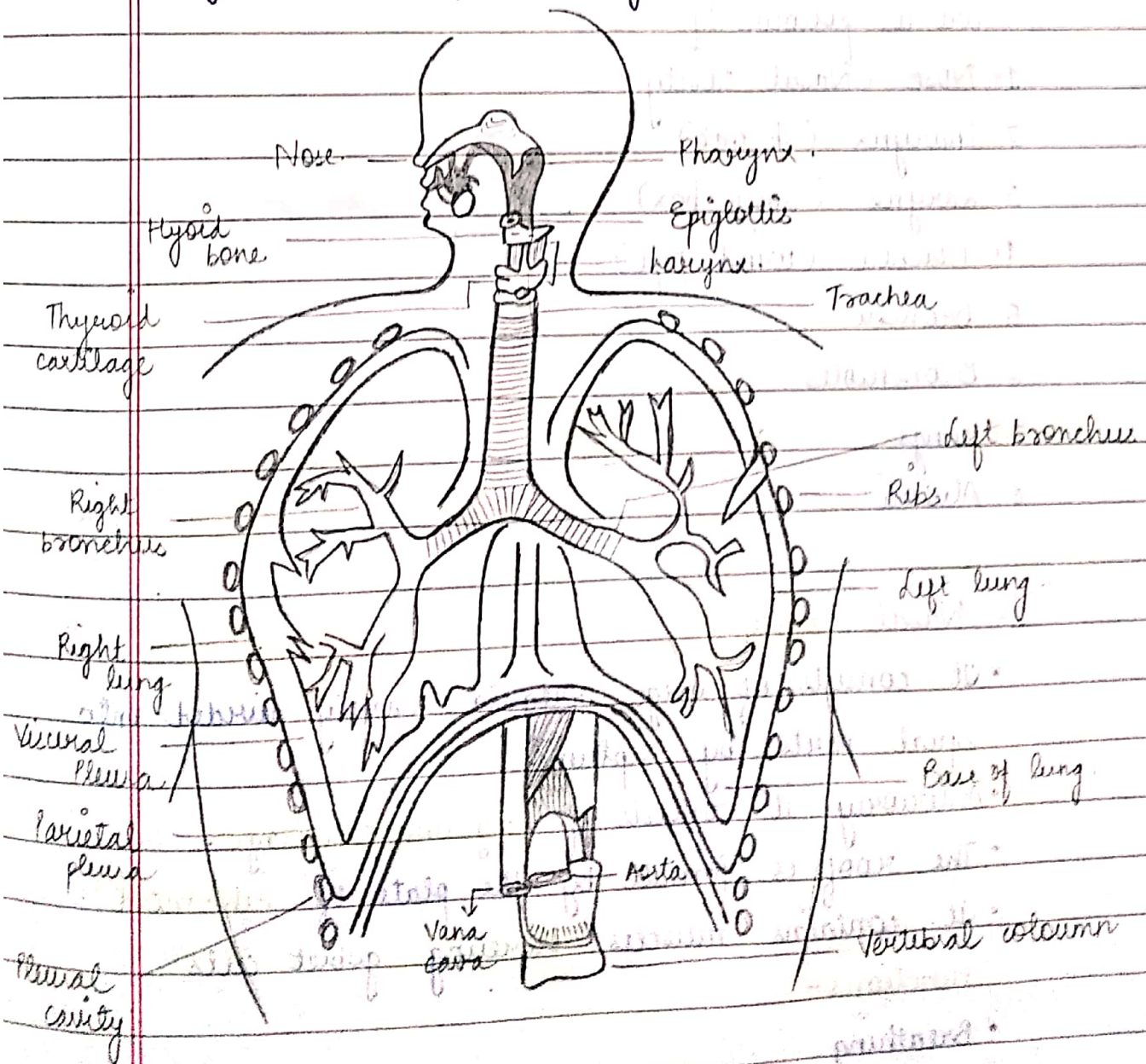


Respiratory System

- Respiration is a chemical phenomena in which exchange of gases takes place.
- Respiratory system provide the route for the entry of O_2 & excretion of CO_2 from the body.
- Blood provides transport system of O_2 & CO_2 b/w lungs & cells of the body.



