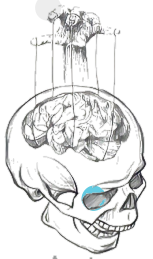
Click logo for editing file



Introduction To Embryology

Lecture 1

Color index:
Main text
Red: important
Pink: in girls slides only
Blue: in boys slides only
Green: Doctors notes
Grey: Extra info

Objectives:

- Define embryology.
- Define the developmental of periods.
- Define the significance of embryology.
- Know the different embryological terminology.
- Define the nomenclature used to describe body parts, positions, and relationships.
- Describe in brief the major events in embryology.

Definition of Embryology

Embryology refers to the prenatal (before birth) development of embryos and fetuses.
Human embryology: is the science concerned with the origin and development of a human being from a zygote to birth of an infant.
Development does not stop at birth. Important changes, in addition to growth occur after birth (postnatal changes) e.g.,development of teeth and female breasts.

Significance of Embryology

Importance of Embryology:
The study of prenatal stages of development, especially those occurring **during the embryonic period** (because embryo undergoes a rapid development of organs & structures in this period) to understand **the normal body structure and the causes of congenital anomalies**.
So, It is concerned with various genetic and /or environmental factors that disturb the normal development producing birth defects.

Developmental Periods

Prenatal Development

Includes the main developmental changes occuring **before birth**, including

Embryonic period

starts from the fertilization to the end of 8th week.
(Called an embryo)

Fetal period

begins from the 9th week until birth.
(Called a fetus)

Postnatal Development

The changes occurring after birth, like teeth and breast.

NOTE:

- Prenatal development is more rapid than postnatal development and results in more striking changes.
- The most critical period is the embryonic period.

Critical Periods of Human Development

- It is the stage of development of an embryo that is susceptible to an agent, such as a drug or virus, which can lead to congenital abnormalities.
- The development of the embryo is most easily disrupted when the tissues and organs are forming during the embryonic period.

Common terminology

- **Oocyte**: the immature ovum or female germ cell.
- **Ovum**: the mature female germ cell.
- **Sperm**: the mature male germ cell.
- **Zygote**: the fertilized ovum.

Cell division:
one cell divides into two cells; there are two types of cell Division:

Mitosis		Meiosis
Somatic cells	**Occurs in**	Primitive germ (sex) cells in the testes or the ovaries
2 cells	**Produces**	2 cells then 4 cells
Only one stage	**Stages**	Two stages
44	**Autosomes**	22
2 (Diploid number)	**Sex chromosomes**	1 (Haploid number)

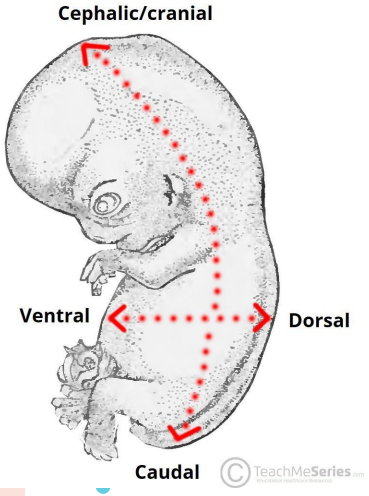
Descriptive Terms of the embryo

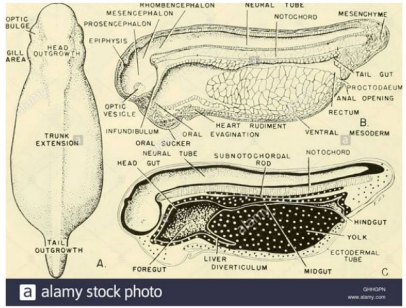
Related to the Direction:

Same meaning
- **Cranial**: the top of the embryo or the head
- **Cephalic**: superior or the head
- **Caudal**: inferior or the tail end
- **Dorsal**: back of the embryo
- **Ventral**: anterior or the belly side
- **Medial**: near to the midline
- **Lateral**: flank side (away from the midline)

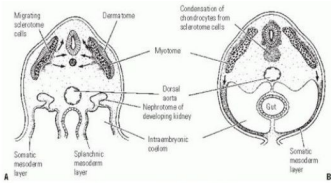
Planes or sections:

Longitudinal: median or sagittal (divides the body into right & left parts)
Coronal: frontal (divides the body into anterior & posterior parts)
Transverse: horizontal (divides the body into upper & lower parts)

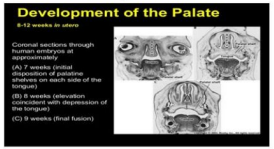




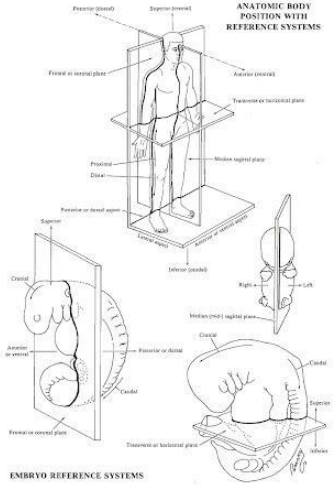
Longitudinal Section



Transverse; horizontal

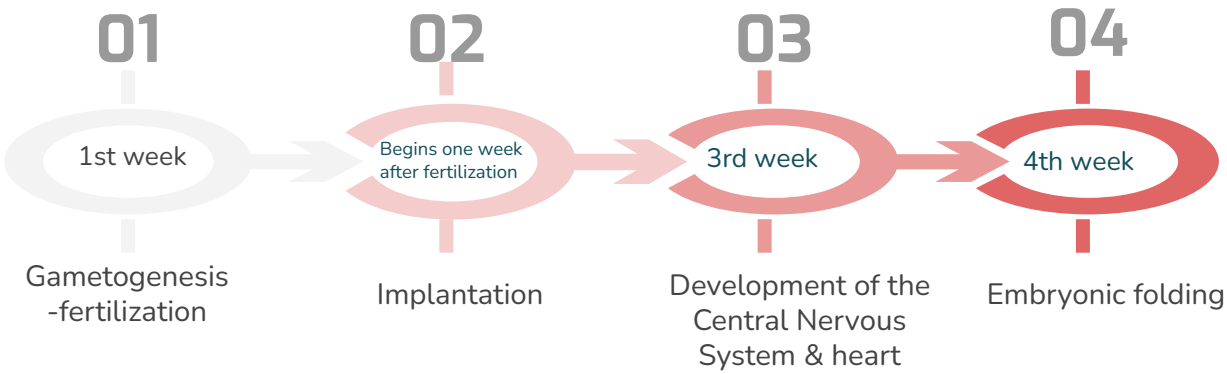


Coronal Section



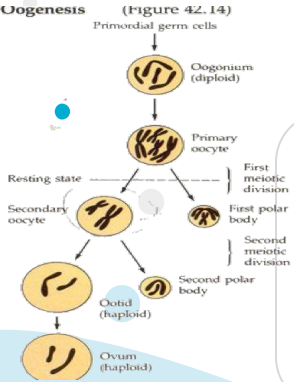
Major events during embryonic period

Mnemonic:
C.N.S —> 3 letters
3rd week
————————
Fold—> 4 letters
4th week



Gametogensis

Is the production of mature gametes (sperm and ova) in the gonads testes in male & ovaries in female



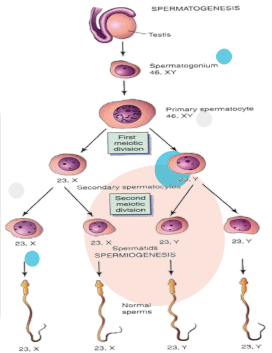
Oogenesis (female)

It is the process of **formation** of mature ovum.
It **occurs** in the cortex of the ovary,
starts during fetal life,
completed after puberty,and fertilization and continues till menopause
It **ends** by formation of mature ovum with haploid number of chromosomes.

Spermatogensis (male)

It is the process of **formation** of mature sperms.
Occurs in the semenifrous tubules of testis.
Starts from puberty till old ages.

It **ends** by formation of mature sperms with haploid number of chromosomes.



