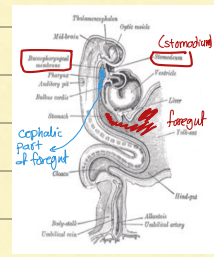


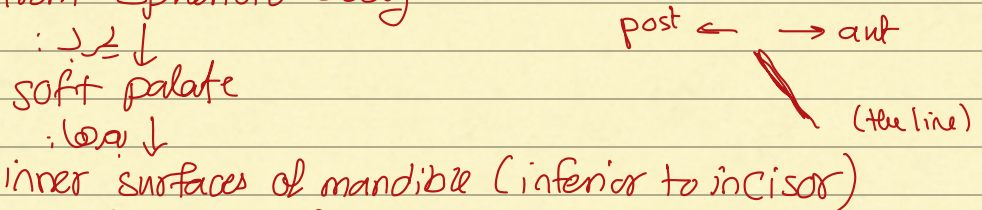
\* Development of the oral cavity - (2 sources of development)



- ① depression in the stomodaeum (or anterior to stomodaeum)
  - (mouth) ↓ ↓ outwards (lip)
  - so ↳ origin: ectoderm
- ② Cephalic end of foregut → origin: endodermal (behind the stomodaeum)

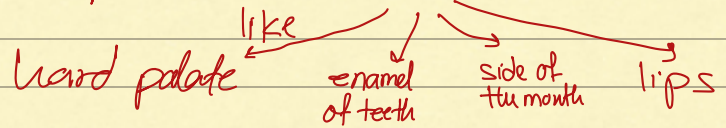
\* these 2 parts are separated by buccopharyngeal membrane (behind the stomodaeum)

↳ so this line/membrane during 3rd week of development should be disappeared  
 ↳ But: its an important landmark  
 ↳ starts from sphenoid body

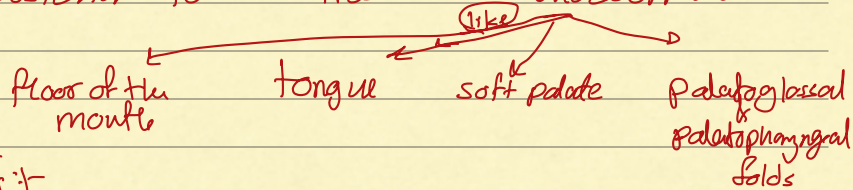


SO → the line is obliquely passing from above downwards & to anterior

\* Now: anything anterior to this plane is ectodermal



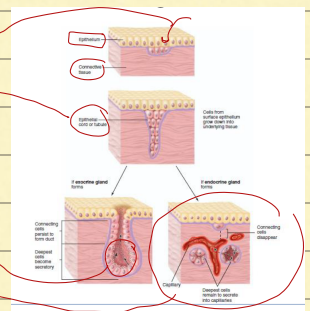
\* & anything behind/posterior to the line is endodermal



\* Development of salivary glands

- We will focus on the 3 large salivary glands: parotid, submandibular, sublingual

invagination is ← proliferation of cells is ← tube through the CT is ← proliferation is ← enzymes is ← duct is ← canalization is ← (acinar cells)



↳ if the gland is endocrine: the end → gland secretion is ← (like: thyroid follicles)

rich in blood supply b/c it's ductless + exocrine hormones

↳ but here we don't have a duct → so in the duct place we have degeneration

cells / follicles → circular follicles → cord (like: the suprarenal gland / the liver)

\* Now what about the development of salivary glands?  
 on the 7th week → a solid outgrowth of cells arises  
 starts from the epi of oral cavity (mouth)  
 enters/grows in the mesenchyme layer  
 invaginates → solid duct sinus  
 & opens → & at its end the acini are formed (exocrine)

\* most important thing in exocrine that it's surrounded by a capsule (CT)  
 then it sends septae that convert the gland into lobes & lobules

\* in the parotid gland → the form of the ducts: intercalated / striated ducts  
 \* parotid: ectodermal in origin → while the submandibular & the sublingual → endodermal (inside the oral cavity)

