

RESPIRATORY SYSTEM (I)

**Histology of the Upper
Respiratory Tract
(Nasal cavity, Paranasal sinuses
and Larynx)**

Objectives:

By the end of this lecture the student should be able to describe the microscopic structures of:

- **Vestibule** of the nasal cavity.
- **Respiratory mucosa** of the nasal cavity.
- **Nasal septum**.
- **Olfactory mucosa** of the nasal cavity.
- **Mucosa of the paranasal sinuses**.
- **Larynx**.

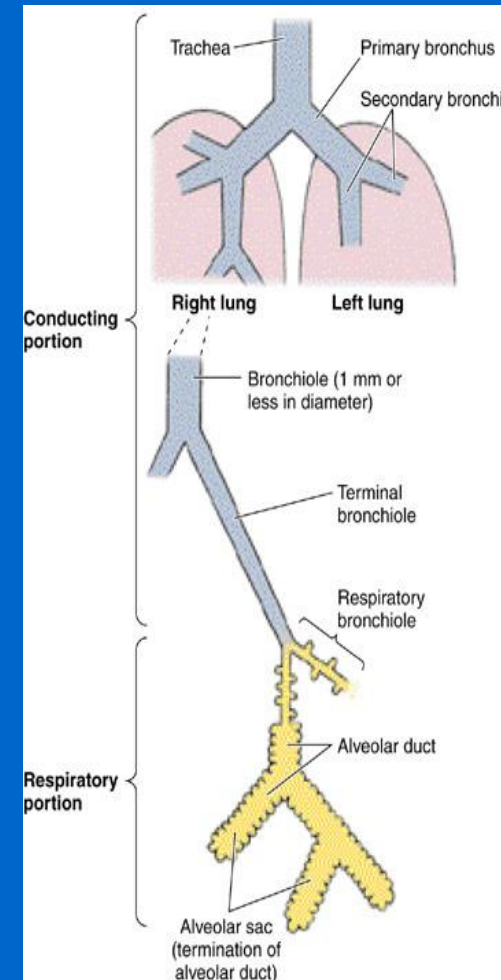
RESPIRATORY SYSTEM

(A) Conducting portion :

- 1- Nasal cavity.
- 2- Nasopharynx.
- 3- Larynx.
- 4- Trachea.
- 5- Primary bronchi (extrapulmonary bronchi).
- 6- Intrapulmonary bronchi:
 - 2ry bronchi (lobar bronchi).
 - 3ry bronchi (segmental bronchi).
- 7- Primary bronchioles (preterminal bronchioles).
- 8- Terminal bronchioles.

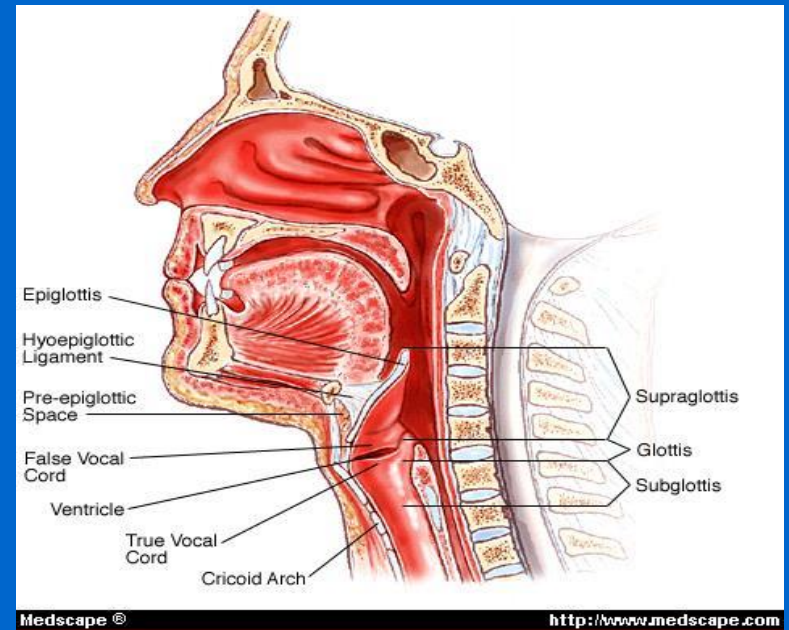
(A) Respiratory portion:

- 1- Respiratory bronchioles.
- 2- Alveolar ducts .
- 3- Alveolar sacs.
- 4- Pulmonary alveoli.



