

الهدف لا سهل الا ما جعله سهلا
واب يجمع اجتنابا سببا

Histology

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

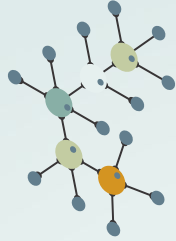
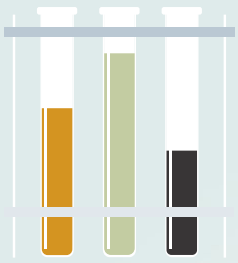


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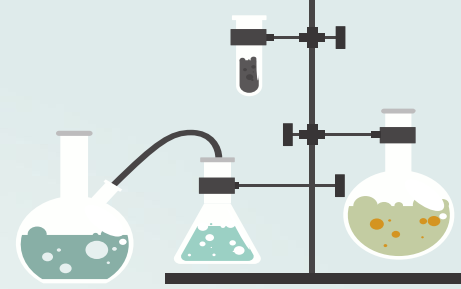
Color index

- Important
- Doctor's note
- Extra info





Objective



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

01

Vestibule of the nasal cavity

02

Respiratory mucosa of the nasal cavity

03

Nasal septum

04

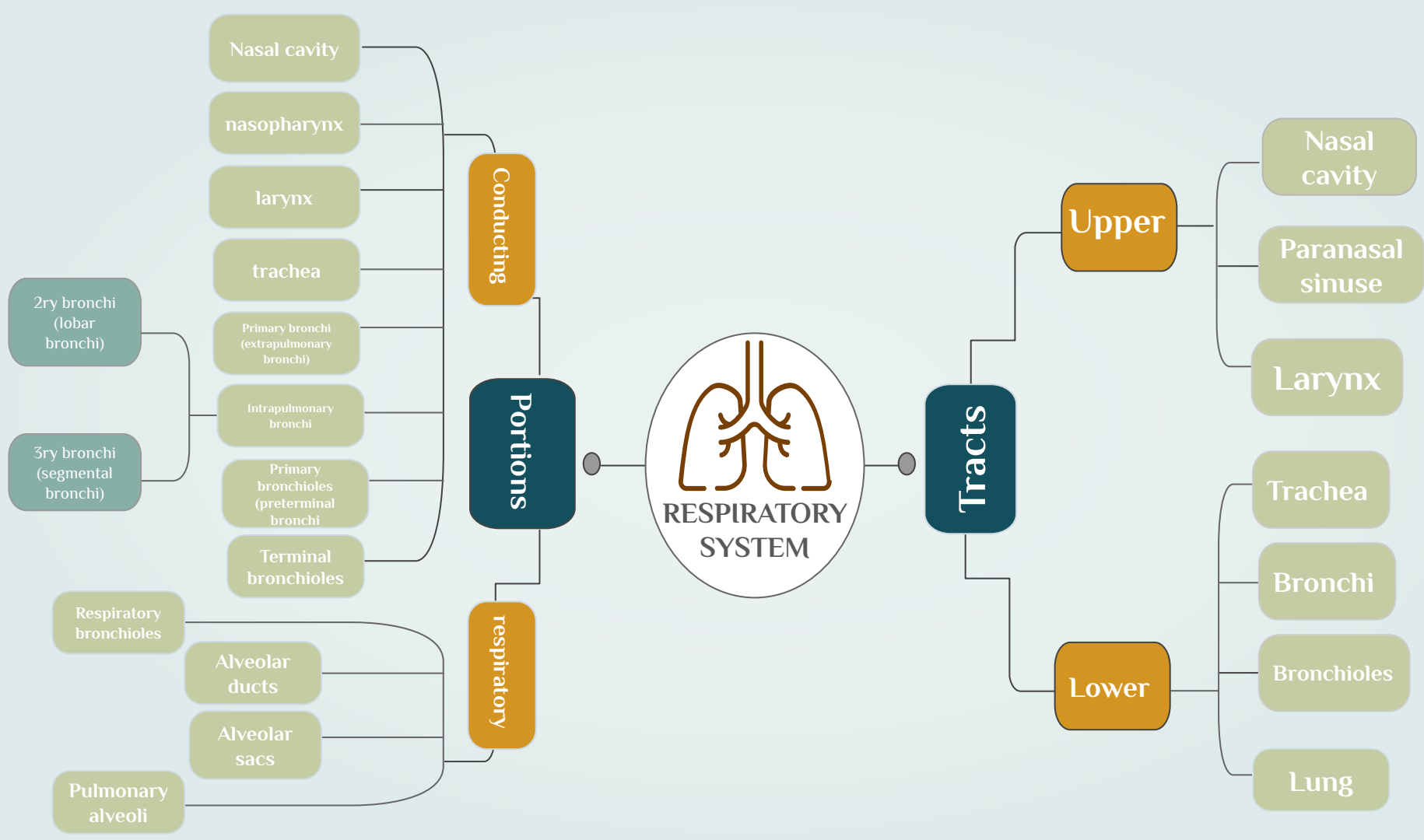
Olfactory mucosa of the nasal cavity

05

Mucosa of the paranasal sinuses

06

Larynx



Nasal cavity

Posterior portion of N.C

Anterior portion of N.C (Vestibule)

Respiratory region

Olfactory region

nasal septum
-The nasal septum divides the nasal cavity into two halves (right and left)

Definition

Vestibule: the area surrounding the anterior external opening to the nasal cavity.

Structure

Lining

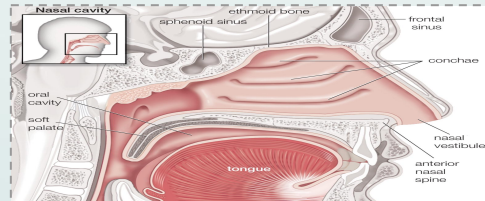
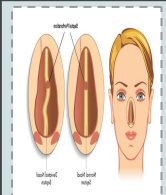
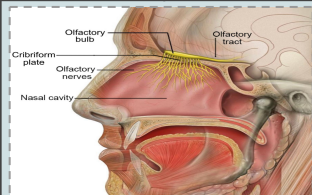
- 1- Epidermis: (Keratinized stratified Squamous epithelium).
- 2- Dermis.

Contents

- 1- Vibrissae : stiff hairs
- 2- Sebaceous glands.
- 3-Sweat glands

Wall

- 1- Hyaline cartilage
- 2- Cancellous (spongy) bone.



Note & extra inf



