

# The A to Z of Respiration



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# The A to Z of Respiration

## Introduction

This book is a reference and illustrated guide to the breathing process. It is the 16th book in the A to Z series & now has more material online, at the A to Z website listed below. Please let me know if there is any other support whether online or not, which would be helpful. All feedback is appreciated, and I thank those of you who send me your thoughts and comments on this series. Believe me they make a difference. I feel with each book a new level is reached. I hope this is the case with this latest book.

The A to Zs may be viewed on 3 sites –

**[www.amandasatoz.com](http://www.amandasatoz.com) and**

**<http://www.aspenpharma.com.au/atlas/student.htm>**

**<http://www.aspenpharma.com.au>**

Feedback may be left at

**[mandasatoz@gmail.com](mailto:mandasatoz@gmail.com)**

## Acknowledgement

Thank you Aspen Australia for your support and assistance in this valuable project.

## Dedication

*To those who support this project and have done so for many years. To my friends and colleagues, many of whom work at Aspen. It is possible things are changing with respect to Anatomy - many medical and other healthcare students including nursing students have pushed for more anatomy in their courses. Indeed there is a push in the community for more understanding of the components and working of this wonderful machine - the human body - so I also dedicate this book to the wonderful human body.*

## How to use this book

The format of this A to Z book has been maintained.

The Common Terms (CT) section comments on a number of processes & pathologies in the respiratory system, while the Main Text (MT) is alphabeticalized as usual, & has 3 subsections: the Respiratory Cells, the Function & the Structures of the Respiratory System. The cross-referencing b/n the 2 sections & other A to Zs has been expanded, as requested via feedback comments. So as usual **think of it and then find it** is the motto **of the A to Zs** and continues to be the structure behind the book. Additional information may found in all the A to Zs but in particular **The A to Z of the**

*Head & Neck Bones & Muscles, The A to Z of Major Organs, The A to Z of the Brain & Cranial Nerves, The A to Z of the Heart, & The A to Z of the Digestive Tract*, and in some instances the reader is guided to these areas and other areas of interest via QR codes inserted strategically into this book. However as with all the A to Zs this book is complete unto itself.

Thank you

**A. L. Neill**

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# Abbreviations of the terms used in Respiration

## A

|             |  |
|-------------|--|
| a           | artery   |
| aa          | anastomosis (ses)  |
| AA          | amino acid   |
| AB          | acid/base  |
| Ab          | antibody   |
| ACTH        | adrenocorticotrophic hormone / adrenal cortical hormone                                |
| adj.        | adjective  |
| ADP         | adenosine diphosphate  |
| <b>ADS</b>  | <b>anatomical dead space</b>   |
| AF          | air flow   |
| Ag          | antigen  |
| AKA         | also known as  |
| alt.        | alternative  |
| <b>ALTH</b> | <b>acclimatization to hypoxia - long term</b>  |
| AMP         | adenosine monophosphate  |
| ANS         | autonomic nervous system   |
| ant.        | anterior   |
| art         | artery   |
| AP          | anterior – posterior   |
| AQP         | aquaporin  |
| <b>AR</b>   | <b>Airways resistance</b>  |
| AS          | Alternative Spelling, generally referring to the diff. b/n British & American spelling |
| <b>ASTH</b> | <b>acclimatization to hypoxia - short term</b>   |
| ATP         | adenosine triphosphate   |
| a&v         | artery and vein  |

## B

|             |  |
|-------------|--|
| b           | bone   |
| B           | blood  |
| <b>BALT</b> | <b>bronchus associated lymphoid tissue</b>                         |
| BB          | basal bodies   |
| bc          | because  |
| BGB         | blood / gas / barrier  |
| BM          | basement membrane / basal lamina / terminal lamina / plasma lamina |
| b/n         | between  |

## The A to Z of Respiration

|    |                |
|----|----------------|
| bn | bone           |
| BP | blood pressure |
| br | branch         |
| BS | Blood Supply   |

### C

|             |  |
|-------------|--|
| cAMP        | cyclic AMP                                     |
| cart        | cartilage                                      |
| CC          | costal cartilage                               |
| CCF         | congestive heart failure                       |
| c.f.        | compared to                                    |
| CF          | cystic fibrosis                                |
| CFA         | cryptogenic fibrosing alveolitis               |
| CM          | cellular membrane / plasma membrane            |
| CMV         | controlled mechanical ventilation              |
| CMV         | cytomegalovirus                                |
| CNS         | central nervous system                         |
| <b>COAD</b> | <b>chronic obstructive airway disease</b>      |
| <b>COLD</b> | <b>chronic obstructive lung disease</b>        |
| <b>COPD</b> | <b>chronic obstructive pulmonary disease</b>   |
| CP          | cervical plexus                                |
| <b>CPAP</b> | <b>continuous positive airway pressure</b>     |
| collat.     | collateral                                     |
| Cr          | cranial  |
| CT          | connective tissue / computed tomography        |
| CT          | common terms section of this book ( $\neq$ MT) |
| CXR         | chest Xray                                     |

