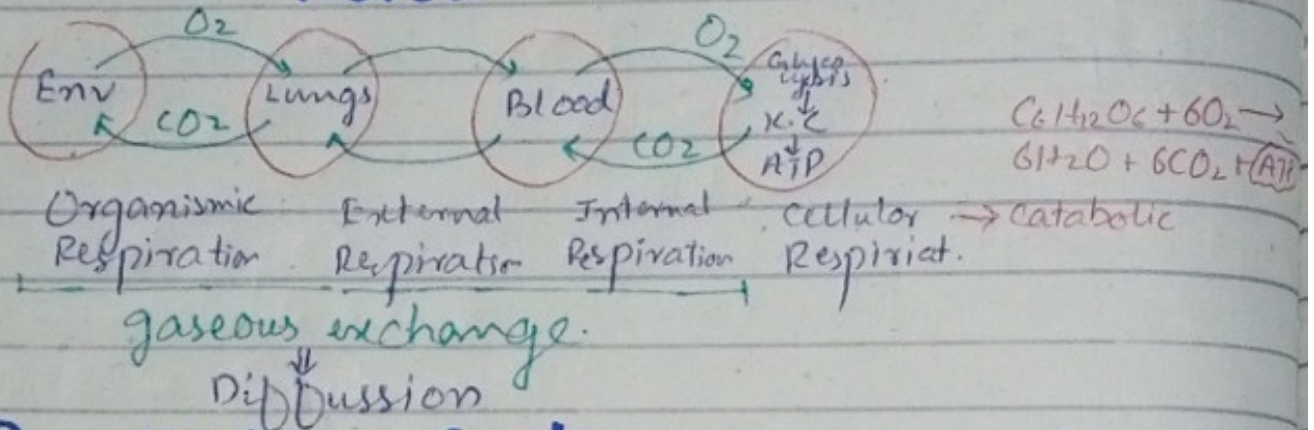


Respiration

→ Primary character of life.
Energy

Levels:



Respiratory System: → Mesodermal

- ↳ gaseous exchange
- ↳ Vocalization
- ↳ Filtration (Defense)
- ↳ Acid base balance
- ↳ Thermoregulation

→ Respiratory Membrane:

↳ memb/surface → gaseous exchange.

G.E ∝ Permiability, Thickness, ^{large surface area} Moisture:

→ Permiability = $\frac{1}{\text{Thickness}}$

→ Thickness = $G.E \propto \frac{1}{\text{Thickness}} < 1\text{mm}$

→ L.S.A = Contact

@isamiqamar

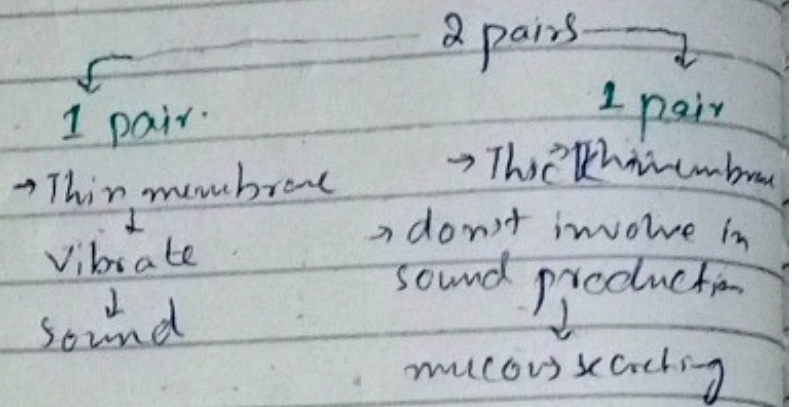
→ Steep gradient = Concentration difference.

→ Moisture = G.E ∝ moisture → surfactant ^{surface tension} ↓
↳ Lower surface tension } surfactants
↳ facilitate G.E

→ Vascularization = Rich blood supply.
↳ character of higher mammals

Channelize Air

Vocal Cords



Trachea:

(Wind pipe)

- Ventral side → neck
- 10-20cm length
- 2-2.5cm diameter.
- 15-20 C-shaped cartilaginous rings.
 ↳ Avoid collapsing.