NASAL CAVITY (N.C.)

1. Anterior portion of N.C.:
Vestibule.
2. Posterior portion of N.C.:
 - a- **Respiratory region.**
 - b- **Olfactory region.**



N.B. The nasal septum divides the nasal cavity into two halves (right and left).

VESTIBULE OF N.C.

Lining: is lined with thin skin.

1- Epidermis: (Keratinized stratified Squamous epithelium).

2- Dermis.

Contents:

1- Vibrissae: stiff hairs.

2- Sebaceous glands.

3- Sweat glands.

Wall:

1- Hyaline cartilage.

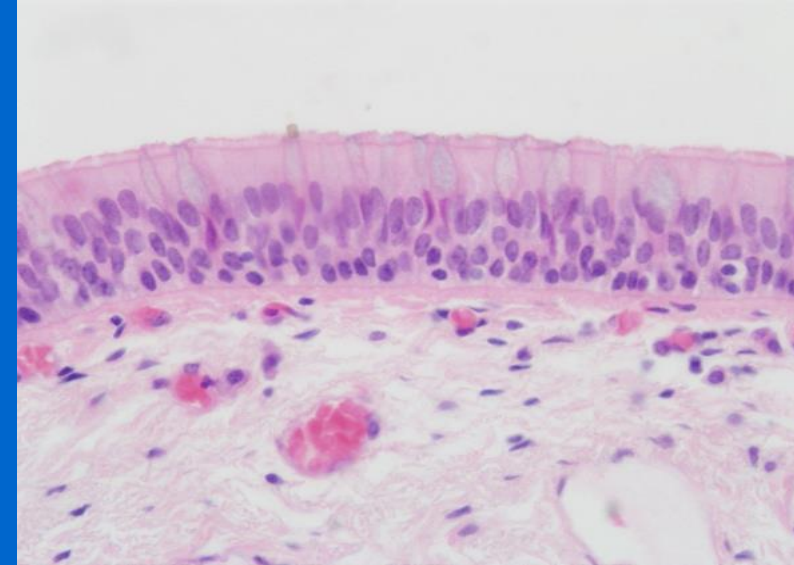
2- Cancellous (spongy) bone.

RESPIRATORY REGION (AREA) OF NASAL CAVITY

MUCOSA (MUCOUS MEMBRANE):

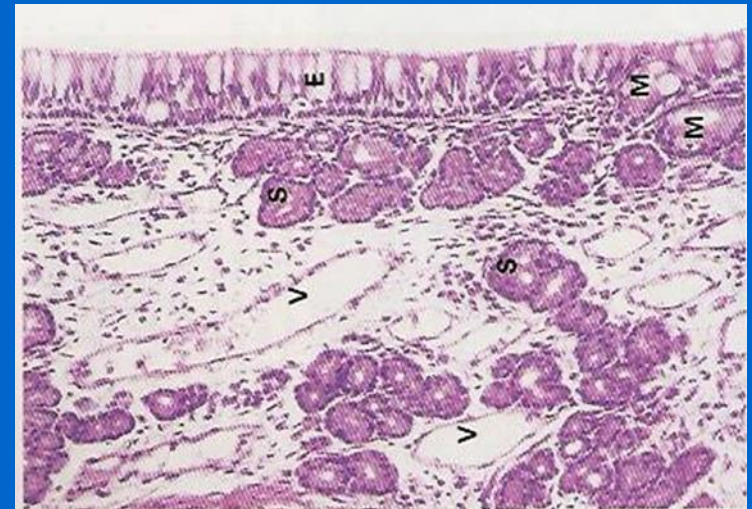
(A) Respiratory Epithelium:

Pseudo-stratified ciliated columnar epithelium with goblet cells.



Main Types of cells (all touch the basement membrane)

- 1- Ciliated columnar cells.
- 2- Goblet cells.
- 3- Basal cells: are stem cells.
- 4- DNES cells: e.g. serotonin.