Types of Respiration :-

1. EXTERNAL RESPIRATION-

It is gaseous exchange b/w environment & lung.

2. INTERNAL RESPIRATION-

It is the gaseous exchange b/w lung & blood & also b/w blood & tissue cell.

The parts

PARTS OF RESPIRATORY SYSTEM-

are as follows :-

1. Nose (Nasal cavity).
2. Pharynx (Throat).
3. Larynx (voice box).
4. Trachea (wind pipe).
5. Bronchi
6. Bronchioles
7. Lungs
8. Alveoli

1. Nasal cavity :-

- It consists of large irregular cavity divided into equal parts by septum.
- Anteriorly it consists of hyaline cartilage.
- The roof is formed by the plate of ethmoid.
- It contains mucous secreting goblet cells.

Functions -

- Breathing
- sense of smell

- The nose is the first part of respiratory system through which inspired air passes.
- Air entering the nose becomes warm & moist.
- The large surface area humidify.
- ⇒ FILTERING & CLEARING.
- ⇒ SENSE OF SMELL.

11/19. Lungs :-

- There are 2 lungs one on each side of the midline in the thoracic cavity.
- They are cone shaped.
- They have apex & base & medial surface

Apex - It is rounded part into the root of neck & close to the 1st rib.

Base - This is concave shaped & lies on the upper surface of diaphragm.

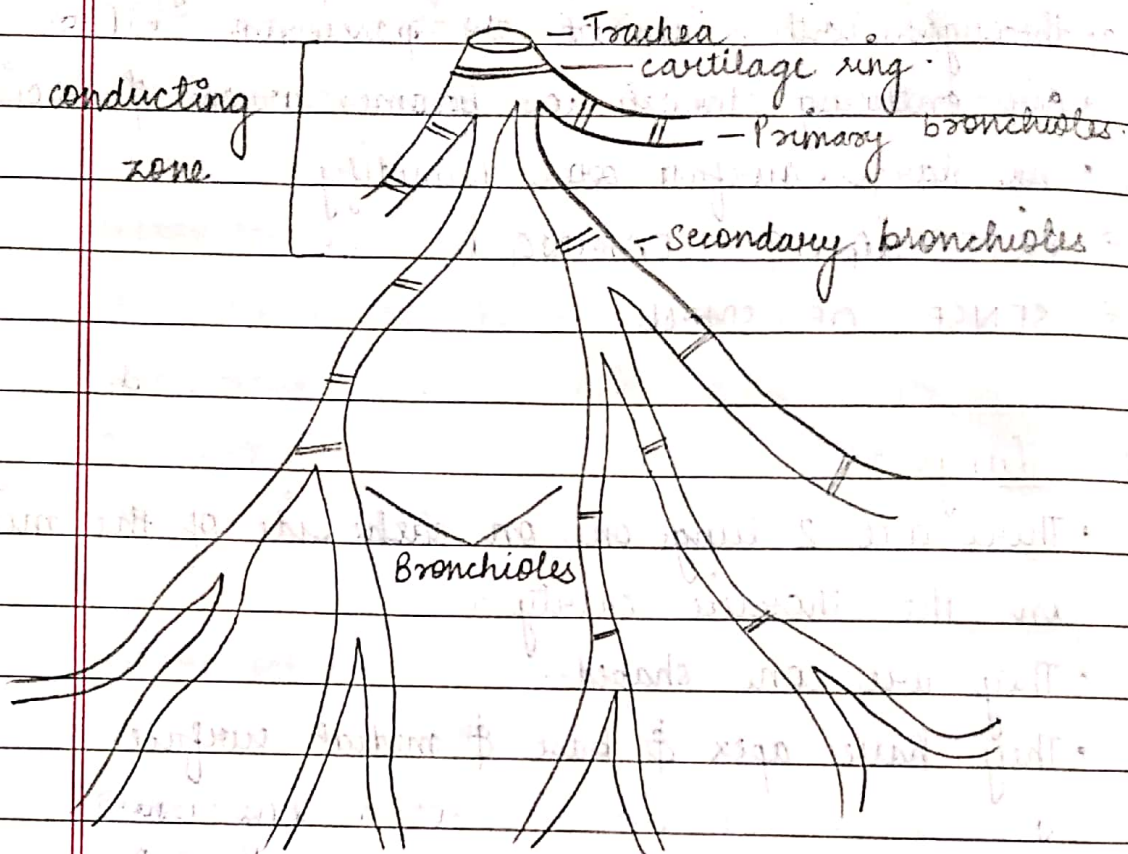
The right lung is divided into 3 lobes, superior, medial, inferior.

