

وَقُلْ رَبِّ زِدْنِي عِلْمًا



RESPIRATORY SYSTEM

HAYAT BATCH



SUBJECT : Anatomy

LEC NO. : One part 2 & Lec 2

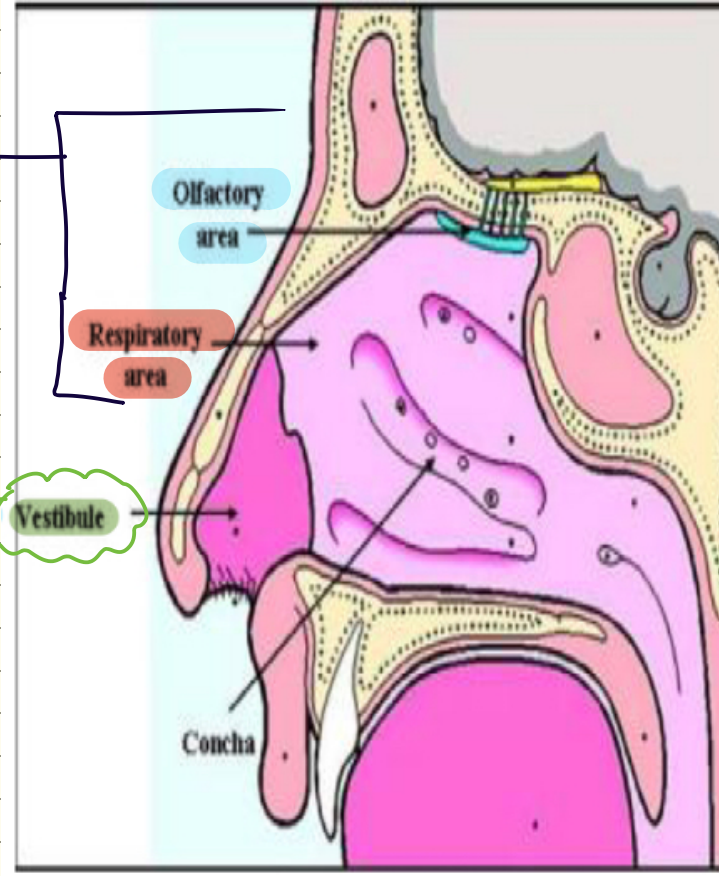
DONE BY : Shahed Tanineh ✨

Anterior part and histology of the nose لما نيجي نقسم ال رح نقسمه ل

Posterior part

Vestibule ال الجزء تاغ ال

Posterior part هو الجزء الي ورا ال vestibule وال



ال posterior part (الي يكون وراء ال vestibule) رح اقسمة
ل الجزء الي بمشي فيه ال Air الي اسمه Respiratory part
والجزء المسؤول عن ال smell الي هو ال Olfactory part

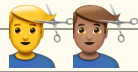
Anterior part

Vestibule

Concha

ال epithelium بأي مكان بال Respiratory هو عبارة عن pseudostratified columnar ciliated epithelium & goblet cells ولكن
في أماكن مختلفة رح نركز عليها

أول مكان مختلف هو ال vestibule of the nose : رح ألقى انه ال epithelium بتاعه زيه زي ال skin
[stratified squamous keratinised epithelium]



* تذكر : ال vestibule عبارة عن جلد والجلد هاد فيه نشوية شعر

Sebacous glands → sweat ← مليان ← Dermis

Epidermis ال lined عبارة عن Stratified squamous keratinized epithelium وطبقات ما تنس
Hairs stiff ← انها مليان

ال skin يبقى زيه زي أي skin

Histology of the nasal cavity

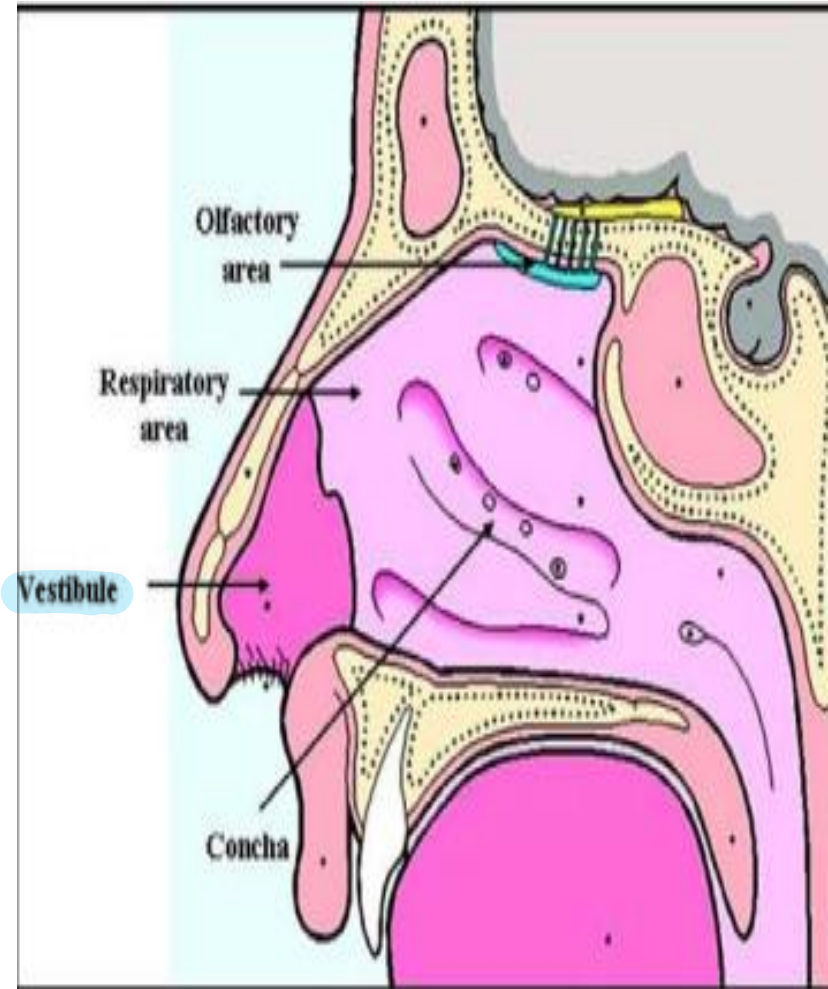
It is divided into 2 parts:

[1] Anterior part of nasal cavity (vestibule): It is the dilated anterior part of the nasal cavity. It is lined with modified skin formed of:

1. Epidermis: lined by

Stratified squamous keratinized epithelium with short stiff hairs (vibrissae) for filtration of the inspired air.

2. Dermis: contains **sweat** and **sebaceous glands**.



[2] Posterior part of nasal cavity : Its lateral wall contains 3 projections called conchae (superior, middle and inferior). It is divided into 2 areas, respiratory and olfactory areas.

I. Respiratory area: It is lined by mucous membrane; which is formed of:

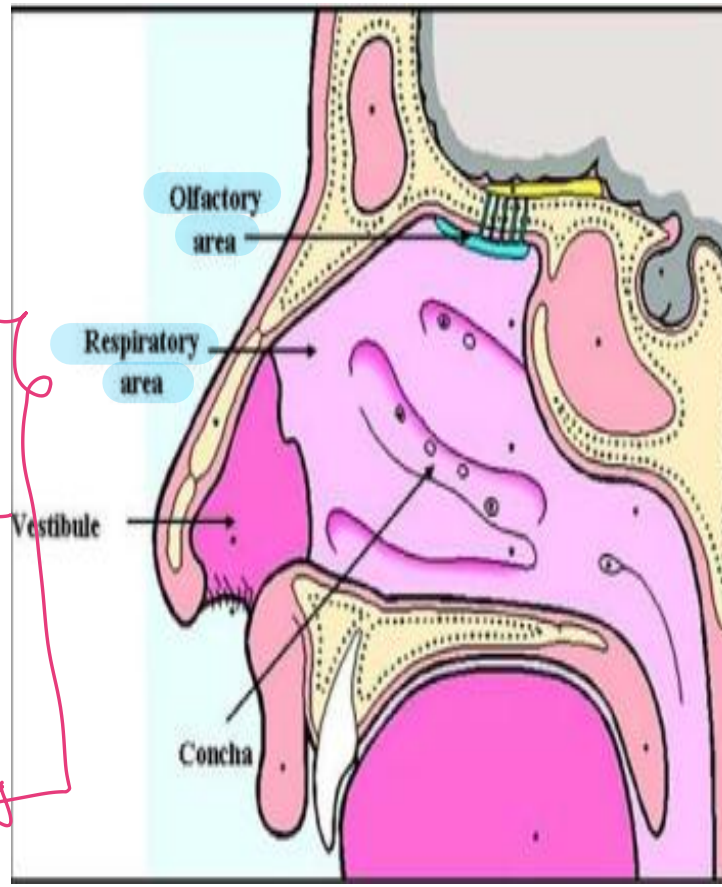
(a) **Respiratory epithelium;** Pseudo-stratified columnar ciliated with goblet cells.

(b) **Lamina propria:** which is a dense fibroelastic connective tissue characterized by:

- 1- It is **highly vascularized** blood vessels مليانة
- 2- It **contains muco-serous glands** to moisten the air and make a film of mucoid fluid on the surface to trap any minute foreign particles that is removed by the action of cilia. Defiance mechanism
- 3- It is rich with **lymphocytes, macrophages** and plasma cells (have **immune function** against any FBs) immune system

هذه عبارة عن epithelium كتية connective tissue اي هو Lamina propria

نوع ال epithelium فيها



المucous هاد بلزق فيه ايم جسم غريبه (اي Bacteria or virus)

- وكمات بالنسبة ل Respiratory احنا بنحكي ال cilia بتعويض ال cilia شغالة ال cilia دي عاملة زي المكسبة بنشيل الغراب ادر ايم حاجة غريبة داخلة مع الهواء

II. Olfactory area : present at the roof of the nasal cavity and extends on upper parts of its medial and lateral walls.

- **Lining: lined by olfactory mucosa (organ of smell) which includes olfactory epithelium and thick lamina propria**