01

-The nasal cavity is the inside of your nose. It is lined with a mucous membrane that helps keep your nose moist by making mucus so you won't get nosebleeds from a dry nose. There are also little hairs that help filter the air you breathe in, blocking dirt and dust from getting into your lungs.

02

-nasal vestibule : the most anterior part of the nasal cavity and It is enclosed by the cartilages of nose and lined by the same epithelium of the skin (stratified squamous, keratinized)

03

-Respiratory region : lined by a ciliated psudeo-stratified epithelium, interspersed with mucus-secreting goblet cells.

-Olfactory region : located at the apex of the nasal cavity. It is lined by olfactory cells with olfactory receptors.

04

-Nasal septum : it is formed of the bone and cartilage also it separates the nasal cavity into the two

05

-The nasal skeleton is a combination of bone and cartilage
-Most of cartilage in the nasal is hyaline cartilage



RESPIRATORY REGION (AREA) OF NASAL CAVITY

Respiratory Epithelium

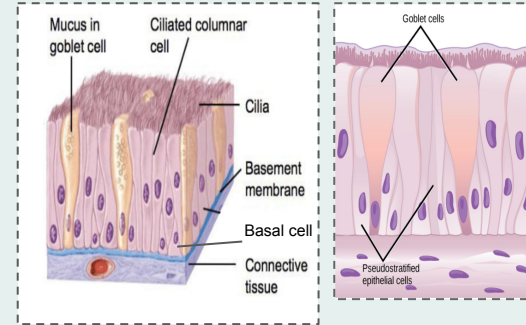
Main Types of cells

Definition

Pseudo-stratified ciliated columnar epithelium with goblet 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)
secret hormones e.g. serotonin



single layer of cells , The nuclei of these epithelial cells are at different levels

