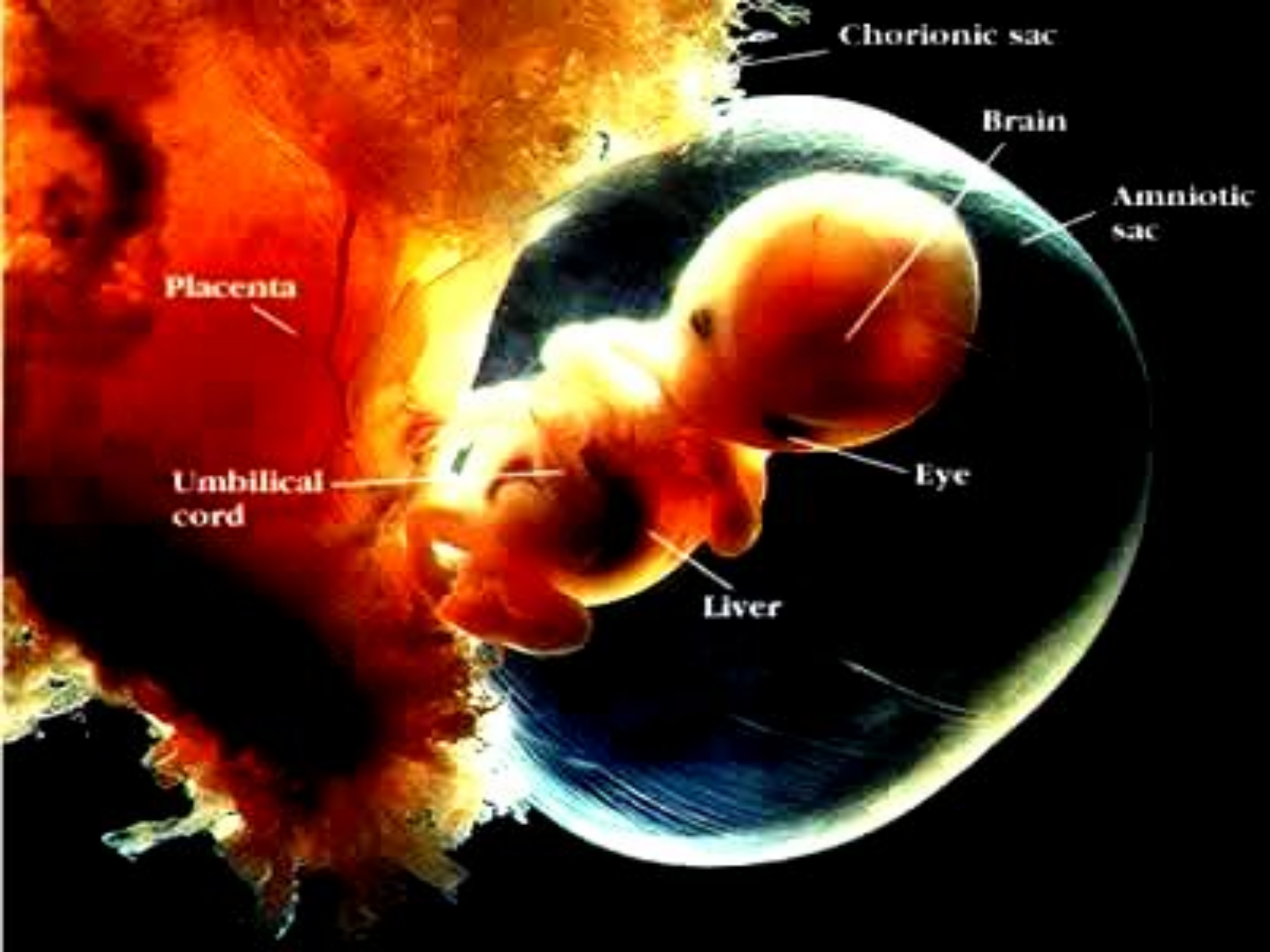
Pregnancy

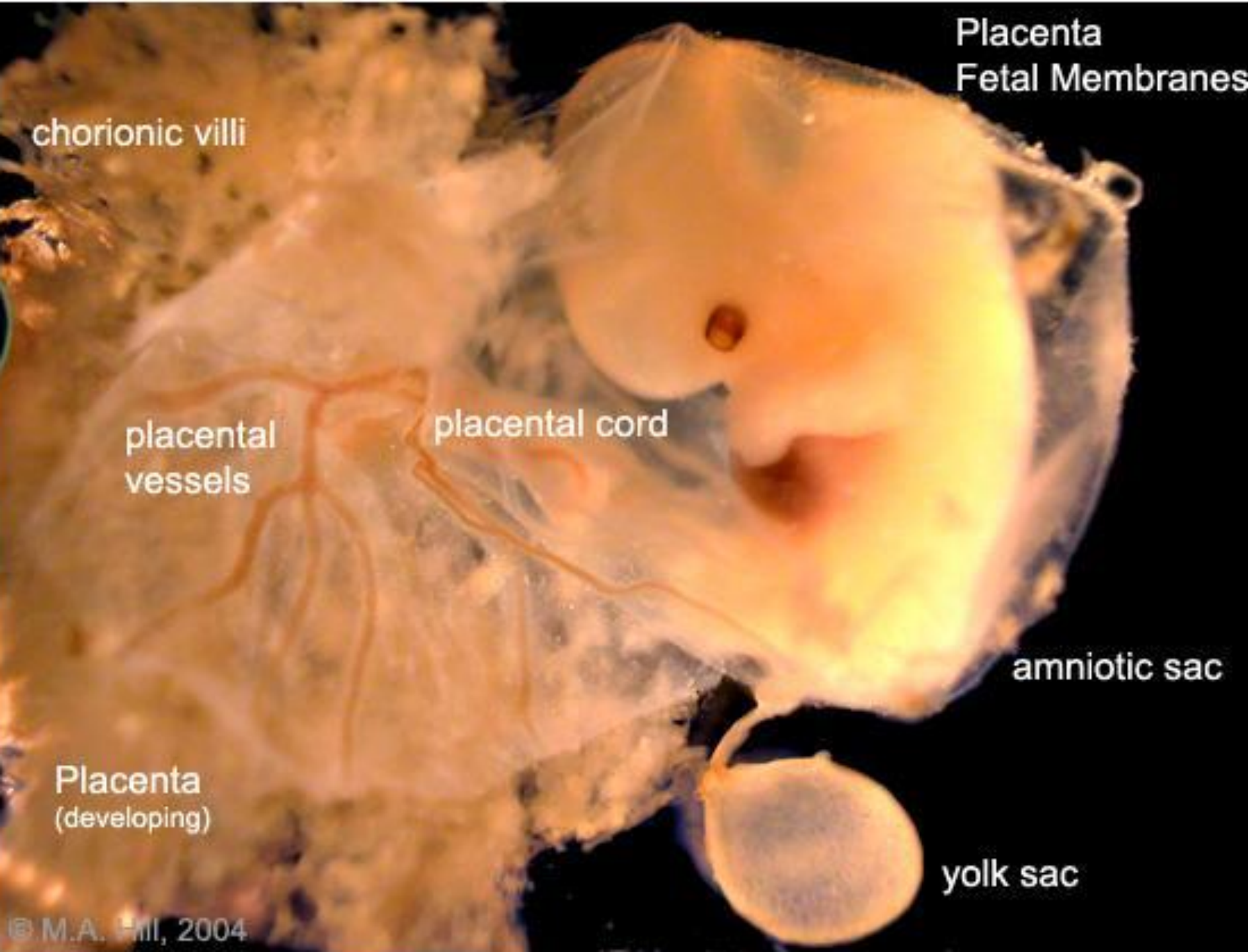
- **First Trimester**: the most important events of development occur.

