

وسهلا

أهلا



الأستاذ الدكتور يوسف حسين

أستاذ التشريح وعلم الأجنة - كلية الطب - جامعة الزقازيق - مصر

رئيس قسم التشريح و الأنسجة و الأجنة - كلية الطب - جامعة مؤتة - الأردن

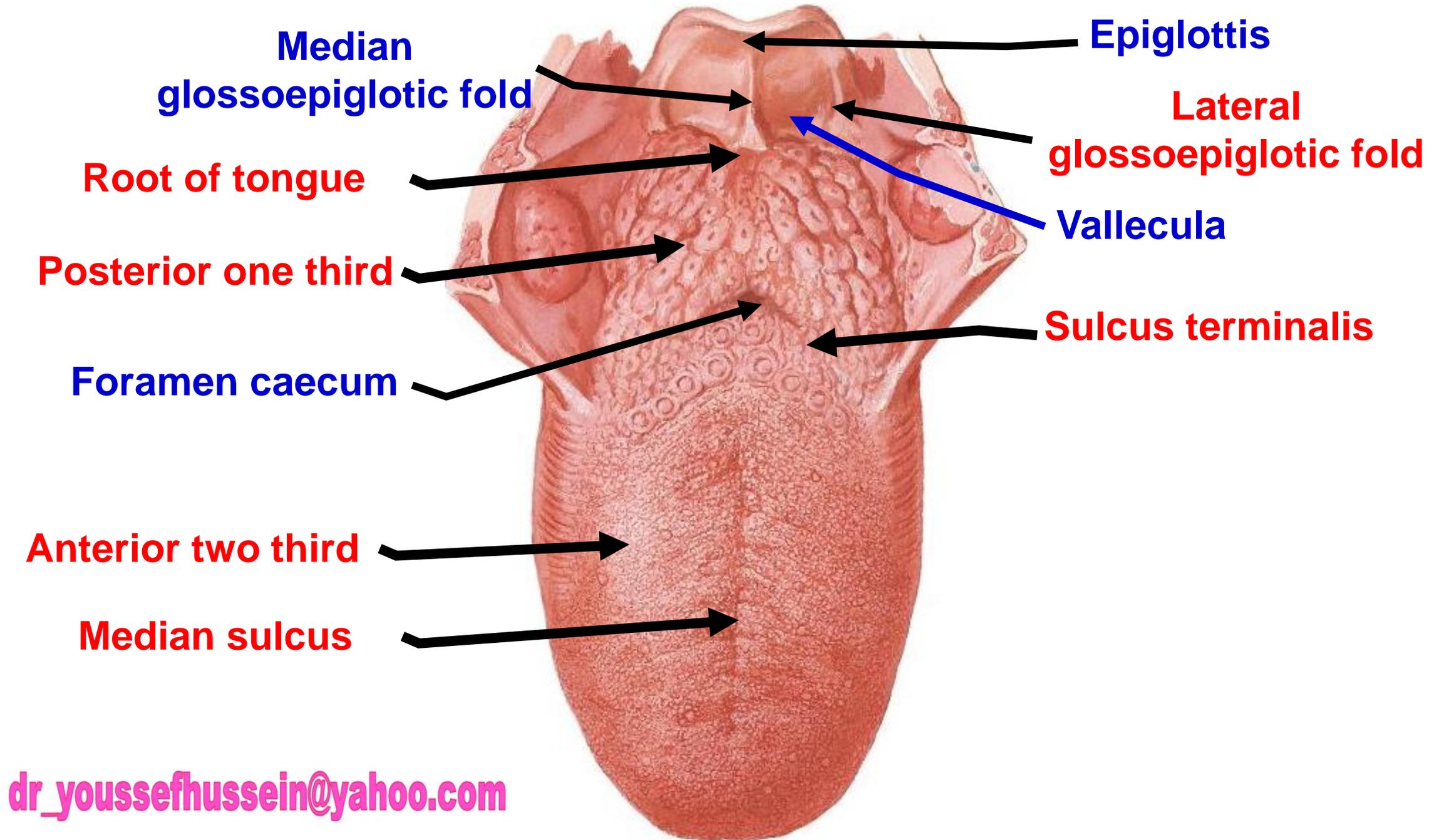
دكتورة من جامعة كولونيا المانيا

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Development of Tongue



**Median
glossoepiglottic fold**

Epiglottis

Root of tongue

**Lateral
glossoepiglottic fold**

Vallecule

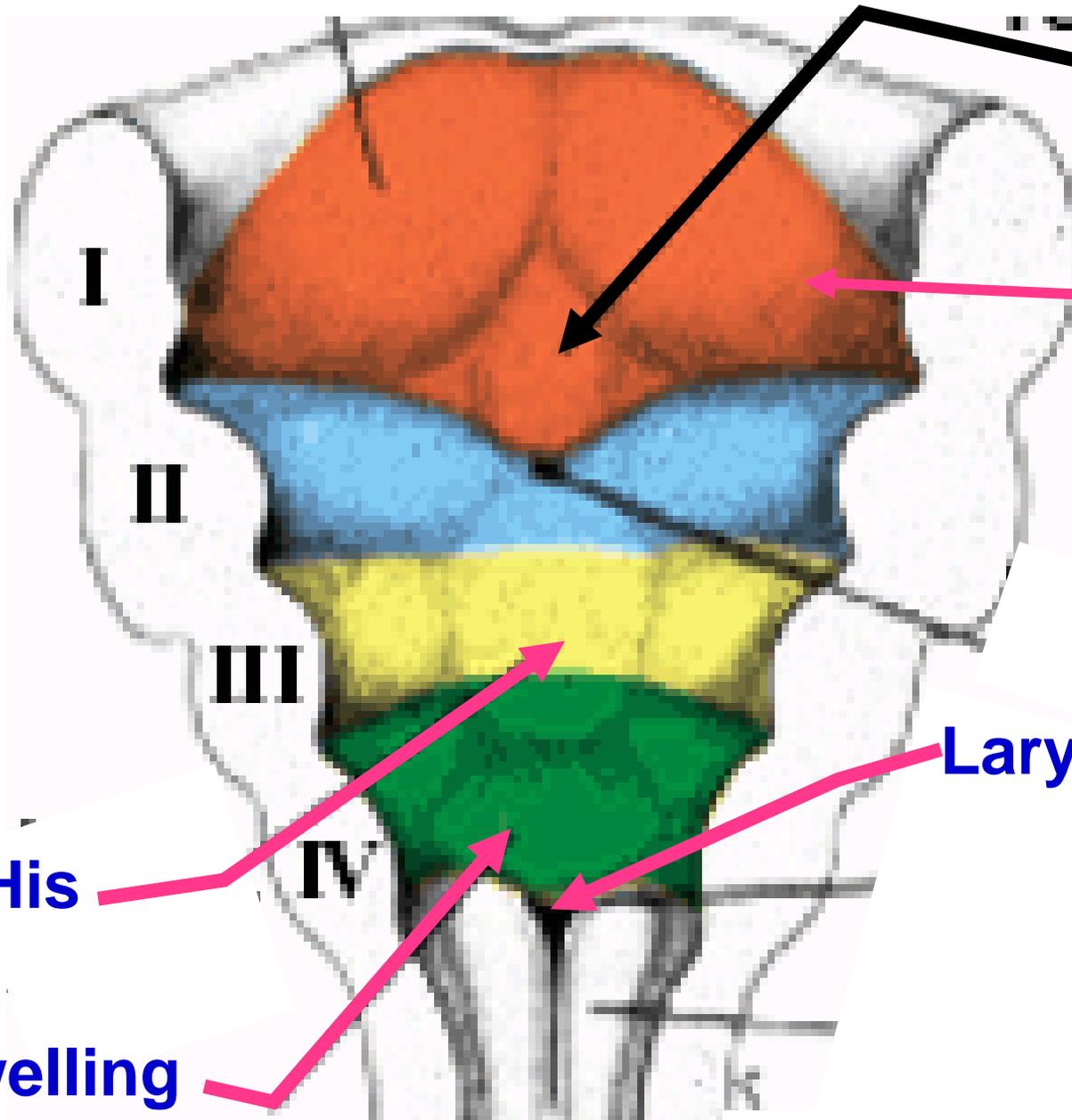
Posterior one third

Sulcus terminalis

Foramen caecum

Anterior two third

Median sulcus



Tuberculum impar

Lateral lingual swelling

Laryngeal orifice

Copula of His

Epiglottic swelling

- **Development of the mucous membrane of the anterior 2/3 of the tongue:**
- **At 4th week 3 endodermal swellings appears from 1st pharyngeal arches**
- **1- A median swelling** called the **tuberculum impar**
