



INTEGRATED RESPIRATORY I

RESPIRATORY BLOCK



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.**



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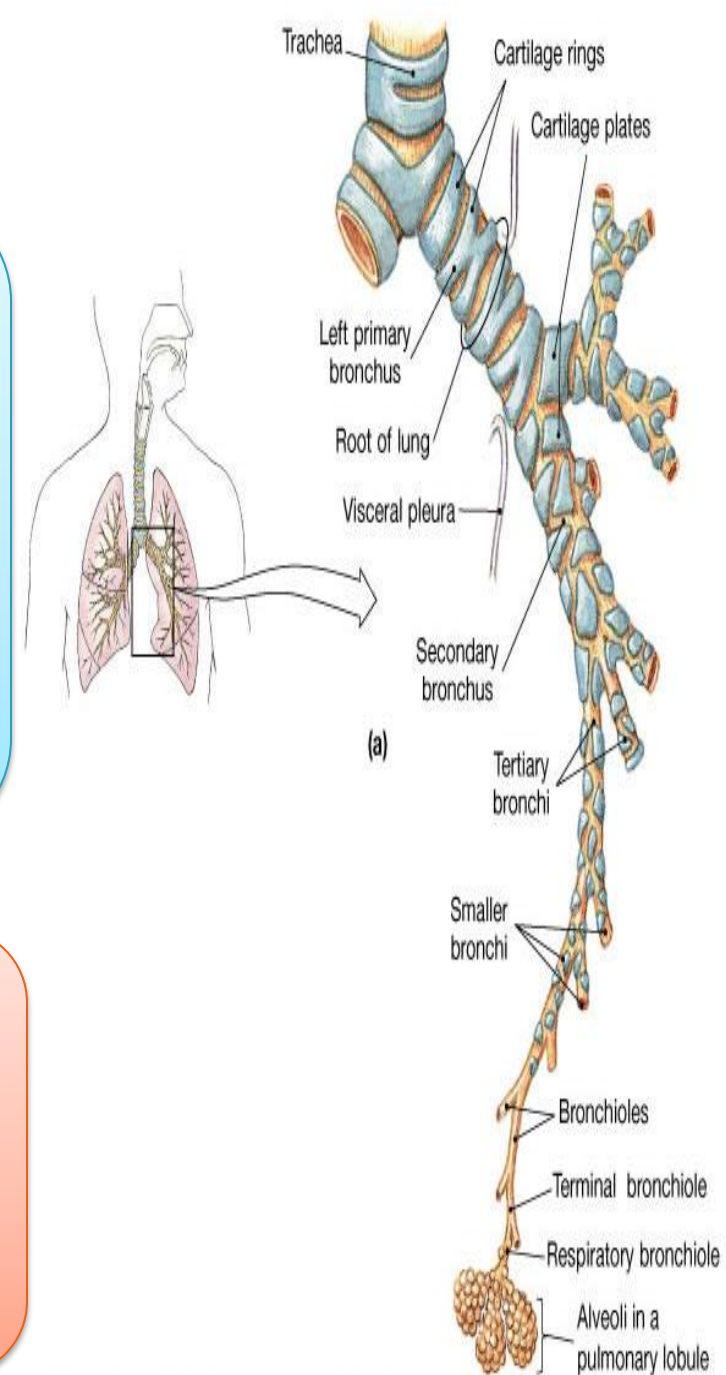
Respiratory system

A. Conducting portion :

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

B. Respiratory portion :

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



NASAL CAVITY(N.C.)