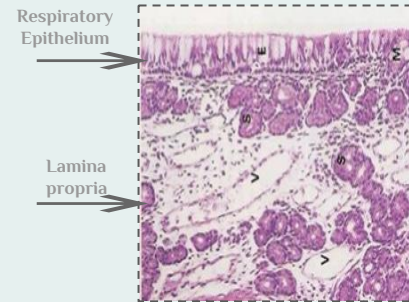
Lamina propria (Sub-epithelial C.T.)

contains

Definition

connective tissue lie below the respiratory epithelium

- 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

		Site	1-Roof of nasal cavity. 2-Upper part of nasal septum. 3-over superior concha.	
Lamina propria	Definition	Highly (richly) vascularized loose C.T		
	Contains	<ol style="list-style-type: none"> 1-Highly vascularized loose C.T. 2-Bowman's glands (olfactory glands): are serous acini 3-Bundles of unmyelinated nerve fiber 4-Rich vascular plexus. 5-Numerous lymphoid elements 		
Olfactory epithelium	Definition	Pseudo-stratified columnar epithelium , lie below C.T = lamina propria		
	Cell	olfactory cells (olfactory nerve cells)	<ol style="list-style-type: none"> 1-bipolar neurons 2-Dendrite has olfactory vesicle that has non-motile cilia. 3-Axons are unmyelinated with Schwann-like cells. 4-Axons will collect in the lamina propria to form bundles of nerve fibers 5-Bundles will collect to form the olfactory nerve 	
		sustentacular (supporting) cells	columnar cells. Function :Physical support and nourishment for olfactory cells	
		basal cells	Pyramidal in shape, basal in position and act as stem cells	

If you didn't like the last two slides you can study from this diagram

NASAL CAVITY

RESPIRATORY REGION

OLFACTORY REGION

MUCOSA (MUCOUS MEMBRANE)

site

site

OLFACTORY MUCOSA

Majority of the posterior nasal cavity is respiratory regions

Respiratory Epithelium

Lamina propria (Sub-epithelial C.T.)

Olfactory epithelium

Lamina propria

Pseudo-stratified ciliated columnar epithelium with goblet cells

contains

Pseudo-stratified columnar epithelium

Contains

Roof of nasal cavity.

over superior concha.

Upper part of nasal septum.

Ciliated columnar cells

Goblet cells

Basal cells: are stem cells

DNES cells: e.g. serotonin

- 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.

- 1-bipolar neurons
- 2-Dendrite has olfactory vesicle that has non-motile cilia.
- 3-Axons are unmyelinated with Schwann-like cells.
- 4-Axons will collect in the lamina propria to form bundles of nerve fibers
- 5-Bundles will collect to form the olfactory nerve

columnar cells for Physical support and nourishment for olfactory cells

Pyramidal in shape, basal in position and act as stem cells.

Olfactory (nerve) cells

Sustentacular cells

Basal cells

- 1-Highly vascularized loose C.T.
- 2-Bowman's glands (olfactory glands): are serous acini
- 3-Bundles of unmyelinated nerve fiber
- 4-Rich vascular plexus.
- 5-Numerous lymphoid elements

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

Note & extra inf



01

- Majority of the posteriors nasal cavity is respiratory regions
- respiratory mucosa : include Respiratory Epithelium and Lamina propria

02

- functions of respiratory region in the nasal cavity : humidify, warm, filter the air and protection
- Function of the Lamina propria : is Regulation of air temperature and secretion of mucosa by gland that work as protective barrier of the inhaled pathogens.