- **2- Two lateral lingual swellings** proliferate and grow medially.
- In the midline, they fused together at **median sulcus** and completely covered tuberculum impar forming mucous membrane of anterior 2/3 of the tongue.
- **So the anterior 2/3 is supplied by Lingual nerve from posterior division of mandibular nerve.**

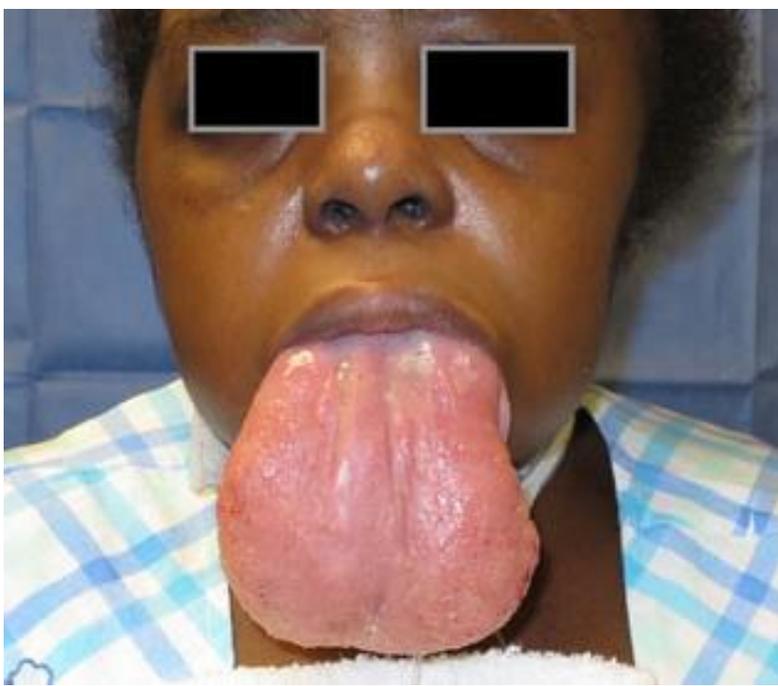
- **Development of the mucous membrane of the posterior 1/3 of the tongue:**
- It develops as a large midline mass (**copula of His**) derived from **endoderm of 2nd, 3rd and 4th** pharyngeal arches.
- The part of the **3rd arch** proliferates and migrates forward overlying the 2nd arch and forms **posterior 1/3 of the tongue that fused with anterior 2/3 by sulcus terminalis.**
- **So the posterior 1/3 is supplied by the glossopharyngeal nerve.**
 - **Development of the mucous membrane of the Root of the tongue;**
