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Textbook for students of higher education of English speaking

SPECIAL HISTOLOGY OF THE DIGESTIVE SYSTEM IN FIGURES AND DIAGRAMS

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Textbook for students of higher education of English speaking, EPP «Dentistry», EPP «Medicine», 22 «Healthcare», specialty 221 Dentistry, specialty 222 Medicine. The material of the textbook includes vocabulary, tables, diagrams and microphotographs. Provides systematization of knowledge of students, facilitates preparation for employment, gives the chance to make the analysis of structural features of organs of digestive system, promotes development of knowledge, abilities and skills.

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Рекомендовано вченою радою Полтавського державного медичного університету як навчальний посібник для англомовних студентів, які навчаються за ОПП «Стоматологія», ОПП «Медицина», галузі знань 22 Охорони здоров'я зі спеціальності 221- Стоматологія та спеціальності 222 - Медицина.
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С 44 Спеціальна гістологія травної системи в зображеннях і схемах / Т.А. Скотаренко, М.В. Рудь, О.В. Вільхова. – Полтава, 2023. – 183 с.
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Навчальний посібник для здобувачів вищої освіти, які навчаються за ОПП «Стоматологія», ОПП «Медицина», англомовна форма навчання, галузі знань 22 Охорони здоров'я зі спеціальності 221- Стоматологія та спеціальності 222 - Медицина. Матеріал навчального посібника включає словник, таблиці, схеми та мікрофотографії. Забезпечує систематизацію знань студентів, полегшує підготовку до занять, дає змогу зробити аналіз структурних особливостей органів травної системи, сприяє виробленню знань, умінь і навичок, передбачених програмою.

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Topic 1. General structure of digestive system organs. Face development and organs of oral cavity.

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General structure of the digestive tract wall			
1.	**Mucosa**	Epithelium	Stratified squamous or simple columnar
		Lamina propria	Loose connective tissue
		Muscularis mucosae (lamina muscularis mucosae)	Smooth muscles tissue
2.	**Submucosa**	In the esophagus and duodenum the submucosa includes glands.	Loose connective tissue
3.	**Muscularis externa**	Can has one, two or three layers.	Smooth muscles tissue or striated muscles tissue
4.	**Adventitia or serosa**	Adventitia and serosa have one difference.	Adventitia includes loose connective tissue. Serosa consists loose connective tissue and mesothelium.

