Oral Histology Lect.1 ا.د.عذراء 2021

General embryology

- **Embryology** – study of the origin and development of single individual
- Prenatal period include
  - **Embryonic period** – first 8 weeks
  - **Fetal period** – remaining 30 weeks

The Embryonic Period include:

- **Stages of first week**
  - Zygote
  - 4-cell
  - Morula
  - Early blastocyst
  - Late blastocyst (implants at this stage),composed of

    A. Trophoblast cell (form the olacenta)

    B. Inner cell mass(embryoblast) form the embryo.

Fertilization and the Events of the First 6 Days of Development

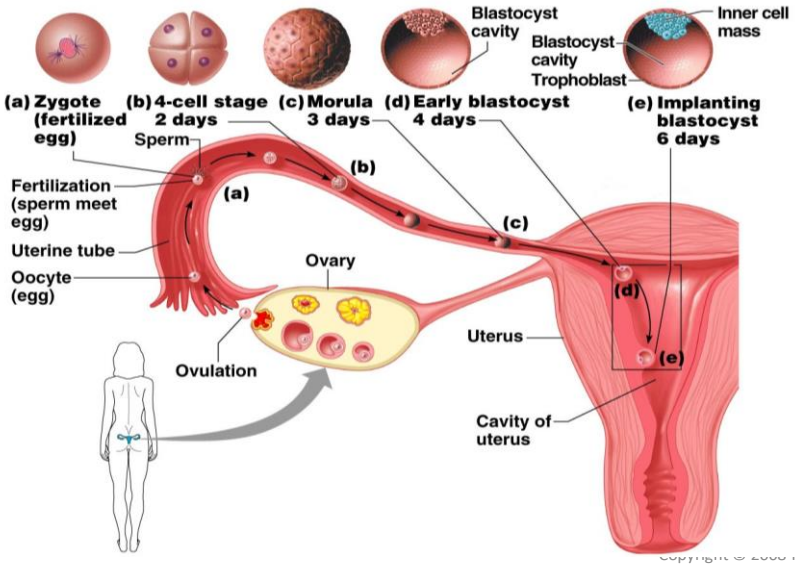


Figure 3.3

Week 2 – The Two-Layered Embryo

1.Bilaminar embryonic disc – inner cell mass divided into two sheets

-Epiblast and the **hypoblast** (Together they make up the bilaminar embryonic disc).

2.Amniotic sac – formed by an extension of epiblast

- Outer membrane forms the **amnion**

-Inner membrane forms the **amniotic sac cavity** Filled with amniotic fluid

3.Yolk sac – formed by an extension of hypoblast

- **Digestive tube** forms from yolk sac
- Tissues *around* yolk sac
  - Gives rise to *earliest blood cells* and *blood vessels*

Implantation of the Blastocyst

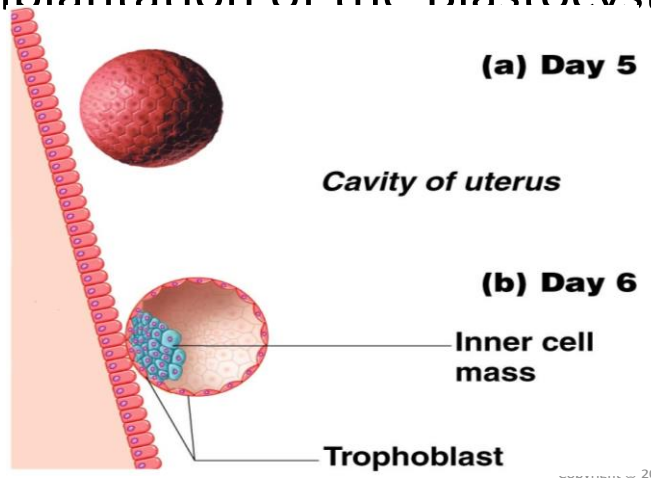
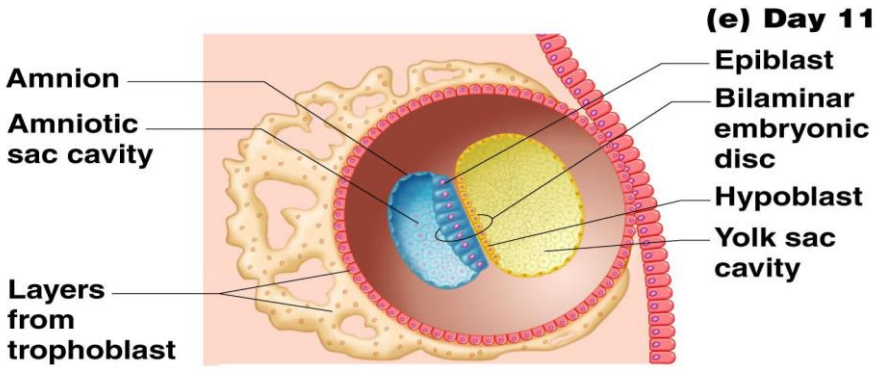


Figure 3.4 (1 of 3)

Implantation of the Blastocyst



Week 3 – The Three-Layered Embryo

1.Primitive streak – raised groove on the dorsal surface of the epiblast

2.Gastrulation – a process of invagination of epiblast cells

- Begins at the primitive streak
- **Forms the three primary germ layers**

3.Three Germ Layers*

- **Endoderm** – formed from migrating cells that *replace* the hypoblast

- **Mesoderm** – formed *between* epiblast and endoderm
- **Ectoderm** – formed from epiblast cells that stay on dorsal surface

All layers derive from *epiblast cells

- **Neural crest Cell**
  - Cells **originate** from **ectodermal (neuroectoderm)cells**
  - Forms sensory nerve cells,cranial senrory ganglia and nerves of medulla of adernal gland
  - Migrate to head and neck form the skeletal and C.T like ,bone,cartilage, **dentin**(tooth).

