

Upper Respiratory tract (Nasal cavity , paranasal sinuses and larynx)

Color code: ◉ extra and doctor notes ◉ **Important**

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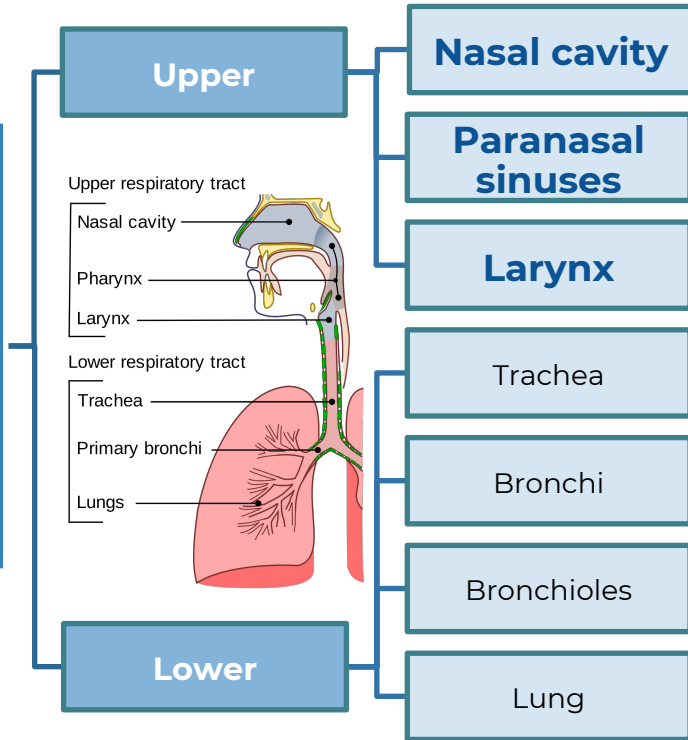
Objectives:

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

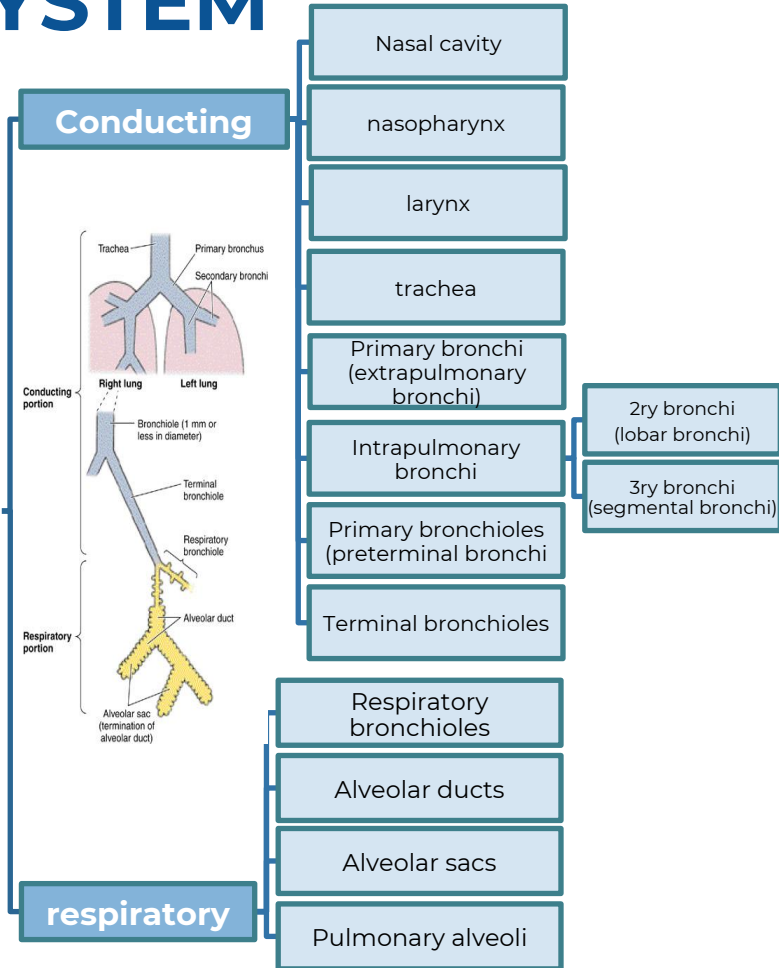
- **Vestibule** of the nasal cavity.
- **Respiratory mucosa** of the nasal cavity.
- **Nasal septum.**
- **Olfactory mucosa** of the nasal cavity.
- **Mucosa of the paranasal** sinuses.
- **Larynx.**