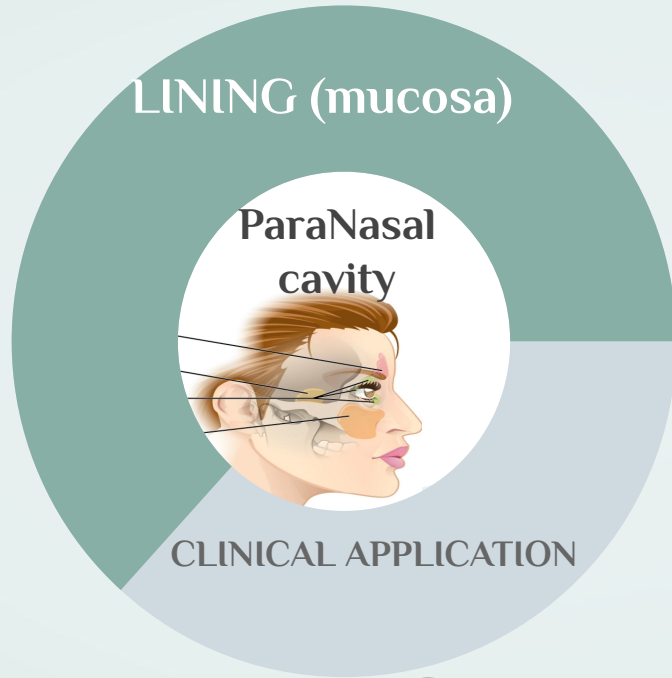
03

- Causes wetness of the nasal cavity
- 1) goblet cell in the Respiratory Epithelium
 - 2) seromucous gland in the lamina propria

04

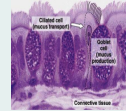
- OLFACTORY REGION consists of neurons and receptors
- sustentacular cells in this region support neuron cell body
- this area mainly for sense of smell



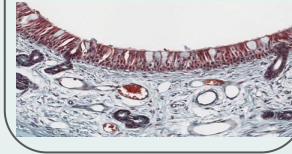


Respiratory epithelium

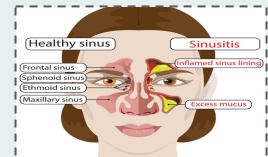
(Pseudo-stratified ciliated columnar epithelium with goblet cells)