- **From** the part of the copula derived from the **4th pharyngeal arch**
- **So** it is supplied by the vagus nerve (internal laryngeal nerve).

- **Development of the muscles of the tongue:**

- **The muscles of the tongue** are derived from the **occipital myotomes** except **palatoglossus** muscle that develop from the **mesoderm in situ**.
- **So** the muscles are supplied by the **hypoglossal nerve** except palatoglossal muscle supplied by pharyngeal nerve plexus

Separation of the tongue

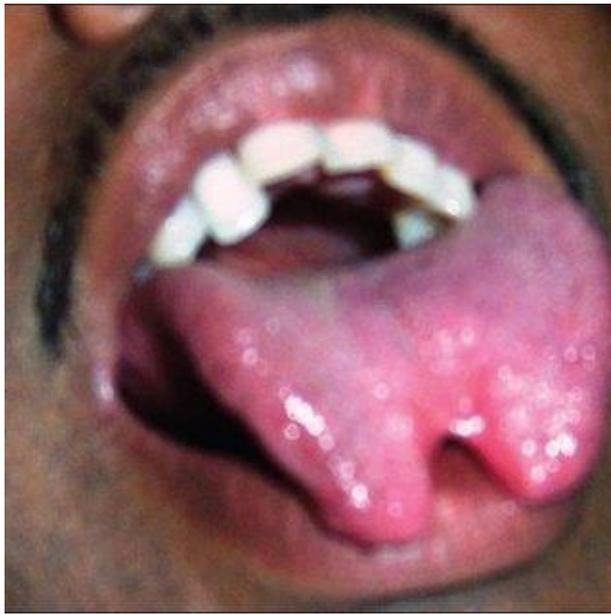
- At first the tongue is adherent to the floor of the mouth, then a horse-shoe (C-shaped) groove called **alveololingual groove** separates the anterior 2/3 of tongue from the floor of the mouth except in the midline where the tongue is connected to the floor by the **frenulum of the tongue**.



