**Lec.7**

**Embryology**

**DR. HULAL SALEH SAHIB**

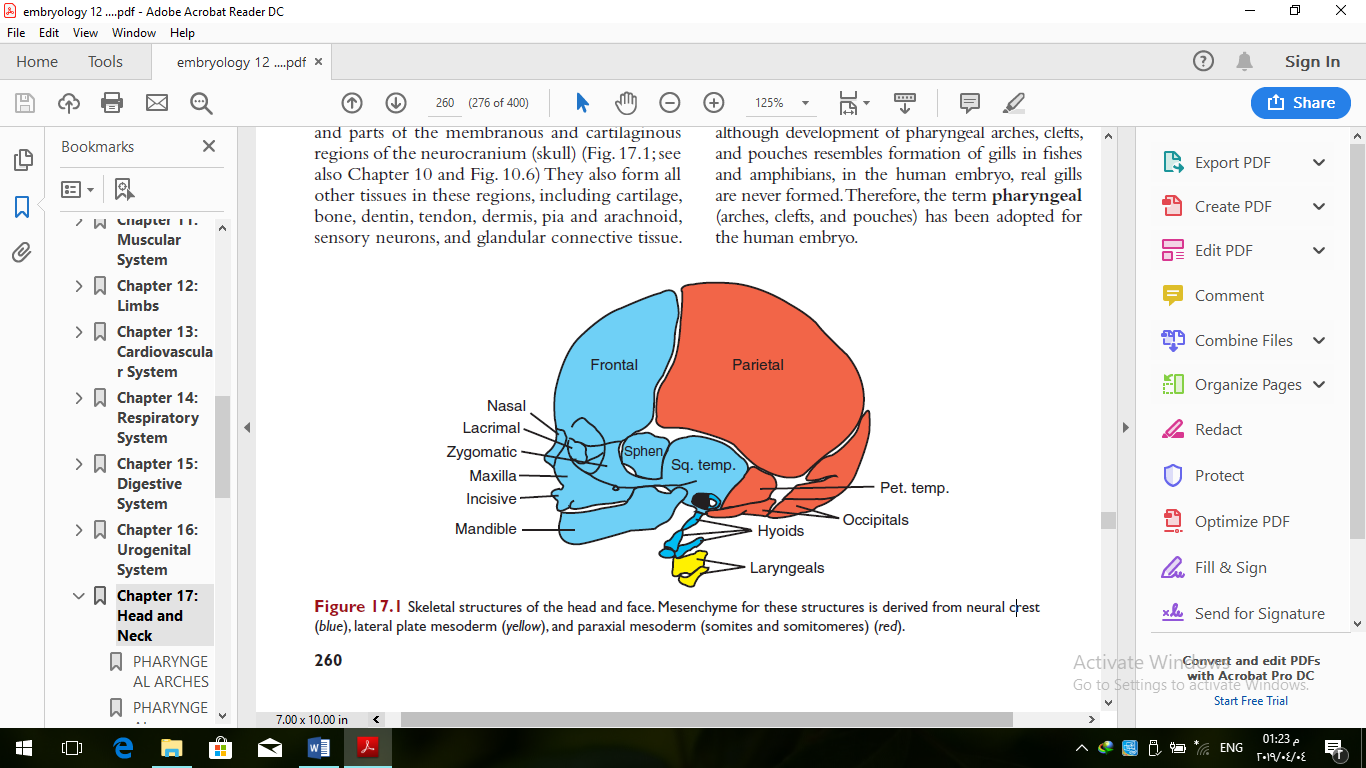
Head and Neck

Mesenchyme for formation of the head region is derived from **paraxial** and **lateral** **plate mesoderm, neural crest**, and thickened regions of ectoderm known as **ectodermal placodes**.

Paraxial mesoderm (**somites**) forms a large portion of the neurocranium (skull), all voluntary muscles of the craniofacial region, the dermis and connective tissues in the dorsal region of the head, and the meninges caudal to the prosencephalon.

Lateral plate mesoderm forms the laryngeal cartilages (arytenoid and cricoid) and connective tissue in this region.