Lamina propria



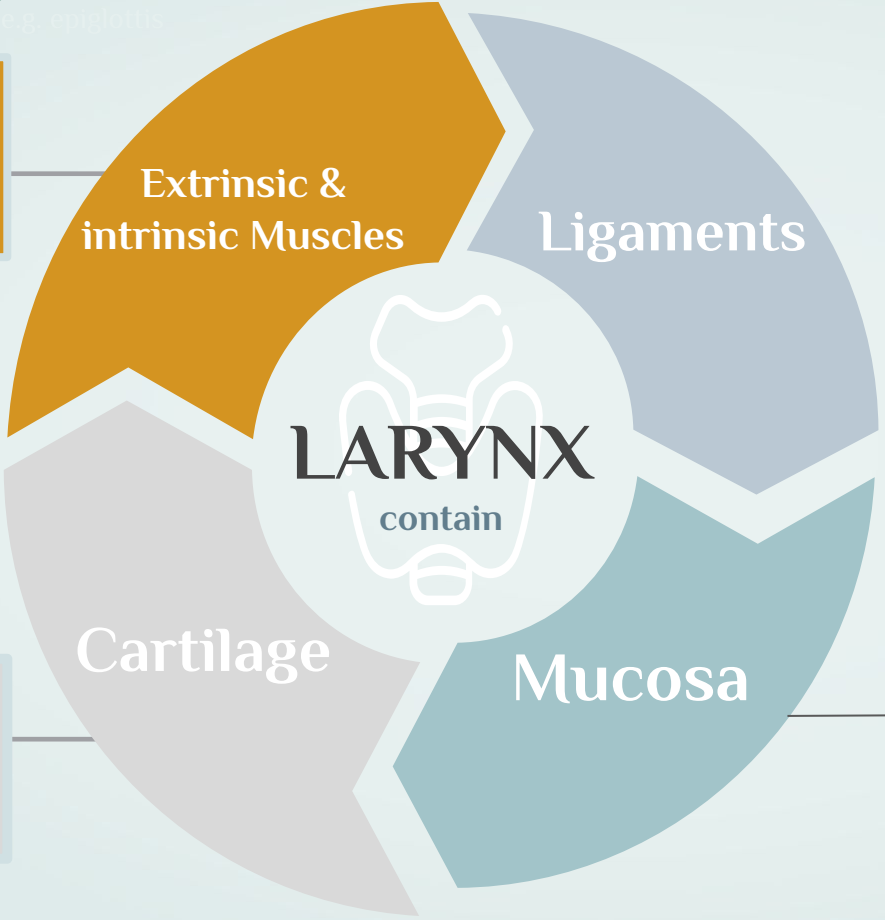
Sinusitis



LARYNX

2-elastic cartilage e.g. epiglottis

All are skeletal



1-hyaline cartilage e.g. thyroid

2-elastic cartilage e.g. epiglottis

Lamina propria

Vestibular folds: Are immovable. L/M:
a- Respiratory epithelium.
b- Lamina propria:
Loose C.T. with seromucous glands, lymphoid elements & adipose cells.

Vocal folds (cords), have:
a- Epithelium: non keratinized stratified squamous.
b- Lamina propria:
C.T. containing bundles of elastic fibers and skeletal muscle.
-No lymphoid nodules, No seromucous glands.

Epithelium

1)epithelium "2 types":
a- Respiratory epithelium
b-Non-keratinized stratified squamous epithelium ln:Vocal folds & Superior surface of epiglottis

Note & extra inf



01

-Paranasal sinuses are a group of four paired air-filled spaces that surround the nasal cavity

02

-Function (benefits) of the cavity in the skull :

1)lessening skull weight 2)contributing to voice resonance

-Any cavity in the skull is lined by epithelium : 99% is respiratory epithelium

03

-Sinusitis : is an inflammation or swelling of the tissue lining the sinuses

04

-Larynx is formed of : 1-bone 2-cartilage 3-muscle

-Epithelium of larynx:

95% respiratory epithelium

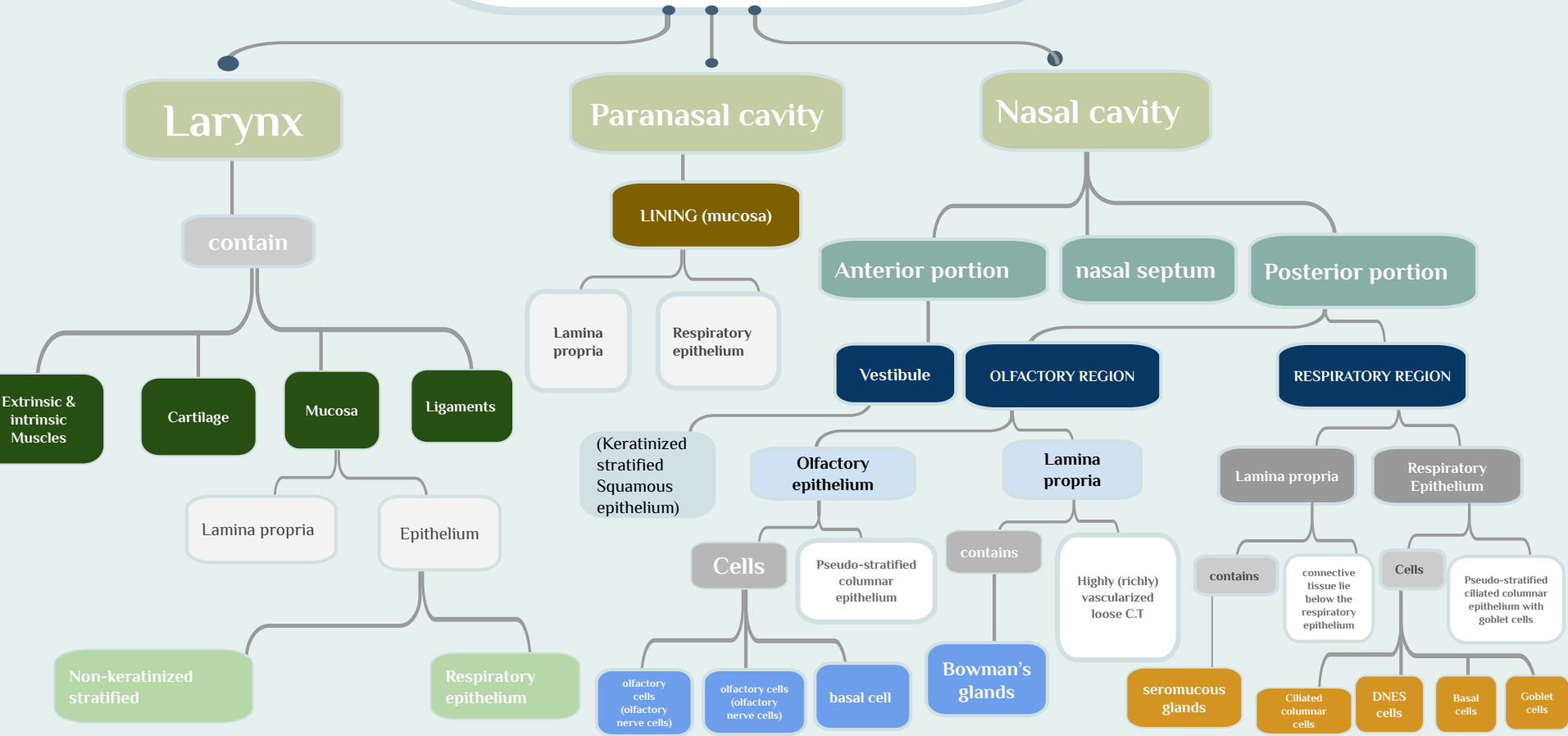
1% Non keratinized stratified squamous epithelium

-Lamina propria in the larynx have no goblet cell



SUMMARY

Upper respiratory Portions



MCQs :



Answer key:

- | | |
|-----|-----|
| 1:C | 5:C |
| 2:D | 6:B |
| 3:B | 7:C |
| 4:B | 8:A |

01

What is the type of respiratory epithelium?

- A) pseudo-stratified columnar epithelium.
- B) stratified columnar epithelium
- C) pseudo-stratified ciliated columnar epithelium with goblet cell
- D) Keratinized stratified Squamous epithelium

02

The lining of paranasal sinuses is?

- A) Respiratory epithelium
- B) Lamina propria.
- C) Elastic fibers.
- D) A&B

03

The wall of vestibule is?

- A) elastic cartilage
- B) Hyaline cartilage
- C) C.T
- D) A&B

04

The anterior portion of nasal cavity is?

- A) respiratory region
- B) Vestibule
- C) Sweat glands
- D) A&B

05

Which of the following has non motile cilia?

- A) Respiratory epithelium
- B) Vocal folds epithelium
- C) Olfactory nerve cell
- D) Sustentacular cells

06

Which of the following exists in the lamina propria of olfactory mucosa?

- A) seromucous glands
- B) unmyelinated nerve fiber
- C) mucous glands
- D) Vibrissae

07

Where can Non-keratinized stratified squamous epithelium be found?

- A) epidermis of vestibule
- B) inferior surface of epiglottis
- C) Vocal fold
- D) Respiratory epithelium

08

Adipose cells can be found in?

- A) lamina propria of vestibular fold
- B) lamina propria of vocal cords
- C) lamina propria of respiratory mucosa
- D) lamina propria of olfactory mucosa

Team leaders



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