- **Olfactory epithelium:**

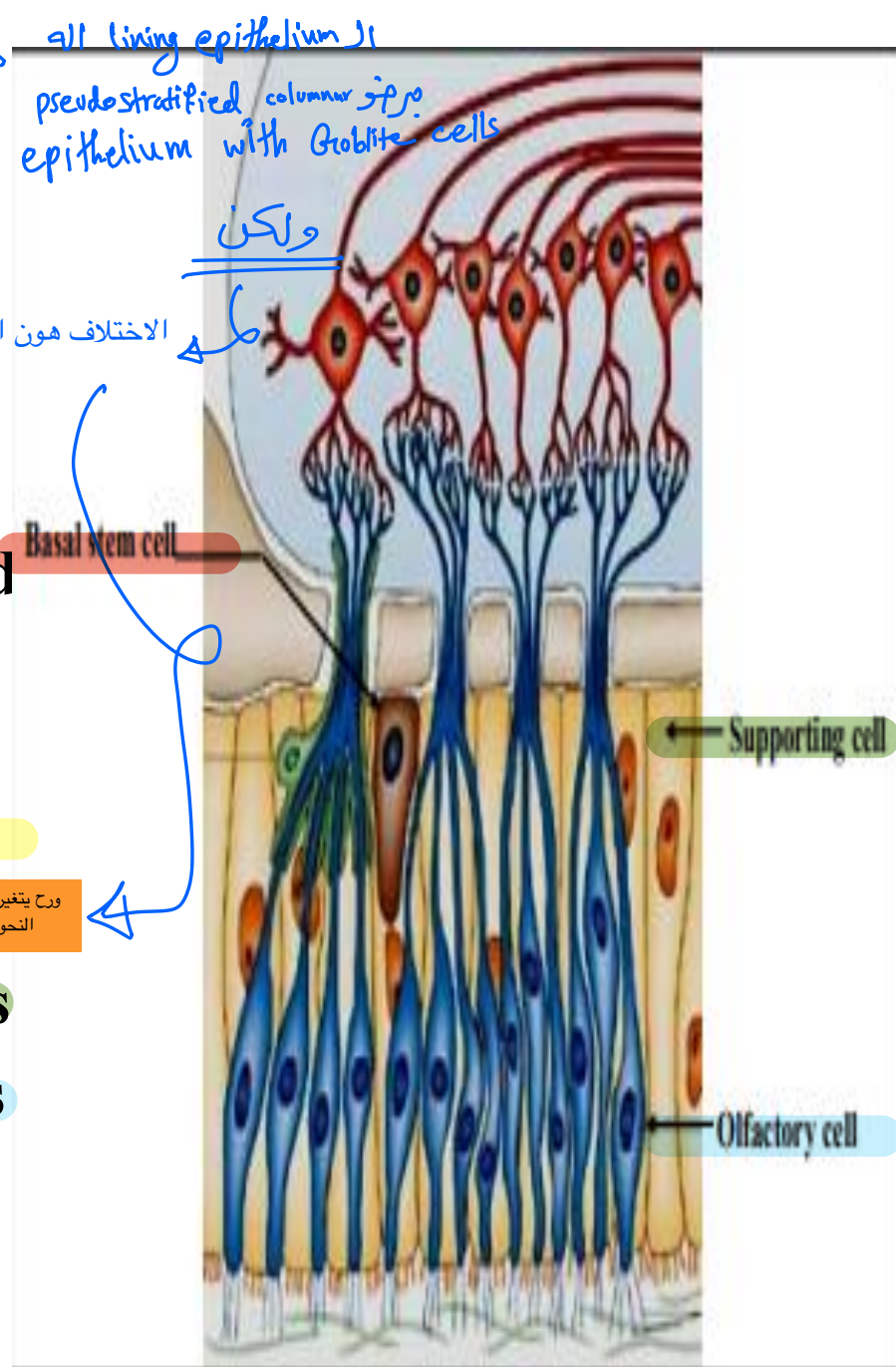
Thick pseudo stratified epithelium

formed of three types of cells:

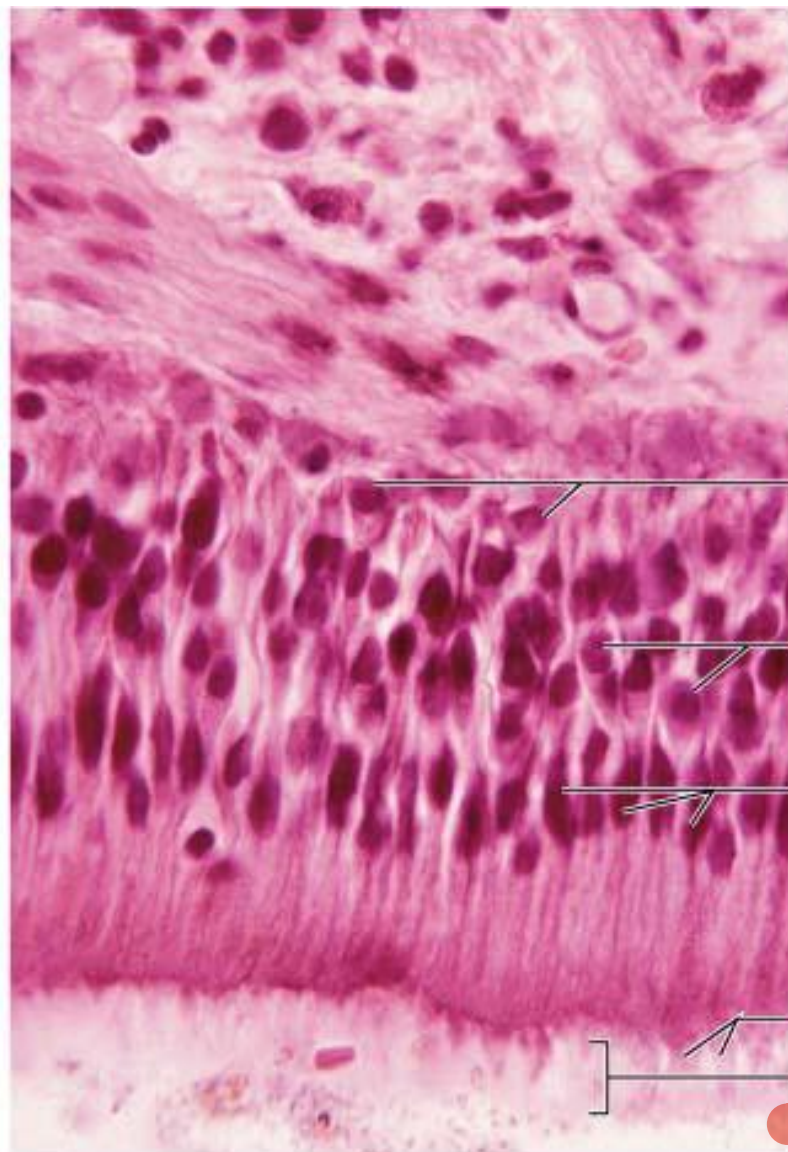
a. Sustentacular (supporting) cells

b. Olfactory (chemoreceptor) cells

c. Basal (stem) cells



* (مخروطية مقلمة)



Lamina propria

Camina propria (ناحية ال)

Basal cell nuclei → Basal layer

Olfactory receptor cell nuclei → Medial layer

Supporting cell nuclei → superficial layer

Epithelium

Olfactory hairs

Mucus

b

Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition*: <http://www.accessmedicine.com>

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تعالو نعمل تجميع أفكار ال histology of the nasal cavity عشان حسيت عجة

* أول اشني عرفنا انها بتتكون من جزئين الي هم Anterior & Posterior *

أول اشني ال Anterior حكيانا انه عبارة عن جلد وفيه شعر واسمه Vestibule وبما انه جلد فزيه زي غيره بتكون من

Epidemics & Dermis

نوع ال epithelium فيه مختلف عن أي epithelium
بار Respiratory (حيث أي epithelium في ال Respiratory عبارة عن
(pseudostratified columnar ciliated epithelium & goblet cells)

ولكن هنالك بعض الاختلافات وال Vestibule هو أول واحد من
هاي الاختلافات حيث نوع ال epithelium فيه
Stratified squamous keratinized

* أما ال Posterior فهو فيه منطقتين منطقة بمرجينا ال Air واسمها Respiratory part
ونوع ال epithelium فيها pseudostratified columnar epithelium & Goblet cells
وتحت هاي الطبقة من ال epithelium هي
طبقة من ال C.T لها Lamina propria لها
خصائص الملعبو اقرأها من اسباب 😊🤔

Olfactory part

Smell واسمها

ومنطقة قائمة مسؤولة عن ال

ولكن في اي بييزها

pseudostratified columnar epithelium & Goblet cell

هبريز نوع ال epithelium فيها

هاي بييزها ال columnar عندها قدرة على ال Differentiation لـ ٣ انواع :

- a. Sustentacular (supporting) cells
- b. Olfactory (chemoreceptor) cells
- c. Basal (stem) cells

وهيك بتكون خلصة أول محاضرة بلا ع اي بعد ما

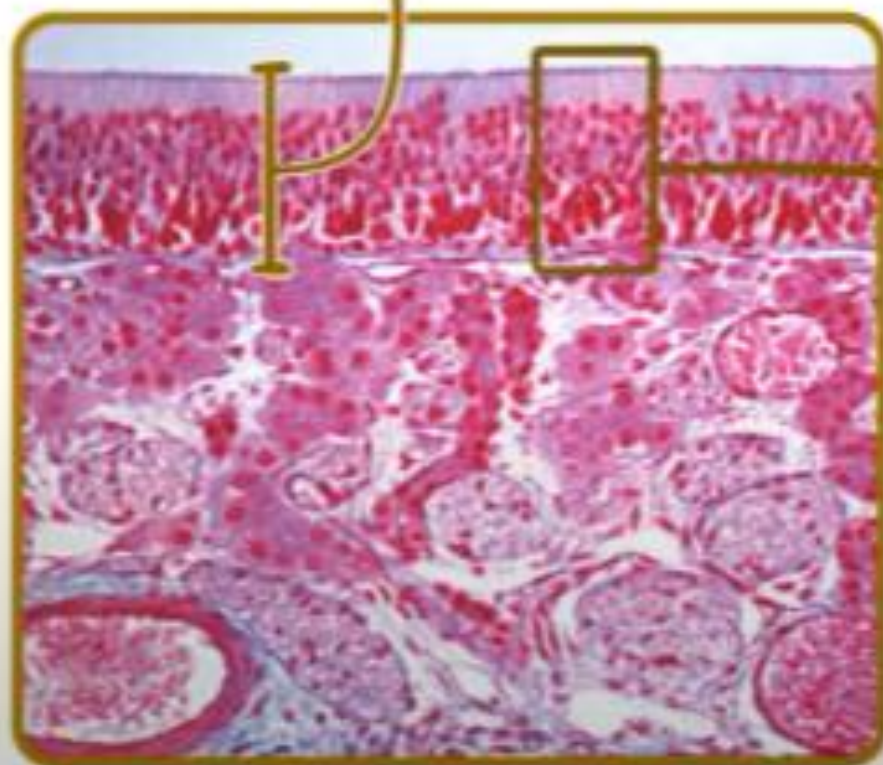
يا رب تكونوا مستفيدين (٦٦)

OLFACTORY EPITHELIUM

↳ PSEUDOSTRATIFIED CILIATED
COLUMNAR CELLS

↳ olfactory, sustentacular, & basal cells

↳ lined with **OLFACTORY RECEPTORS**





Thank You
Thank You
Thank You!!!!