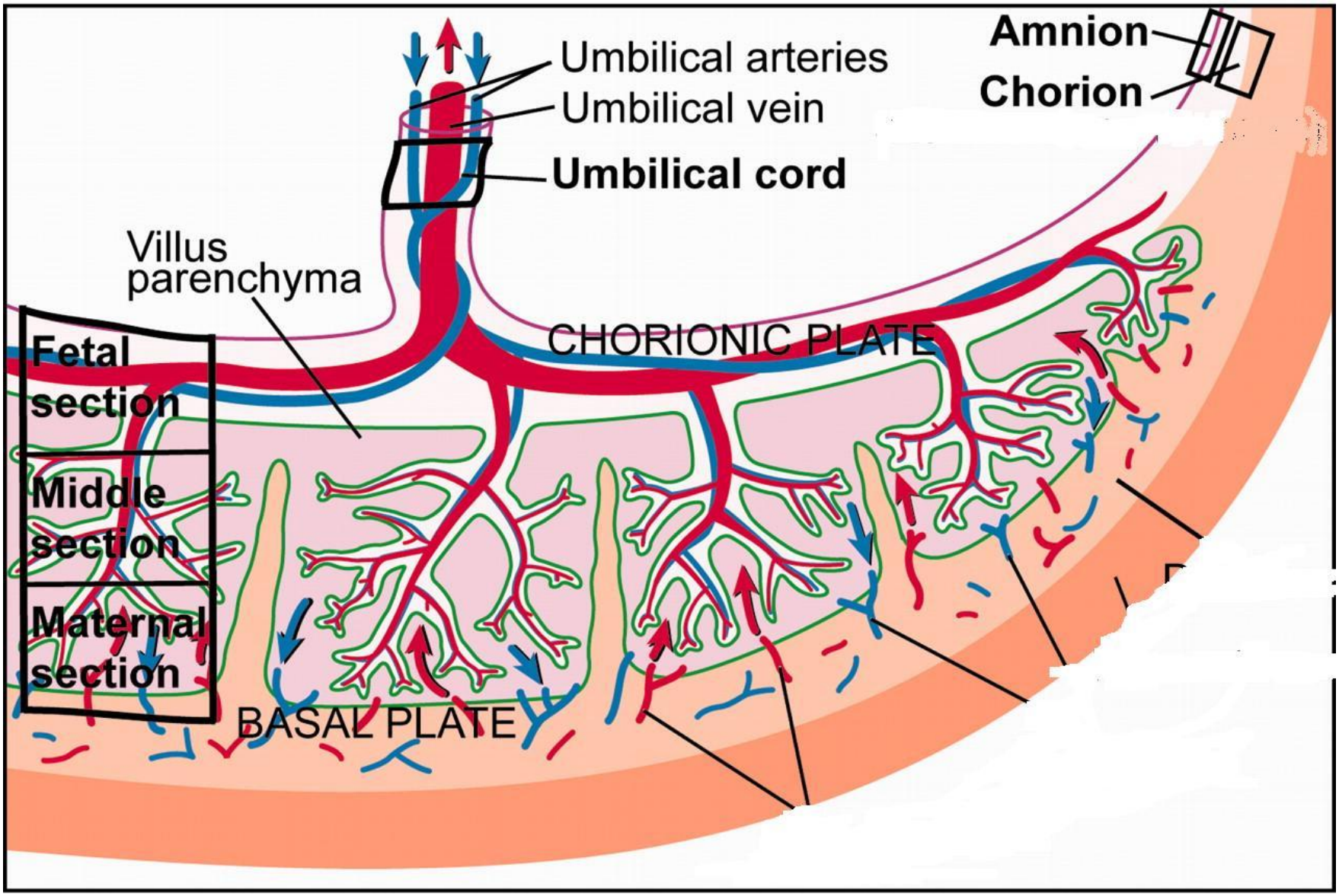
1. The embryo grows rapidly
2. **development of supportive membranes:** that nourish and protect the embryo {will develop in the 2nd week after fertilization}.