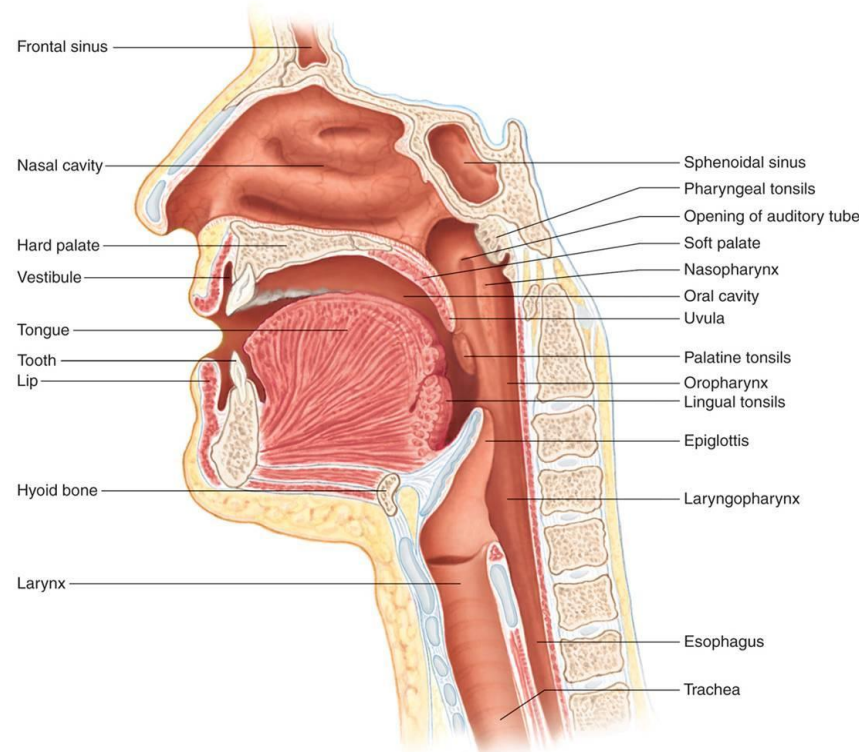
A. Anterior portion of N.C. : Vestibule.

B. Posterior portion of N.C :

1-Respiratory region.

2- Olfactory region.

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



RESPIRATORY REGION

Mucous membrane :-

A. Epithelium : pseudo-stratified ciliated columnar epithelium with goblet cells (Respiratory epithelium).

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

Contains:

1- large arterial plexuses and venous sinuses (Highly vascularized C.T.).

2- many seromucous glands (acini).

3- abundant lymphoid elements: including occasional lymphoid nodules, plasma and mast cell.

VESTIBULE OF N.C.

Lining : is lined with thin skin.

1- epidermis : (keratinized stratified squamous epithelium).

2- Dermis.

Contents:

- Vibrissae : 1- Stiff hairs.

2- Sebaceous glands. 3- Sweat glands.

Wall: 1- Hyaline cartilage.

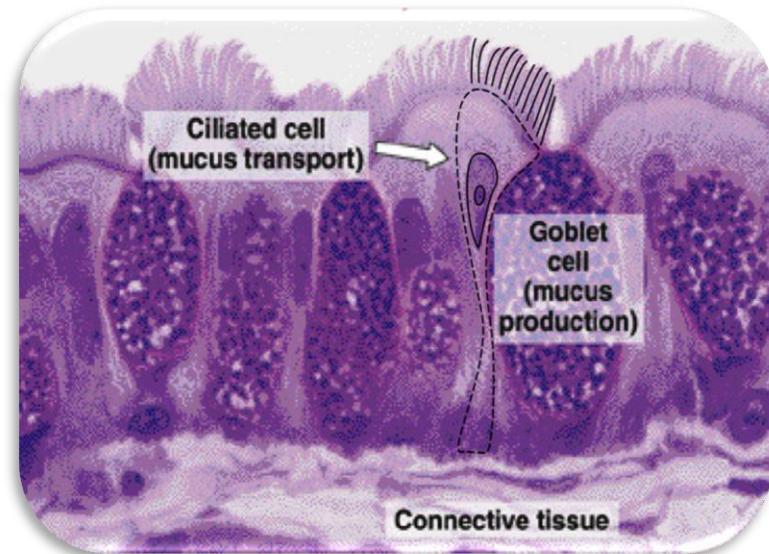
2- cancellous (spongy) bone.

PARANASAL SINUSES

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

CLINICAL APPLICATION:

Sinusitis.