**** Congenital anomalies of the tongue**

- **A glossa:** failure of development of the tongue,
- **Macroglossia:** large sized tongue which protrudes from the mouth (as in mongolism and cretinism).
- **Microglossia:** small sized tongue

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- **Bifid tongue:** due to failure of fusion of the 2 lingual swellings.

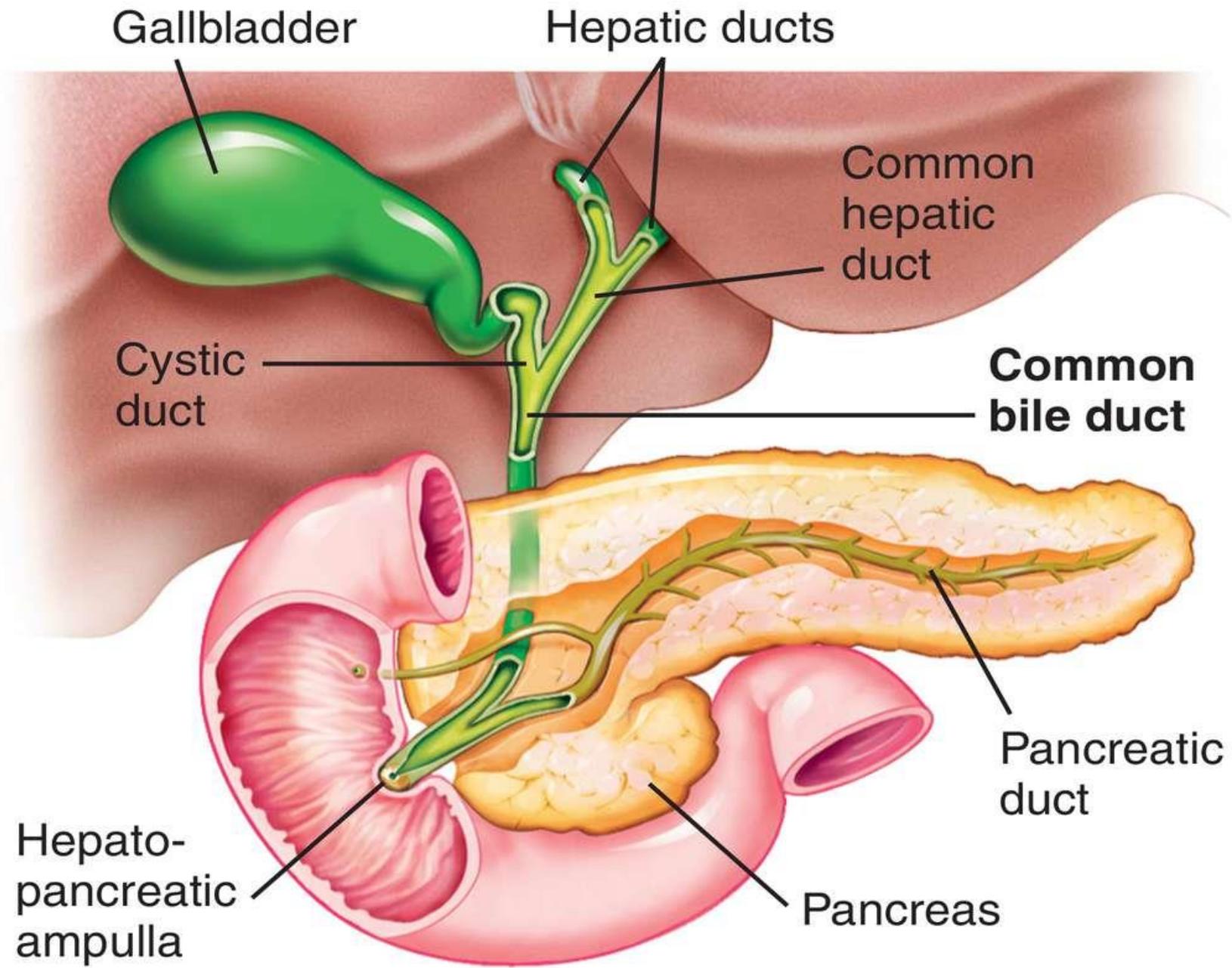
- **Tongue-tie (Ankyloglossia):** the tongue is adherent to the floor of the mouth.