Respiratory system

Larynx & Pharynx

Dr. Mohamed Fathi

Assistant professor of Anatomy Department
Faculty of medicine

By the end of this lecture you must know:

- 1- Larynx (definition, extension, size and construction).
- 2- Laryngeal ligaments and membranes.
- 3- Laryngeal inlet and laryngeal cavity.
- 4- Laryngeal muscles , actions and nerve supply.
- 5- Blood supply of the larynx.
- 6- Histology of the larynx
- 7- Pharynx (structure, boundaries and parts).
- 8- Pharyngeal muscles (names, action, relations and nerve supply).
- 9- Sensory innervation of the pharynx.
- 10- Interior of the pharynx
- 11- Palatine tonsils (Anatomy and applied anatomy).

المحاضرة
نهاية
نوضح
الجزء
والتكامل
المحاضرة
الجانب
البيئي

LARYNX

Part of conducting part of R S

- **Definition:** part of respiratory tract that acts as organ of phonation (*voice production*) & it has a sphincteric function to prevent passage of food and foreign bodies through its inlet.

• نشو الي بساعدها انه تمنع دخول الطعام ، الاجسام الغريبة من المنفذ تاعها؟
• sphincteric function

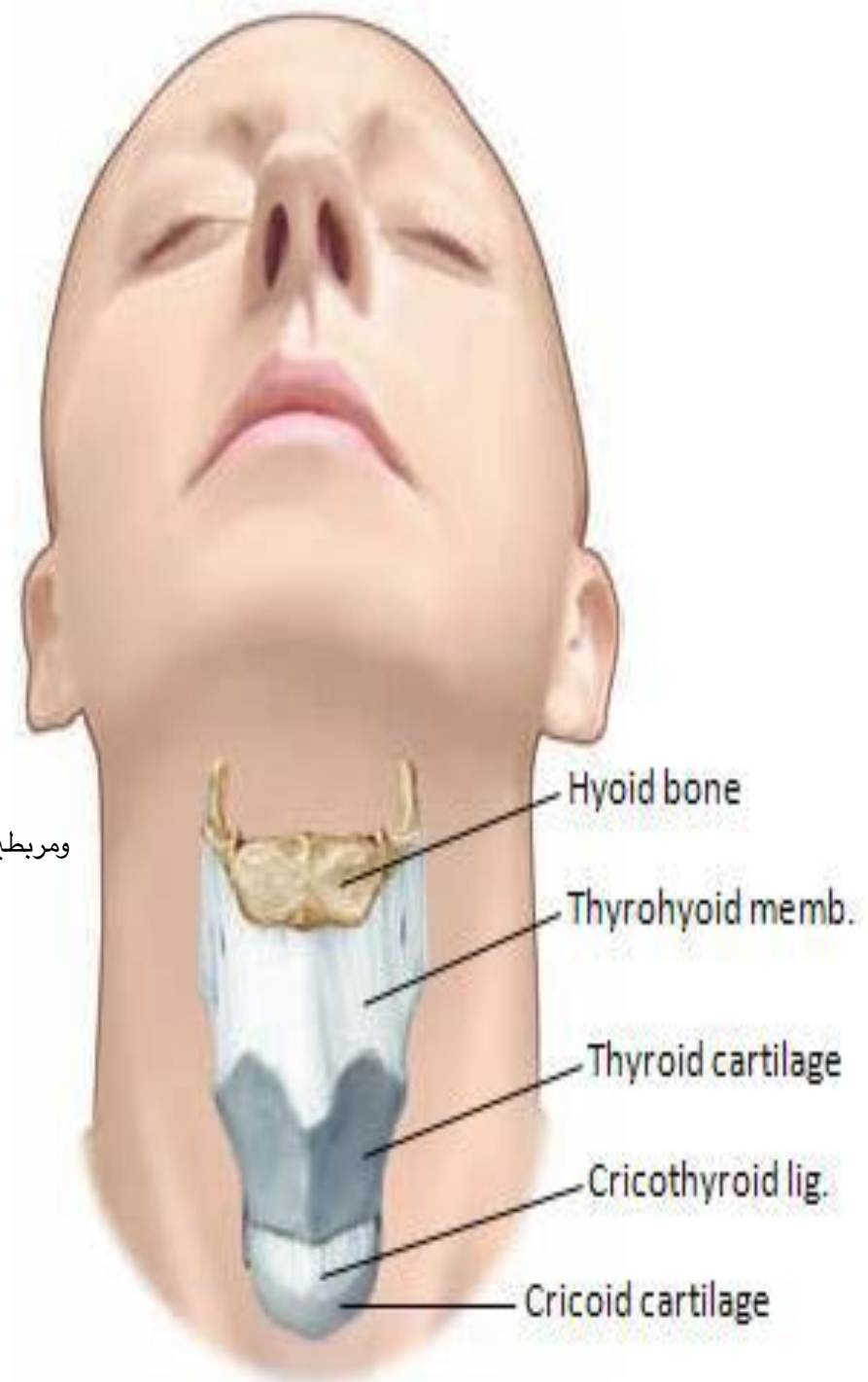
- **Extent:** from the root of tongue to trachea. It lies in front of C3-C6 vertebrae

• لجر C6 تنتهي ال Larynx
وتبدأ ال Trachea



*** Constrictions:** Formed of skeletal framework of cartilages connected together by joints, ligaments & membranes. It is lined by mucous membrane.

مجموعة من ال cartilages مرتبين فوق بعض ب Joints
ومربطين مع بعض ب ligaments membrane و attach في ال cartilage
وال muscle lined by Mucous Membrane



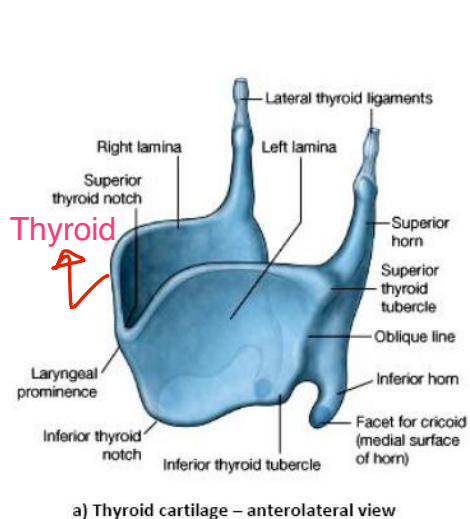
* Cartilages of

Larynx:

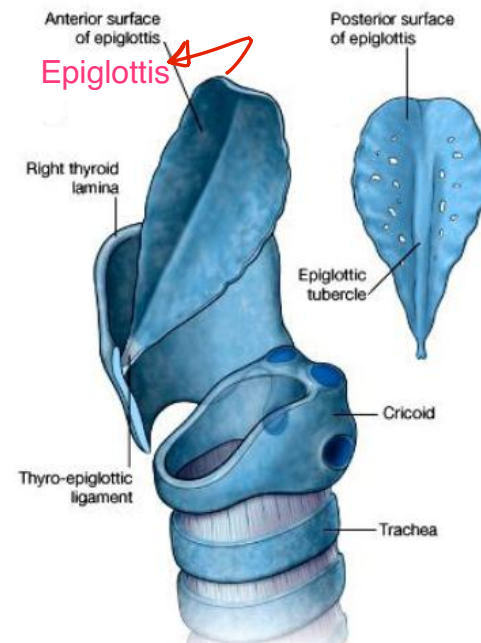
تنقسم إلى جزأين: ① ②

① **Single: Thyroid, cricoid & epiglottis.**

② **Paired: Arytenoid, corniculate and cuneiform.**

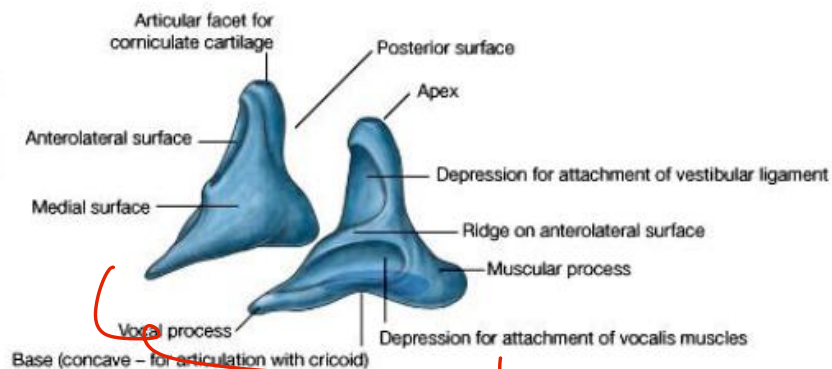
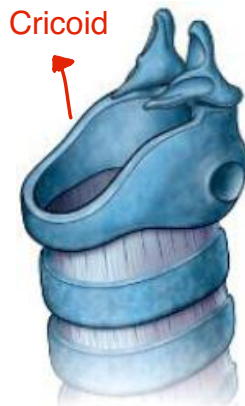