Results of spermatogenesis

1- Reduction of chromosomal number from the diploid to the haploid number.
2- Change the primitive germ cell (spermatogonia) to the motile sperm.
3- Increase the number of the sperms.

Fertilization

Definition

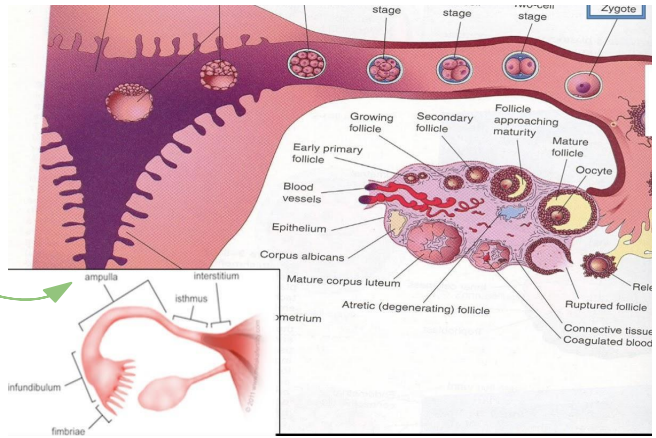
It is the process during which a maturemale gamete (sperm) unites with a female gamete (oocyte) to form a single cell (ZYGOTE).

Site

It occurs in the uterine tube.(ampulla)

Result

-The diploid number of chromosomes is restored.
-The sex of the embryo is determined.
-Initiates cleavage (cell division) of the zygote.(via mitosis)



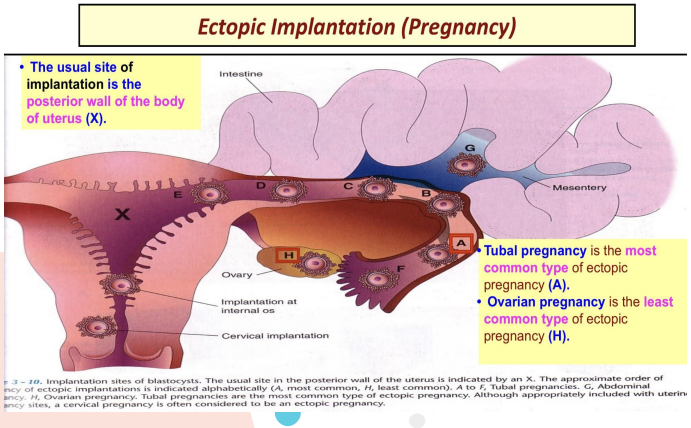
Implantation

It is the process of embedding of the blastocyst in the endometrium of the uterus.

- It begins one week after fertilization.
- It is completed by the 12th day after fertilization.

Abnormal site of implantation (ectopic pregnancy):

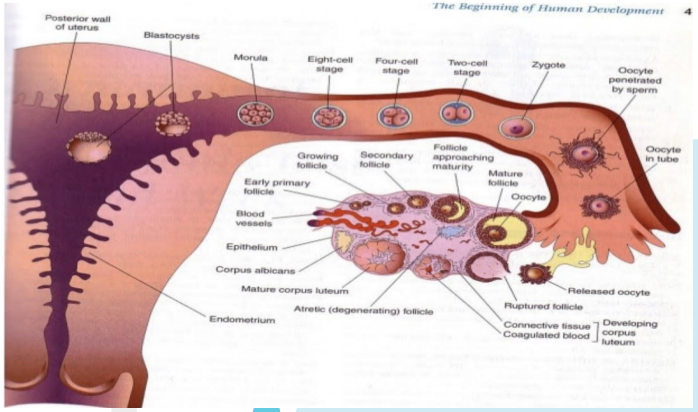
Most common type of ectopic pregnancies occurs in the uterine tube. (Fallopian tube)



Implantation

Normal site of implantation :

In the upper part of the posterior surface of the uterus near the fundus.