- ***Amnion:*** the Inner membrane
- ***Chorion:*** the outer membrane around the embryo it interacts with the uterus lining to form the placenta.

3. ***Placenta*** is formed


Chorionic sac
Brain
Amniotic sac
Placenta
Umbilical cord
Eye
Liver


Placenta
Fetal Membranes
chorionic villi
placental
vessels
placental cord
amniotic sac
Placenta
(developing)
yolk sac
© M.A. Hill, 2004


Amnion
Chorion
Umbilical arteries
Umbilical vein
Umbilical cord
Villus parenchyma
CHORIONIC PLATE
Fetal section
Middle section
Maternal section
BASAL PLATE

Supportive membrane

- Functions of amnion:

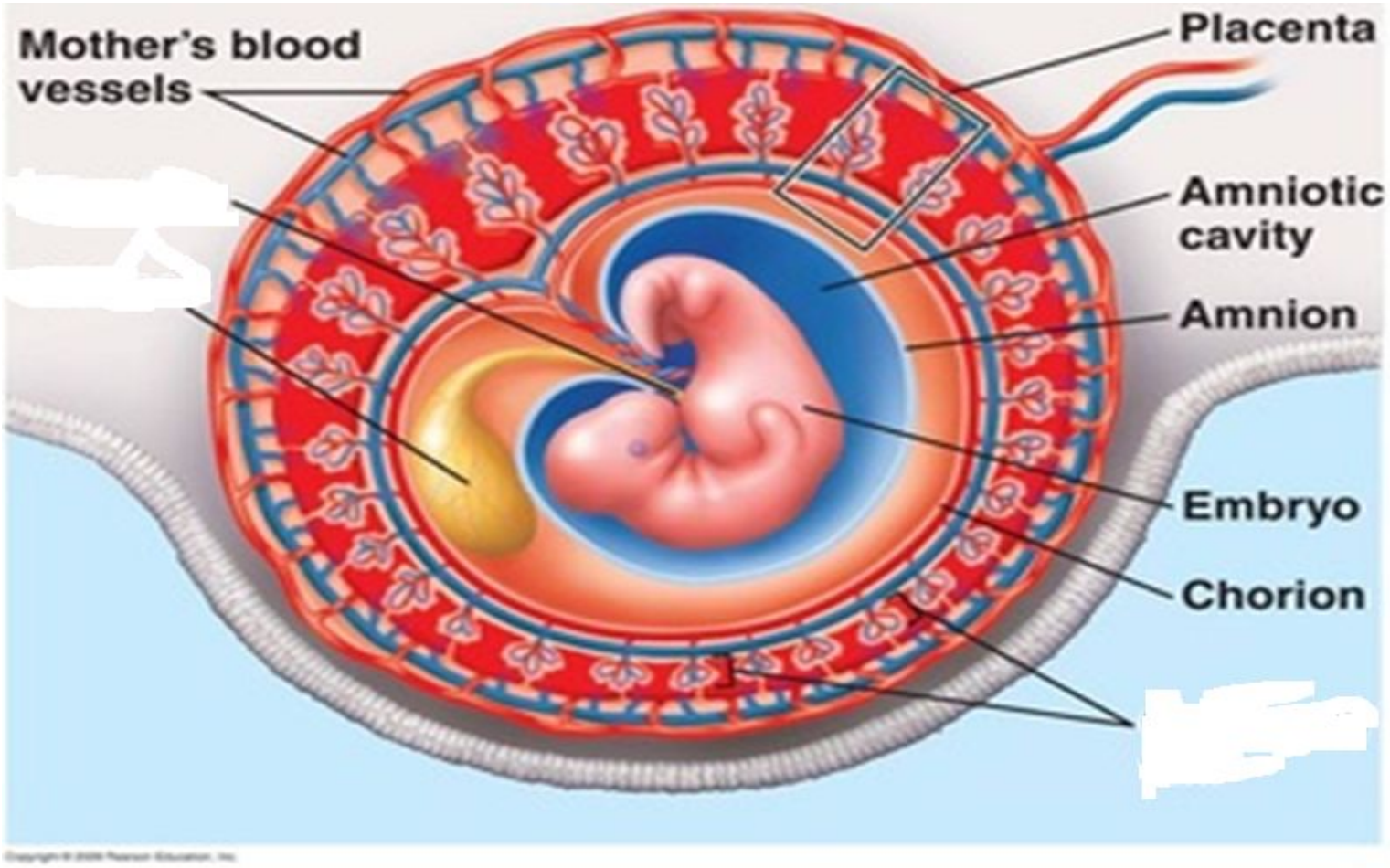
1.Protects and encloses the embryo.