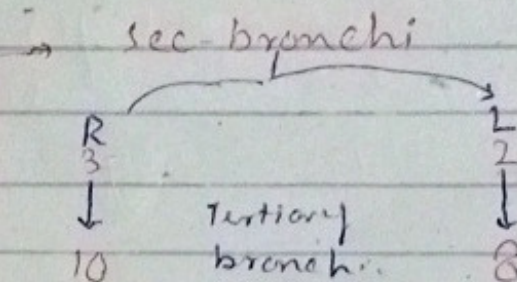
Bronchi:

- 2 primary bronchi
 ↳ similar to trachea.

Right → R. lung → Broad & short
 Left → L. lung → Narrow & long.

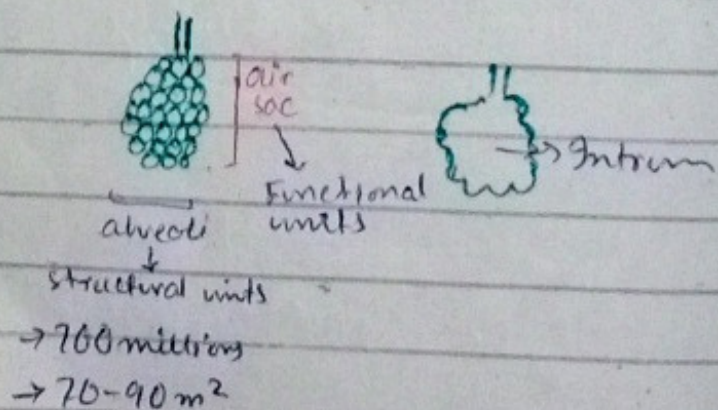
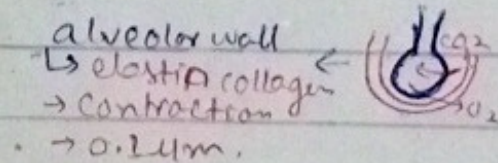
Decrease in size

Reduction of C-Rings.



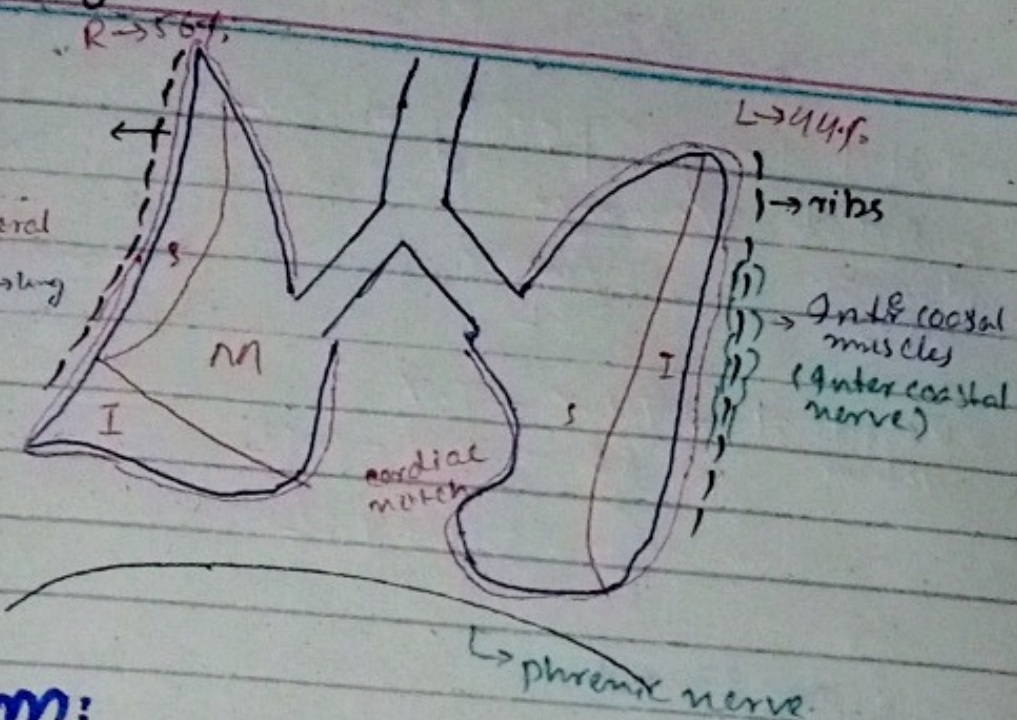
Bronchioles:

- Diameter < 1mm
- 1st → No cartilage
 ↳ continuous air distribution
- Terminal bronchioles
 ↓
 Respiratory
 ↓
 Alveolar ducts
 ↓
 Alveoli



Lungs:

- Pair
- Chest cavity
- spongy
- Pleura
- Double membrane
- Parietal ← pleural flange
- visceral ← close to lung
- outer lung

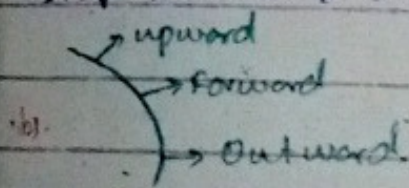


Mechanism:

Cyclic Process

Inspiration (Inhalation)

- Active
- Chest cavity ↑
- Pressure lungs ↓
- Env - Air → lungs.



→ sternum distance ↑ → V. column

→ Diaphragm → Flat

→ Intercostal Muscles

Outer - Contract

Inner - Relax

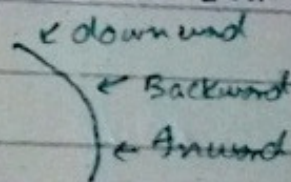
→ 21% → O₂

→ 0.03 - 0.04 → CO₂

→ 78% → N₂

Expiration (Exhalation)

- Passive, Exercise → active
- Chest cavity ↓
- Pressure lungs ↑
- Lungs air → out → env



→ sternum distance ↓ → V. column

→ Diaphragm → dom shape.

→ Intercostal muscles.

Outer - Relax

Inner - Contract

→ 16% → O₂

→ 4% → CO₂

→ 78% → N₂

Lung Capacities & Volumes

→ Total Lung Capacity = 5L

→ Tidal Volume:

Normal
0.5L

Exercise
3.5L

→ Residual Volume = T.L.C - T.V

Volume

5L - 0.5L = 4.5L
Normal breathing

5L - 3.5L = 1.5L
Exercise.

Nerves:

Phrenic

Intercostal

Rhythmic impulses

Control:

Autonomic

Cerebrals.

Pons, Medulla, Amygdala.

Cerebrum

Pattern

emotions

↳ speaking & singing.

Inspiration

→ Dorsal
→ Lateral

Expiration

Gaseous Transport:

Tissue $\xrightleftharpoons[O_2]{CO_2}$ Lungs

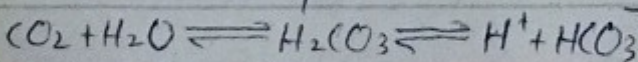
CO₂:

1: HCO₃⁻ → 70%

2: HbCO₂ → 23% (carb amino haemoglobin) → Bluish red

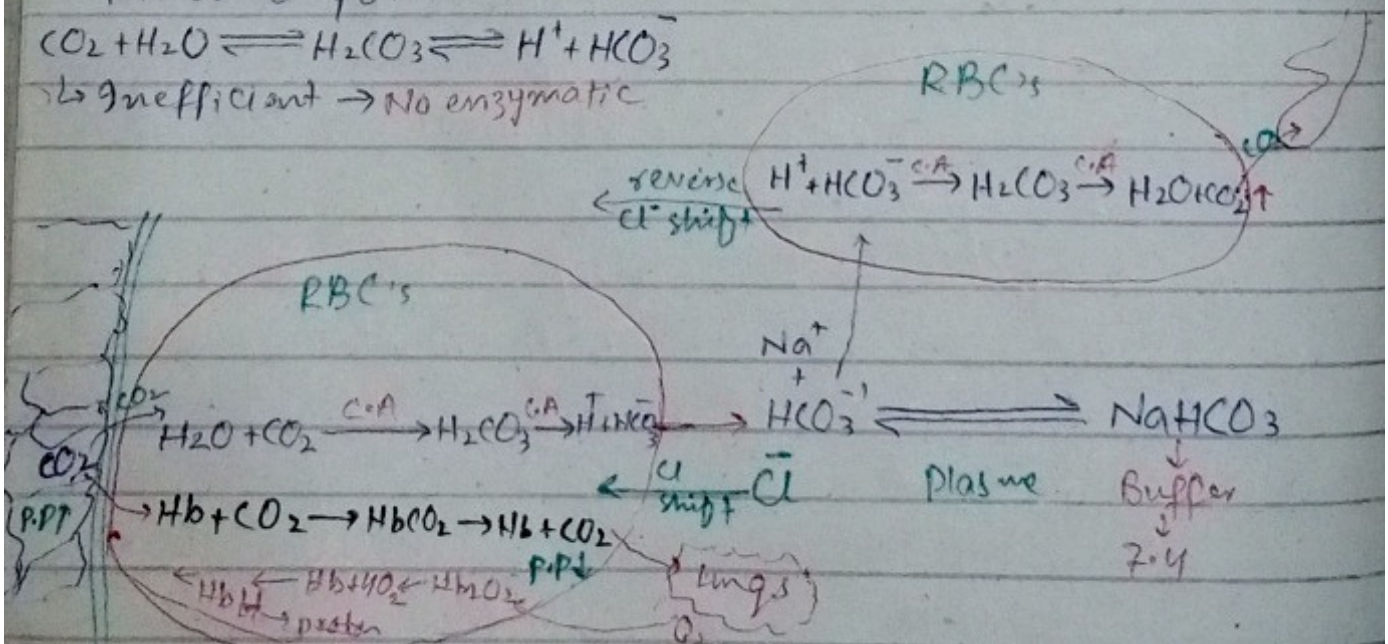
3: Plasma → 7%

↳ Dissolved form



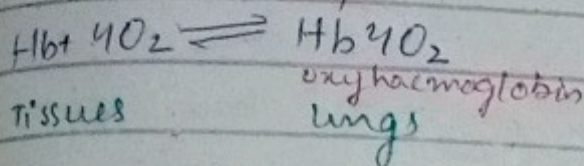
↳ inefficient → No enzymatic

@isamiqamar



O₂

Hb: 97%



Plasma: \rightarrow Dissolved form 3%

Saturation:

Hb \rightarrow Unsaturated

Hb \rightarrow O₂ \rightarrow 30% Partial saturated

Hb \rightarrow 4O₂ \rightarrow Fully saturated

Carrying Capacity: 100ml blood \rightarrow O₂?

1g Hb \rightarrow 1.34ml O₂

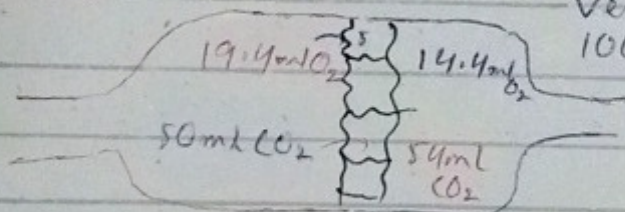
\therefore 100ml blood \rightarrow 15g Hb

15g Hb \times 1.34ml = 20.1ml/100ml \rightarrow Theoretical

= 19.4ml O₂ \rightarrow Actual "0.7 difference"

Arterial: 100ml

Venous 100ml

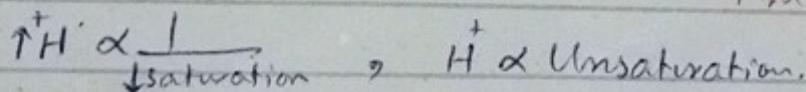


100ml Blood:

5ml O₂ \rightarrow Normal

15ml O₂ \rightarrow Exercise

4ml CO₂



Respi

Hb

\rightarrow RBC's

\rightarrow 574 a.a

\rightarrow 4 polypeptide chains

Quaternary

4 Fe⁺⁺

\rightarrow 4 O₂

\rightarrow Transport

\rightarrow less affinity O₂

a.a \rightarrow CO₂ \rightarrow carboxyhaemoglobin \rightarrow Globular
 Hb \rightarrow CO₂ \rightarrow carbamino haemoglobin \rightarrow 1 Fe⁺⁺
 Hb \rightarrow O₂ \rightarrow Oxyhaemoglobin \rightarrow 1-O₂