Week 4 – The Body Takes Shape

- **Derivatives of the germ layers**

1.Ectoderm forms

- Central nervous system CNS (Brain, spinal cord)
- Peripheral nervous system(PNS)
- epidermis,hair,nail
- mammary gland
- ant.ptuitary gland
- enamel of tooth
- inner ear,lens

2.Endoderm forms

- Inner epithelial lining of the gut tube
- Respiratory tubes, digestive organs, and urinary bladder

- liver ,pancreas

3.Mesoderm – forms

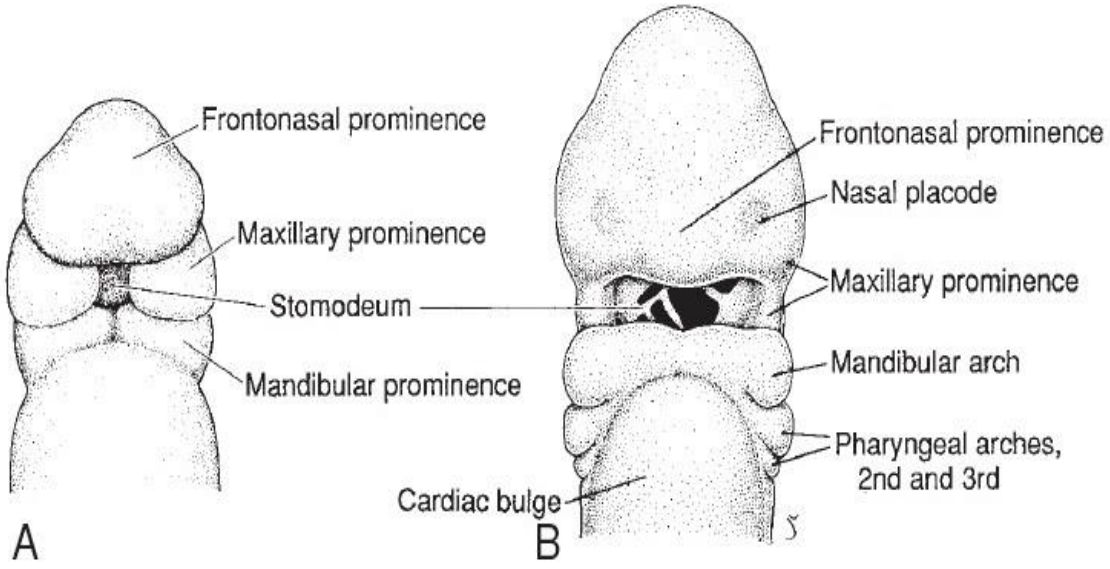
- Lateral plate,intermediate,paraxial
  - Pericardium,peritoneum,cardio-vascular system(CVS),lymphatic system,spleen
  - adrenal cortex,Muscle,Bone,Dermis,Connective tissues (all).
- Mesoderm differentiates further and is more complex than the other two layers

Head and Neck

The most typical feature in development of the head and neck is formed by the **pharyngeal** or **branchial arches.** These arches are **5 pairs** in number **(first,second,third,fourth and sixth),**the fifth is rudimentary. The **arch appear in the fourth weeks** of development and contribute to the characteristic external appearance of the embryo Initially, they consist of bars of mesenchymal tissue separated by deep clefts known as **pharyngeal** (**branchial**) **clefts** ,with development of the arches and clefts, a number of outpocketings, the **pharyngeal pouches,** appear along the lateral walls of the pharyngeal gut.

At the end of the fourth week, the center of the face is formed by the **stomodeum(**primitive mouth), it's boundaries are

1. **mandibular prominences** caudally
2. **maxillary prominences** laterally
3. **frontonasal prominence,** cranially



1.Pharyngeal Arches

Each pharyngeal arch consists of

1. a core of mesenchymal tissue with neural crest cells

2. covered on the outside by surface ectoderm

3.lined inside by endoderm .

