# RSS - histo

- [ ] conducting part is separated from respiratory part by weak transitional part .
- [ ] dyeline is protein lead to Cilli movement outward to get foreign bodies out .
- [ ] Immotile cilia syndrome (Kartagner syndrome) : smoking nicotine prevent cilia movement = infertility in men.
- [ ] conducting part : pseudo stratified ciliated columnar + goblet cells , no exchange , moister + clean + warm air ,
- [ ] bronchi : primary (main - out lung) , secondary (lobar bronchi , 3 in right lung , 2 in left) , tertiary(10 segments in each lung).
- [ ] terminal bronchiole : (simple columnar to cuboidal , ciliated to non ciliated ).
- [ ] trachea : mucosa>> submucosa >> hyaline cartilage >> connective tissue “adventitia”.
- [ ] hyaline cartilage keeps trachea open (c shape , tracheales muscle posterior complete circle ) , like circular plates in bronchus.
- [ ] respiratory part : simple squamous , exchange , capillaries surround alveolus , + surfactant cells “ newborn-phrenic nerve - diaphragm moves - surfactant - wider alveoli - breath ” .
- [ ] to check blood gases take artery blood sample .
- [ ] lining epithelium : 5 cells :

1. pseudo stratified ciliated columnar ,most abundant attached to basal , mitochondria .
2. goblet cells : secret mucin
3. Bruch cells : microvilli , sensory attached to basal .
4. basal : reserve cells , stem .
5. DNES :(diffuse neuroendocrine system), Kulchitsky Cells , regulate secretion .

- [ ] hyaline cartilage + goblet disappear moving distally “narrower diameter ” ,more smooth muscle appear .lymphatic nodules increase till lungs .

## nasal cavity

- [ ] vestibule : modified skin , hair follicles “vibrissae”, sweat + Sebaceous glands .
- [ ] respiratory area : pseudo stratified ciliated columnar + goblet cells , + bipolar cells in nasal roof .
- [ ] Olfactory region : roof and upper parts , bipolar cells transmits signal to olfactory nerve, Bowmans gland “dissolve odor ” + basal cells .

## Nasal Sinuses

- [ ] lined with a thinner respiratory epithelium , contain air , glands .
- [ ] 2 frontal , 2 maxillary , 2 sphenoid , 3 sub ethmoidal .

- [ ] trachea from C6 , left bronchi= longer , narrower , horizontal, right : shorter , wider , vertical “more infected”.
- [ ] respiratory bronchioles : “clara cells” , no goblet , then simple squamous epithelium .

## Bronchioles

- [ ] 0.5-1 mm , no cartilage , no glands , few goblets , clara cells “simple columnar to cuboidal , no cilia ,secretory granules ,surfactants,neuroepithelial bodies , cholinergic nerve endings ” , no lymphatic nodules .
- [ ] terminal bronchioles : folds of smooth muscle , simple ciliated columnar to cuboidal , sympathetic cause bronchodilatation .
- [ ] respiratory bronchioles : closed, simple squamous epithelium , knobs of smooth muscle .
- [ ] Type I cells : squamous , respiratory , 97% of wall , desmosomes & occluding junctions.
- [ ] Type II cells : cuboidal , decrease surface tension , surfactant ”foamy , lamellar bodies , antibacterial ” , regulate replacement ,
- [ ] Alveolar : elastic and reticular fibers provides support , septum connects alveolar walls , less type 1 in septum (squamous) , **more type 2 (surfactant) = septal cells** .
- [ ] The capillaries and connective tissue constitute the interstitium (septum = macrophages & mast cells & type 2 cells).
- [ ] pores equalizes air pressure between alveoli , 15 um .

- [ ] Blood-air barrier : 0.1 to 1.5 um , 1-lining cytoplasm **alveoli type 1** “respiratory”, 2-fused basal , 3- cytoplasm of capillary .

## Gas exchange

- [ ] 140 m2 exchange area , o2 to capillary , co2 to lung , $CO_2$ from $H_2CO_3$ is catalyzed by the enzyme carbonic anhydrase.
- [ ] Capillary endothelial cells : non fenestrated , empty cytoplasm , near by RBCs , pinocytotic vesicles.
- [ ] Inhalation of $NO_2$ destroys most of the cells , type 2 regenerates it self and type1 .
- [ ] dust cells : in septum , ingulf foreign bodies , huge number more than type1 in alveoli .
- [ ] pulmonary veins are on sides of alveoli , then to left atrium .
- [ ] lymph in right & left duct in beginning of brachiocephalic veins , Pleura = mesothelial then connective , 2 layers .