(B) Lamina propria (Sub-epithelial C.T.):

contains:

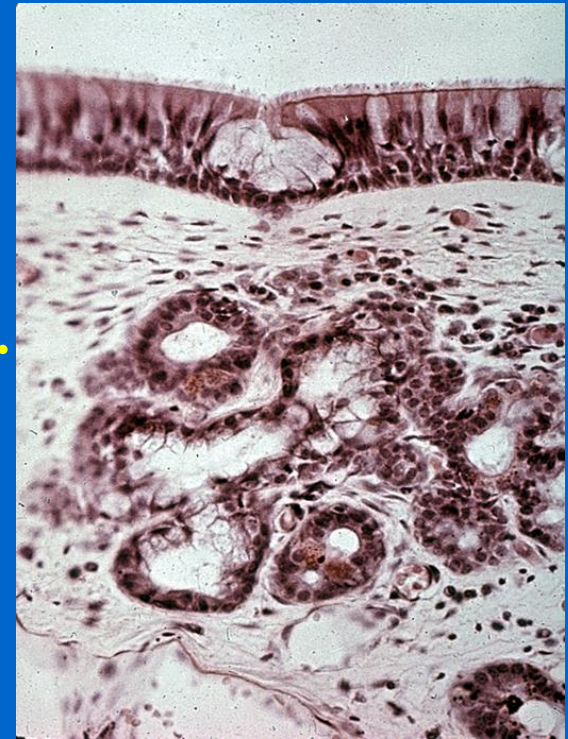
1- Large arterial plexuses &
venous sinuses

(Highly vascularized C.T.)

3- Many seromucous glands (acini).

4- Abundant lymphoid elements:

Including occasional lymphoid
nodules, plasma cells & mast cells.

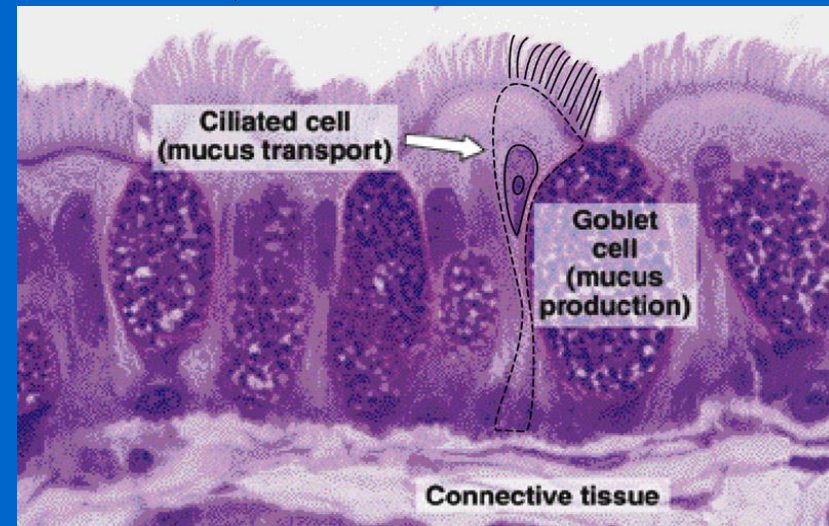
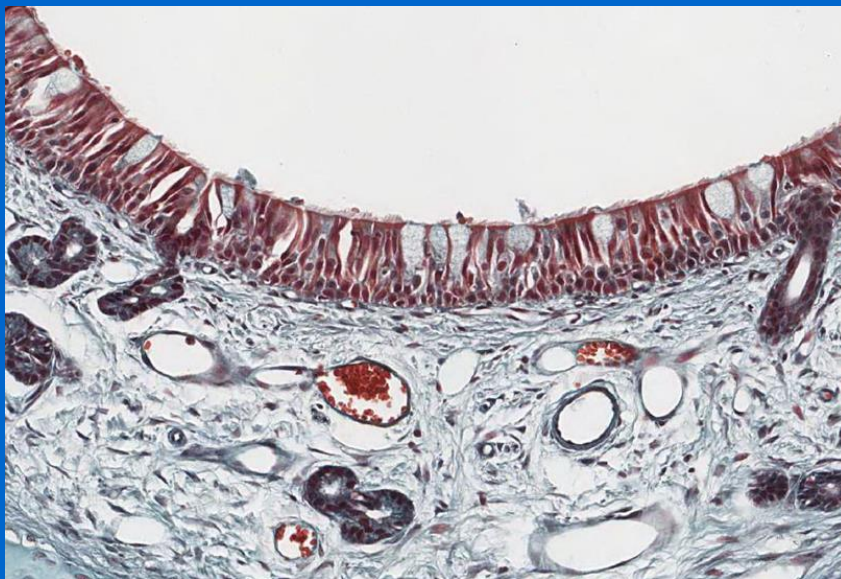


PARANASAL SINUSES

Lining: 1- Respiratory epith. (Mention.....)
2- Lamina propria.