2. Production of amniotic fluid.

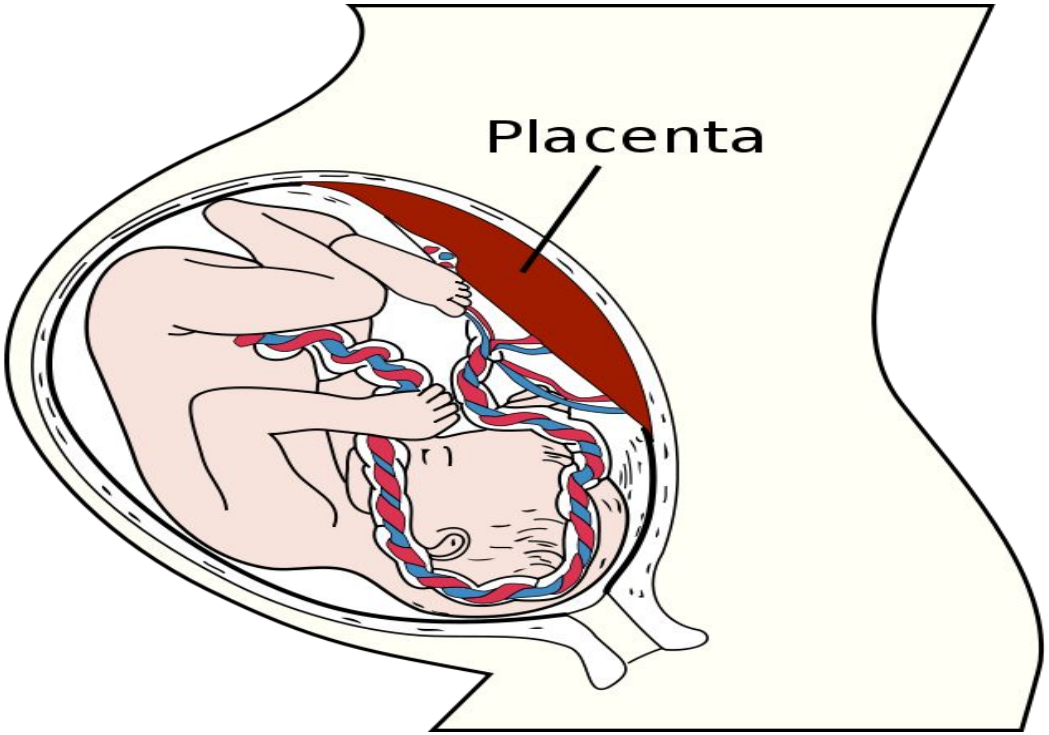
Functions of amniotic fluid:

1. To protect the embryo from external shock.
2. To prevent temperature change.

Pregnancy


Mother's blood vessels
Placenta
Amniotic cavity
Amnion
Embryo
Chorion

Placenta: the structure through which the embryo is nourished, it is made of interlocked tissue of mother and embryo, to help exchange materials between them.



Umbilical Cord: a rope-like structure that connects fetus to placenta. It contains blood vessels to transport substances between fetus & mother.