The left lung is divided into 2 lobes, superior & inferior.

funcⁿ ⇒ lungs are reservoir of blood in the body.

- It helps to absorb for exchange of gases.
- The lungs helps the body to get rid of CO₂ gas when we breath out.

Bronchi & Bronchioles -



Right bronchi

- This is shorter & more vertical than the left bronchi

- It is 2.5 cm long

- It is divided into 3 branches

- It is subdivided into smaller branches

Left bronchi

- It is narrower than the right

- It is 5 cm long

- It is divided into 2 branches

- It is subdivided into smaller airways

funcⁿ ⇒ control of air entry

→ warming & humidifying

→ support

→ removal of particulate matter

→ cough reflex

Alveoli-

- ⇒ They are the structural & functional unit of lungs.
 - ⇒ 300 millions alveoli are present in each lung.
 - funcⁿ ⇒ Defence against microbes
- Air entering in alveoli is clear



Defence is provided by the protective cells in lung tissue



Plasma cells produce anti-bodies.



warming & humidifying.



If we continue inhaling for a long time.



causes irritation in mucosa

Pharynx :

- Pharynx is a tube about 12-14 cm long
- It starts from base of the skull to the 6th cervical vertebrae.
- It lies behind the nose, mouth & larynx.
- It divided into 3 parts -
 - a) Nasopharynx
 - b) oropharynx
 - c) Laryngopharynx.

a) Nasopharynx ⇒ They are most prominent in children upto approximately 7 years of age. Thereafter, they gradually atrophy.

b) Oropharynx -

- The oral part of pharynx lies behind the mouth
- ⇒ It starts from below the level of the soft palate to the level of the upper part of the body of the 3rd cervical vertebrae.
- ⇒ This is a portion or part where the oral cavity opens.
- ⇒ It is a collection of lymphoid tissues called the palatine Tonsel.

c) Laryngopharynx -

- The laryngeal part of the pharynx extends from the oropharynx above & continues as the oesophagus below i.e. from the level of 3rd to 6th cervical vertebrae.

funcⁿ ⇒ ① passage way for food & air.

- Pharynx is involved in both the **respiratory tract** or **system** & **the digestive system**.

- Food passes through the oral & laryngeal section.

- Air passes through the nasal & oral section.

② Warming & humidifying -

By the same method in nose the air is warmed & moistened as it passes through the pharynx.

③ Taste -

Olfactory nerve endings of the sense of the taste in the epithelium of oral parts.

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④ Hearing -

Allow air to enter the mid ear, satisfactory hearing depends on the presence of air at atmospheric pressure between both side of the tympanic membrane.

⑤ Protection -

Lymphatic tissue present in the pharynx produces anti-bodies in response to antigens.

⑥ Speech -

The pharynx funcⁿ is speech, it helps to give the voice, its individual characteristics.

Larynx : (Voice box / Sound box)

- It lies at the level of 3rd, 4th, 5th & 6th cervical vertebrae.
- It is placed b/w pharynx & trachea.