Development of face	
Inside view	**Outside view**
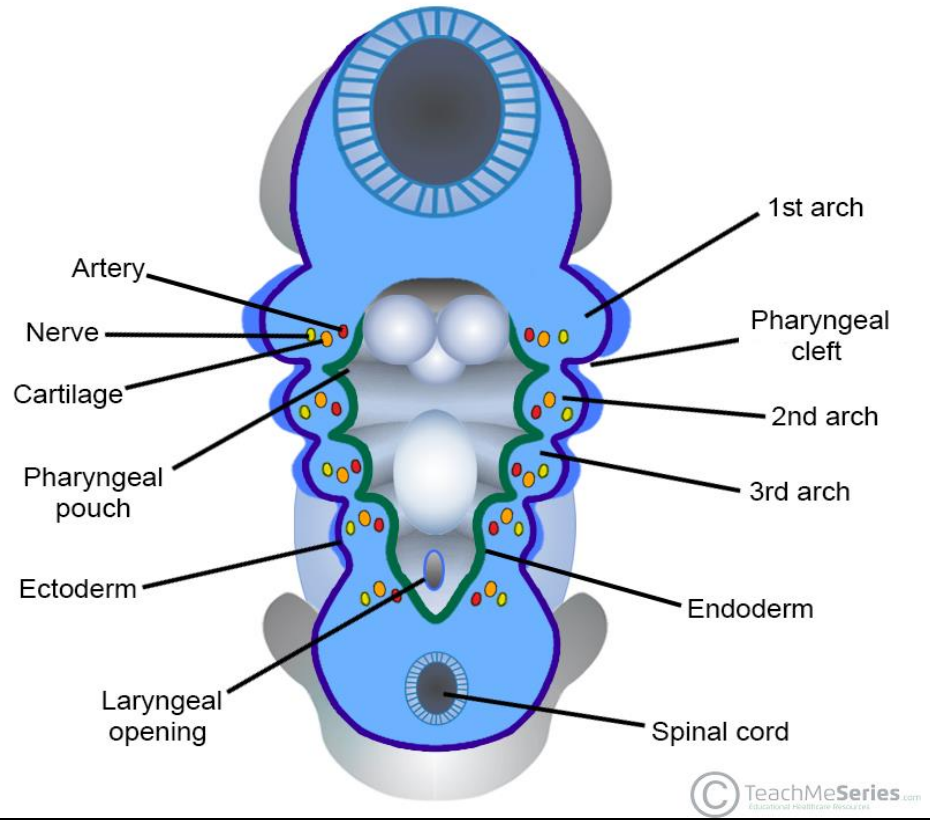	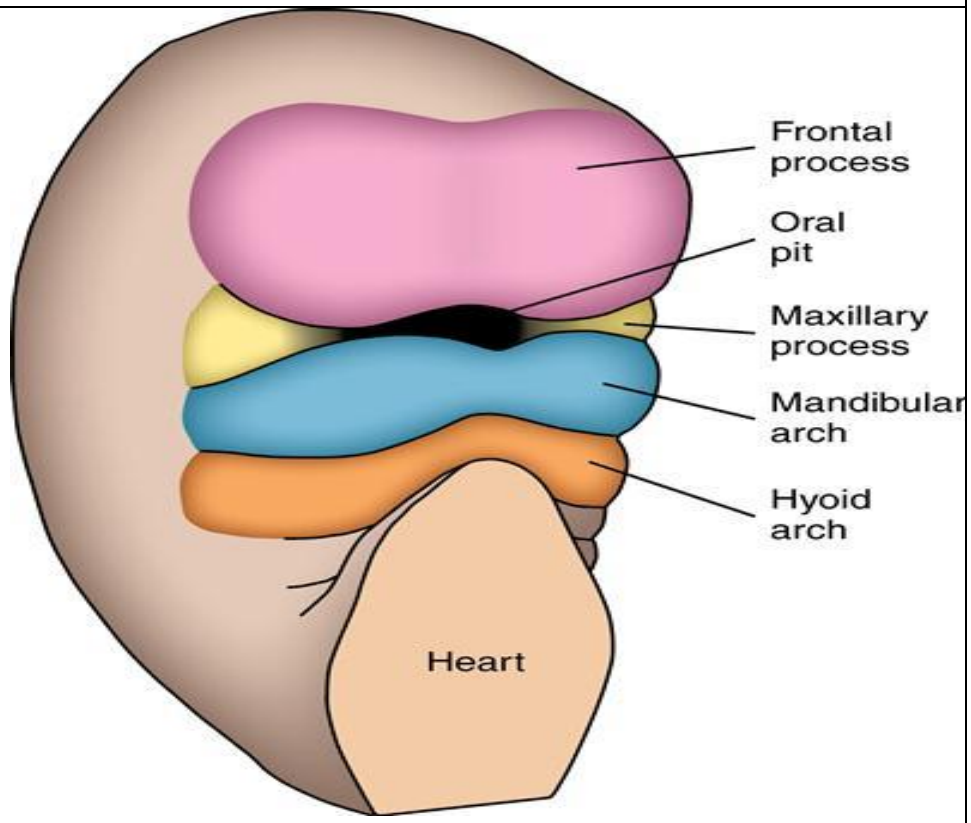
Fig. 1 https://teachmeanatomy.info/the-basics/embryology/head-neck/face-palate/	Fig. 2 https://pocketdentistry.com/4-development-of-the-face-and-palate/

Germinal layers and their derivatives		
1.	**Ectoderm**	Pharyngeal clefts
2.	Mesenchyme (thickening between the ectoderm and endoderm)	Pharyngeal arches
3.	Endoderm	Pharyngeal pouches

Pharyngeal arches and their derivatives		
Arches		**Derivatives**
1.	First arch (1st arch)	Maxillary, mandibular processes and frontonasal (prominence), malleus, incus (auditory ossicles).
2.	Second arch (2nd arch)	Stapes (auditory ossicle), styloid process of the temporal bone, lesser cornu of the hyoid bone, stylohyoid ligament.
3.	Third arch (3rd arch)	Greater horns of the hyoid bone, the body of the hyoid bone.
4.	Fourth arch (4th arch)	Thyroid cartilage of the larynx