RESPIRATORY SYSTEM

TRACTS

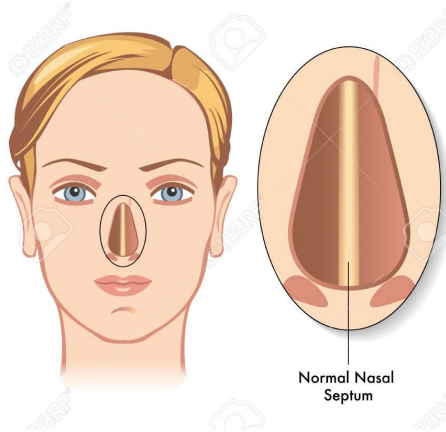


PORTIONS



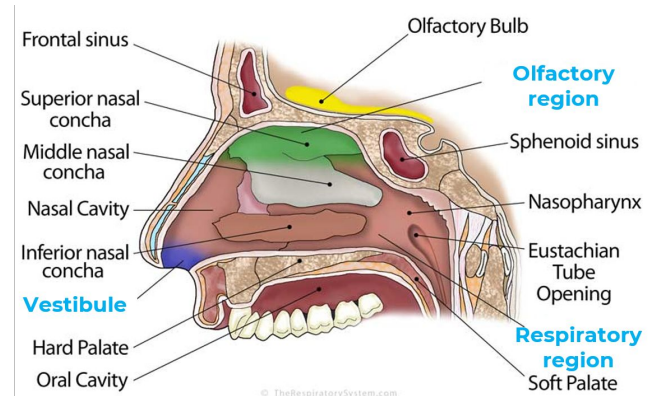
❖ Nasal cavity

- **Anterior portion of N.C. :**
Vestibule.
- **Posterior portion of N.C. :**
Respiratory region.
Olfactory region.
- The **nasal septum (made from cartilage + spongy bone)** divides the nasal cavity into two halves (right and left).



❖ Vestibule

- **Lining:** is lined with thin skin.
Epidermis: (Keratinized stratified Squamous epithelium).
Dermis.
- **Contents:**
Vibrissae : stiff hairs *short thick hair
Sebaceous glands.
*secrete an oily or waxy matter called **sebum**
*Cause acne (حب الشباب)
Sweat glands.
- **Wall:**
Hyaline cartilage.
Cancellous (spongy) bone.



RESPIRATORY REGION (AREA) OF NASAL CAVITY

MUCOSA (MUCOUS MEMBRANE):

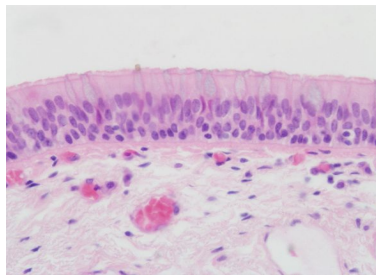
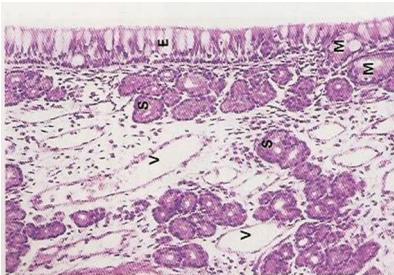
Respiratory Epithelium

Pseudo-stratified ciliated columnar epithelium with goblet cells.