• After that it grows larger in males.

Str ⇒ Larynx is the muscle attached to the hyoid bone & the muscles of neck.

• The larynx is composed of several irregular shaped cartilages attached to each other by ligaments & membranes.

funcⁿ - a) Production of sound ⇒ sound has the properties of pitch, volume & resonance.

b) Pitch of the voice ⇒ It depends upon the length & thickness or lightness of the cords. At puberty the male vocal cords begin to grow longer.

c) **Volume of the voice** \Rightarrow It depends upon the force with which cord vibrates.

d) **Resonance of tone** \Rightarrow It depends upon the shape of the mouth.

c). **Protection of the lower respiratory tract** \Rightarrow During swallowing, the larynx move upwards, blocking $\&$ opening into it from the pharynx. Due to this food passes into the oesophagus $\&$ not into the trachea.

Trachea : (Wind pipe).

It starts at the end of the larynx $\&$ extends downwards to about the level of 5th thoracic vertebrae.

\Rightarrow At 5th thoracic vertebrae, it divides into the rt. $\&$ left pulmonary bronchi.

• one branch going to each lung.

• It is approximately 10-11 cm long $\&$ lies in the mid plane of oesophagus.

Str \Rightarrow The trachea is composed of 3 laryngeal tissue. The 3 layers of tissue clothe the cartilages of the trachea.

Funcⁿ \Rightarrow **Support $\&$ Patency** \Rightarrow Tracheal cartilages holds the trachea permanently open, but the soft tissue bands in b/w the cartilages $\&$ allow flexibility so that the head $\&$ neck can move freely without obstructing or kicking $\&$

(2) **Mucociliary escalator** \Rightarrow This is the synchronous $\&$ regular beating of the cilia of the mucous memb.

So, that the cough & foreign particles are either swallowed or coughed up.

③ cough reflex :

nerve endings in larynx, trachea & bronchi are sensitive to irritation

↓
generate nerve impulses

↓
conducted by vagus nerves to the respiratory centre in brain

↓
Deep inspiration followed by closure of glottis (vocal cords).

↓
Suddenly air is released under pressure

↓
mucous or foreign material expels from the mouth

④ warming, humidifying & filtering

(a) outer layer ⇒ It contains the fibrous & elastic tissue & enclose the cartilages

(b) middle layer ⇒ It consists of cartilages & bands of smooth muscle

(c) inner layer ⇒ The lining is ciliated columnar epithelium containing mucus secreting goblet cells.

Physiology Of Respiration

Respiration \rightarrow

Respiration means the exchange of gas b/w body cells & environment. This involves 2 main processes -

1. Breathing
2. Exchange of gas.

Breathing \Rightarrow This is movement of air in & out of the lungs.

Exchange of gases \Rightarrow This takes place into the lungs. (external respiration).

In the tissue (internal Respiration).

Breathing :-

'cycle of breathing':

Average respiration rate is 12-15 breaths per minute.

Each breathe consists of 3 phase -

Inspiration -

Inter costal muscles & diaphragm contracts.



Thoracic cavity enlarge.

Sternum upwards & ribs move outwards.



Air pressure \downarrow so that by air passage air enters into the lungs.

Expiration -

This process starts because of \downarrow in the volume of thoracic cavity.



Intercostal muscles & diaphragm relax.



Thoracic cavity \downarrow in the volume.



Sternum downward & ribs inwards.



The air pressure \uparrow ses, air exude out from the lungs by air passage.

Exchange of gas -

External respiration - This is exchange of gas by diffusion b/w alveoli & blood capillaries, veins carry blood to the lungs from all the tissue of the body.



The blood contains high level of CO_2 & low level of O_2



CO_2 diffuse out of the blood until equilibrium.



Same as O_2 is diffused into the blood



When blood leaves the alveolar capillary, conc. of CO_2 & O_2 are in equilibrium.