

# NASAL CAVITY

## 1. Anterior portion of N.C.: Vestibule.

**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.

## 2. Posterior portion of N.C

**A- Respiratory region**  
**MUCOSA (MUCOUS MEMBRANE):**  
**(A) Epithelium:**  
 Pseudo-stratified ciliated columnar epithelium with goblet cells (Respiratory epithelium).  
**(B) Lamina propria ( Subepithelial 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.

**B- Olfactory region**  
**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.**  
**(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.

## PARANASAL SINUSES

**Lining:**  
 1- Respiratory epith.  
 2- Lamina propria.  
**CLINICAL APPLICATION:**  
 Sinusitis.

**1- Olfactory cells:** Are **bipolar neurons**  
**Dendrite** has olfactory vesicle.  
**Olfactory vesicle** has 6-8 olfactory cilia.  
**Olfactory cilia** are nonmotile  
 Microtubules of olfactory cilia  
**Cell body** with spherical nucleus.  
**Axons** are unmyelinated with Schwann cell-like olfactory ensheathing cells (glial cells).  
 Axons penetrate the basal lamina.  
 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 with:  
 Apical striated border (microvilli).  
 Oval Nucleus, in the upper third.  
 Apical cytoplasm has secretory granules with yellow pigments.  
 Have junctional complexes with olfactory Vesicles and other sustentacular cells.  
**Function:**  
 Physical support, nourishment & electrical insulation for olfactory cells.

**3- Basal cells: 2 types:**  
**a) Horizontal cells:**  
 Flat cells, lie against the B.M.  
**Function:**  
 Replicate to replace globose cells.  
**b) Globose cells:**  
 Short basophilic pyramidal cells.  
 Whose apical aspects do NOT reach the epithelial surface.  
**Function:**  
 Proliferate to replace both sustentacular & olfactory cells.

# 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.

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- **Vocal ligament**: bundles of parallel elastic fibers (dense regular elastic C.T.).

b- **Vocal muscle**: Skeletal muscle.

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

**No seromucous glands.**

## (B) Cartilages:

### 1- Hyaline cartilages:

Thyroid,

Cricoid,

Body of arytenoids.

### 2- Elastic cartilages:

Epiglottis,

Corniculate,

Cuneiform,

Tips of arytenoids.

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

## (D) Ligaments.

# RESPIRATORY EPITHELIUM

**Pseudostratified ciliated columnar epithelium with goblet cells.**

**6 types of cells** ( all touch the basement membrane)

### (1) Goblet cells (30%):

Produce mucinogen → hydrated → mucin.

### (2) Ciliated columnar cells (30%).

### (3) Basal cells(30%):

Short cells, rest on the B.M., Do not reach the lumen.

Function: stem cells (proliferate to replace other cell types.

### (4) Brush cells (3%):

Have microvilli.

**Function:** are sensory receptors or degranulated goblet cells.

### (5) Serous cells (3%): secrete serous fluid.

### (6) DNES cells ( K cells) (3-4%):

Are neuroendocrine cells.

Contains basal secretory granules.

Amines, Peptides, Acetylcholine, ATP.

# TRACHEA

## MUCOSA OF TRACHEA

### **(1) Epithelium:** Respiratory epithelium:

Pseudostratified ciliated columnar epithelium with goblet cells.

### **(2) Lamina propria:**

Loose, fibroelastic C.T. containing:

a- Lymphoid elements (e.g. lymphoid nodules & lymphocytes).

b- Mucous & seromucous glands.

### **(3) Elastic lamina:**

Dense layer (thick bundle) of elastic fibers.

It separates lamina propria from submucosa.

**N.B.** Mucosa is non-folded except posteriorly.

## SUBMUCOSA OF TRACHEA

Contents:

1- Dense irregular fibroelastic C.T.

2- Numerous mucous & seromucous glands.

3- Lymphoid elements.

4- Rich blood & lymph supply.

**N.B.** Other textbooks reported that submucosa of trachea is loose C.T.

## ADVENTITIA OF TRACHEA

Contents:

1- **Fibroelastic C.T.**

2- **C-shaped rings (10-12) of hyaline cartilage.**

**Trachealis muscle (bundle of SMF)** connects the open ends of each C-shaped ring of cartilage. Perichondrium of C-shaped rings of hyaline cartilage are connected together by dense fibroelastic C.T.