Neural crest cells originate in the neuroectoderm of forebrain, midbrain, and hindbrain regions and migrate ventrally into the pharyngeal arches. They also form all other tissues in these regions, including cartilage, bone, dentin, tendon, dermis, pia and arachnoid, sensory neurons, and glandular connective tissue.



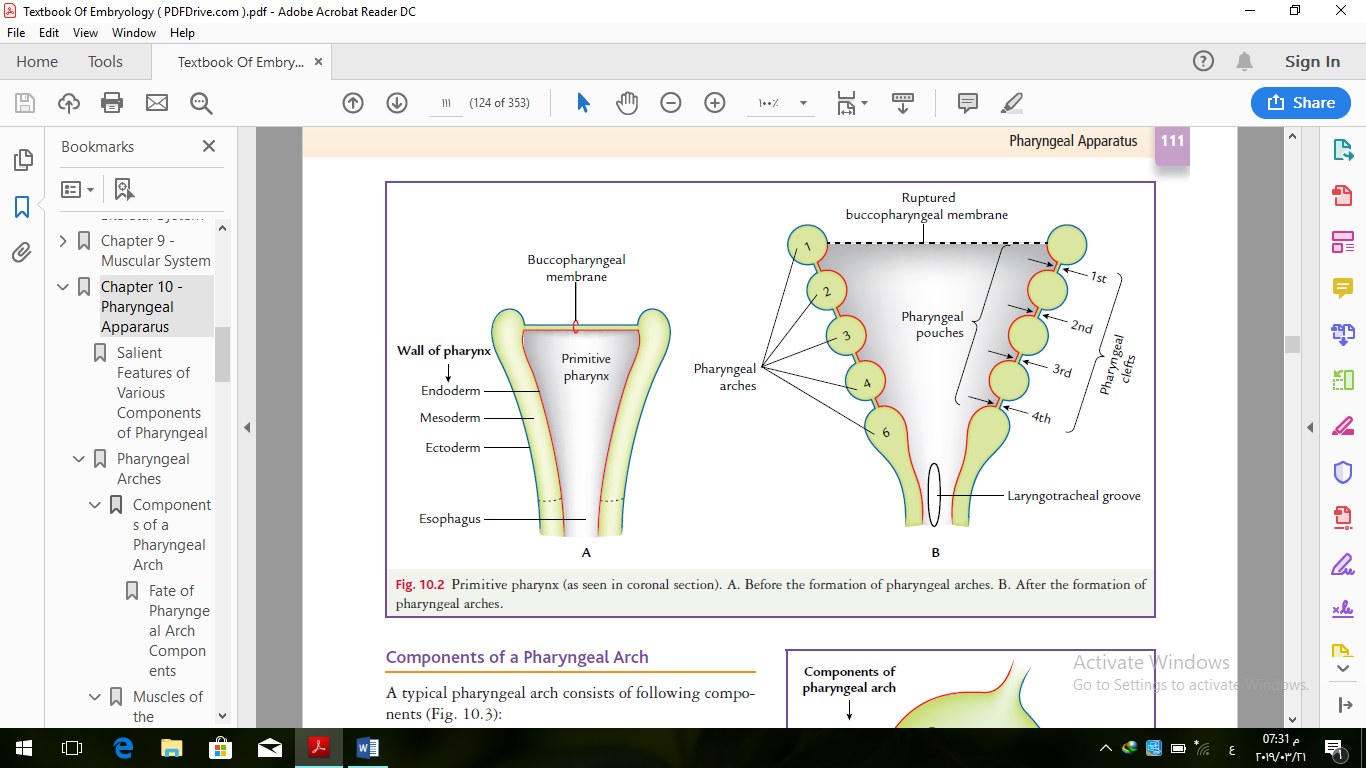
Cells from **ectodermal placodes**, together with neural crest, form neurons of the fifth, seventh, ninth, and tenth cranial sensory ganglia.