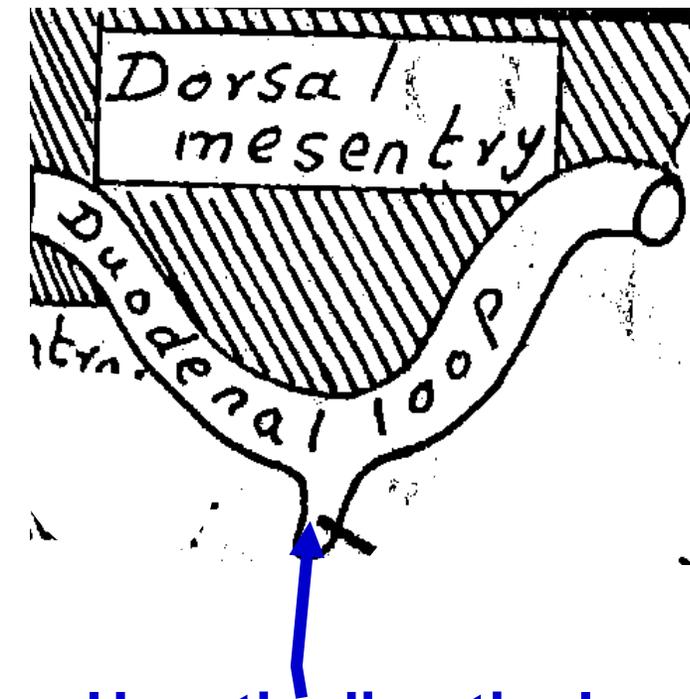
- **Short frenulum:** due to incomplete separation of tongue (common).
- **Long frenulum:** due to excess separation of the tongue. It causes the tongue to fall back and close the pharynx and larynx (suffocation).