### Development of the tongue

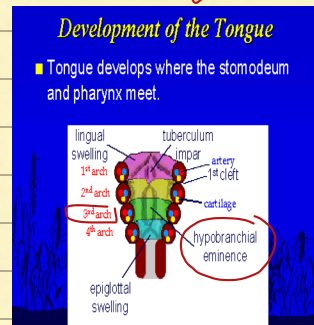
in the 4th week in embryonic life → signal for the development of the tongue

① formed from the tuberculum impar in the midline & on the 2 sides: lateral lingual swellings  
 (3 origins of the tongue) these 3 are the first to develop & they are coming from the first pharyngeal arch

② the 2nd median swelling → copula or hypobranchial  
 Related to the 3rd pharyngeal arch  
 (formed by the mesoderm of the 2nd, 3rd and part of the 4th arch)

2nd & 4th → no extension at the epiglottis 3rd → no mainly at the epiglottis

③ Finally, 3rd median swelling is formed by the post part of the 4th pharyngeal arch  
 marks the development of epiglottis  
 (in front of the epiglottis is the hypobranchial eminence / copula)



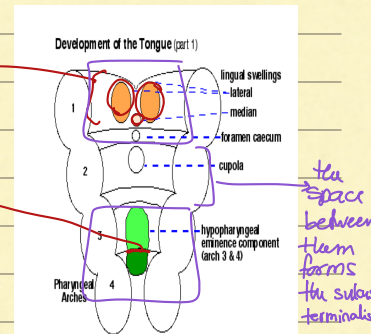
(the 3 swellings) first arch → tongue  
 (mainly 3rd but could be) other arches →  
 from 2nd & 4th also → hypobranchial / copula

\* lateral lingual swelling increases in size & overgrows into the tuberculum impar

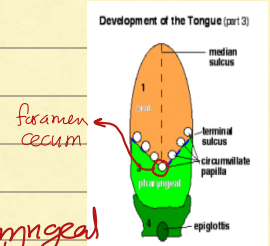
\* the innervation to the anterior 2/3:  
 sensory: lingual nerve from mandibular of trigeminal  
 taste: taste is from the facial

\* the body of the tongue is separated from the post 1/3 by sulcus terminalis

laryngeal orifice (above epiglottis)



\* the post part / roof of the tongue → 2nd + 3rd + 4th pharyngeal arches  
 ↳ its sensation: Glossopharyngeal nerve  
 ↳ mainly from 3rd arch



\* the thing that separates the 2 parts: sulcus terminalis  
 \* Circumvallate → in development was with the post 1/3 → so N.S: Glossopharyngeal  
 ↳ after development it goes anterior to sulcus terminalis

\* most of the tongue muscles are from → the occipital somites  
 ↳ occipital somites → means that the N.S is from hypoglossal nerve (motor)  
 ↳ except: palatoglossal → accessory through the vagus

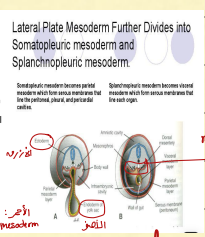
\* taste → facial through Chorda tympani for; anterior 2/3  
 ↳ Glossopharyngeal for; post 1/3 = circumvallate papillae  
 ↳ also sensory

Development of the pharynx

\* pharynx → from pharyngeal arches → internally: pouches → clefts  
 ↳ endodermal  
 ↳ externally (outside) → ectodermal  
 While the same arch is from mesenchymal origin

\* endoderm is separated from the ectoderm by mesenchyme  
 \* Result of these swellings → formation of pharyngeal clefts → pouches  
 ↳ pouches → grooves  
 \* So the foregut to the pharynx is coming from upper 4 pouches

Development of ant. abd. wall:



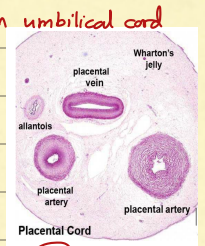
mesoderm → undergoes some changes to give me 2 layers  
 ↳ somatic layer → outer  
 ↳ splanchnic layer → inner

\* ant. abd. wall is derived from somatopleuric mesoderm → innervated by: ventral rami of spinal nerve  
 ↳ the wall → pleura  
 N.S: lower 6T ← abd. muscles  
 (نصف من الأعصاب؛ الأعصاب)

\* somatopleuric then gives 3 layers → Ext. oblique / Int. oblique / transversus abdominis  
 (somatopleuric → innervation)  
 \* What about rectus abdominis? retains the indications of the segmented origin  
 (so its separated ← tendinous intersections → myotome) →  
 ↳ so it remains inside the rectus sheath  
 ↳ insertion: midline in linea alba

\* Development of the umbilicus & the umbilical cord :-

- ① Wharton's jelly (mucoid CT)
- ② 2 arteries
- ③ 1 vein



\* What is inside the umbilical cord?