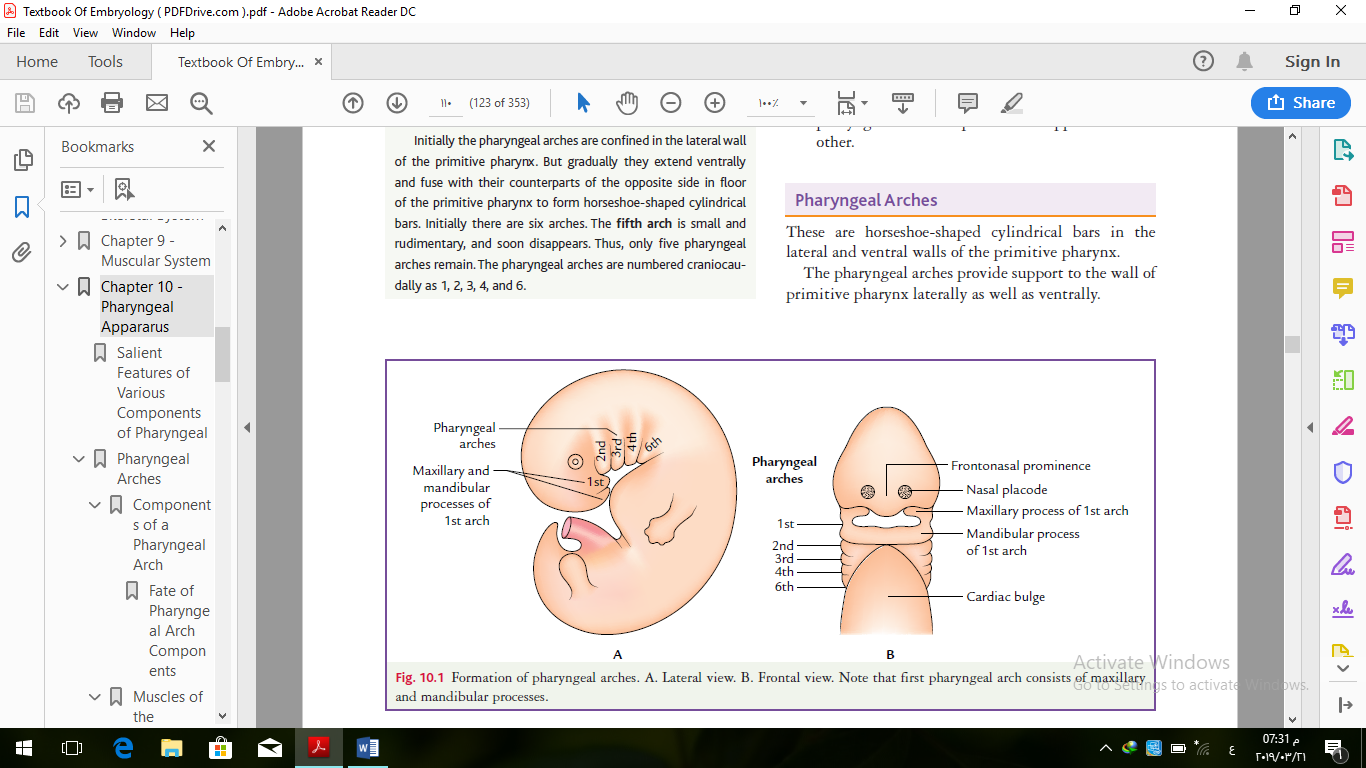
Head and neck development include bony skeleton of the head and neck (skull and vertebrae), and the development of other components (the pharyngeal apparatus).

The **pharyngeal apparatus** consists of pharyngeal arches, pharyngeal pouches, and pharyngeal clefts (grooves).

After the embryo fold and after formation of the head fold, the buccopharyngeal membrane is buried at the bottom of stomodeum (which is an ectodermal depression representing the primitive mouth and located between the forebrain cranially and the primitive heart caudally.