### D

|       |                        |
|-------|------------------------|
| DNA   | deoxyribonucleic acid  |
| DOPA  | dihydroxyphenylalanine |
| DT    | digestive tract        |
| diff. | difference(s)          |
| dist. | distal                 |
| DM    | dura mater             |
| DT    | digestive tract        |

## E

|      |  |
|------|--|
| E    | energy   |
| e.g. | example  |
| EAM  | external acoustic meatus                         |
| EC   | extracellular (outside the cell)                 |
| ECF  | extracellular fluid                              |
| ER   | endoplasmic reticulum                            |
| ext. | extensor (as in muscle to extend across a joint) |

## F

|     |                              |
|-----|------------------------------|
| FRC | Functional Residual Capacity |
| FVC | Forced Vital Capacity        |

## G

|     |                 |
|-----|-----------------|
| GA  | Golgi apparatus |
| gld | gland           |
| Gk. | Greek           |
| GM  | grey matter     |
| GN  | Golgi network   |
| grp | group           |

## H

|     |  |
|-----|--|
| H   | hormone  |
| Hb  | haemoglobin                                    |
| H&E | haematoxylin & eosin                           |
| Hg  | haemorrhage                                    |
| HP  | high pressure / high power - wrt magnification |



|            |                                 |
|------------|---------------------------------|
| IAM        | internal acoustic meatus        |
| <b>IC</b>  | <b>intercostal</b>              |
| IC         | intracellular (inside the cell) |
| <b>ICS</b> | <b>intercostal space</b>        |
| IF         | inflammation                    |
| ImR        | immune response                 |
| inf        | inferior                        |
| In         | infection                       |
| IR         | inflammatory response           |
| IVC        | inferior vena cava              |
| ly         | injury                          |



## J

|       |                        |
|-------|------------------------|
| JC    | junctional complex     |
| jt(s) | joints = articulations |

## L

|            |                                  |
|------------|----------------------------------|
| l          | lymphatic                        |
| lig        | ligament                         |
| L          | lumbar / left                    |
| <b>LA</b>  | <b>lower airways</b>             |
| LB         | lamellar bodies                  |
| lig        | ligament                         |
| LP         | lamina propria / lateral process |
| LP         | low power - wrt magnification    |
| <b>LRT</b> | <b>lower respiratory tract</b>   |
| LT         | lymphoid tissue                  |
| Lt.        | Latin                            |
| LUQ        | left upper quadrant              |
| LV         | left ventricle/ lung volume      |

## M

|      |                                     |
|------|-------------------------------------|
| m    | muscle                              |
| med. | medial                              |
| mem  | membrane                            |
| mito | mitochondrion (a)                   |
| MM   | mucus membrane                      |
| mRNA | messenger RNA                       |
| MT   | main text of this book ( $\neq$ CT) |
| mv   | microvillus(i)                      |

## N

|      |                                |
|------|--------------------------------|
| N(s) | nerve(s)                       |
| NAD  | normal (size, shape)           |
| NAD  | no abnormality detected        |
| NM   | nuclear membrane / nucleolemma |
| NR   | nerve root origin              |
| NRAM | non-respiratory air movement   |
| NS   | nerve supply / nervous system  |
| NT   | nervous tissue                 |
| nv   | neurovascular bundle           |

## O

|     |                         |
|-----|-------------------------|
| O   | origin                  |
| OSA | obstructive sleep apnea |

## P

|            |  |
|------------|--|
| pl.        | plural   |
| ParaNS     | parasympathetic nervous system                 |
| <b>PDS</b> | <b>physiological dead space</b>                |
| PN         | peripheral nerve                               |
| <b>PND</b> | <b>posterior nasal drip</b>                    |
| post.      | posterior                                      |
| proc.      | process  |
| prox.      | proximal                                       |
| PSCCE      | pseudo-stratified columnar ciliated epithelium |

## Q

|   |           |
|---|-----------|
| Q | perfusion |
|---|-----------|

## R

|           |                                |
|-----------|--------------------------------|
| R         | right / resistance             |
| R&L       | right and left                 |
| REM       | rapid eye movement             |
| RNA       | ribonucleic acid               |
| rRNA      | ribosomal RNA                  |
| RT        | respiratory tract              |
| RUQ       | right upper quadrant           |
| RV        | right ventricle (of the heart) |
| <b>RZ</b> | <b>respiratory zone</b>        |