01

Bilaminar Disc

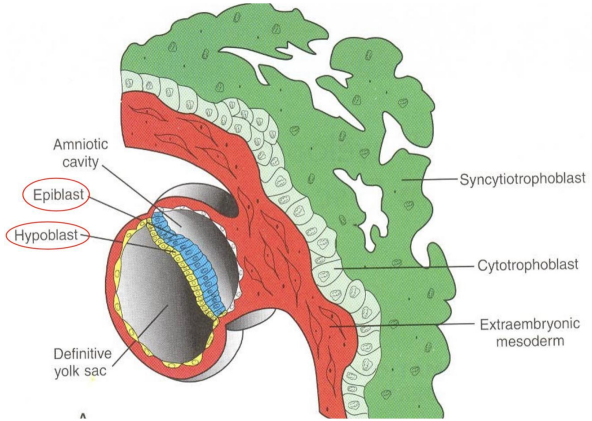
It is The differentiation of the cells into Two layers :

(A) **Epiblast** (epi=up) develops into embryonic ectoderm

High columnar cells adjacent to the amniotic cavity.

(B) **Hypoblast** (hypo=down) developers into embryonic endoderm

Small cuboidal cells adjacent to Yolk sac.



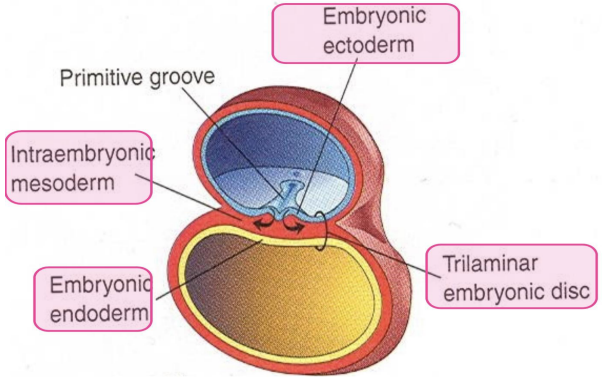
02

Trilaminar Disc

Now the embryonic disc is formed of 3 layers:

- Embryonic Ectoderm (formation of CNS and skin)
- Intraembryonic Mesoderm.formation of skeletal muscles and connective tissues)
- Embryonic Endoderm.(formation of cardiovascular tissues)

Cells in these layers will give rise to all tissues and organs of the embryo.



MCQs:

1-“Human embryology’’ is the science concerned with the origin and development of a human being from:

A-birth to puberty	B-sperm and ovum to zygote	C-9th week to birth	D-a zygote to birth of an infant

2-The most critical period is the?

A-fetal	B-embryonic	C-postnatal	D-prenatal

3-What is the term used to express the anterior direction in Embryology?

A-Ventral	B-Caudal	C-Frontal	D-Sagittal

4-Epiblast layer is adjacent to

A-cortex of the ovary	B-amniotic cavity	C-uterus	D-yolk sac

5-Where does the Oogenesis occur ?

A-epididymis	B-cortex of the Ovary	C-endometrium	D-seminiferous tubules

6-The site of fertilization

A-semenifrous tubules of testis.	B-posterior of uterus	C-in the vagina	D-in ampulla of uterine tube

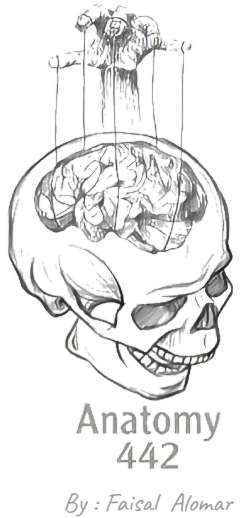
1-D
2-B
3-A
4-B
5-B
6-D

Team Leaders

Mishal Alsuwayegh

Arwa Alghamdi

Anatomyteam442@gmail.com



Team Members

Faisal Alomar	Mohammed Aldawsari
Mohammad Alrashed	Waleed AlRashoud
Salman Albadr	Fares Alotaibi
Omar Alkadhi	Mohammed Alamri
Abdulaziz AlShalhoub	Saleh Aldeligan

Lina Almohsen	Maha Alkoryshy
Hissah Alshiqari	Rahaf Almotairi
Maha Alzahrani	Jana Alhazmi
Sarah Albenmousa	Lina Alyahya
Alhnouf Alyami	Shaden Albassam