Each pharyngeal arch is characterized by its own **muscular components. cranial nerve and arterial component .**

TABLE 15.1 Derivatives of the Pharyngeal Arches and Their Innervation

Pharyngeal Arch	Nerve	Muscles	Skeleton
1 mandibular (maxillary and mandibular processes)	V. Trigeminal: maxillary and mandibular divisions	Mastication (temporal; masseter; medial, lateral pterygoids); mylohyoid; anterior belly of digastric; tensor palatine, tensor tympani	Premaxilla, maxilla, zygomatic bone, part of temporal bone, Meckel's cartilage, mandible malleus, incus, anterior ligament of malleus, sphenomandibular ligament
2 hyoid	VII. Facial	Facial expression (buccinator; auricularis; frontalis; platysma; orbicularis oris; orbicularis oculi); posterior belly of digastric; stylohyoid; stapedius	Stapes; styloid process; stylohyoid ligament; lesser horn and upper portion of body of hyoid bone
3	IX. Glossopharyngeal	Stylopharyngeus	Greater horn and lower portion of body of hyoid bone
4–6	X. Vagus · Superior laryngeal branch (nerve to fourth arch)	Cricothyroid; levator palatine; constrictors of pharynx	Laryngeal cartilages (thyroid, cricoid, arytenoid, corniculate, cuneiform)
	· Recurrent laryngeal branch (nerve to sixth arch)	Intrinsic muscles of larynx	

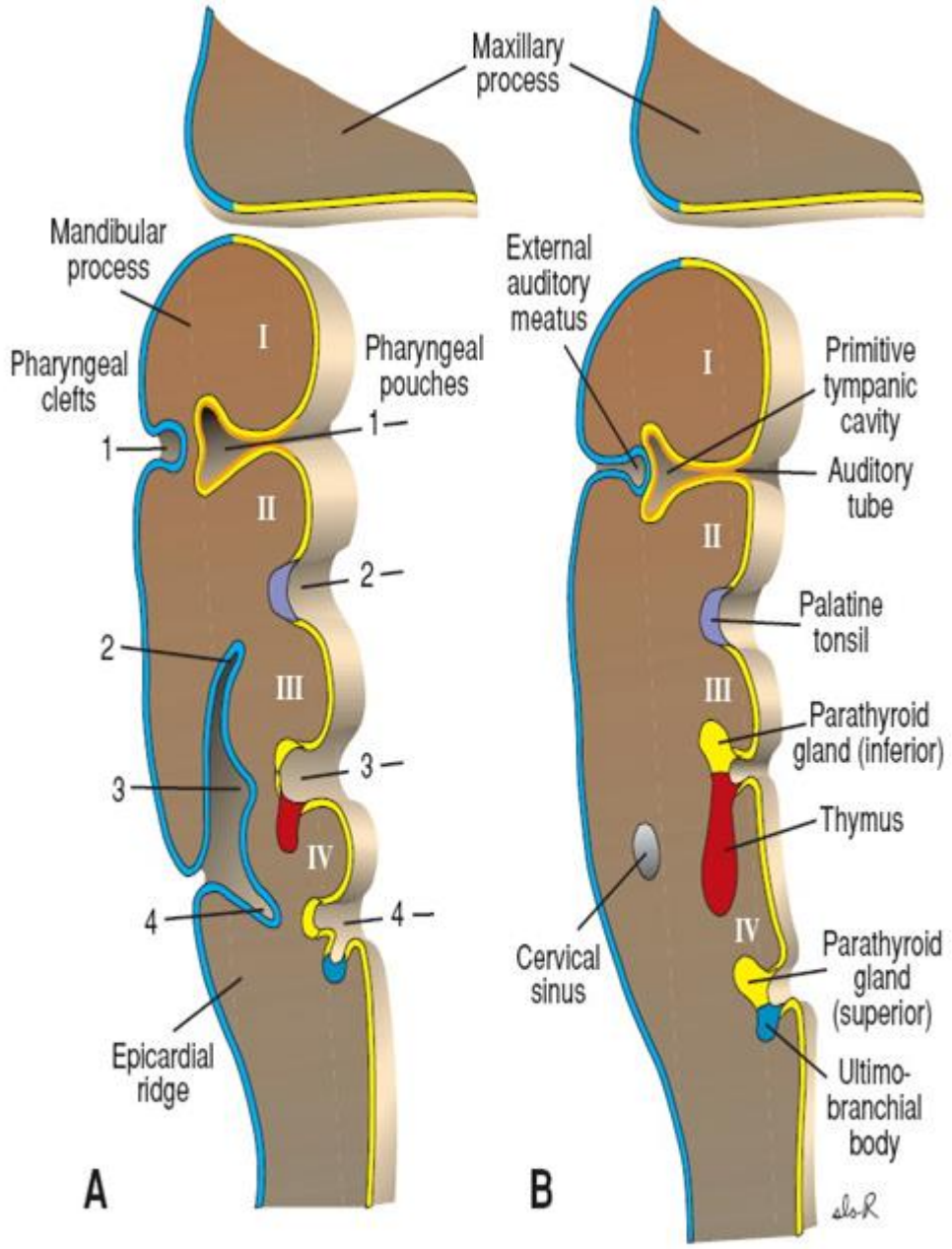


Figure 15.10 A. Development of the pharyngeal clefts and pouches. The second arch grows over the third and fourth arches, burying the second, third, and fourth pharyngeal clefts. **B.** Remnants of the second, third, and fourth pharyngeal clefts form the cervical sinus, which is normally obliterated. Note the structures formed by the various pharyngeal pouches.