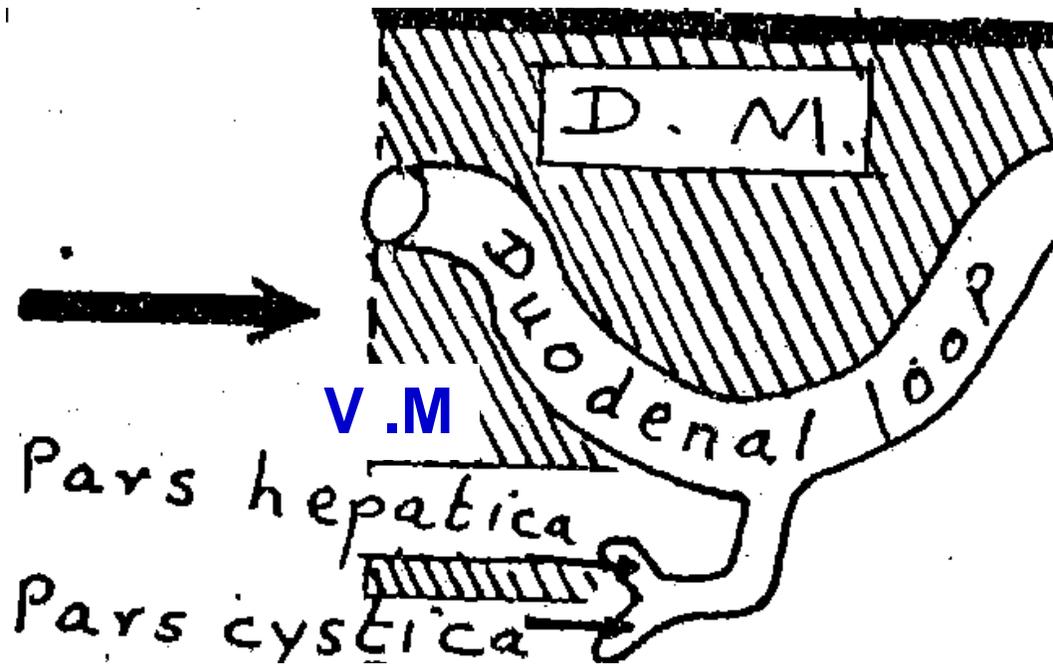
Development of liver & Biliary system



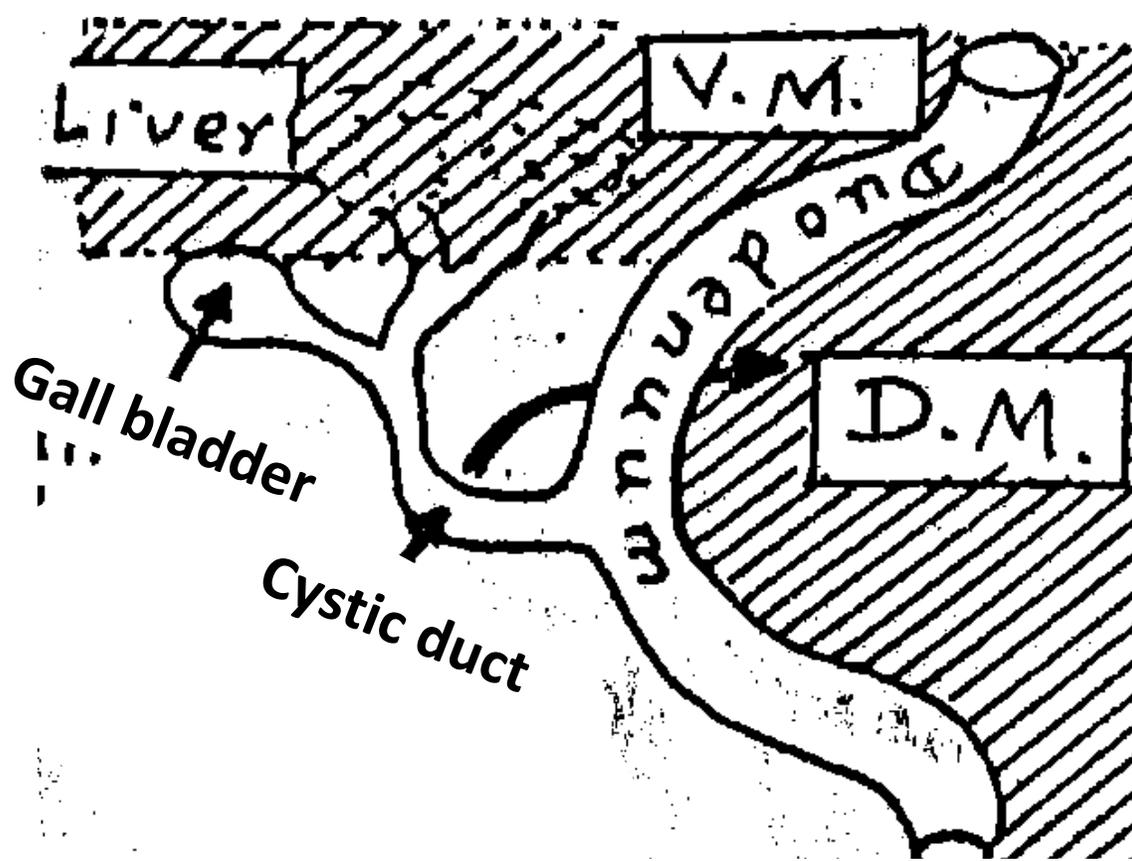
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Hepatic diverticulum from the **ventral** wall of the duodenal loop by the 4th week of development



- **The diverticulum** grows ventrally and cranially into ventral mesentery.
- The diverticulum divides into 2 parts:
- **Cranial** part called **pars hepatica**
- **Caudal** part called **pars cystica.**



I- Development of the liver (Pars Hepatica)

- * The cranial end of the pars hepatica divides into 2 branches that form right and left hepatic ducts.
- * The cranial ends of ducts divide to form hepatic cells and intrahepatic biliary tree.
- * The hepatic cells are separated by **blood sinusoids** developed from absorbed umbilical and vitelline veins.
- * The blood sinusoids are lined by mesenchymal cells and large phagocytic cells (Kupffer cells).
- * The connective tissue stroma and fibrous capsule derived from the surrounding mesoderm

II- Development of the gall bladder (Pars cystica)

a- Distal part is dilated and forms **gall bladder**.

b- Proximal part remains narrow and forms **cystic duct**.