Mb

\rightarrow Muscles

\rightarrow 153 a.a

\rightarrow 1-Polypeptide chain

Mb \rightarrow O₂

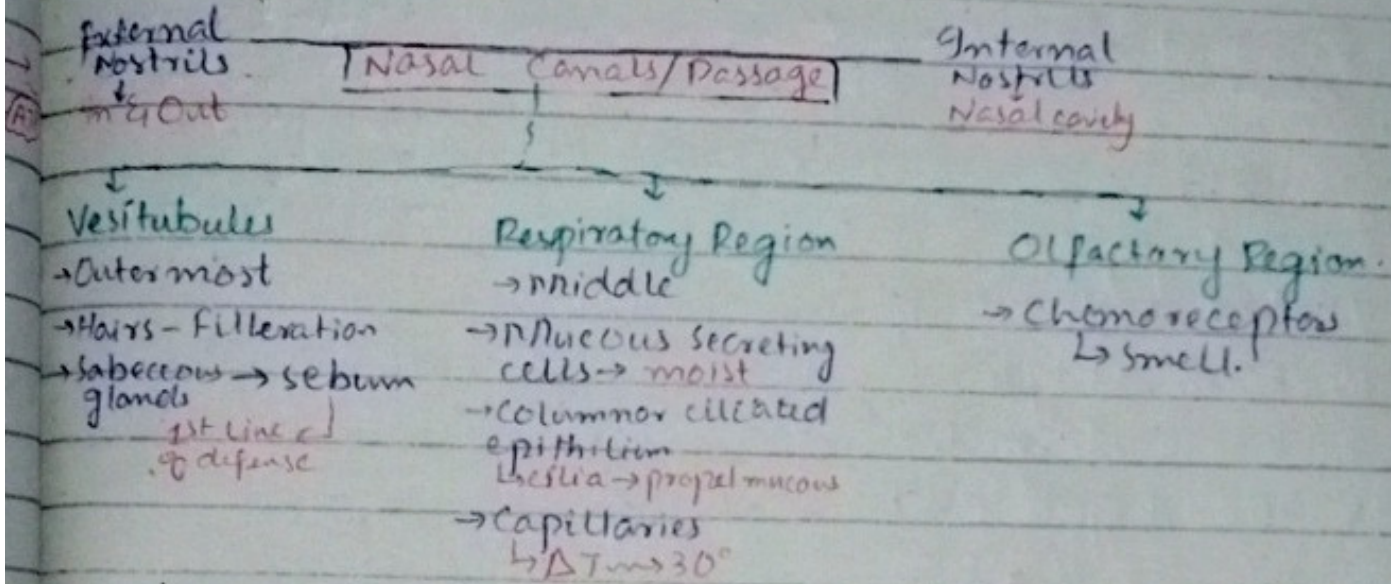
\rightarrow 1-O₂

\rightarrow store

\rightarrow more affinity O₂

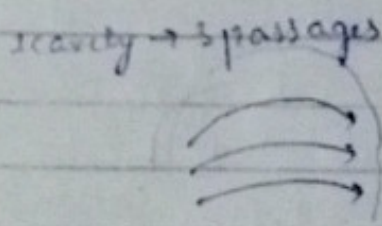
Nose: External, visible part.

- ↳ Nasal Bone
 - ↳ Nasal bone
 - ↳ Ethmoid
- ↳ Cartilage
 - ↳ hyaline cartilage
- ↳ Fibro fatty tissues
- ↳ Vomer
- ↳ Septum



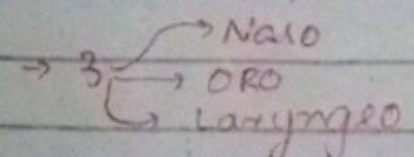
Nasal Cavity:

- ↳ 2 Cavities → 6 passages
- ↳ Conchae → divides cavities
- ↳ Upper → oral cavity
- ↳ Palate



Pharynx:

- ↳ Muscular, control organ



- ↳ Common opening Respiratory & Digestive tract
- ↳ Diversion → air → Larynx

@isamiqamar

Larynx: prominent in male ♂

- ↳ Cartilagenous structure
- ↳ Base of pharynx & above trachea
- ↳ Cricoid (Adam apple)
- ↳ Opening → glottis
 - ↳ covered by epiglottis → flap of fibrocartilage