Main Types of cells

(all touch the basement membrane)

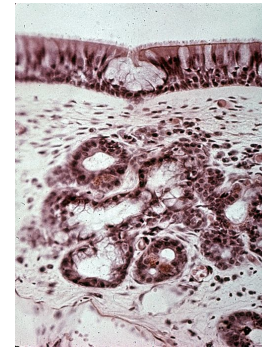
- 1) Ciliated columnar cells.
- 2) Goblet cells.
- 3) Basal cells: are stem cells.
- 4) DNES cells (diffuse neuroendocrine system.)
secrete hormones e.g. serotonin.



Lamina propria (Sub-epithelial C.T.)

contains:

- 1- Large arterial plexuses & venous sinuses (**Highly vascularized C.T.**)
- 2- Many seromucous glands (acini).
- 3- Abundant lymphoid elements:
Including occasional lymphoid nodules, plasma cells & mast cells.



OLFACTORY REGION (AREA) OF NASAL CAVITY

OLFACTORY MUCOSA :

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

Olfactory epithelium

pseudo-stratified columnar epithelium (without goblet cell)

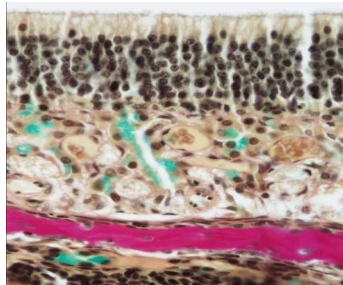
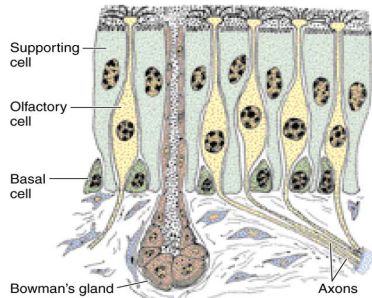
1- olfactory cells (olfactory nerve cells):

- **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

3- basal cells: pyramidal in shape, basal in position and act as stem cells

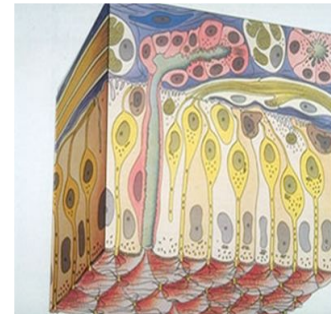


Lamina propria

Highly (richly) vascularized loose C.T.

Contents:

- 1- **Bowman's glands (olfactory glands):** are serous acini
- 2- Bundles of **unmyelinated** nerve fibers: are axons of olfactory nerve cells + Schwann-like cells (glial cells)
- 3- Rich **vascular plexus**
- 4- Numerous **lymphoid elements**



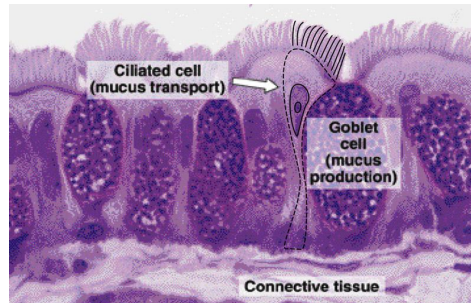
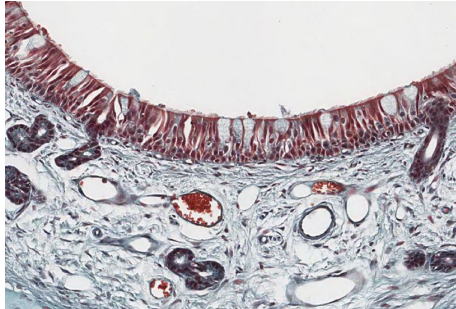
PARANASAL SINUSES

❖ LINING (mucosa):