CLINICAL APPLICATION:

Sinusitis.



OLFACTORY REGION (AREA) OF NASAL CAVITY (OLFACTORY MUCOSA)

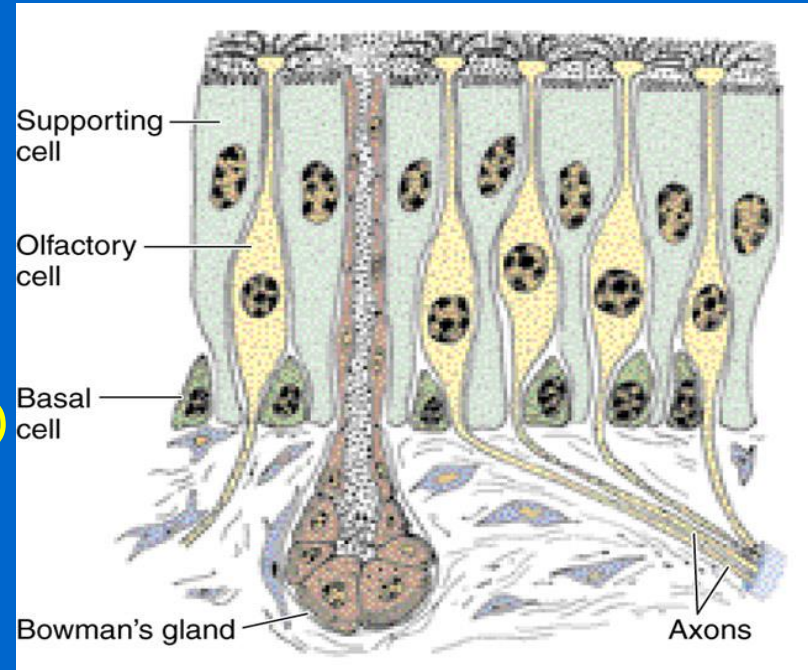
Site: 1-Roof of nasal cavity.
2-Upper part of nasal septum.
3-over superior concha.

Structure:

(A) Olfactory epithelium:

Pseudo-stratified columnar epith.

- 1- **Olfactory cells** (olfactory nerve cells)
- 2- **Sustentacular** (supporting) **cells.**
- 3- **Basal cells:** Pyramidal in shape, basal in position and act as stem cells.



OLFACTORY EPITHELIUM

1- Olfactory cells:

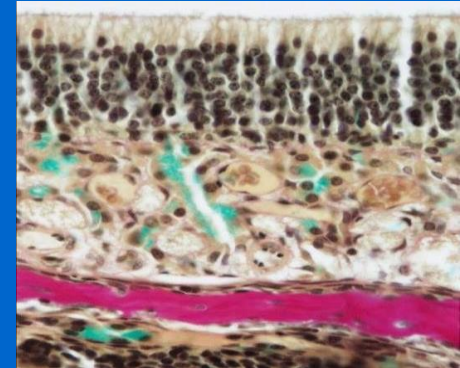
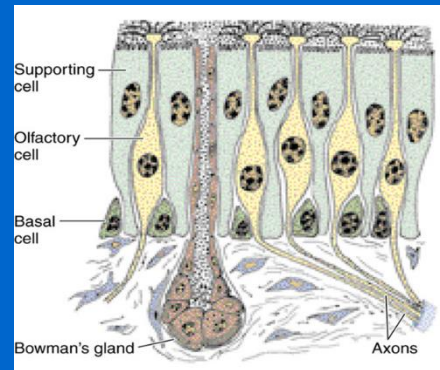
Are bipolar neurons

Dendrite has olfactory vesicle that has nonmotile cilia.

Axons are unmyelinated with Schwann-like cells.

Axons will collect in the lamina propria to form bundles of nerve fibers.

Bundles will collect to form the olfactory nerve.



2- Sustentacular (supporting) cells:

Are columnar cells.

Function:

Physical support and nourishment for olfactory cells.

(B) Lamina propria: contains:

1- Highly (richly) vascularized loose C.T.