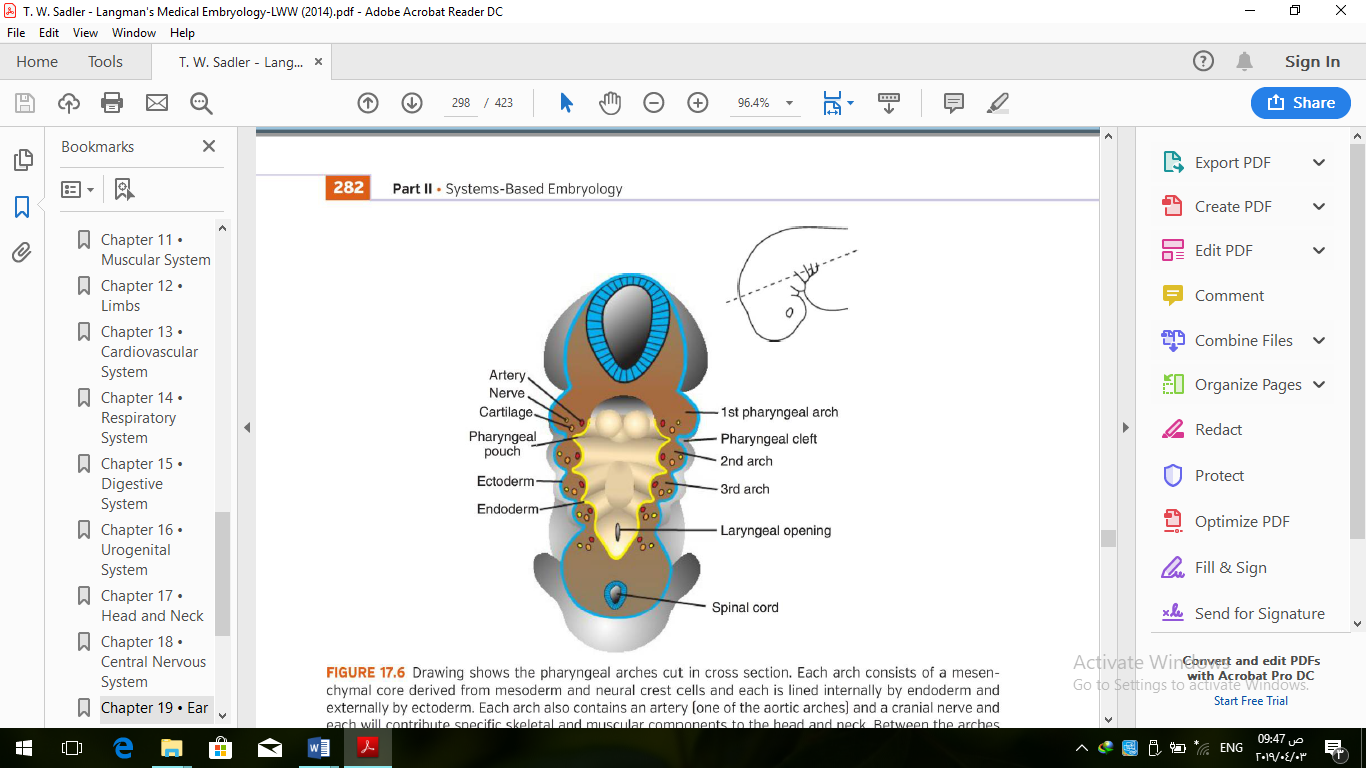
In the region between the stomodeum and the primitive heart, in the fourth week of intrauterine development, a series of surface elevations appear in the lateral wall of primitive pharynx. These are termed pharyngeal arches.