## S

|         |                                    |
|---------|------------------------------------|
| SA      | surface area                       |
| SC      | spinal cord                        |
| sing.   | singular                           |
| SN      | spinal nerve                       |
| SP      | surfactant proteins                |
| SS      | signs & symptoms                   |
| St      | surface tension                    |
| subcut. | subcutaneous (just under the skin) |
| sup     | superior                           |

## The A to Z of Respiration

|       |                            |
|-------|----------------------------|
| supf  | superficial                |
| SymNS | sympathetic nervous system |

### T

|            |                                  |
|------------|----------------------------------|
| T          | thoracic / thorax / tissue       |
| TJ         | tight junctional complexes       |
| TNF        | tumour necrosis factor           |
| tRNA       | transfer RNA / transport RNA     |
| <b>TRU</b> | <b>terminal respiratory unit</b> |
| <b>TZ</b>  | <b>transport zone</b>            |

### U

|            |                                |
|------------|--------------------------------|
| <b>UA</b>  | <b>upper airways</b>           |
| UL         | upper limb / arm               |
| <b>URT</b> | <b>upper respiratory tract</b> |

### V

|            |  |
|------------|--|
| V          | vein / vertebra                                |
| V          | ventilation                                    |
| v          | very   |
| VB         | vertebral body                                 |
| VC         | vocal cord / vertebral column / vital capacity |
| VF         | vocal fold                                     |
| <b>V/Q</b> | <b>ventilation / perfusion ratio</b>           |
| vv         | visa versa                                     |

### W

|     |                 |
|-----|-----------------|
| WM  | white matter    |
| w/n | within          |
| w/o | without         |
| wrt | with respect to |

### Z

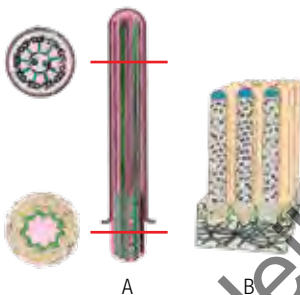
|    |                                   |
|----|-----------------------------------|
| ZA | zonula adherens                   |
| ZO | zonula occludens / tight junction |

## SYMBOLS

|        |                   |
|--------|-------------------|
| &      | and               |
| $\cap$ | intersection with |

**Chronic Obstructive Airways Disease (COAD):** a collective term for IF airway diseases (e.g. emphysema, chronic bronchitis, bronchopneumonia etc). This term is synonymous with COLD, COPD.

**Cilium (sil-ee-um):** *Lt cilia* = *eyelashes* hence hair-like process(A) associated with cells; a modification of the CM with specific internal fibrillar cytoskeletal structures which allows it independent movement as opposed to a mv(B), which does not. Ciliary movement generates a flow of fluid (usually mucus) in the EC environment.  
*adj. ciliary, ciliated pl. cilia*



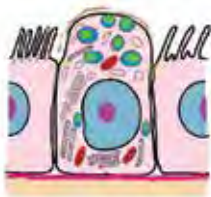
**cine- (sin-ee) movement**

**Circadian Rhythm:** the day/night cycle determined by the pineal gland through its secretion of melatonin. Sleep patterns are in part determined by the levels of melatonin. *see also Melatonin*

**circum- (SER-kum) around , surrounding**

**cis- (sis) on this side**

**Clara cells:** "clear & famous" cells found at the beginning of the terminal bronchioles, which produce surfactant similar to Type II cells of the alveoli. Clara cells "peg out" when they release their secretions often dying in the process - holocrine secretion *see also surfactant MT cells of respiration*



**"Clearing the throat"** *see Throat*

**cleist- (klist-) closed**

**clist- closed**

**Closing Volume:** as the Lung Volume (LV) is reduced towards the Residual Volume (RV), there is a point when the airways start to close. Closing Vol = Closing Capacity - RV

**co- (koh) with together**

**coen- general, common**

**col- with, together**

**Cold AKA Common Cold AKA Nasopharyngitis AKA Rhinopharyngitis AKA Coryza:** an acute but mild self-limiting viral infection(s) of the URT, primarily affecting the nose & throat. SS mainly result from the body's reaction to the infectious agents include: low fever, coughing, congested/runny nose, headache, sneezing & sore throat. Duration is b/n 3-10 days or

if severe up to 21 days. The cough may persist for longer. The rhinoviruses are the commonest causes, although >200 viruses have been implicated, often occurring together i.e. the cold may result from multiple viral In's & lead onto a bacterial In.