a) Thyroid cartilage – anterolateral view

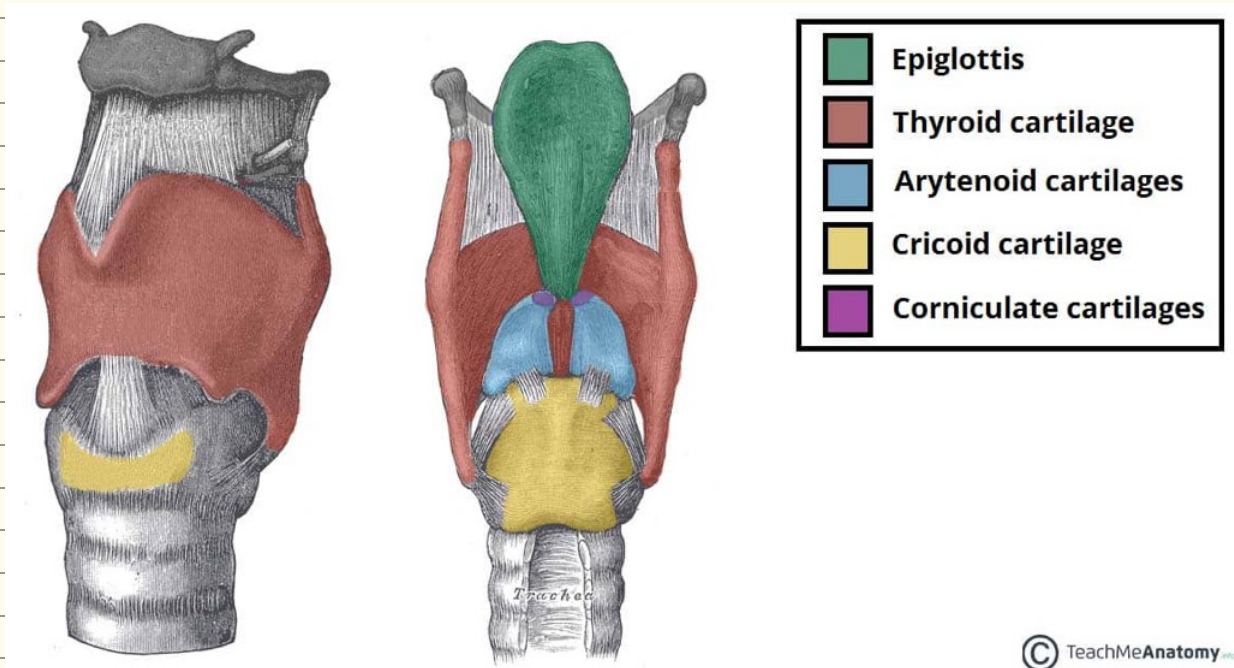


b) Epiglottis – anterolateral view and posterior surface

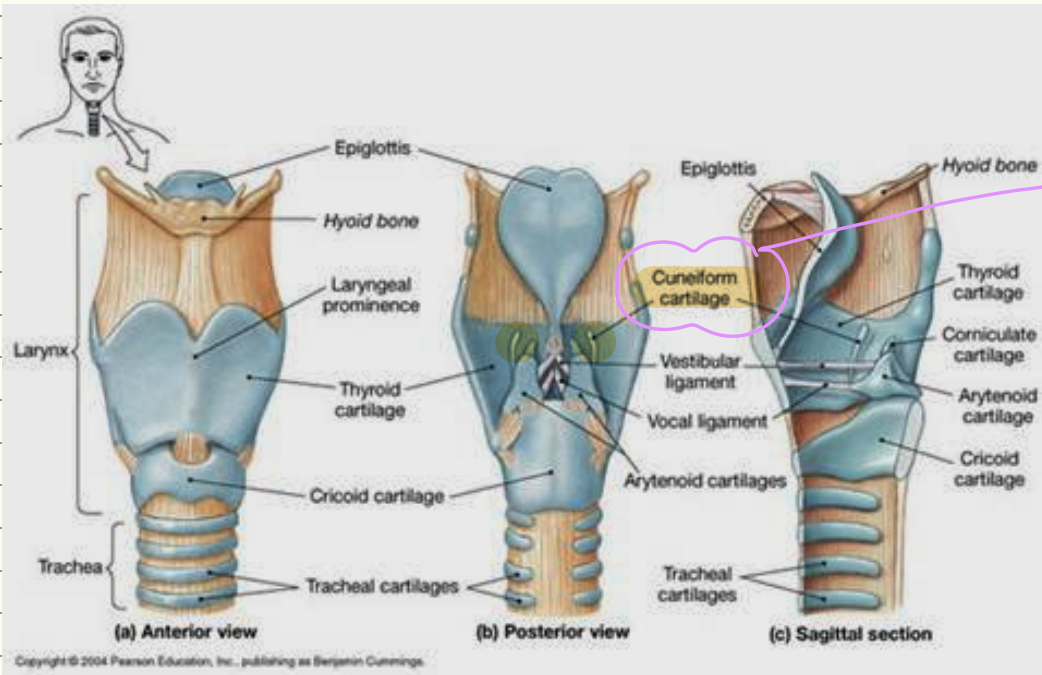
فوق ال cricoid في Arytenoid
فوق ال Arytenoid بلاقي ٢ صغيرين وفوق ال ٢
صغيرين في ٢ أصغر
اسمهم corniculate & cuneiform



c) Arytenoid cartilages



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بهاي الصورة
 شوفا ال cuneiform
 وانسوا الباتي.

* حيث انفسلكم جدول الصور عنان

تخلوا منيح.

ما بين ال cartilage في شوية membrane و ligaments

Laryngeal ligaments & membranes

Ligaments = membranes

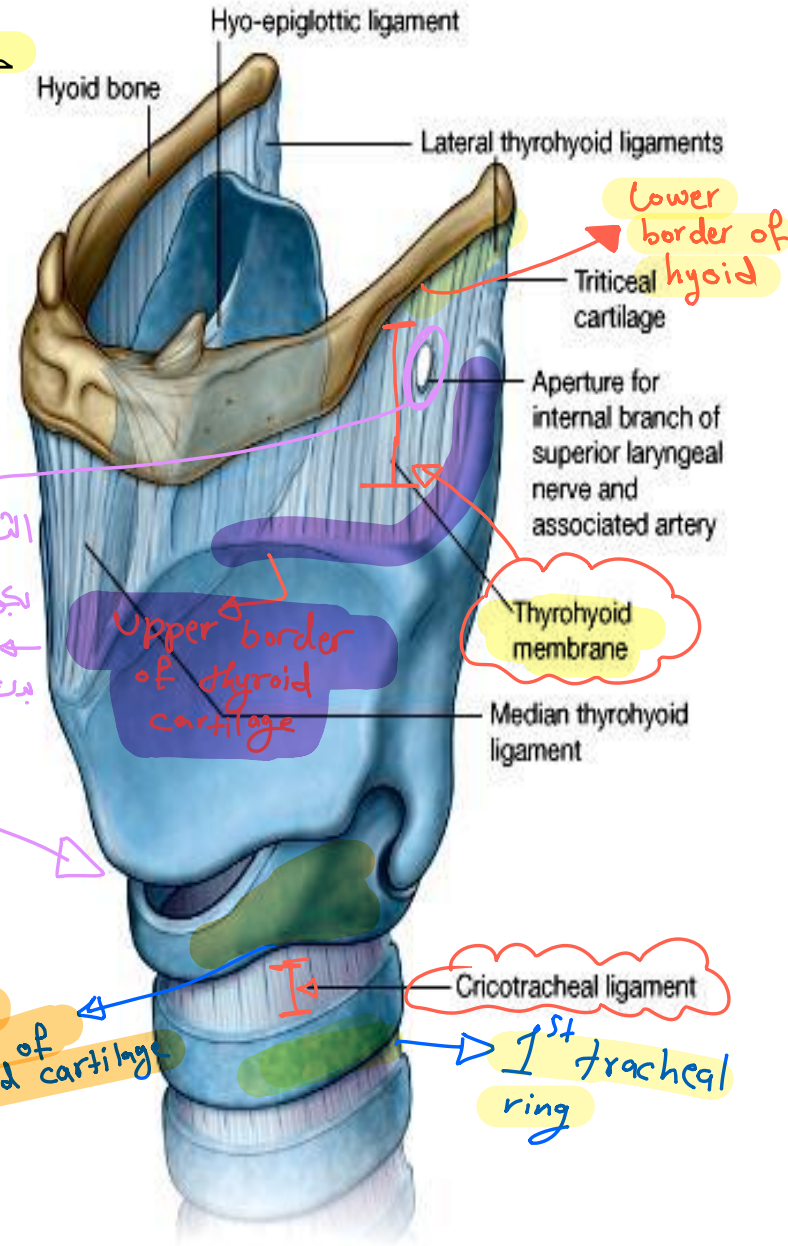
حيث مثلا لو حكيت Thyrohyoid membrane أو Thyrohyoid membrane فهم نفس الاشياء

A) Extrinsic ligaments:

1-Thyrohyoid membrane: Extends from lower border of hyoid to upper border of thyroid cartilage.

- It is **pierced** by the internal laryngeal nerve & superior laryngeal artery.

① القرب بار
 ② تكونه حامله
 ②/①
 لو جاب سؤال انه صحت ما مرتقب في ال Thyroid membrane
 Both ① أو ②



2- Cricotracheal ligament: Connects lower border of cricoid cartilage & 1st tracheal ring.

3- Glosso-epiglottic ligament : connecting tongue to epiglottis.

B) Intrinsic ligaments:

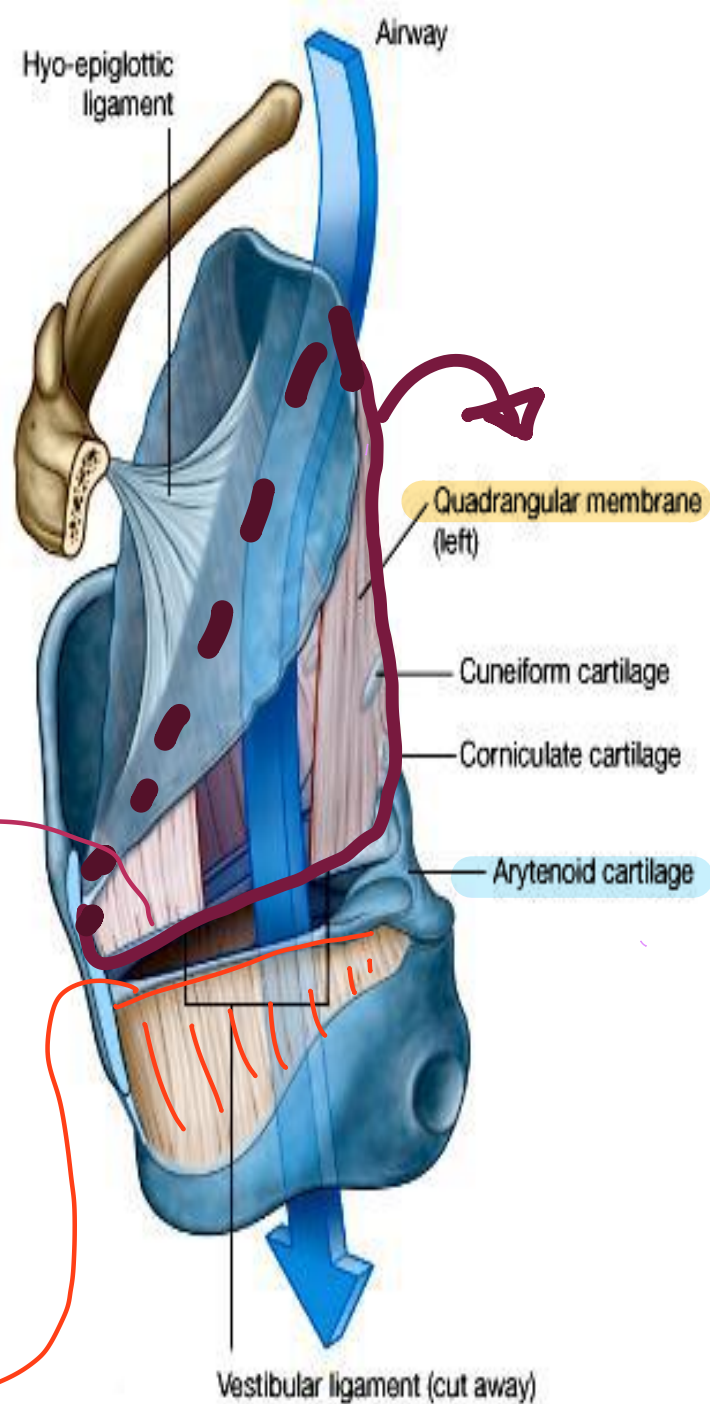
1-Quadrate membrane: a fibro-elastic membrane that lies beneath mucous membrane of vestibule of larynx.