Rudiments of facial skull bones			
Rudiments (Prominence or process)		**Derivatives**	**Developmental pathology**
1.	Frontal (frontonasal) process	Medial nasal, lateral nasal processes and frontal prominence proper, forehead, bridge of nose.	
2.	Maxillary processes	Cheeks, lateral upper lip, secondary palate, lateral upper jaw (maxilla).	Upper micrognathia
3.	Mandibular processes	Mandible (Meckel's cartilage gives rise mandibular bone), lower lip.	Middle cleft of the lower lip and lower jaw, microgeny or lower micrognathia.
4.	Upper part of the maxillary processes merge (connect) with the lateral nasal processes	Form the upper lip	Eye -nasal slit or oblique cleft of the face
5.	Lower part of the maxillary processes merge (connect) with	Form the upper lip	Lateral cleft of the upper lip (unilateral or bilateral).

	the medial nasal processes		
6.	Medial nasal processes	Medial part of the nose and medial part of the upper lip, philtrum, primary palate, upper 4 incisors.	Congenital middle cleft of the upper lip
7.	Lateral nasal processes	Lateral parts of the nose	
8.	Upper part of the maxillary processes merge (connect) with the lateral nasal processes	Nasolacrimal furrow (gives rise to the nasolacrimal duct)	Eye -nasal slit or oblique cleft of the face
9.	Lower part (medial part) of the maxillary processes merge (connect) with the medial nasal processes	Form the upper jaw (maxilla).	Lateral cleft of the upper lip (unilateral or bilateral).
10.	Concrescence of lateral departments of maxillary and mandibular processes	Intermediate area of the cheeks and rudimentary embryonic suture	Macrostomy and transverse cleft of face, microstomy.
Tab. 1 https://youtu.be/p8eeITuhFQg , https://pocketdentistry.com/4-development-of-the-face-and-palate/.			