1- Respiratory epithelium

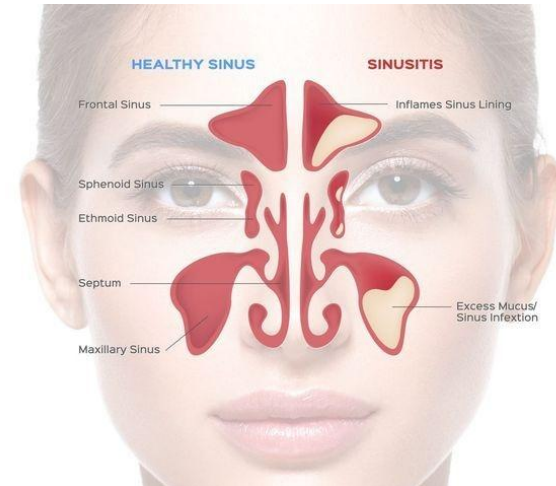
(Pseudo-stratified ciliated columnar epithelium with goblet cells.)

2- Lamina propria.



❖ CLINICAL APPLICATION: Sinusitis.

Sinusitis is an inflammation or swelling of the tissue lining the sinuses. Healthy sinuses are filled with air. But when they become blocked and filled with fluid, germs can grow and cause an infection.



Larynx

The larynx consists of four basic components :

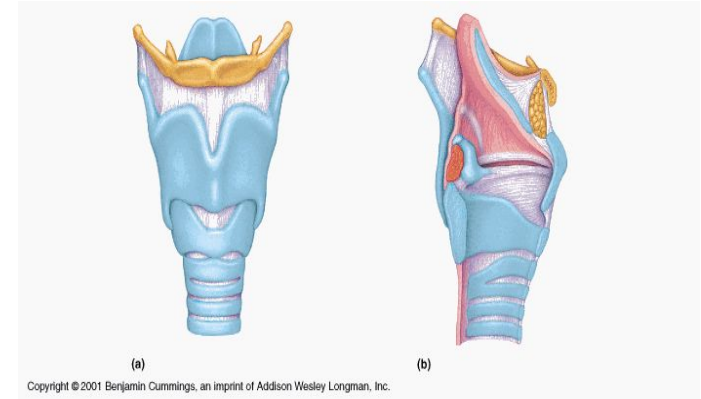
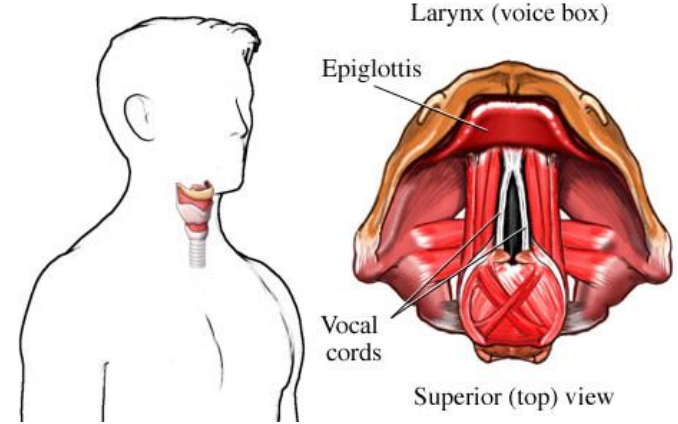
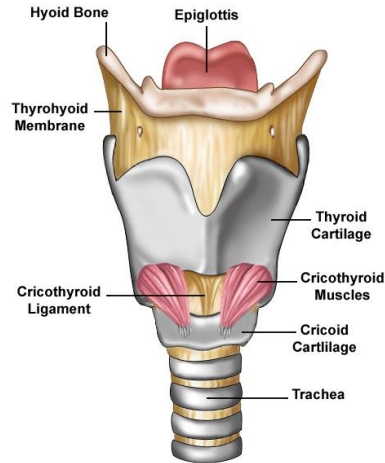
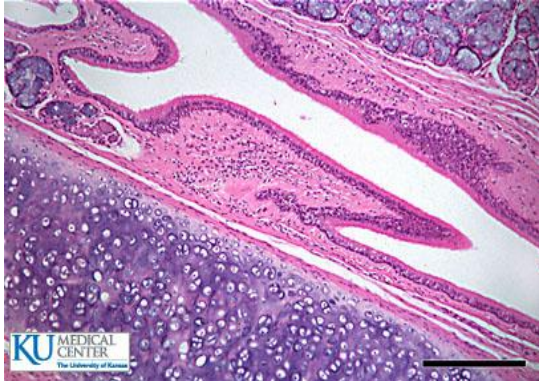
(A) Mucosa (Mucous membrane):

- 1- Epithelium.
- 2-Lamina propria.