- mucoid CT (Wharton's jelly)
- remains of yolk sac (allantois)
- umbilical vessels

2 arteries → function: carrying deoxygenated blood from the fetus to the chorion (placenta)  
 2 veins → function: carry the oxygenated blood from placenta to the baby

But: the right one disappears or obliterates → Ligamentum teres

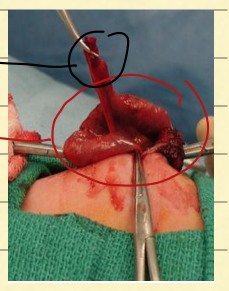
the umbilical cord is a connection between placenta in the uterus to the umbilicus of the baby / fetus

So when we take a section in the cord we only see 1 vein

\* Vitelline duct abnormalities :-

\* Vitelline duct: between the midgut (especially ileum) & the umbilicus  
 ↳ in embryo: it's opened → But: after that it undergoes obliteration and becomes a fibrous tissue

meckel's diverticulum  
 ileum



\* in 2-4% of people: part of vitelline duct persists

Rule of 2

- ↳ With a length of 2 inches
- ↳ 2 feet away from ileocecal junction

so it forms extension (زوائد) → and it contains either Gastric tissue or Pancreatic tissue

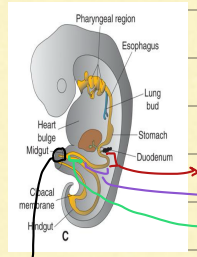
symptoms of appendicitis ← infection في المنطقة ← (bc it's in the right side and almost in the same area)  
 : severe pain in right iliac fossa

- \* it can cause:
  - inflammation
  - perforation
  - bleeding
  - peritonitis

diverticulum ← Meckel's diverticulum = ileal diverticulum  
 \* لا يفتح الجراح بلا حتى الـ appendix normal ← ليس لواتح الـ ileum و سوف

vitelline cyst ← حرات مكن به الـ cyst: fibrosis of upper & lower parts fluid

\* formation of the lung buds & esophagus



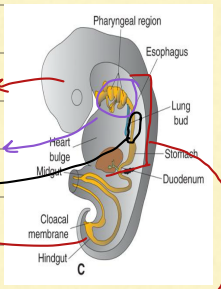
hindgut: lateral 1/3 of transverse colon + descending + sigmoid + rectum + upper 1/2 of anal canal

midgut → B.S: superior mesenteric a.  
 jejunum + ileum

large intestine → proximal 2/3 of transverse colon

B.S: celiac trunk ← foregut → liver bud / duodenum

B.S: inferior mesenteric a.



cephalic part  
 pharyngeal region (pharynx)  
 esophagus  
 caudal part

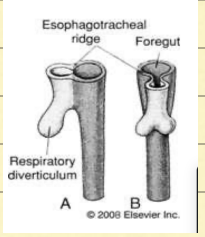
\* On the 4th week → stimulation of ant. surface of foregut (in front of the esophagus)

↳ proliferation of cells → to form: lung bud → respiratory tract

(trachea → bronchi → bronchioles → alveoli)

\* epi of the internal lining of the larynx + trachea → all respiratory tract → endodermal in origin  
 \* cartilage + muscles + CT → mesodermal in origin

\* at the beginning when the bud was formed: there was a connection between the esophagus & trachea →  
 و كان الاتصال بين  
 الجهازين RT + GIT  
 طاعة عن فتحة الـ epiglottis



normally

so first: a ridge is formed (tracheoesophageal ridge)  
 ↓  
 separates foregut from the respiratory tract  
 ↓  
 septum ridge  
 ↓  
 then: separation  
 ↓  
 So esophagus is posterior & trachea is anterior

\* Laryngeal orifice →  
 فتحة موجودة بين الـ larynx  
 pharynx

BY: Khokha