**coelom-** (**SEE-lohm**) **body cavity**

**Collagen (KOL-a-jen):** a protein that is an abundant component of CT.

**Collateral:** *adj. Lt. con = together & latus = side*, hence, alongside.

**Columna:** *Lt. = column, or pillar.*

**com-** together, with

**Coma (KOH-mah):** *Gk koma = sleep* hence refers to a depressed state of consciousness & ability to respond to stimuli. The breathing patterns change with varied conscious states - *see MT breathing patterns*

**Compliance:** the ease of stretching the lungs or the chest wall. Reduced in fluid filled walls - which occurs with RV failure / pulmonary oedema ( $\neq$  **Elastance**).

**con-** together with

**Concha (KONG-ku) AKA Turbinate:** a shell shaped bone as in the ear or nose *pl. conchae adj. chonchoid.*

**Conductance:** the ease with which the gas or liquid can be made to flow through a tube ( $\neq$  **Resistance**).

**Conducting airways:** the airways which conduct the gas to the site of GE. These passages make up most of the ADS, & are proximal to the respiratory bronchioles.

**Congenital (KON-jen-it-al):** present from birth

**Connective tissue (CT) (kon-EK-tiv Tish-ew):** one of the 4 basic types of T in the body. It is characterized by an abundance of EC material with relatively few cells, & functions in the support & binding of body structures.

**Consolidation:** term used to describe when the normally air filled alveoli in the lung become solid with cells &/or exudate etc - present in pneumonias  $V/Q < 1$  approaching zero in severe cases.

**Constrictor:** to squeeze - generally referring to a circular muscle's action where it  $\downarrow$  the size of an opening often to direct movement of the contents in a single direction (as in Pharynx, with swallowing) *see also Sphincter*

**Continuous Airways Positive Pressure**

**(CPAP):** a method of non invasive ventilation whereby air is blown into the airways for the whole respiratory cycle. It is generally delivered via a mask over the mouth &/or nose for sufferers of OSA, pushing open the soft palate.



## contra- opposite against

**Contralateral:** *Lt. contra = against, latus = side*, the opposite side  
(≠ Ipsilateral)

## cor- heart

**Cor pulmonare:** RV enlargement due to pulmonary hypertension *see also Pulmonary Hypertension*

**Cornu:** a horn (as in the Hyoid)

**Corona (kor-ROH-nuh):** *Lt. coron = crown, hence, encircling like a crown:* a crown. *adj. coronary, coronoid or coronal;* hence a coronal plane is parallel to the main arch of a crown which passes from ear to ear (*c.f. coronal suture*). It extends vertically to divide the body into ant. & post. portions, AKA the frontal plane

## corp- (kor) body

**Corpus:** *Lt. = body, pl.- corpora.* pertaining to the body or the main part of the organ

**Corpuscle (KOR-puhs-el):** *Lt. = a little body* hence used to describe a small body contained w/n a sac, as in red corpuscle (RBC) small package of Hb

## Coryza (KOR-ï-zuh) AKA Cold AKA Rhinitis

**Cortex (KOR-tehks):** *Lt. = bark, adj. cortical* the outer portion of an organ.  
(≠ Medulla)

**cost- (kost) rib** *Lt. = rib. adj. costal*

**Cough (KOF):** non-respiratory air movement due to forced expiration against a closed glottis *see MT*

**Countercurrent:** two streams flowing in an opposite directions to maximize the exchange of chemicals or heat

**Cribriform / Ethmoid:** a sieve or bone with small sieve-like holes.

**Cricoid:** a ring wrt pulmonary system the uppermost ring of the trachea – & the only complete tracheal ring. It is associated with the thyroid & arytenoid cartilages and larynx *see also arytenoid cartilages, larynx.*

## -crine (krin) to secrete

**crur- (kroo-r) leg** *Lt. = leg, sing crus pl - crura.*

## crypt- hidden, covered occult

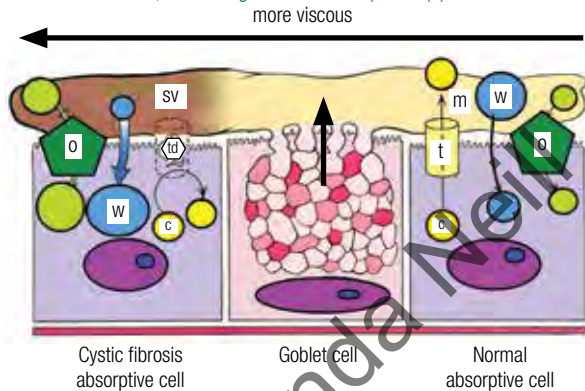
**Cutis - (KEW-tis):** *Lt. cutis = the skin adj cutaneous (kew-TAY-nee-us)*