III- Development of the common bile duct:

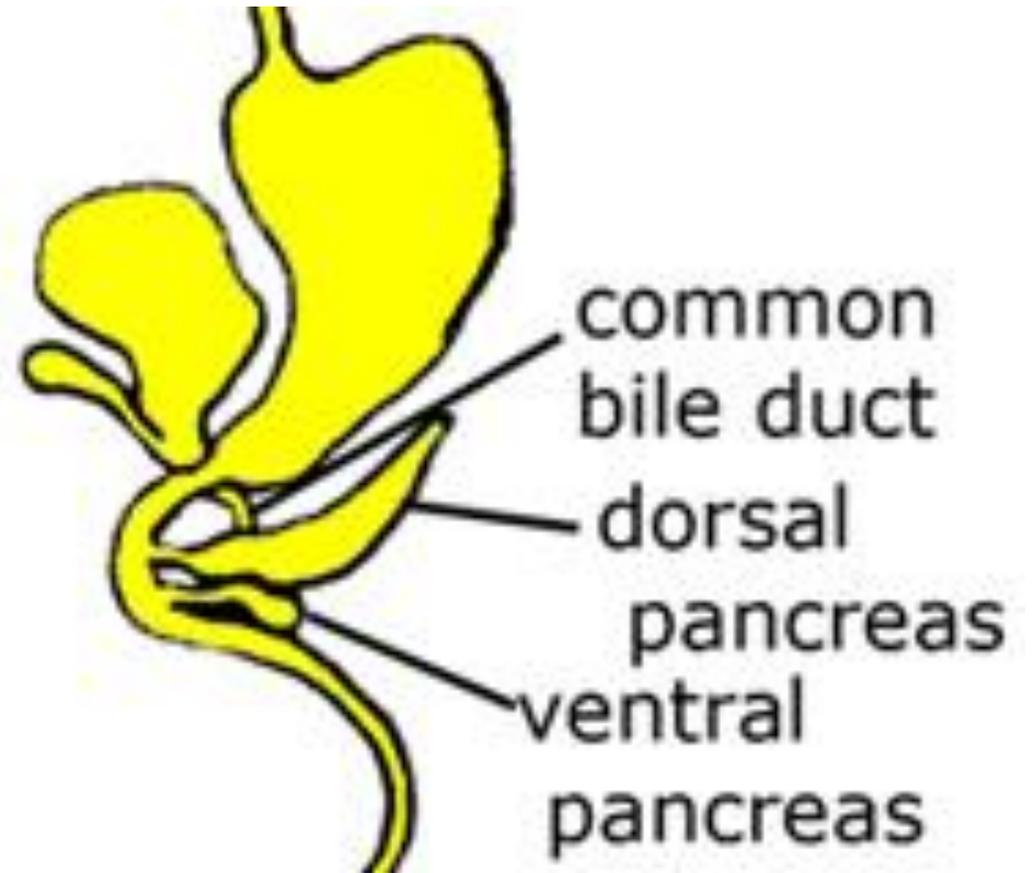
- The proximal part of the hepatic diverticulum forms the common bile duct.