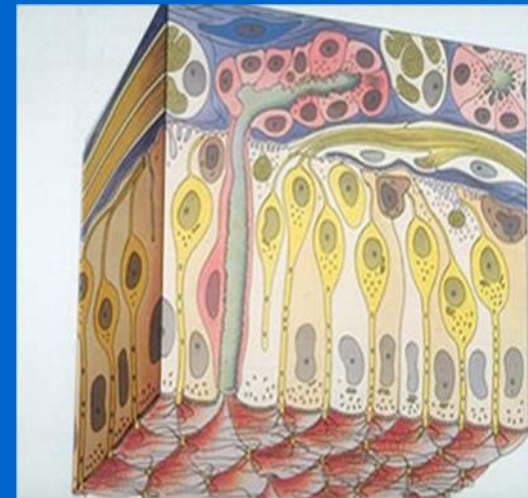
2- Contents:

a) Bowman's glands (olfactory glands) :
are serous acini.

b) Bundles of unmyelinated nerve fibers:
Are axons of olfactory nerve cells +
Schwann-like cells (glial cells).

c) Rich vascular plexus.

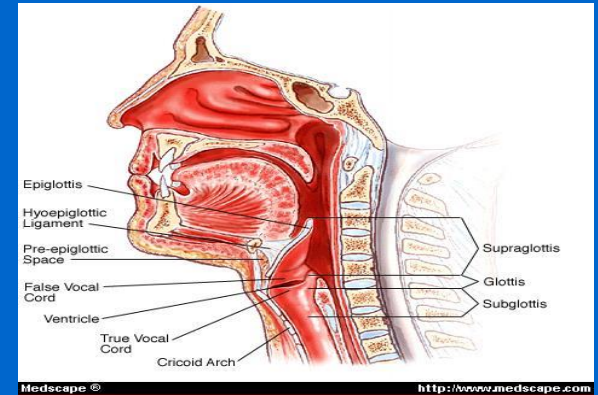
d) Numerous lymphoid elements.



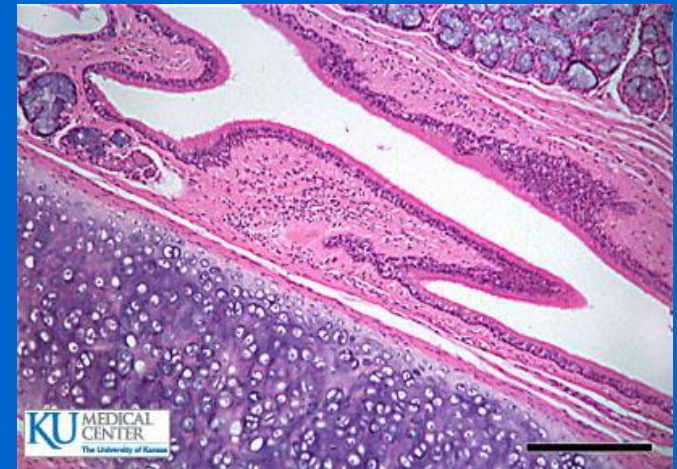
LARYNX

(A) Mucosa (Mucous membrane):

- 1- Epithelium.
- 2- Lamina propria.

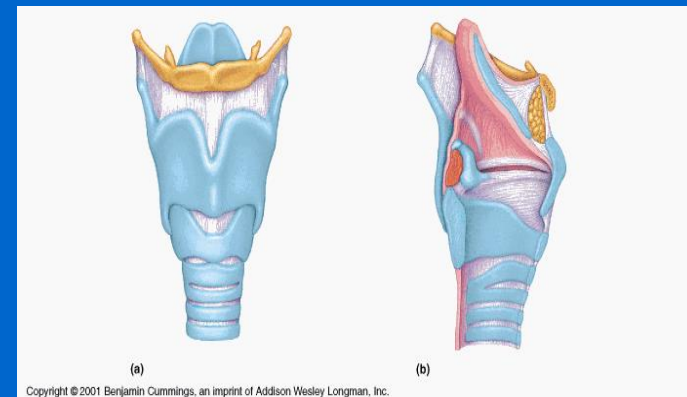


(B) Cartilages.



(C) Extrinsic and intrinsic muscles: all are skeletal.

(D) Ligaments.