**Cyanosis (SĪ-an-oh-sis):** *Gk kyanos –blue material*, hence blueness mauveness of the skin, or elsewhere due to the amounts of de-oxygenated Hb

## cyst-(sist-) sac, bladder

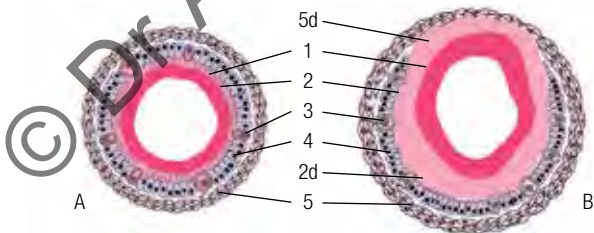
**Cyst (sist-):** *Gk. kystis = bladder, adj. cystic.* referring to fluid enclosed w/n epidermal layers *c.f. cystic fibrosis*

**Cystic Fibrosis (CF):** an autosomal recessive condition caused by a defect (td) in the cystic fibrosis transmembrane transporter (t) of the Chloride ion (c) resulting in the abnormally viscous lung secretions (sv), due to the fact that water (w) travels back into the absorptive cells (a) rather than remaining in the airways & diluting the coating mucous (m). This causes the lungs to be prone to lns & bronchiectasis, even though other ion transporters (o) are not affected.



In the bronchioles this presents as dilated damaged walls (B - 5d) with cilia (2) damaged or missing (2d) full of mucus (1). The number of mucous glands (3) is unchanged but the secretions do not move on, which damages the lining epithelium (4).

Cystic fibrosis also affects the pancreas secretions & production of semen.  
*see also Bronchiectasis*



**cyto-/-cyte (sīt-OH-) cell mature cell type**

**Cytoplasm (Sī-to-plazm):** the material of a cell located w/n the CM & outside the NM containing the cellular organelles.

**Cytosol (Sī-toh-sol)** the thickened fluid of the cytoplasm. It lies outside the cellular organelle membranes.

**Cytoskeleton (sī-toh-SKEL-eh-ton):** the complex supportive network of microtubules & microfilaments in the cytoplasm. *For more details see **the A to Z of Major organs***

## D

**de-** remove, undoing, reversal, depriving, freeing from

**Dead Space (DS):** areas in the RT which do not have any GE - ↑ in many disease states & in CCF *see also Consolidation*

**dec- (des) ten, tenth**

**Deglutition:** *Lt. deglutire = to swallow*, hence the act of swallowing.

**Degranulation:** the process of shedding granules from the cell cytoplasm into the exterior (c.f. degranulation of mast cells in an allergic reaction)

**dem-** people, population

**demi- (dem-ee) half**

**Dendrite AKA Dendron:** *Gk. = a tree*, hence like the branches of a tree.

**dendro-** branching, treelike

**Dens:** a tooth, denticulate having tooth-like projections *adj dental, dentate, dentine denticulate*

**Depress:** *Lt. de = prefix implying descent & pressum = pressed*, hence to press down

**Depression:** downward movement or a concavity on a surface.

**Dermatome** *Gk. derma = skin, tome = a cutting or division*, a segment of skin supplied by a single SN *see also Myotome.*

**derm(o)-** skin

**Dermatitis (derm-u-tī-tis):** any skin IF

**di** two, twice, double, reversal, separation, apart from

**dia-** through across, between, apart, complete

**Diaphragm:** *Gk. dia = across, & phragma = wall*, hence, a partition.

Generally this refers to the dome-shaped muscular sheet which separates the thorax from the abdomen, *adj. diaphragmatic*

**Diffuse parenchymal lung disease AKA Interstitial lung disease:**

diseases where the interstitium is thickened generally by fibrosis, ↓ GE.

These diseases maybe idiopathic but are often associated with IF diseases & IF caused by breathing in FBs such as asbestos, silicon & carbon particles

**Diffusing Capacity:** the ability of the lung to allow gas to diffuse from the air to the B & vv

**Diffusion:** the process whereby a substance is transported along a concentration gradient by a random movement of molecules

**diplo-** double, twin

**dis-** apart from, two, twice, double, reversal, separation, difficult, wrong



**Discharge:** the term used to imply the oozing of a mucoid liquid e.g. nose, throat

**Discus (DIS-kus):** *Lt. = disc. adj. discoid*

**Disease (DIZ-eez):** *Eng. dis- ease = lack of comfort, anything limiting health & comfort of the organism*

**Distal (DIS-tahl):** *Lt. di = apart & stans = standing, away from the middle of the body or the axis or core of the body (≠ proximal)*

**Dorsum (DOR-sal):** *Lt. dorsum = back adj = dorsal* a directional term indicating toward the back side, or posterior

**Drive to breathe:** physiological changes which increase ventilation c.f.

↓ O<sub>2</sub> &/or ↑ CO<sub>2</sub>

In most people the drive to breathe depends upon the B[CO<sub>2</sub>], rather than the O<sub>2</sub> levels. Oxygen drive occurs in long standing patients with COAD as the B[CO<sub>2</sub>] is constantly elevated, and is no longer a reliable parameter.