** **At first**, the common bile duct opens in the ventral wall of the duodenum.

- After **rotation of the duodenal loop 90° (clockwise) and unequal growth of its walls,**

a) The opening shifts to the dorsomedial wall of the 2nd part of the duodenum.

b) The common bile duct passes behind the first part of the duodenum



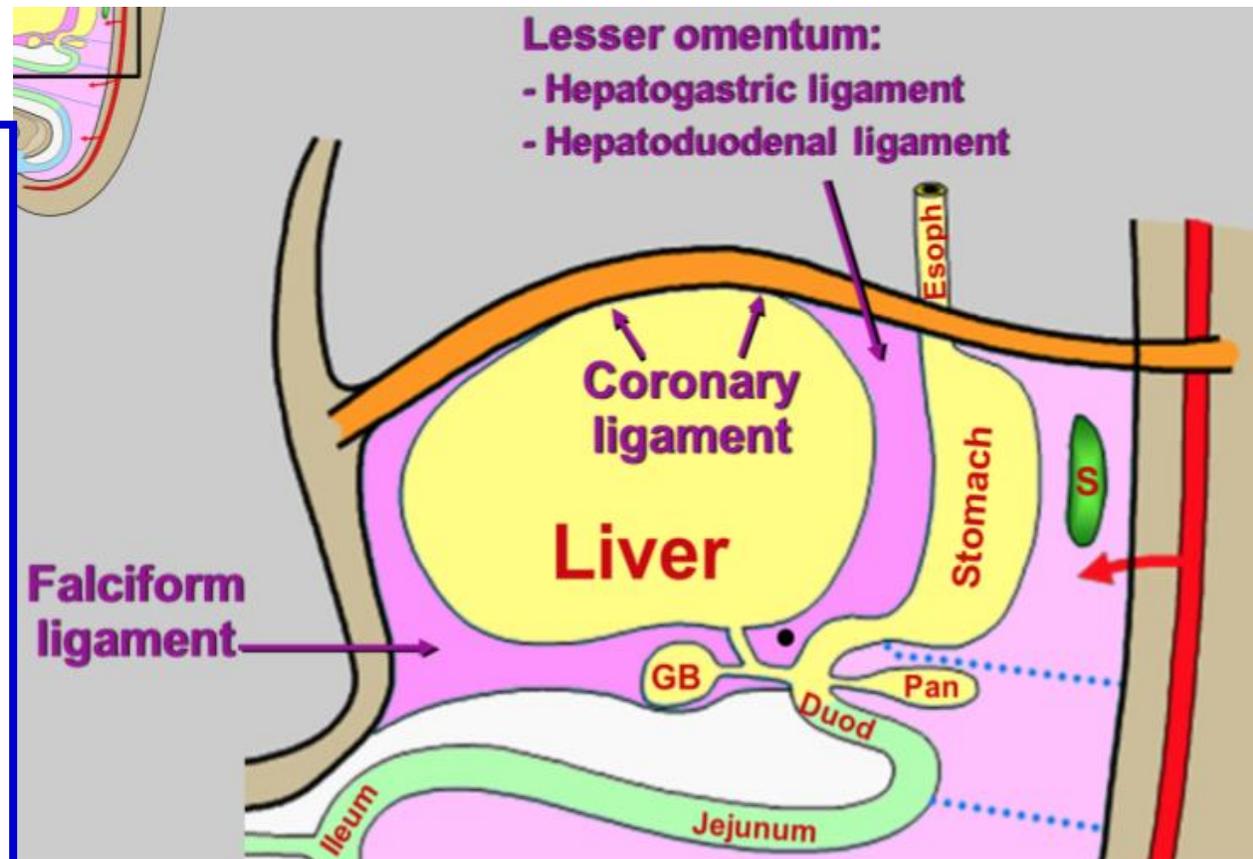
**** Development of ligaments of liver:**

- Development of the liver between the layers of the **ventral mesentery** divides it into:

a- Ventral part connects liver to anterior abdominal wall (falciform ligament).

b- Dorsal part connects liver to stomach (lesser omentum)

c- Cranial part forming triangular and coronary ligaments



**** Congenital Anomalies of the liver and biliary system:**

- I. Agenesis or hypo-genesis of the liver:** due to failure of formation of the hepatic diverticulum or due to incomplete development of the hepatic bud.
- II. Abnormal number of the liver lobes:** due to abnormal division of the pars hepatica.
- III. Agenesis of the gall bladder:** failure of development of the cystic bud
- IV. Double gall bladder:** abnormal division of the cystic bud into 2 parts.
- V. Mobile gall bladder:** the gall bladder is completely separated from the liver and completely covered with peritoneum.
- VI. Atresia (narrowing) of the biliary ducts:** due to failure of their canalization. It is associated later with congenital jaundice

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