Placenta

Chemicals that pass/diffuse from the mother's blood stream to embryo/ fetus:

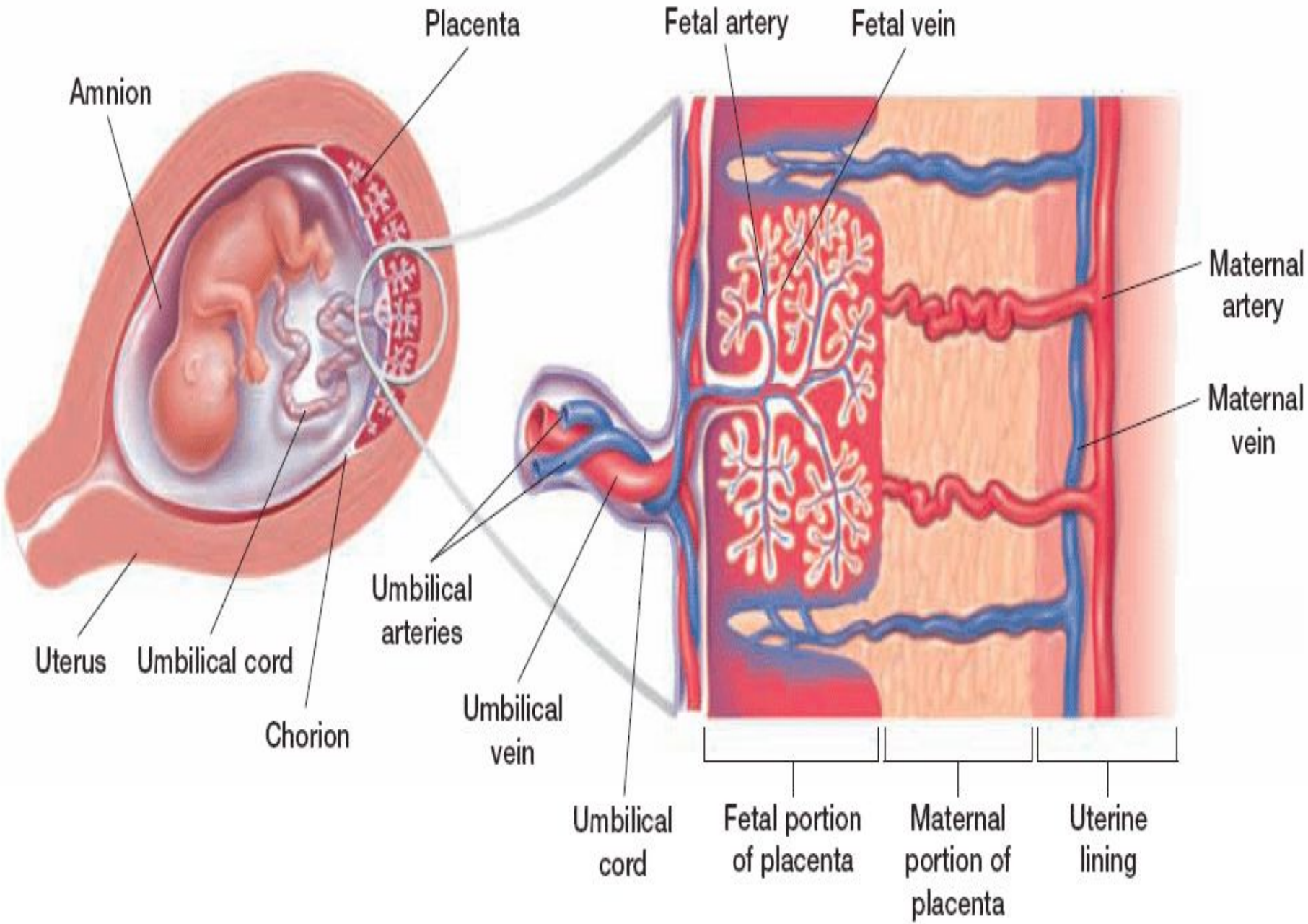
- Oxygen
- Nutrients
- Alcohol
- Drugs
- pathogens

Chemicals that pass/diffuse from the embryo/fetus to the mother's blood stream:

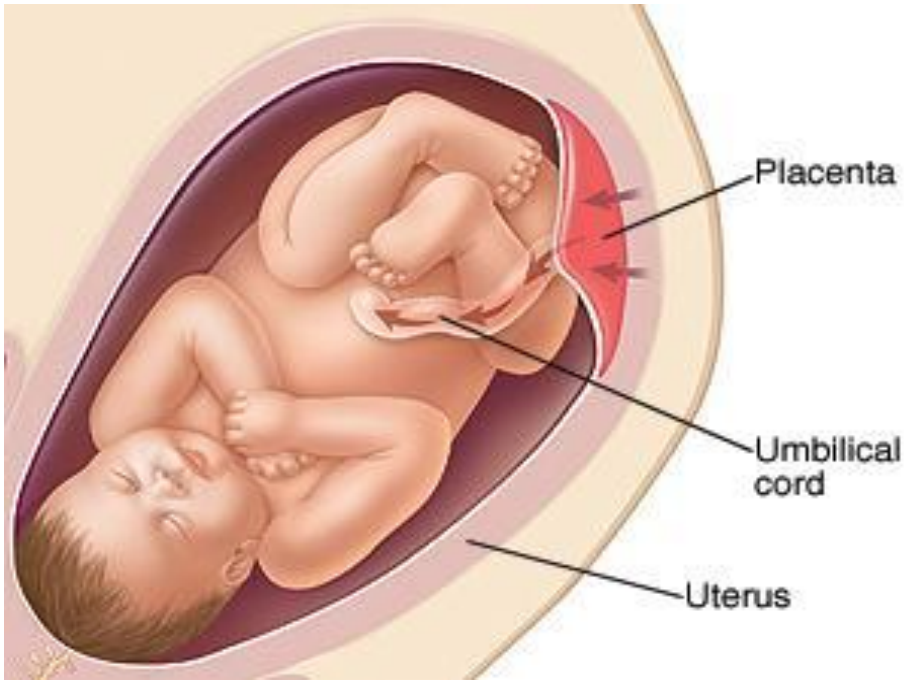
- Wastes:

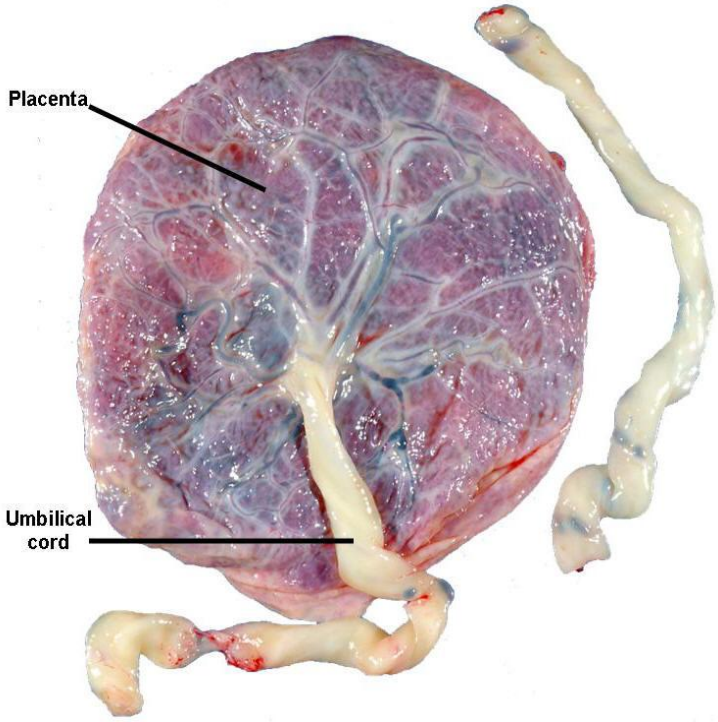
*Urea

*CO_2

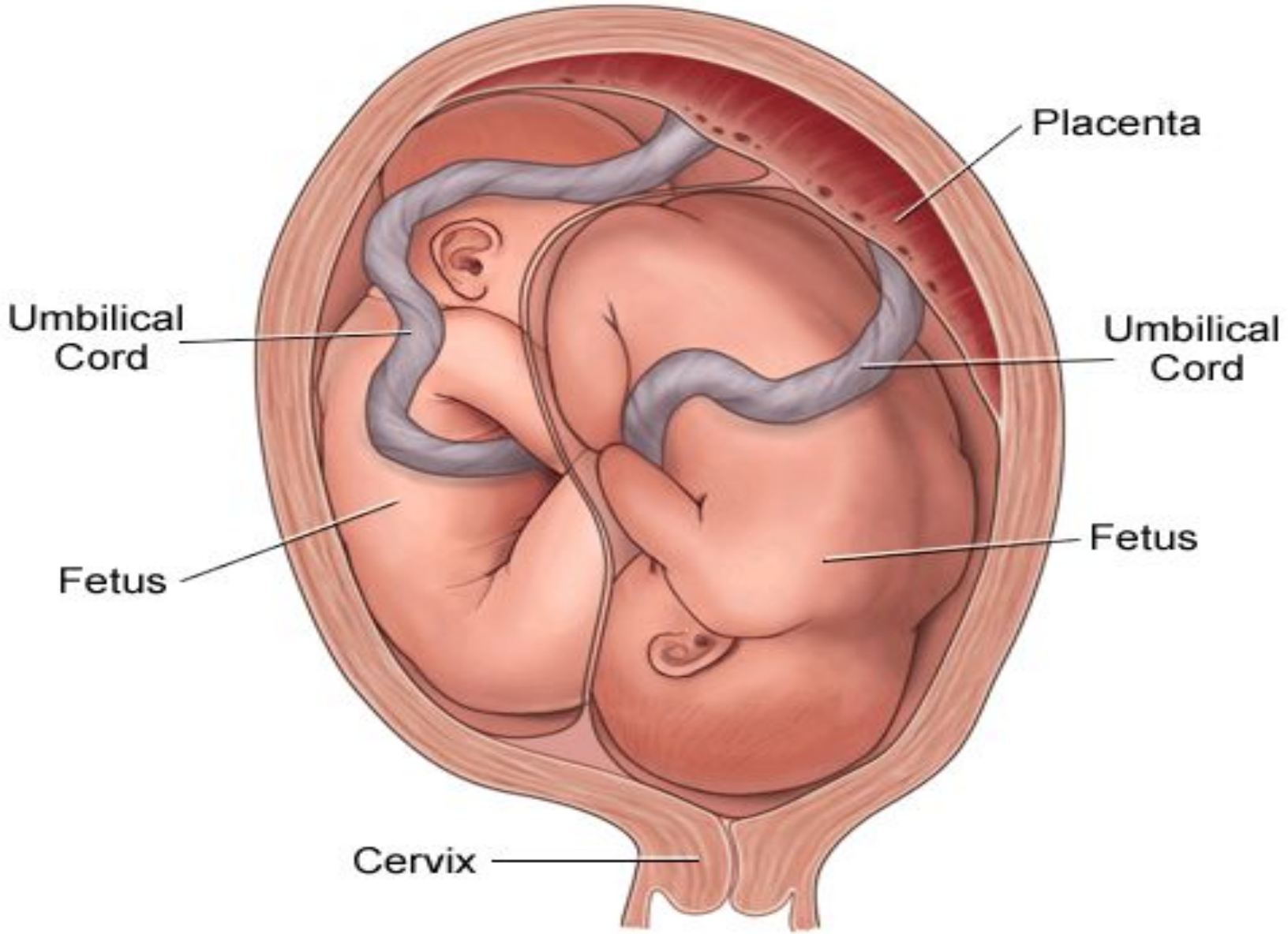

Placenta
Fetal artery
Fetal vein
Amnion
Maternal artery
Maternal vein
Umbilical arteries
Uterus
Umbilical cord
Chorion
Umbilical vein
Umbilical cord
Fetal portion of placenta
Maternal portion of placenta
Uterine lining

Note: the blood of the mother and embryo never mixes, the materials are exchanged between mother and embryo through diffusion.





Twin Pregnancy: Single Placenta



Features of placenta to allow substances to diffuse easily

1. Placenta is folded (villi-like structure) to increase the surface area for faster diffusion.

2. Placenta is well-supplied with blood vessels.

3. Spongy structure.

Role of placenta in maintaining pregnancy:

1. Producing progesterone & estrogen to:
   *prevent ovulation
   *maintain a thick endometrium.

2. Prepare mammary glands.

3. Prepare the mother's body for labor.

Role of placenta in development of embryo:

1. Oxygen and nutrients in the mother's blood diffuse through the placenta to the embryo.

2. Waste products of the embryo (urea/CO_2) pass through the placenta to the mother's blood.

3. Protect the fetus blood vessels from being damaged by high blood pressure of the mother.

Fetal Alcohol Syndrome

- Drinking alcohol , smoking or using drugs during pregnancy can cause :

Fetal alcohol syndrome.

*Birth defects in babies/ deformed face.

*Small or sick babies.

*Mental retardation.

*Behavioral retardation.

*Physical retardation.

Continue Events of 1st Trimester:

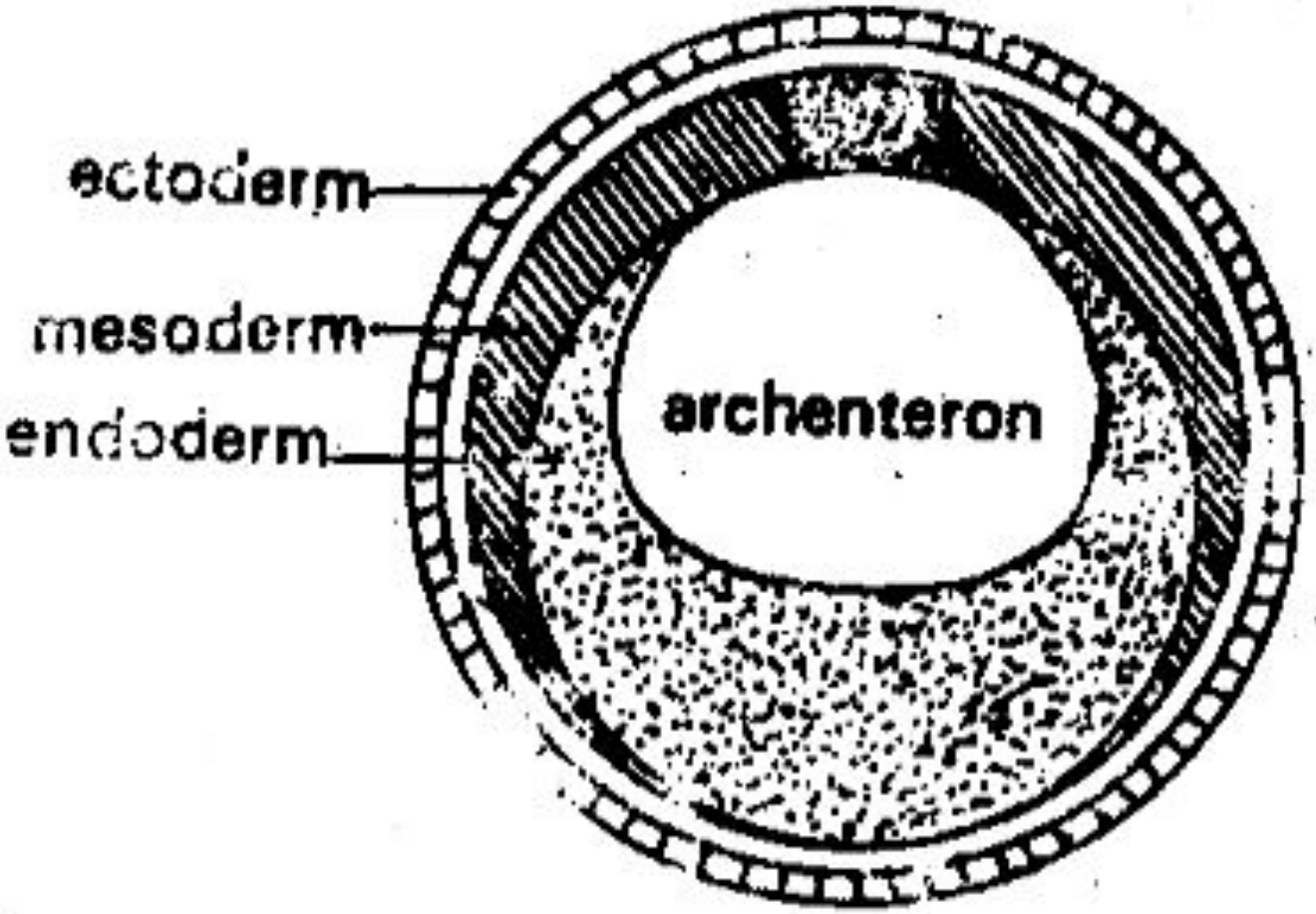
- **Formation of embryo:**

* After placenta forms, the inner cells of blastocyst form three layers of tissue, each layer is responsible to form some organs:

1- Ectoderm : External layer {Skin}

2- Mesoderm: Middle layer {Muscles}

3- Endoderm: Internal layer {Lungs, pancreatic cell}


ectoderm
mesoderm
endoderm
archenteron

Continue Events of 1st Trimester:

*3rd week of pregnancy: 2 mm, blood vessels form.

*4th week of pregnancy: - Arms & legs form.
- Major organs form.
- Heart starts beating.

*8th week: all major organs form

* At the end of first trimester :the sex of the baby can be distinguished.

Second & Third Trimester:

- Rapid growth of fetus occurs.
- Organs become functional.
- At the end of 3rd trimester the fetus is able to exit outside the mother's body.

Labor

***Labor:** the process by which fetus leaves the mother's body.

-The walls & uterus contract, cervix & vagina dilate, and the fetus is expelled from the uterus through the vagina to outside the mother's body.

-The placenta and umbilical cord are expelled shortly after birth.

After birth

- Physical growth and neurological development continue for years after birth.

Ultrasound

Uses of ultrasound

- Indicates the fetus age.
- Indicate the health of the fetus.
- Diagnose fetal abnormalities.

- The BIGGEST advantage is its **SAFETY**

Sexually transmitted diseases STD's

- Pathogens are present in body fluid such as SEMEN and can be passed from one person to another though sexual contact.

- Condom can help prevent the spread of STD's

STD's

Bacterial STD's

Caused by bacteria
Treated by antibiotics

Viral STD's

Caused by viruses
Can't be treated by antibiotics

Disease	Symptoms	Pathogen
AIDS	Immune-system failure and susceptibility to opportunistic infections	Human immunodeficiency virus (HIV)
Chlamydia	Painful urination and penile discharge in males; vaginal discharge and abdominal pain in females	*Chlamydia trachomatis* (bacterium)
Genital herpes	Painful blisters on genital region, thighs, or buttocks and flulike symptoms	Herpes simplex virus (HSV)
Genital warts	Warts on genital or anal region	Human papilloma virus (HPV)
Gonorrhea	Painful urination and penile discharge in males; vaginal discharge and abdominal pain in females	*Neisseria gonorrhoeae* (bacterium)
Hepatitis B	Flulike symptoms and yellowing of skin	Hepatitis B virus
Syphilis	Chancre on penis in males; chancre in vagina or on cervix in females; fever and rash	*Treponema pallidum* (bacterium)