**duo- (DEW-oh) two**

**dy- two**

**Dynamic Airway Collapse:** collapse of the airways provoked by ↑ flow c.f. coughing ↑ flow & collapse

**dys- (dis) difficult, painful, abnormal**

**Dysplasia:** changes in the morphology of growing cells / Ts

**Dyspnoea:** the sensation of breathlessness - irregular breathing

**Dystrophy (DIS-troh-fee):** irregular abnormal growth

## E

**e- outside external out protrude over away less**

**ec- outside out to protrude over away less / house**

**Ectasia (EK-tay-zee-yuh):** dilatation or distention of a tubular structure. May be physiological & under H influence e.g. duct ectasia of the breast, a dilated milk duct, or pathological c.f. bronchi / bronchiole ectasia.

**ecto- outer out of place**

**-ectomy to cut out , excise surgically**

**Ectoderm (EHK-toh-derm):** *Gk. ektos = outside & derm = skin* the outermost layer of the 3 primary germ layers in the developing embryo. It gives rise to the NS & to the epidermis & its derivatives

**Edema (eh -DEE-mah) AS Oedema**

**Edentulous:** w/o teeth

**Edge:** border or margin of a surface.

**ef- outside out to protrude over away less**

**Efferent:** *adj. Lt. ex = out, & ferens = carrying*, hence, conducting from. Efferent Ns move away from the brain - & are motor Ns  $\neq$  **Afferent**

**Elastance  $\neq$  Compliance**

**Elastic recoil:** the tendency of the lungs to resist stretching, due to their elasticity

**Elasticity (ee-laz-STIS ih-tee):** the physiological property of T to return to its original shape after distortion

**Elastin:** major EC fibre which has large recoil properties - made up of fibrillin(1) filaments & elastin matrix(2). These assemble EC after smaller IC components are extruded.

Later X-links form in the EC, adding to its elastic properties.



**Emphysema (EMPF-uh-seem-uh):** defined as the anatomical destruction of the alveolar septa resulting in permanent enlargement of the air spaces distal to the terminal bronchioles. Part of the spectrum of COAD. The result is permanently hyperinflated lungs - with reduced elastic recoil - so that expiration is difficult to complete.



NAD



emphysema

**em-** within, inside, into in on

**Embolus (EM-bohi-us):** *Gk embolos = plug, wedge or blocking matter* hence a mass which travels in the BS & suddenly blocks an artery i.e. plugs it up, frequently resulting from a dislodged thrombus. If this arises from the LL then it may lodge in the pulmonary arteries causing sudden SOB  $\pm$  death - pulmonary embolus *adj emboliformis see also Thrombosis*

**emet-** vomiting

**-emia AS -aemia** pertaining to blood, generally RBCs

**en-** within, inside, in, on

**endo-** within, inside, into, on

**Endocytosis (ehn'-do-sih-TO-sihs):** the active process of bulk transport of material into a cell. It includes phagocytosis & pinocytosis.

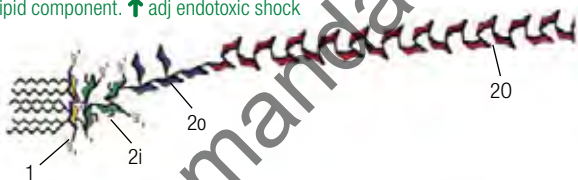
**Endoderm (en-DOH-derm):** *Gk. endo = within, & derm = skin* one of the 3 primary germ layers in an embryo, it begins as the inner layer, later forms the organs of the DT & the RT.

**Endoplasmic reticulum (ER) (en-doh-PLAZ-mik reh-TIK-yew-lum):** a cytoplasmic organelle that consists of a series of tubules with a hollow center. It functions in the transport of cellular products (smooth ER), & as a site for protein synthesis (if ribosomes are attached, called rough ER)

**Endothelium (en-doh-THEE-lee-um):** *Gk. endo = within, & thele = the nipple* a layer of simple squamous epithelium lining the inside of BVS & the heart chambers.