- Anteriorly: attached to side of **epiglottis**.
- Posteriorly: attached to **arytenoid cartilage**.
- Its upper border is **free and forms aryepiglottic fold**.
- Its lower border is free and forms **vestibular ligament**. (False vocal cords)

2- Cricothyroid ligament: a fibro-elastic membrane that lies beneath mucous membrane of lower part of larynx.

- Its anterior part is thick & connects the adjacent sides of cricoid and thyroid cartilages.
- Its lateral part has an upper free border that forms **vocal ligaments**.

true



Laryngeal cavity:

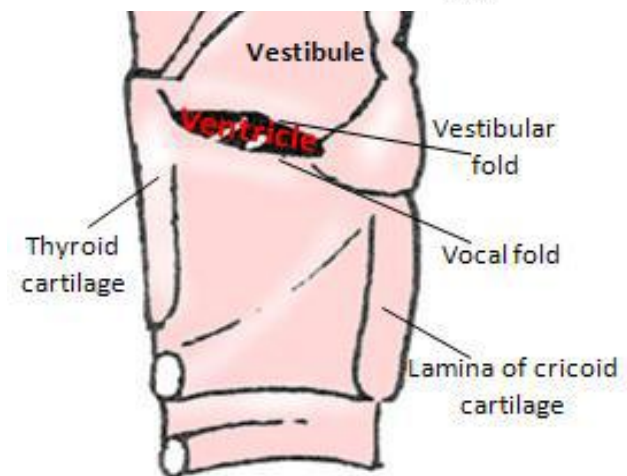
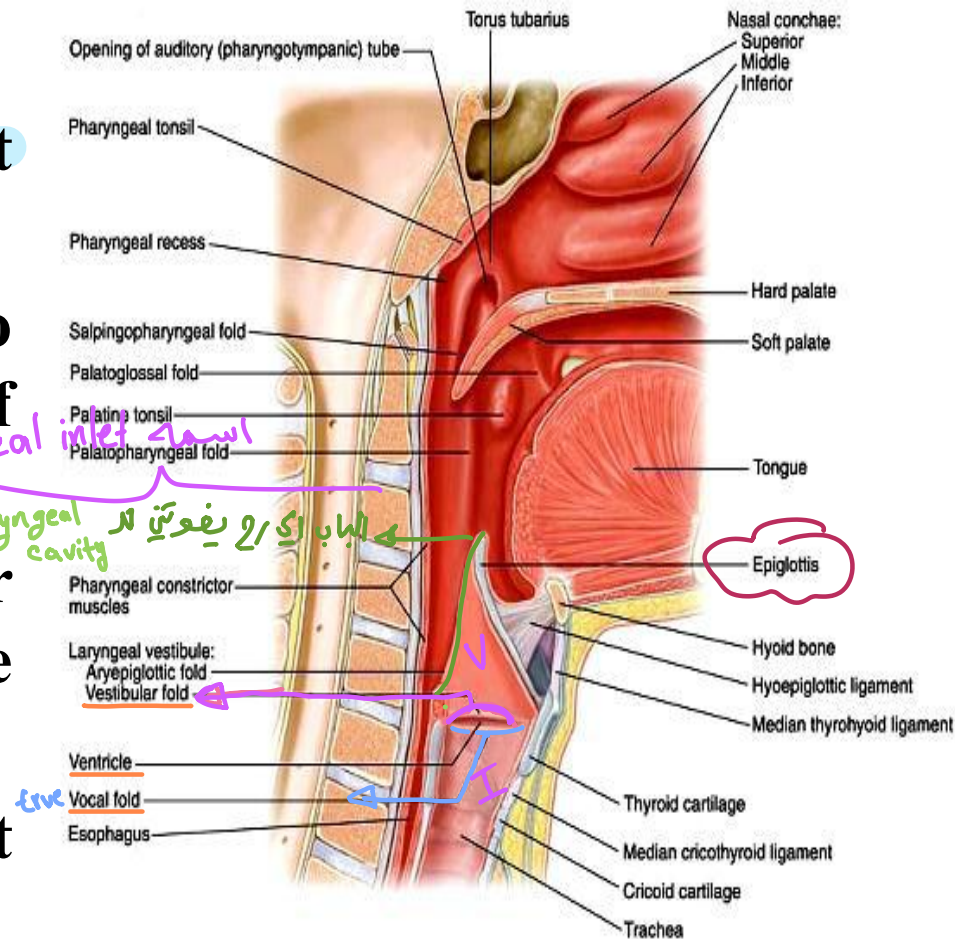
- Extends from **laryngeal inlet** to the trachea.
- It is partially divided into three areas by two folds of mucosa.
- The upper folds: **vestibular folds** and the lower folds: the **vocal folds**.

1- The vestibule lies between inlet and vestibular folds.

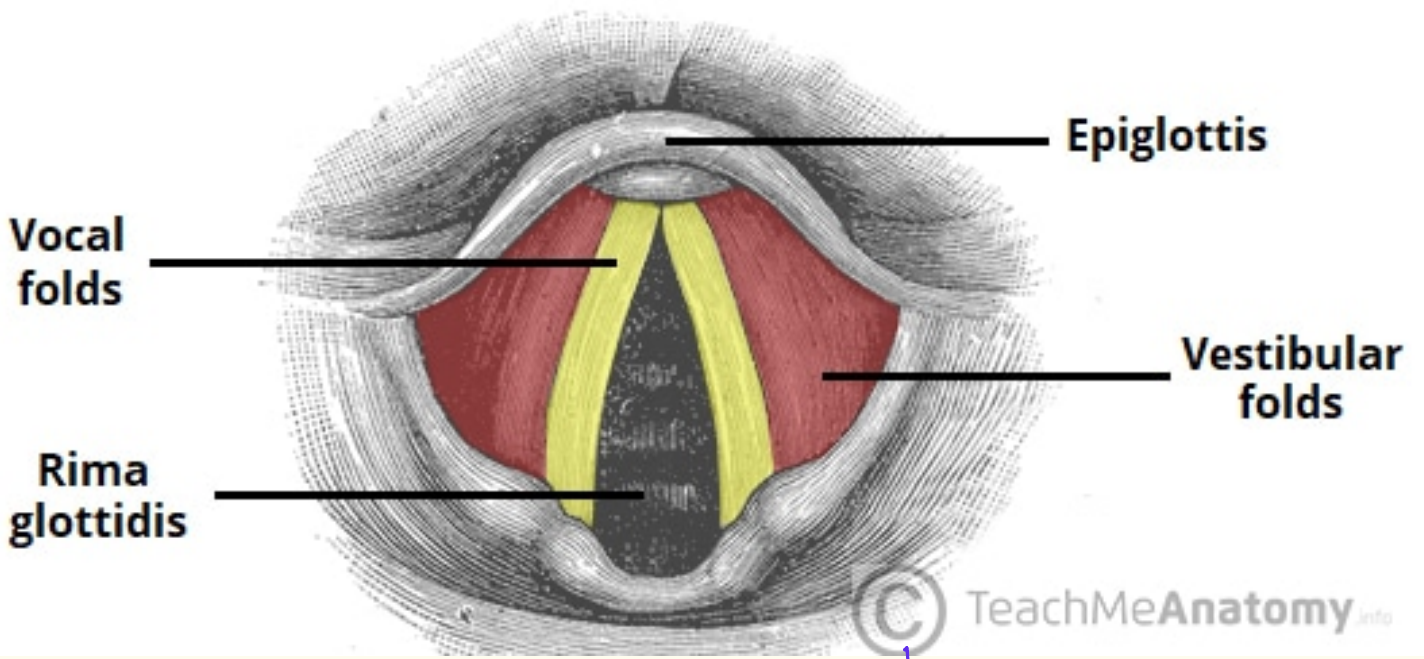
2- The laryngeal ventricle (sinus) is the depression between the vestibular folds above and the vocal folds below.

3- infraglottic part of the larynx:

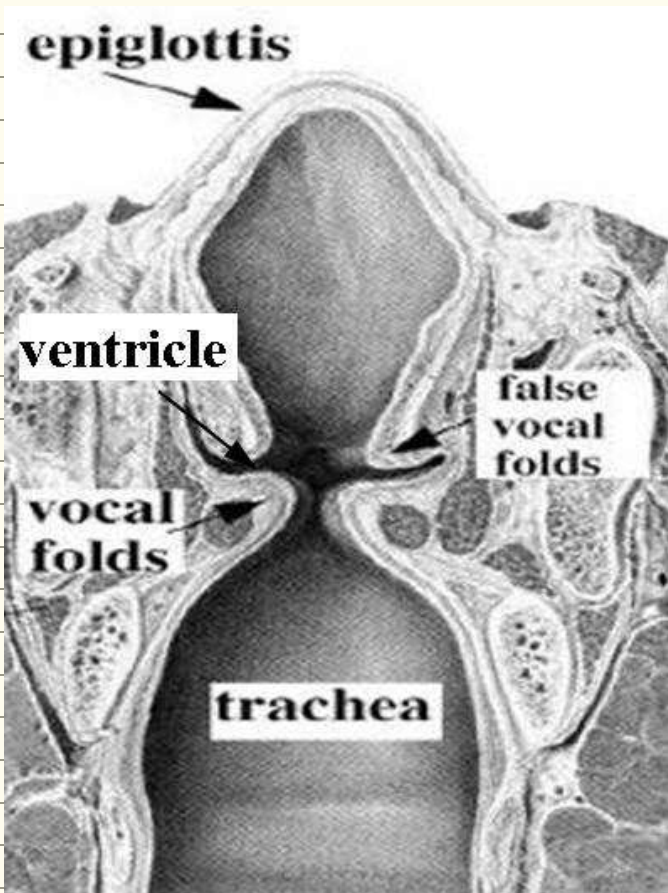
The area below the vocal folds



* هور عشان نهمز و نتخل صبح :