(B) Cartilages.

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

(D) Ligaments.



Larynx

MUCOSA

Epithelium

Epithelium: (2 types)
 1- Respiratory epithelium:
 Pseudostratified ciliated columnar
 epithelium with goblet cells.
 2- Non keratinized stratified
 squamous epithelium:
 In: - **Vocal folds.**
 - Superior surface of epiglottis

Lamina propria

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:
Epithelium: non keratinized stratified squamous.
Lamina propria : C.T. containing bundles of **elastic fibers** and skeletal
 muscle .
No lymphoid nodules, No seromucous glands.

Cartilages:

1- Hyaline cartilages:
 e.g. Thyroid cartilage.
2- Elastic cartilages:
 e.g. Epiglottis.
 All the cartilages are hyaline expect
 epiglottis is elastic

Muscles:

Extrinsic and intrinsic muscles : all
 are skeletal.

Ligaments.

*More details in anatomy lecture



Quiz



Q1 : Which of following structures belongs to the respiratory portion of the respiratory system

- A : Alveolar sac
- B : Primary bronchus
- C : trachea
- D : larynx

Q2 : What is the type of epithelium in respiratory area :

- A : pseudo-stratified columnar epithelium
- B : pseudo-stratified cilliated columnar epithelium with goblet cell
- C : Keratinized stratified Squamous epithelium
- D : non-Keratinized stratified Squamous epithelium

Q3 : What is the type of epithelium in olfactory area :

- A : pseudo-stratified columnar epithelium
- B : pseudo-stratified columnar epithelium with goblet cell
- C : Keratinized stratified Squamous epithelium
- D : non-Keratinized stratified Squamous epithelium

Q4 : Which one of the following gland secrete sebum

- A : Bowman's glands
- B : Sweat glands
- C : Sebaceous glands
- D : olfactory glands

Q5 : Which one of the following cell responsible for Physical support and nourishment for olfactory cells

- A : olfactory nerve cell
- B : basal cell
- C : sustentacular cell
- D : glial cells

Q6 : What is the type of C.T in Vestibular folds

- A : dense C.T
- B : elastic C.T
- C : reticular C.T
- D : loose C.T

1-A-2-B-3-A-4-C-5-C-6-D



Quiz



Q7: Which of them contain large arterial plexuses & venous sinuses ?

- A: Lamina propria of olfactory mucosa
- B: Lamina propria of respiratory mucosa
- C: Lamina propria of larynx
- D: respiratory epithelium

Q8: Vestibule of Nasal cavity contain?

- A: Vibrissae (stiff hairs)
- B: Sebaceous glands
- C: Sweat glands
- D: all of them

Q9: which one of the following cell has nonmotile cilia

- A: olfactory cell
- B: basal cell
- C : supporting cell
- D: goblet cell

Q10: how many types of epithelium found in mucosa of larynx

- A: There is no epithelium
- B: three types
- C: One type
- D: Two types

Q11: normal sinuses filled with ?

- A: Blood :)
- B: Air
- C: Mucosa
- D: water

Q12: all the following are right about vocal fold expect ?

- A: contain lymphoid nodules
- B: contain skeletal muscle
- C: containing bundles of elastic fibers
- D: Epithelium: non keratinized stratified squamous.

7-B 8-D 9-A 10-D 11-B 12-A

Done by :

Abdullah shadid

Team Leaders

Sarah AlFlaj
Abdullah shadid

Please send your suggestions & questions:

 Histology438@gmail.com