**Endotoxins AKA Lipopolysaccharides (LPS) AKA Lipoglycans:**

*Gk. endo = within, & toxia = poison*, are large molecules consisting of a lipid(1) & a polysaccharide(2) composed of O-Ag(20), an outer core(2o) & inner core(2i). They are found in the CM of Gram-negative bacteria, (e.g. *Bordetella Pertussis*) & elicit a strong IR, AKA septic shock due mainly to the lipid component. ↑ adj endotoxic shock



**ent- within, inner**

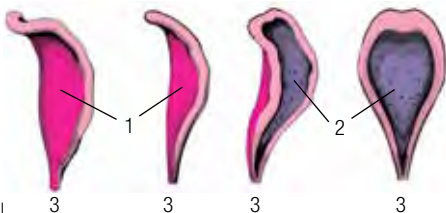
**Eosinophil (ee-oh-SIN-oh-fil):** a type of granulated WBC characterized by a cytoplasm which absorbs the eosin stain. *see MT*

**ep- upon, in addition to, beside among, on the outside, over**

**epi- upon, in addition to, beside, among, on the outside, over**

**Epidural:** *adj. Gk. epi = upon, Lt. dura = tough*, hence, external to the dura mater (DM).

**Epiglottis:** an unpaired leaf like plate of fibro elastic cartilage Vallecule situated behind the root of the tongue (lingual surface - 1) & Hyoid & in front of the laryngeal inlet (laryngeal surface - 2) attached to the thyroid cartilage by the petiolus (cartilaginous stem - 3)



**Epistaxis:** nosebleed, generally from the septum in the Little's area an intersection of the 3 main BVs supplying the nose



**equi-** equal

**Equal Pressure point:** during forced expiration that point of the airways where the intraluminal P = the external lung P, & collapse is likely to occur

**-ergy action**

**erythr-** red

**Erythema (eh-REE-thee-muh):** Gk.: flushing on the skin – redness

**Erythrocyte AKA red blood cell (RBC):** anucleate biconcave cell, the commonest in circulating B which acts as a carrier of O<sub>2</sub> & CO<sub>2</sub> through its Hb.

**Ethmoidectomy:** removal of the partitions b/n the ethmoid sinuses (A) creating larger sinus cavities (B) to treat/cure chronic sinusitis caused by repeated sinus ins & obstructions, which are often associated with nasal polyps.



**Ethmoids AKA ethmoid sinuses (slang)** air spaces in the Ethmoid bone b/n the eyeballs, extending to the bridge of the nose, & drains into the nasal cavity. If fluid is trapped in this area, it may cause chronic infections & sinusitis & may require an ethmoidectomy.

**eu-** good normal well easily

**eury-** broad wide

**Eversion:** Lt. *e = out, and versum = turned*, hence turned outwards.

**ex-** to protrude outside out over away less

**Excretion (ek-SKREE-shun):** the processes by which metabolic waste materials are removed from cells, Ts or entire bodies.

**exo-** outside outer layer out of

**Expiratory Flow Limitation:** the point where in expiration – it is not possible to force more air out as the lung Ts have collapsed this ↑ with age & disease meaning there is less working volume for GE in the lung

**External:** *adj. Lt. externus = outward*, hence, further from the inside.

**External Auditory Meatus (EAM):** ear hole

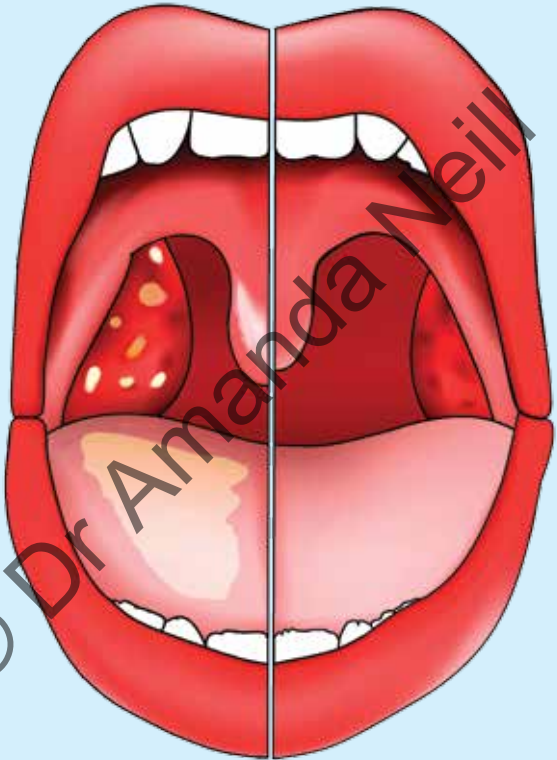
**extra-** outside of out over beyond, in addition to,