هون احنا بنشوف من فوق



هون مشوفو ال Ventricle

اي يكون بين ال False + true Vocal folds

* حطيتكم بيوست التفريغ فيه

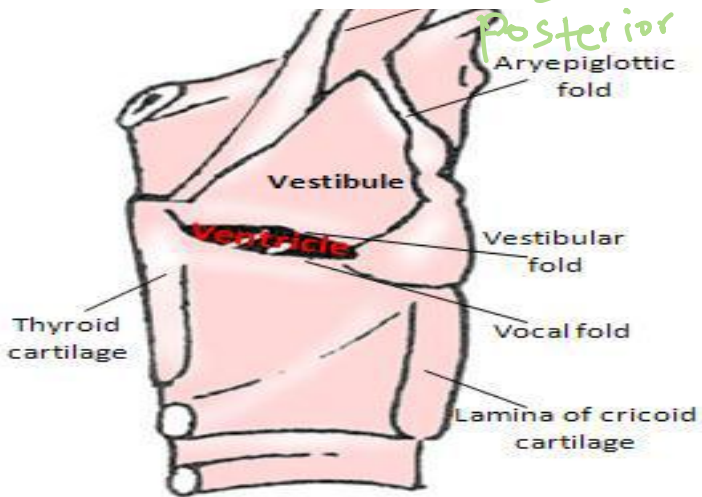
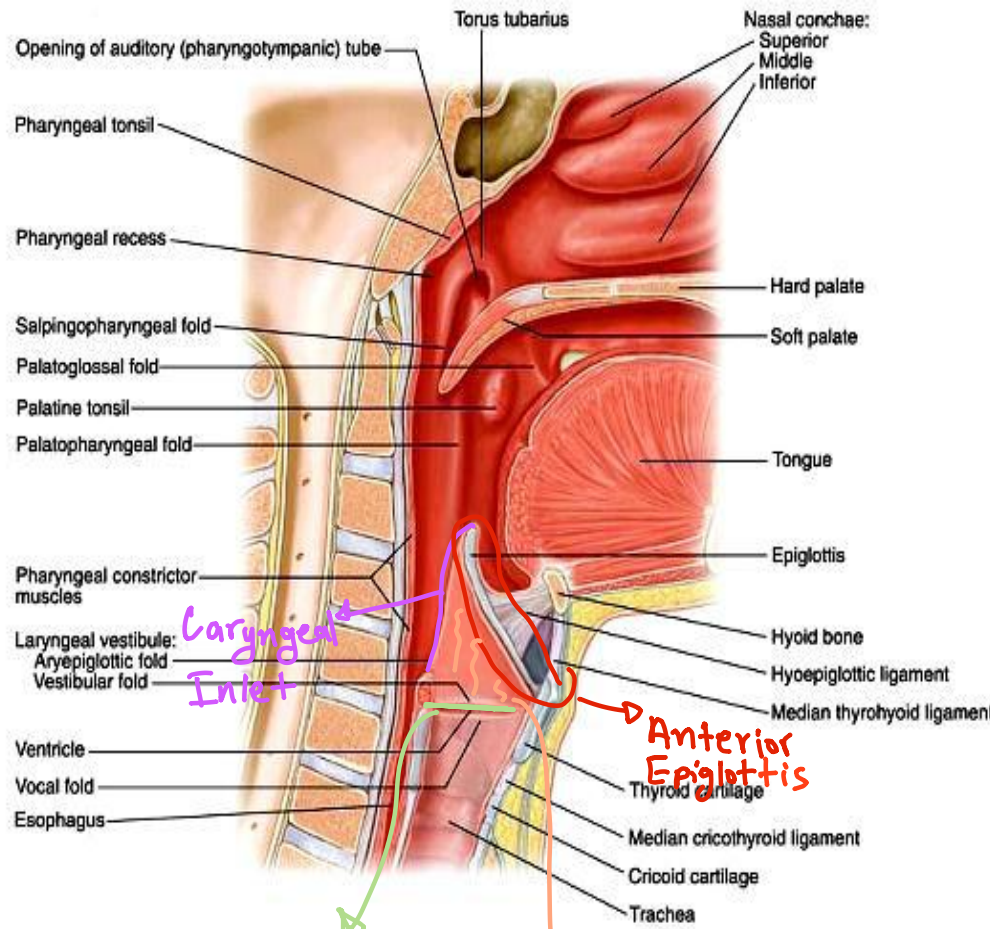
بسا عدكم تضحلو قلبر الفيدو روحوا شوخوه

*** Boundaries of Laryngeal Inlet:**

-Anteriorly: Epiglottis (upper end).

-Laterally: Aryepiglottic folds.

-Posteriorly: Mucosa covering the arytenoid cartilages.



مسؤولة عن حركة

ال Vocal fold

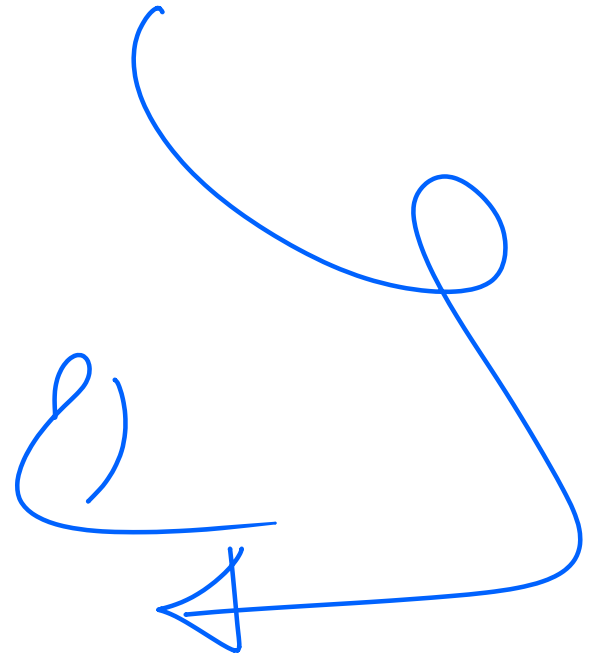
Laryngeal muscles

من عظام من برا ال Larynx
تساعد العضلات

- **The extrinsic muscles:**

Include: infra-hyoid muscles, the inferior constrictor, stylopharyngeus m and palatopharyngeus m.

تعرف عليهم المحاضرة الجاي



هي العضلات الي ماسكة جوا
Laryngeal cavity

- **-The intrinsic muscles:**

يعني العضلات هاي ماسكة بال larynx بب
مش ماسكة بأي حدة برا ال larynx

- They have **no extra laryngeal attachment** (connecting different cartilages together, so most of them are **paired except transverse arytenoid muscle**).

كلهم مجوز ما عدا وحدة single الي هي

- **- All of them lies from inside except cricothyroid m** that lies externally

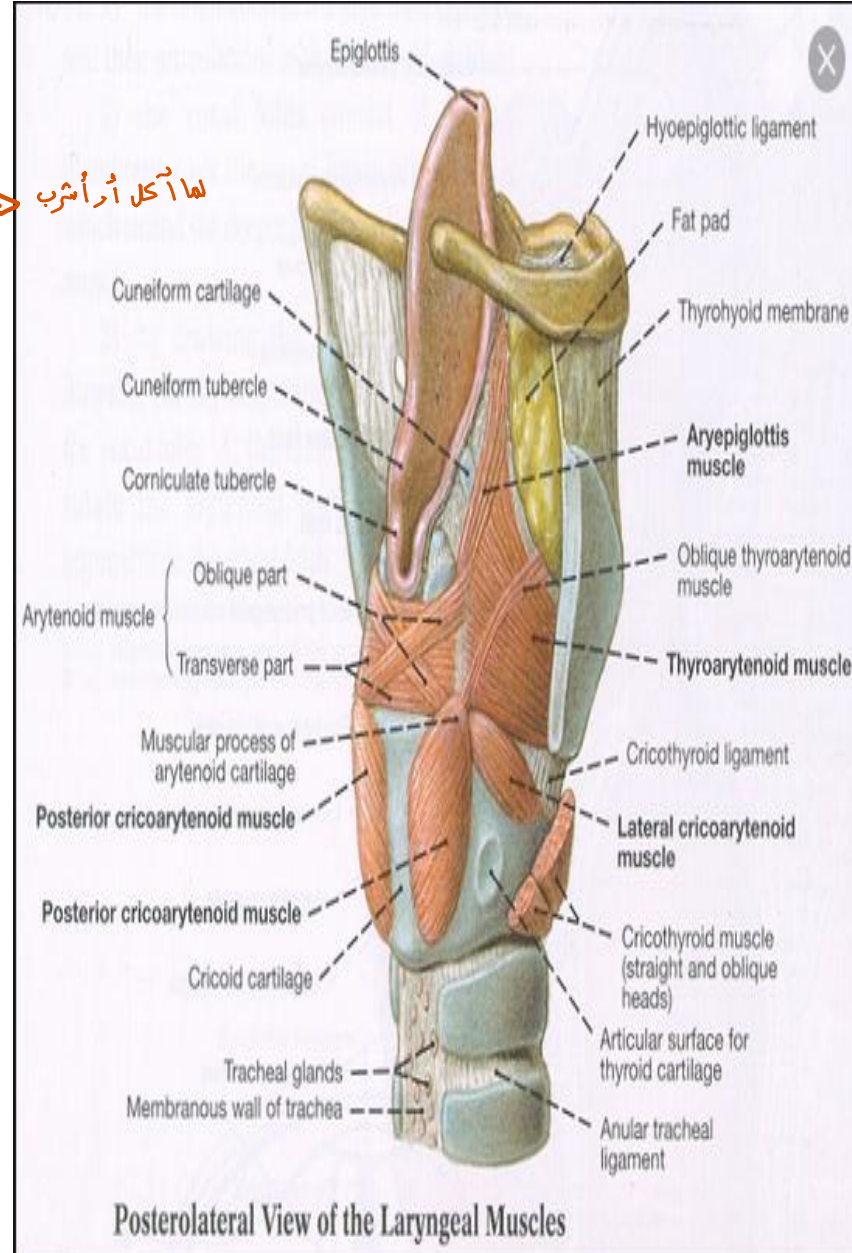
- **- All of them are developed from 6th pharyngeal arch except cricothyroid m which is developed from 4th arch.**

العضلات دي كلها developed
يعني الـ embryological تا لها طالع من ال 6th pharyngeal arch
ما عدا ال cricothyroid طالعة من ال 4th pharyngeal arch

Action of laryngeal muscles

Save

Muscle	Action
1-Aryepiglottic m	Close laryngeal inlet
2-Thyroarytenoid m	Open laryngeal inlet
3-Cricothyroid m	Stretch vocal fold "tense"
4-Thyroarytenoid m	Relax vocal fold
5-posterior cricoarytenoid m	Abduct vocal folds
6-Lateral cricoarytenoid m	Adduction of vocal folds
7-Transverse arytenoid m	



Larynx * نسيج تقسم ال Nerve supply

② ①

①- **Motor supply:** all intrinsic laryngeal ms. are supplied by recurrent laryngeal n. branch of vagus n except **cricothyroid m** which is supplied by **external laryngeal n.** a branch of superior laryngeal nerve of vagus n.