LARYNX

(A) Mucosa:

1- Epithelium: (2 types)

a- Respiratory epithelium:

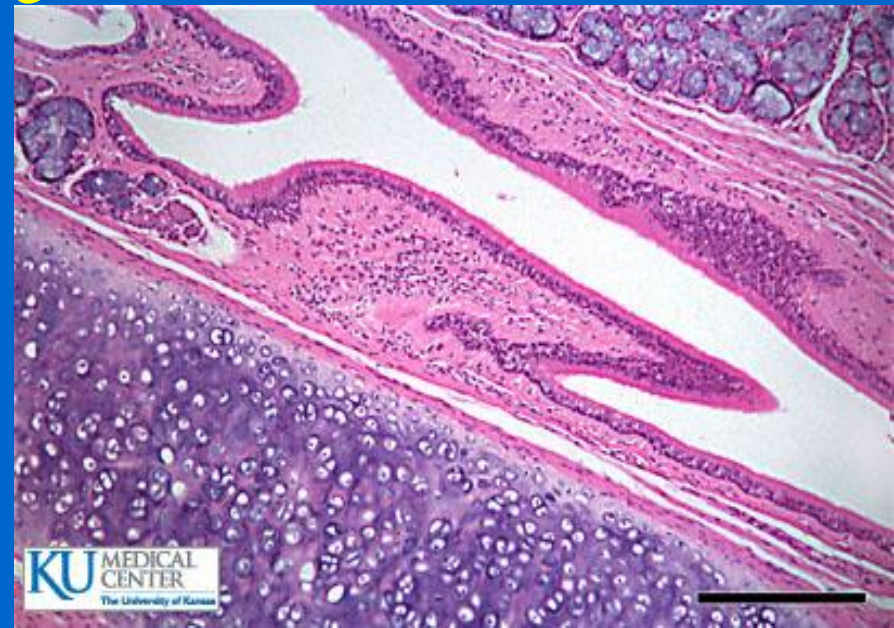
Pseudostratified ciliated columnar epithelium
with goblet cells.

b- Non keratinized stratified squamous epithelium:

In: -Vocal folds.

- Superior surface of epiglottis

2- Lamina propria.



LARYNX

(A) Mucosa (cont.):

There are 2 pairs of shelf-like mucosal folds:

1- Vestibular folds:

Are immovable.

L/M: a- Respiratory epithelium.

b- Lamina propria:

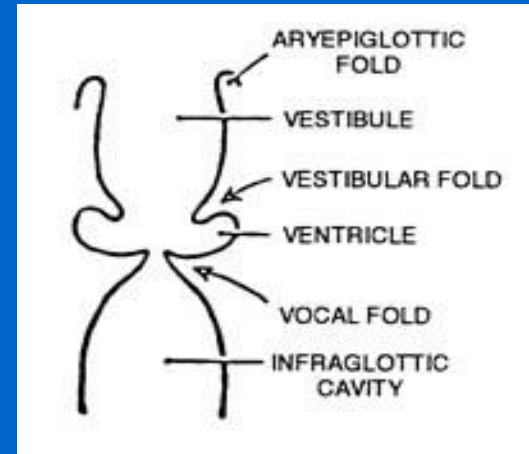
Loose C.T. with seromucous glands
lymphoid elements & adipose cells.

2- VOCAL FOLDS (CORDS): have:

a- Epithelium: non keratinized stratified squamous.

b- Lamina propria: C.T. containing bundles of elastic fibers and skeletal muscle .

**N.B. No lymphoid nodules,
No seromucous glands.**



(B) Cartilages:

1- Hyaline cartilages:

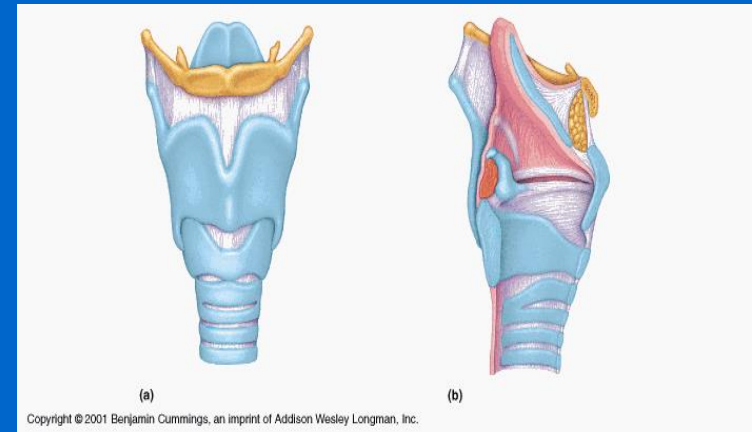
e.g. Thyroid cartilage.

2- Elastic cartilages:

Epiglottis.

(C) Muscles: all are skeletal.

(D) Ligaments.





THANK YOU