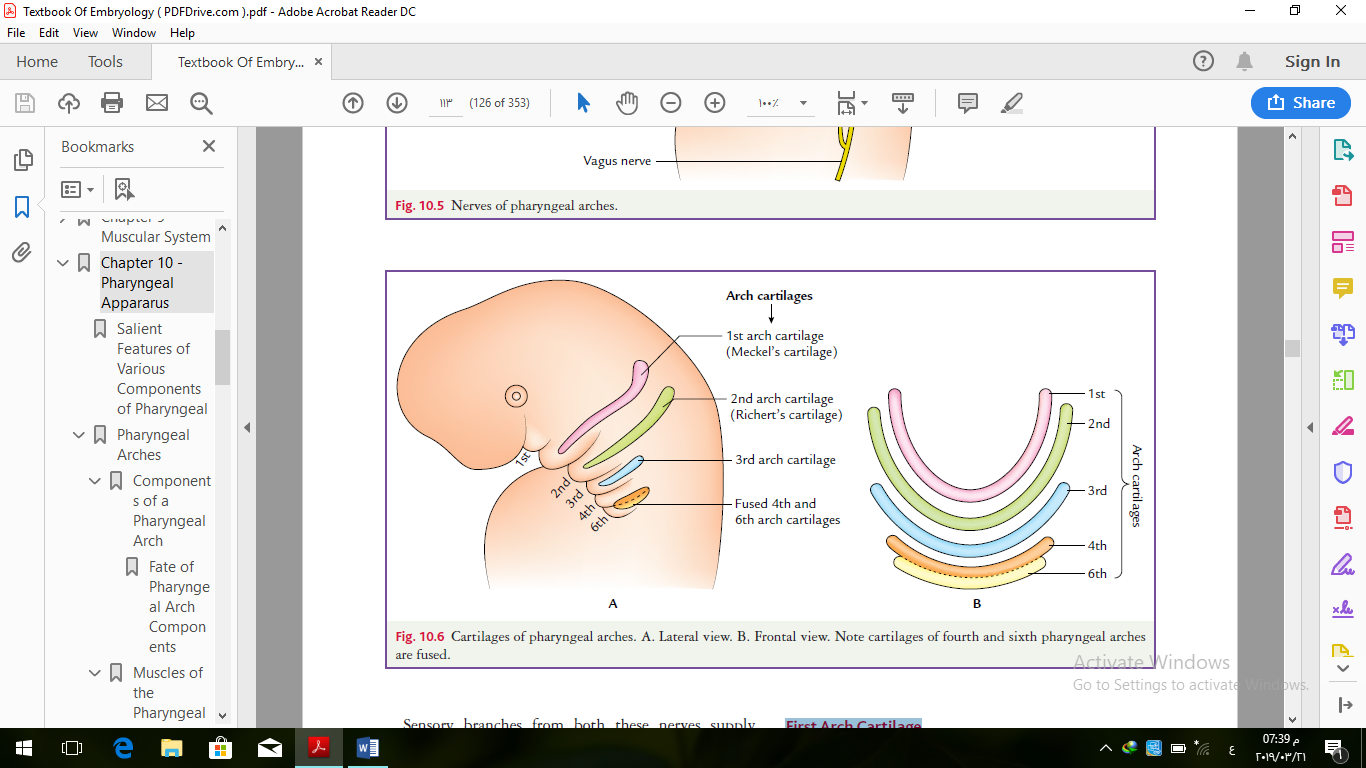




The pouches between them on the inner aspect of the pharyngeal wall are termed pharyngeal pouches and grooves between them on the outer aspect of the pharyngeal wall are called pharyngeal clefts.

At the end of the fourth week, the center of the face is formed by the stomodeum, surrounded by the first pair of pharyngeal arches.





When the embryo is 42 days old, five mesenchymal prominences can be recognized: the **mandibular prominences** caudal to the stomodeum; the **maxillary prominences** lateral to the stomodeum; and the **frontonasal prominence,** cranial to the stomodeum.

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

First pharyngeal arch

The **first pharyngeal arch**, it has two cartilages; the **maxillary process dorsally** and a ventral portion, the **mandibular process**, which contains **Meckel’s cartilage**. During further development, Meckel’s cartilage disappears leaving the **incus** and **malleus (ear ossicles)**

Mesenchyme of the maxillary process gives rise to the **maxilla, zygomatic bone,** and part of the **temporal bone.** The **mandible** is also formed of mesenchymal tissue surrounding Meckel’s cartilage.

The maxillary process and Meckel’s cartilage are replaced by the maxilla and mandible, respectively, which develop by membranous ossification.

Musculature of the first pharyngeal arch includes the **muscles of mastication** (temporalis, masseter, and pterygoids), **anterior belly of the digastric, mylohyoid, tensor tympani,** and **tensor palatini.**

The **nerve** supply to the muscles is provided by the **mandibular branch of the trigeminal nerve**. Sensory supply to the skin of the face is provided by **ophthalmic, maxillary,** and **mandibular branches of the trigeminal nerve.**

**Blood supply; aortic** arch disappear leaving maxillary artery.

Second pharyngeal arch (the hyoid arch)

The cartilage (**Reichert’s cartilage**) gives rise to the **stapes, styloid process of the temporal bone, stylohyoid** **ligament, and part of the** **hyoid bone.**

Muscles are the **stapedius, stylohyoid, posterior belly of the digastric, auricular, and muscles of facial expression.** The **facial nerve,** the nerve of the second arch, supplies all of these muscles. Aortic arch disappear leaving stapedial artery.