Because - All of them are developed from 6th pharyngeal arch except **cricothyroid m** which is developed from 4th arch.

②- **Sensory supply:** the mucosa **above vocal cords** is supplied by **internal laryngeal nerve** while the mucosa **below vocal cords** is supplied by recurrent laryngeal nerve.

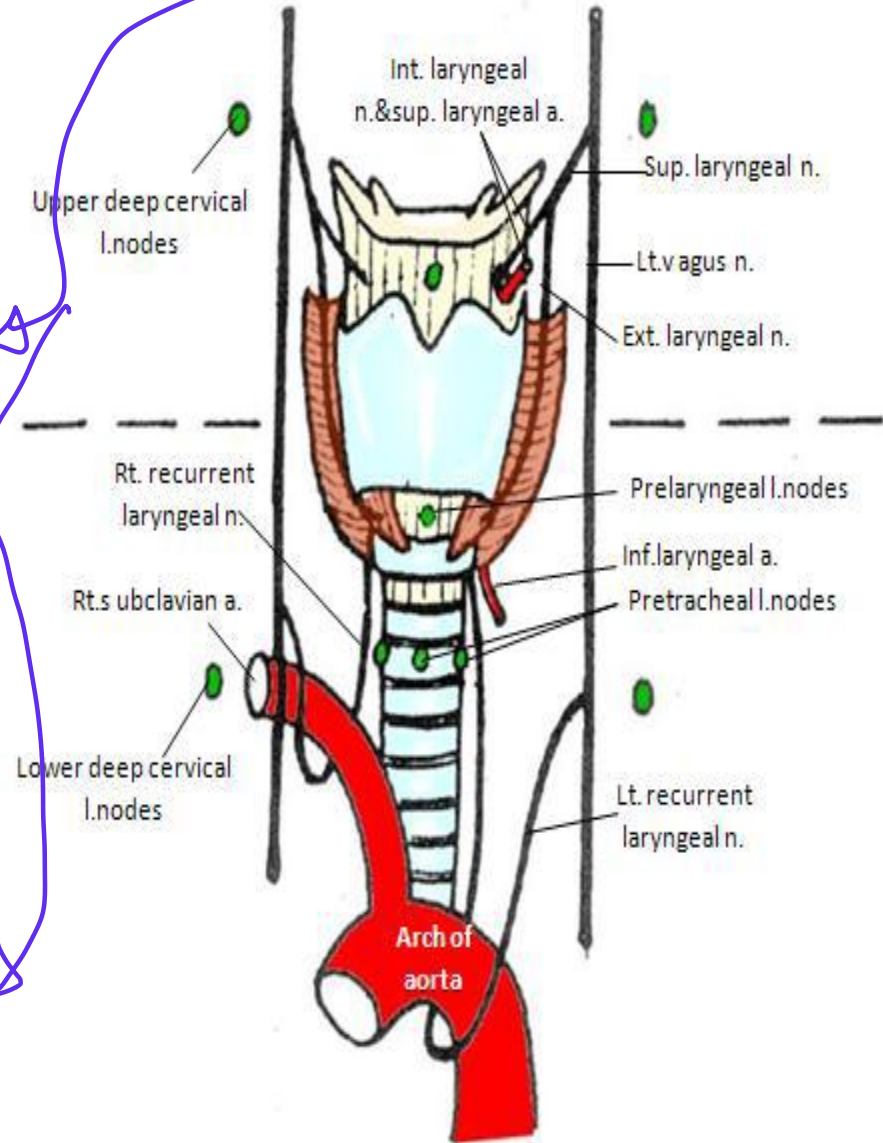
→ Mixed nerve

Blood supply of the larynx

Thyroid gland
BS
کی اس
تا

- 1- Above vocal cords: supplied by superior laryngeal (branch of superior thyroid a.).

- 2- Below the cords: supplied by inferior laryngeal (branch of inferior thyroid a.).



* تنفس القاعدة الي حيناها عن ال epithelium يتاج ال Respiratory أول المحاضرة

Histology of larynx

وأخذنا فوق أول استثناء

وهنا بيترىخذ ال ② وال ③ وال ④

- **1. Epithelium:** Pseudo-stratified ciliated columnar with goblet cells.

Except: (V.I)

1-The vocal cords. (true vocal cords)

2- anterior Surface of epiglottis

3- the upper part of posterior surface of epiglottis

are lined by stratified squamous non-keratinized epithelium.

2. lamina propria:

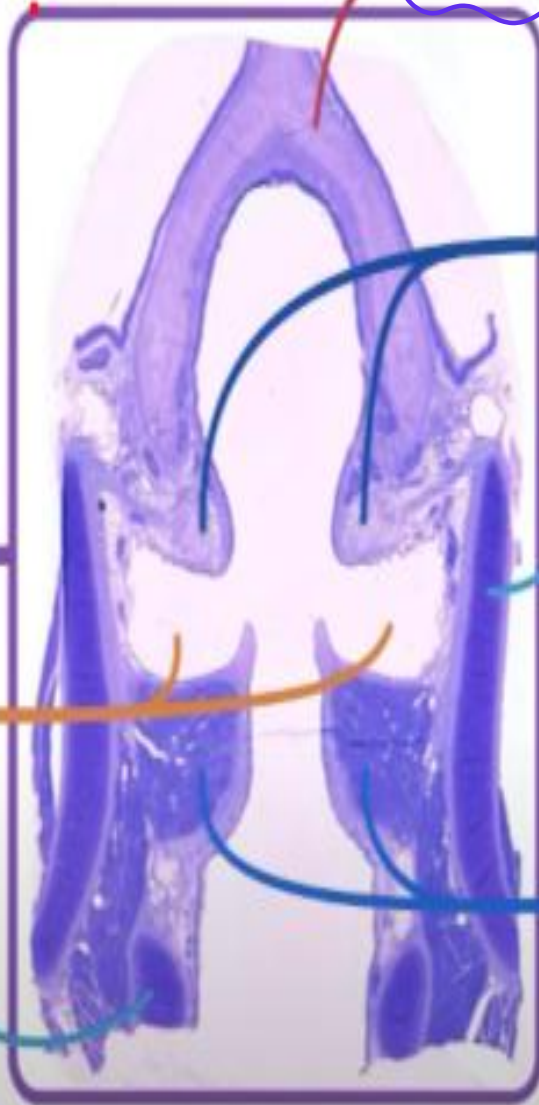
It contains mucus and serous glands.

It contains a number of large and small cartilages which are interconnected by ligaments and voluntary muscles

LARYNX



EPIGLOTTIS



VESTIBULAR FOLDS
(FALSE VOCAL CORDS)

THYROID CARTILAGE

VENTRICLES

VOCAL FOLDS
(TRUE VOCAL CORDS)

CRICOID CARTILAGE



VOCALIS MUSCLES
are STAINED DARKER

UPPER VESTIBULAR FOLD

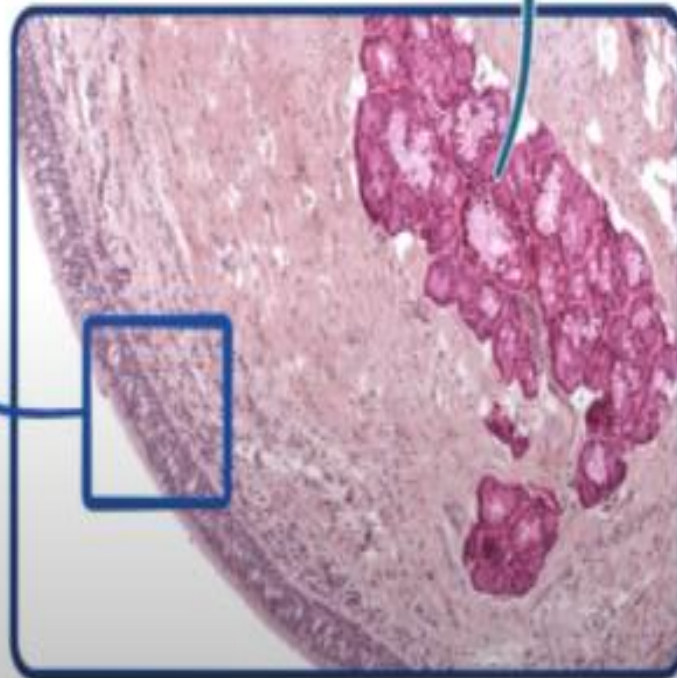
PSEUDOSTRATIFIED CILIATED EPITHELIUM with GOBLET CELLS