Development of face from 5 to 10 weeks of embryonic development

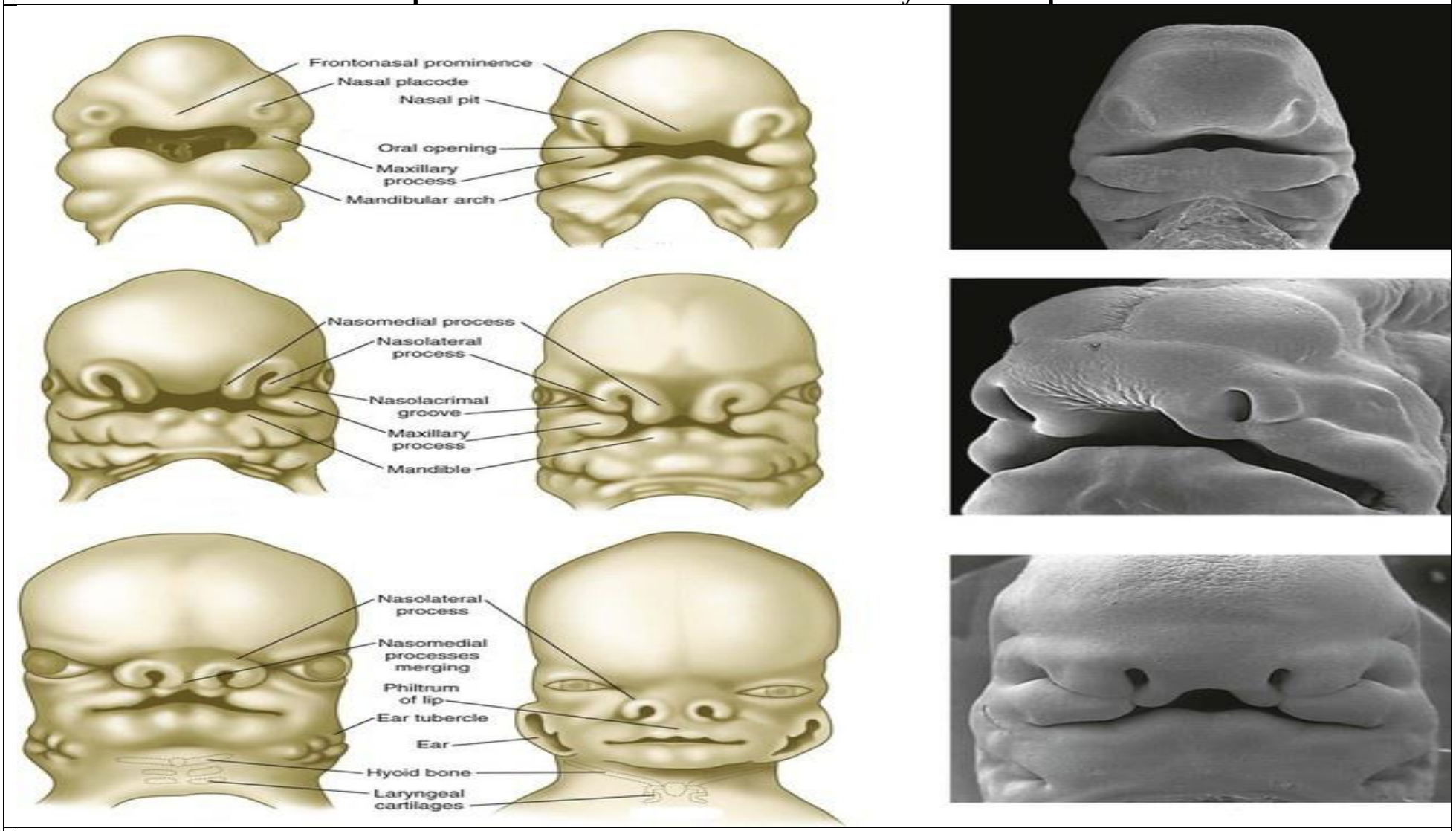

Fig. 3 https://teachmeanatomy.info/the-basics/embryology/head-neck/face-palate/

VOCABULARY

Stomatodeum (also called stomodeum or stomatodaeum) – is the embryonic anterior ectodermal part of the digestive tract. The recesses is located between the pericardium and the brain of the embryo, which acts as the predictor of the mouth and adenohypophysis.

Branchial (pharyngeal) arches – formation in the pharyngeal wall in the form of mesoderm overgrowth infiltrated with neural crest cells. As a result, six cylindrical thickenings are formed. Starting from the lateral wall of the pharynx, they expand and approach similar formations on the opposite side.

Branchial (pharyngeal) pouches. On the inside, the pharyngeal apparatus is lined with endoderm, which forms pouches or folds between the arches;

Branchial (pharyngeal) grooves. Externally, the pharyngeal structures are covered with ectoderm, which forms pharyngeal clefts (or grooves); initially, 4 pharyngeal clefts are formed, corresponding to the number of pharyngeal pouches.

Mucous membrane. A lining epithelium, including glandular tissue, an underlying layer of loose connective tissue called the lamina propria, which provides vascular support for the epithelium, and sometime contains mucosal glands. Finally, a thin double layer of smooth muscle is often present - the muscularis mucosa for local movement of the mucosa.

Submucosa - a layer of tissue under the mucous membrane. In the gastrointestinal tract submucosa is a layer of loose connective tissue or dense irregular connective tissue with blood and lymphatic vessels of large diameter and nerve trunks, the main function of which is support of the mucous membrane, as well as the connection of the mucous membrane with the layer of smooth muscles underlying it.

Muscularis externa ("muscularis"for short) is a muscular wall of the gastrointestinal tract located under the submucosa. The muscles of the tongue and upper esophagus belong to striated muscles. In the rest of the digestive tract, the muscularis externa consists of two layers of smooth muscles. The inner circular layer consists of smooth muscle fibers arranged in a circular pattern. The outer longitudinal layer is made of smooth muscle fibers that are extended along the digestive tube.

Serosa consists of a secretory epithelial layer and a thin connective tissue layer. The epithelial layer, known as mesothelium, consists of a single layer of avascular flat nucleated cells (simple squamous epithelium) that produce the lubricating serous fluid. Serous membranes line and enclose several body cavities, known as serous cavities, where they secrete a lubricating fluid to reduce friction from muscle movements.

Adventitia a connective tissue layer that binds together structures rather than reduces friction between them.

Links:
https://histology.siu.edu/erg/GI014b.htm

TESTS

1. A **newborn child** has a **middle cleft lip and maxilla**. Anomalies in the development of which processes are responsible for this defect?

Nonunion of the medial nasal processes
Cleft of the medial nasal processes of the upper jaw
Cleft of the lateral nasal processes of the upper jaw
Cleft of the palatine processes.
Cleft of the maxillary processes.

2. A histological preparation of the head end of a 5-week-old embryo shows **gill arches**. Indicate what develops from the **first pair** of these structures?

Mandibular and maxillary processes.
Mandibular processes.
Maxillary processes.
External auditory canal.
Cricoid cartilage.

3. An **enlargement** of which **parts of the facial skull in the embryonic period** leads to **abnormalities such as «cleft palate»**?

Palatine processes
Frontal processes
Frontal and maxillary processes
Mandibular processes
Mandibular and palatine processes

Links:
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