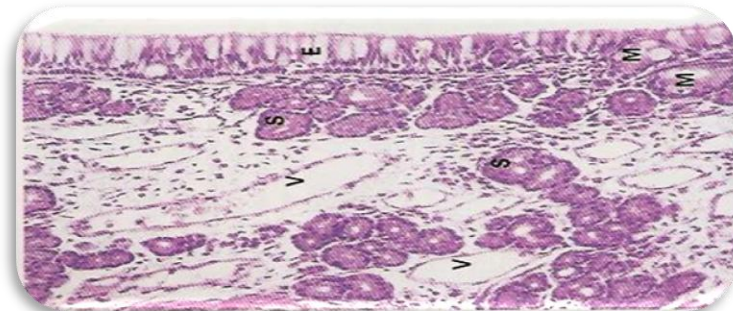
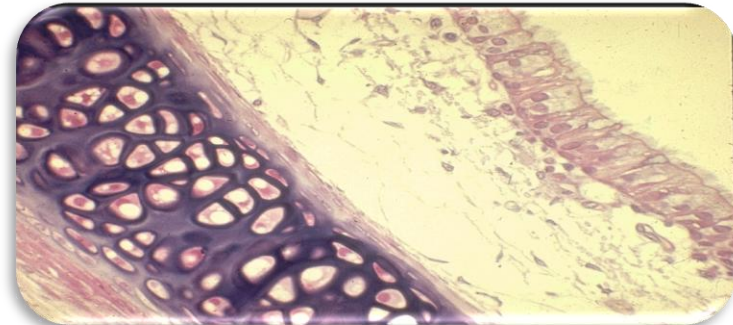


RESPIRATORY EPITHELIUM

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.



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:

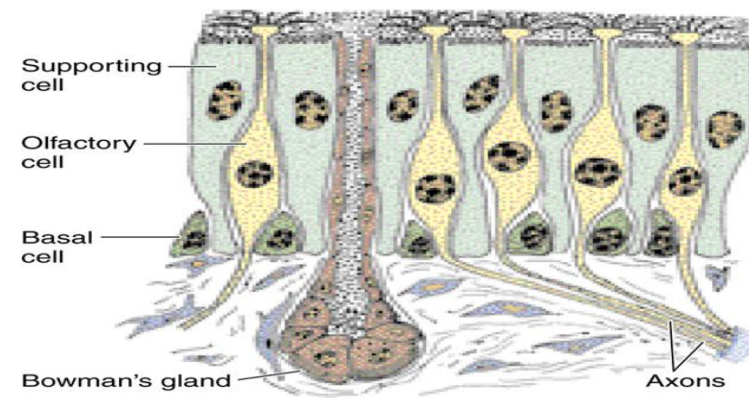
(A) Olfactory epithelium:

Pseudo-stratified columnar epithelium.

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

(B) Lamina propria: contains:

- 1- Highly (richly) vascularized loose to dense 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.



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.

LARYNX

(A) Mucosa (Mucous membrane):

1- Epithelium: (it has 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.

(A) Mucosa (Contact):

: 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:

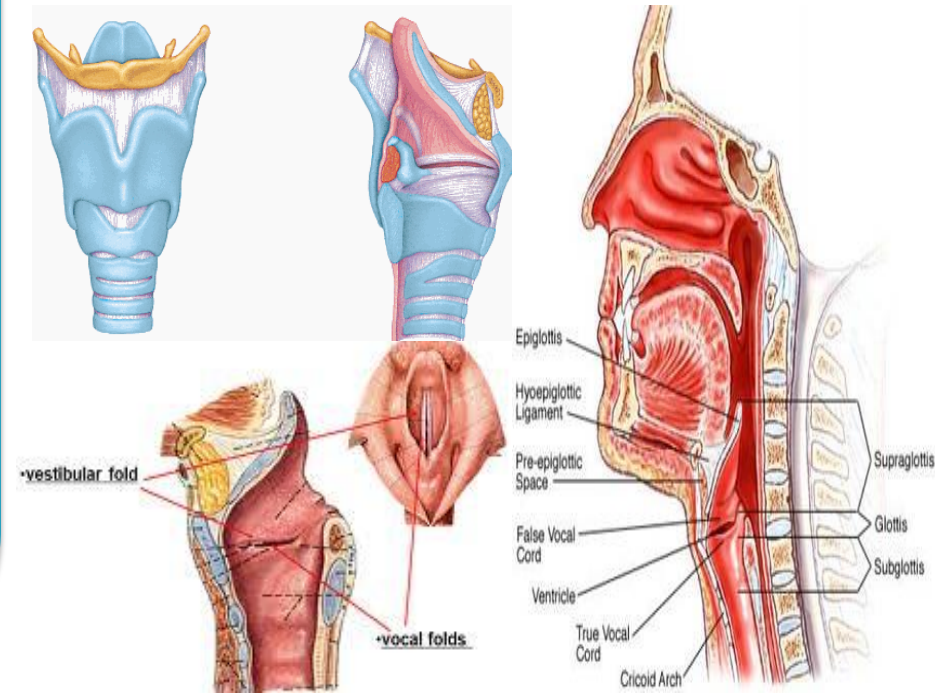
e.g. Thyroid cartilage.