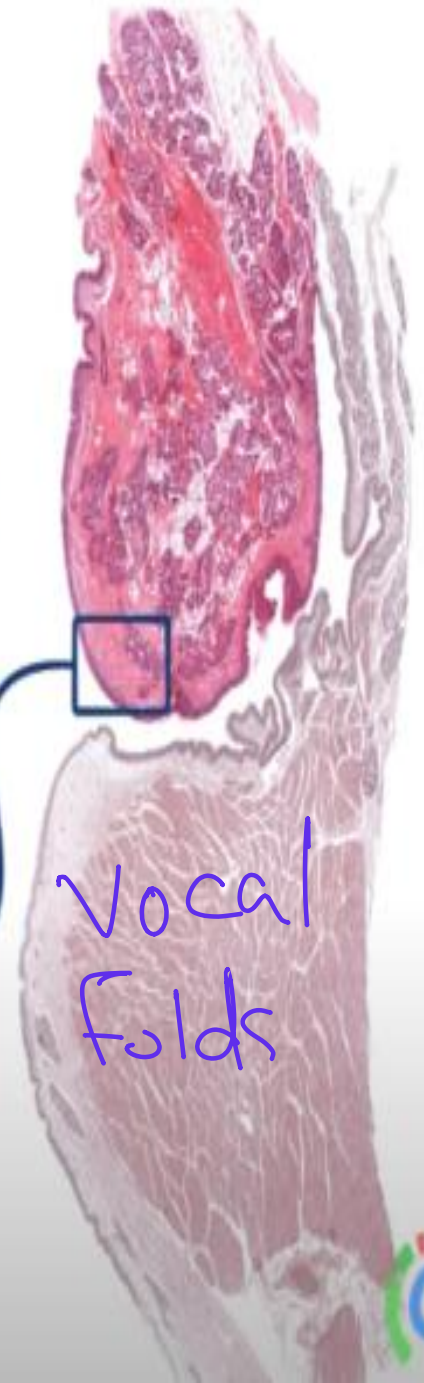
RESPIRATORY EPITHELIUM

may also have PATCHES of STRATIFIED SQUAMOUS EPITHELIUM

SEROMUCOUS GLANDS



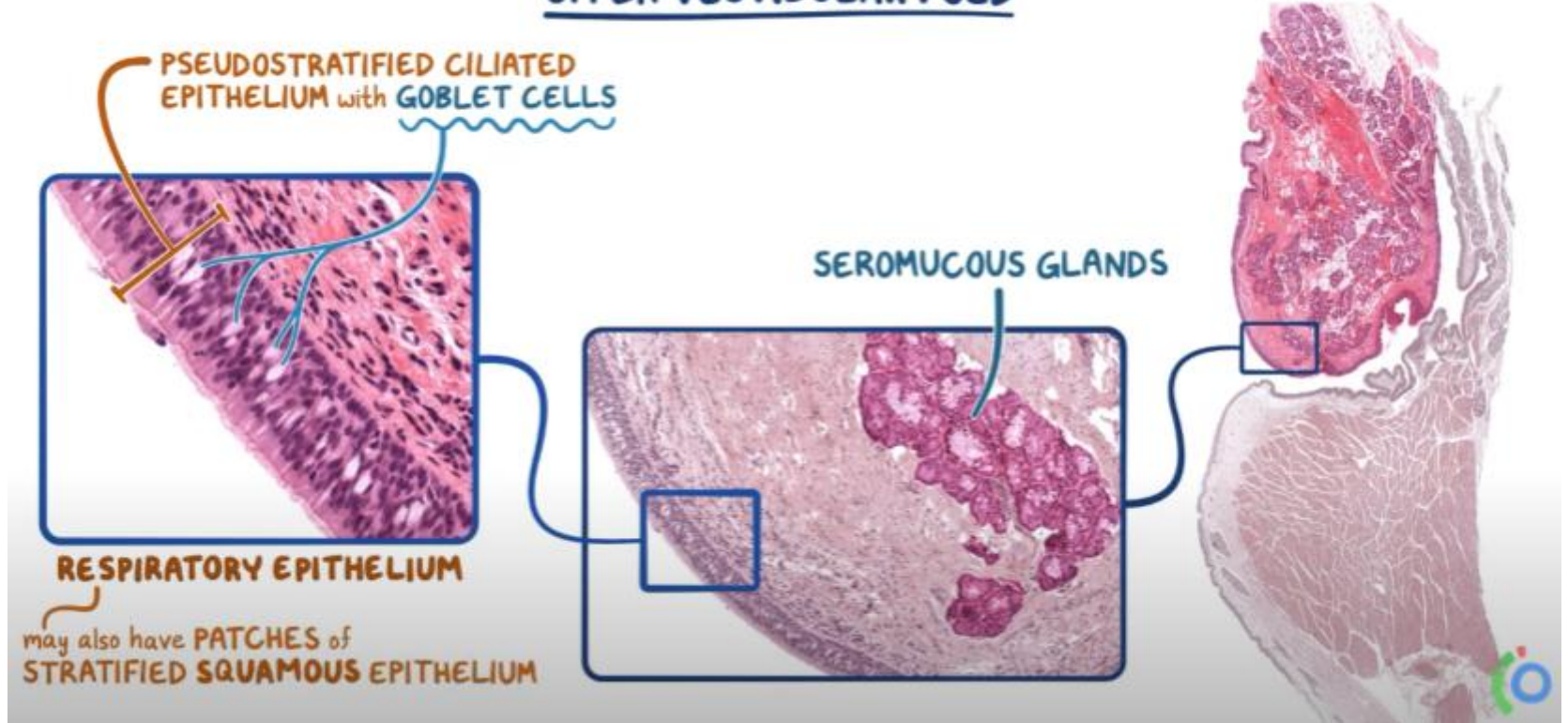
Vocal folds



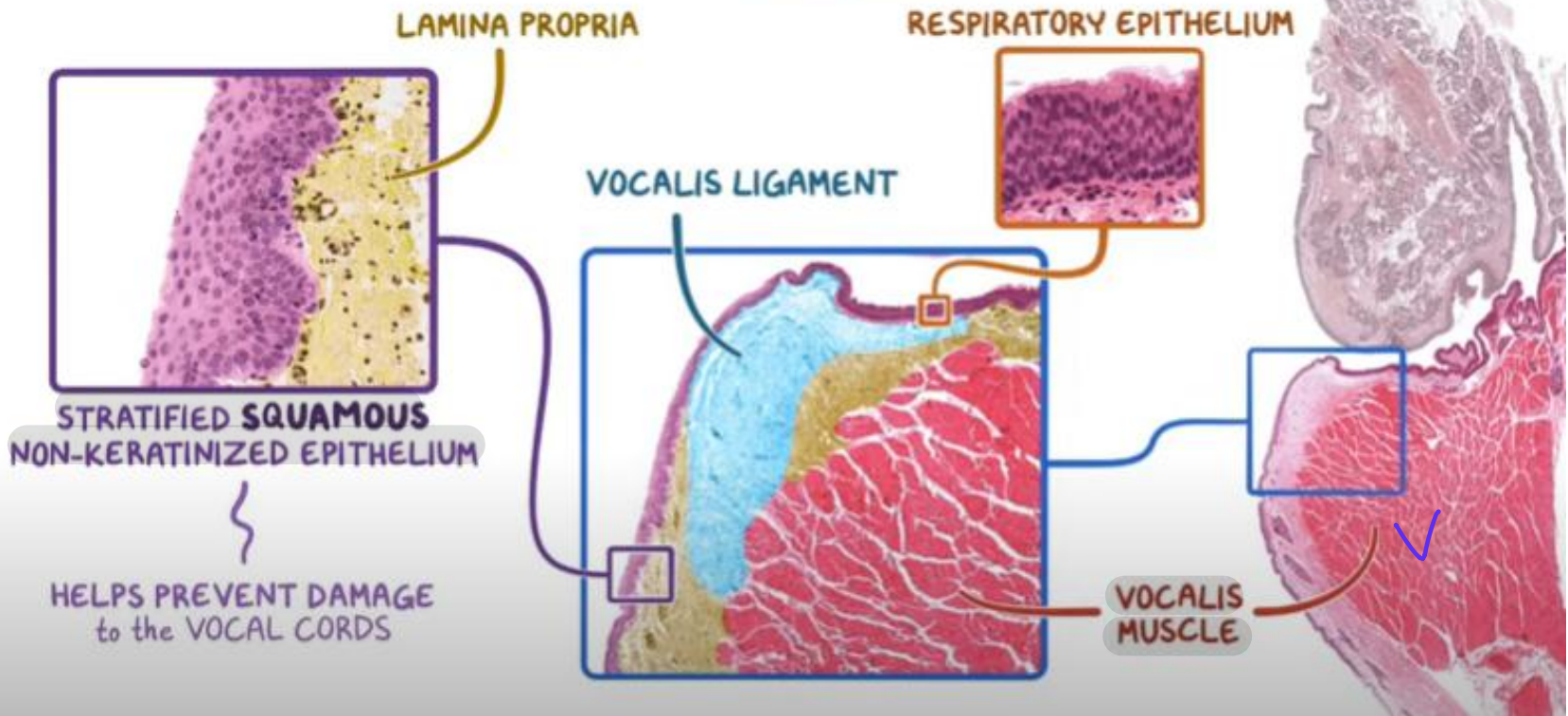
vocalis muscle → true جلد → **epithelium** و **Lamina propria** → false جلد → mucous gland

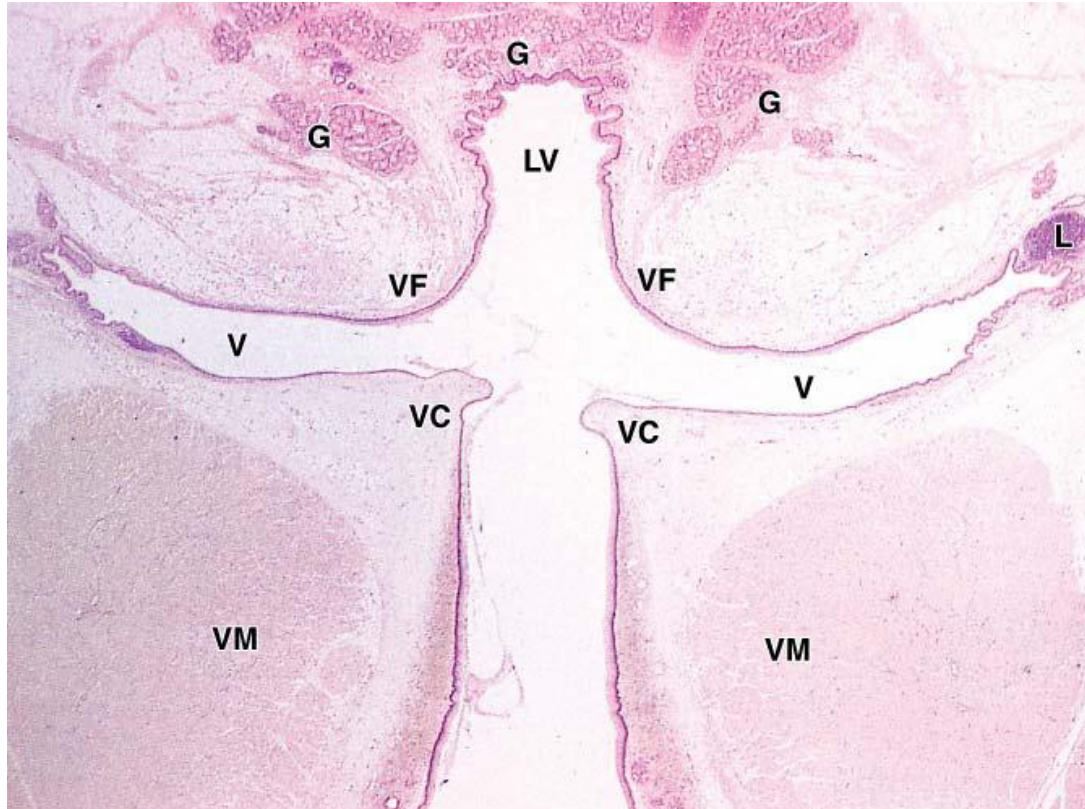
* 1) False & true vocal folds

UPPER VESTIBULAR FOLD



TRUE VOCAL CORDS





Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition*: <http://www.accessmedicine.com>
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The low-power micrograph shows the upper laryngeal vestibule (LV), which is surrounded by seromucous glands (G). The lateral walls of this region bulge as a pair of broad folds, the vestibular folds (VF). These contain seromucous glands, often with lymphoid nodules (L) and are largely covered by respiratory epithelium, with regions near the epiglottis having stratified squamous epithelium. Below each large vestibular fold is a narrow space or ventricle (V), below which is another pair of lateral folds, the vocal folds or cords (VC). These are covered by stratified squamous epithelium and project more sharply into the lumen, defining the rim of the opening into the larynx itself. Each contains a large striated vocalis muscle (VM)