**Extracellular environment (EKS-trah-CEL-yew-lar en-VI-ROH-ment):** the body space outside the CM.

**Extracellular fluid (ECF):** the fluid outside the CM, including interstitial fluid & B plasma.

B

C



©

## Tonsils – in situ

*Lateral view - with tissues cut away to show their relationships*

*Mouth of a child*

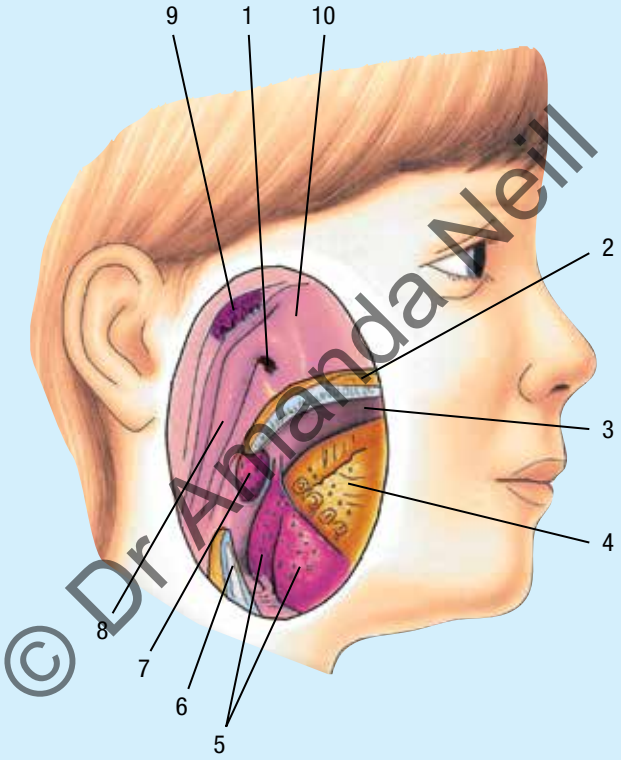
The tonsils form a defense ring around air and food pathways. Even though they play a role in the defense of substances passing through – in infected states – tonsillitis -they swell and compromise access of air and food to the body.

- 1 **Nasopharynx**
- 2 **Hard Palate**
- 3 **Oropharynx**
- 4 **Tongue**
- 5 **Lingual tonsil – on the root of the tongue**
- 6 **Epiglottis – Vallecula**
- 7 **Palatine tonsil**
- 8 **Pharyngeal folds/arches – for funnelling food into the oesophagus**
- 9 **Adenoids = Pharyngeal tonsils**
- 10 **Nasopharynx**

*\*As the mouth – jaw increases in size so does the pharynx – and swollen tonsils are not as obstructive to food and air*



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## Trachea - in situ

*Macroscopic view of the relationship b/n the trachea, oesophagus, & the thyroid gland at 2 levels C6 & T1*

- 1 thyroid parenchyma with CT septa
- 2 tracheal fascia
- 3 isthmus - -showing cut surface & superior edge
- 4 superior thyroid a & v
- 5 anterior surface of the L lobe
- 6 middle cervical fascia = pretracheal fascia
- 7 superior pole of R thyroid lobe
- 8 internal jugular v
- 9 common carotid a
- 10 prevertebral fascia
- 11 trachea
- 12 T1 vertebral body
- 13 oesophagus
- 14 recurrent laryngeal N L&R
- 15 L Vagus N
- 16 Ns of the Brachial Plexus



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T1

C6

©

## Tracheal wall

*A - LP H&E trachea*

*B - HP H&E trachea*

The lining of the trachea is a thick folded mucosa. Its main function is to ensure the air is dust free, warm & moist. Hence the numerous seromucosal glands & PSCCE luminal lining. The lumen is maintained by cartilaginous rings. Posteriorly the connecting smooth muscle allows for the oesophagus to expand with food ingestion, w/o compromising the tracheal lumen.

- 1 demilune of the seromucous gland
- 2 serous gland
- 3 BM
- 4 PSCCE - this T changes with irritation to become truly stratified
- 5 cilia lining the trachea, these structures are lost with metaplasia of the epithelium
- 6 goblet cells
- 7 nuclear rows - note this is a simple epithelium - i.e. all the cells touch the BM & only the nuclei are multilayered
- 8 pulmonary v
- 9 duct
- 10 pulmonary a
- 11 hyaline cartilage - part of the tracheal ring
- 12 perichondrium
- 13 smooth muscle - posterior wall of the trachea
- 14 adventitia
- 15 adipose T
- 16 mucosal folds - lamina propria
- 17 elastic fibres
- 18 Ns



## Additional Images



## Quizzes



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