2- Elastic cartilages:

e.g. Epiglottis.

(C) Muscles: all are skeletal.

(D) Ligaments.



Summary

RESPIRATORY SYSTEM

<i>Respiratory portion</i>	<i>Conducting portion</i>
1-Respiratory bronchioles. 2-Alveolar ducts. 3-Alveolar sacs. 4-Pulmonary alveoli.	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.

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 epithelium. 1- Olfactory cells 2- Sustentacular (supporting) cells. 3- Basal cells
(B) Lamina propria	contains: 1- Highly (richly) vascularized loose to dense C.T. 2- Contents: a) Bowman's glands b) Bundles of unmyelinated nerve fibers c) Rich vascular plexus. d) Numerous lymphoid elements.

NASAL CAVITY (N.C.)

VESTIBULE OF N.C.

Anterior portion of N.C.: Vestibule. Posterior portion of N.C.: a- Respiratory region. b- Olfactory region.	Is lined: 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.
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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.
(B) Cartilages	1- Hyaline cartilages: e.g. Thyroid cartilage. 2- Elastic cartilages: Epiglottis.
(C) Extrinsic and intrinsic muscles	all are skeletal
(D) Ligaments	

PARANASAL SINUSES

Lining	1- Respiratory epith. 2- Lamina propria.
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CLINICAL APPLICATION

Sinusitis

MCQs

1- One of these is not in the Conducting portion :

- 1- Nasal cavity.
- 2- Nasopharynx
- 3- Larynx.
- 4- Pulmonary alveoli.

6- which one of the following lining the vestibule of nasal cavity :

- A-non keratinized stratified Squamous epithelium
- b-non keratinized simple epithelium
- c- keratinized stratified squamous epithelium**
- d- keratinized simple epithelium

2-the anterior portion of the nasal cavity is :

- 1- Vestibule.
- 2-Respiratory region.
- 3-Terminal bronchioles.
- 4- Pulmonary alveoli.

7- which one of the following is the type of the epithelium which found in respiratory region of nasal cavity :

- Pseudo-stratified ciliated columnar epithelium .
- Pseudo-stratified columnar epithelium
- Pseudo-stratified ciliated columnar epithelium with goblet cells**
- Pseudo-stratified columnar epithelium with goblet cell

3- the Posterior portion of N.C is divided to ;

- 1- Respiratory region and Larynx
- 2- Terminal bronchioles and Nasal cavity
- 3- Respiratory region and Olfactory region.**
- 4- Olfactory region and Vestibule

8-which one of the following is the type of the epithelium which found in larynx :

- A-Pseudo stratified ciliated columnar epithelium with goblet cells.
- B-Non keratinized stratified squamous epithelium
- C-both of them**
- D-none of them

4- vestibule cartilage is a Cartilage :

- 1- elastic
- 2- Hyaline**
- 3- osteocartilaginous
- 4- bony

9- Thyroid cartilage in the larynx is :

- A-hyaline cartilage**
- B-elastic cartilage
- C-fibrocartilage

5- the vestibule has Glands :

- 1- Holocrine glands
- 2- Apocrine glands
- 3- Serous glands
- 4- Sweat glands**

10-what are the main types of cells found in respiratory epithelium:

- A-goblet cells
- B-Ciliated columnar cells
- C-Basal cells
- D-All of them**

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