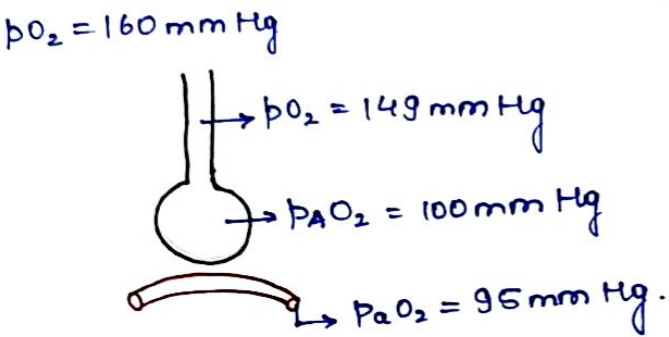


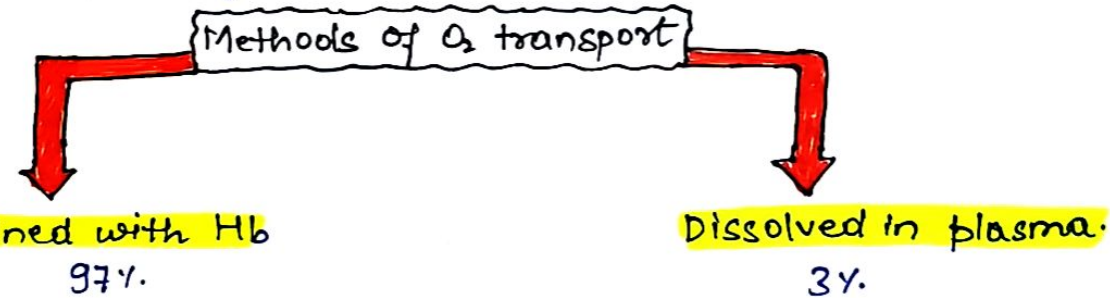
Reasons for differences in Alveolar & Atmospheric air :-

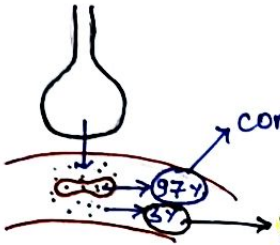
1.) Humidification of dry atmospheric air into respiratory passages.

2.) Alveolar air is only partially replaced by atmospheric air.

3.) O_2 is constantly being absorbed in pulmonary blood.

4.) CO_2 is constantly being diffused from pulmonary blood.





Henry law Amount = $k \times P$

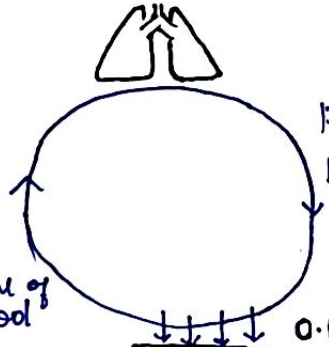
∴ If person breathes O_2 at ↑↑ alveolar pO_2

⇓

Amount of O_2 dissolved in plasma ↑↑

⇓

"Oxygen poisoning"



p_aO_2 = 95mm Hg

Dissolved$_a$ O_2 = 0.29 ml/100ml of blood.

• p_vO_2 = 4.0 mm Hg

D_vO_2 = 0.12 ml/100 ml of blood

Tissue

0.17 ml/100 ml of blood of O_2 transported by dissolved state.

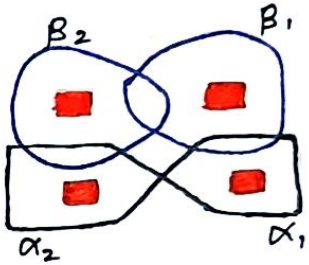
- combined with Hb

Adult Hb → HbA (mc) → 2α 2β

1 Hb chain → 1 heme prosthetic group → 1 Fe^{++}

1 Hb → 4 Hb chain → 4 Fe^{++}

Binds with 4 O_2



Principle :-

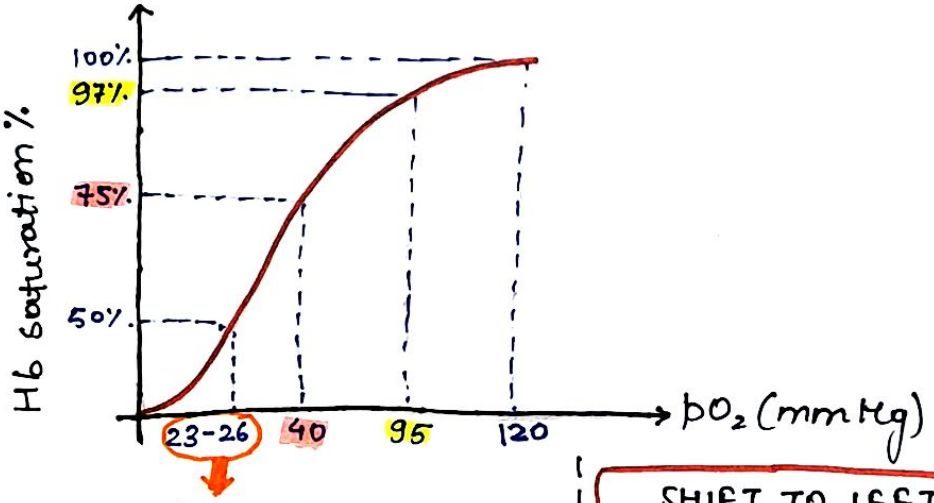
At lungs, ↑ pO_2 ⇒ ∴ O_2 binds to Hb

At tissues, ↓ pO_2 ⇒ ∴ O_2 releases from Hb

Oxygen - Hemoglobin Dissociation Curve :-

↑ pO_2 in blood ➡ ↑ % of Hb bound to O_2

Sigmoid manner

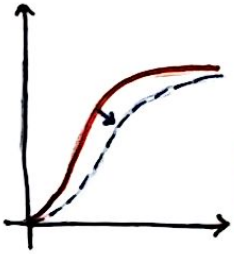


P_{50} value.

SHIFT TO RIGHT :-

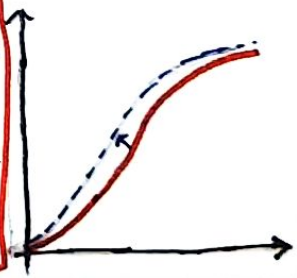
1.) ↑ H^+
2.) ↑ CO_2
3.) ↑ Temp.
4.) ↑ 2,3 BPG

↓ O_2 affinity ⬇ ↑↑ unloading of O_2



SHIFT TO LEFT :-

1.) Fetal Hb
2.) Store in Blood bank
3.) CO - Poisoning
4.) Met - Hemoglobinemia
5.) ↓ H^+, ↓ CO_2, ↓ Temp. ↓ 2,3 BPG



- 100 mL blood → 15 g Hb
- 1 g Hb → 1·34 mL of O_2 (at 100% saturation)

Arterial blood

1 g Hb → 97% of 1·34 mL of O_2 (at 97% saturation)

= 1·29 mL of O_2

15 g Hb = 15 × 1·29 = 19·5 mL / 100 mL of blood

∵ Dissolved O_2 = 0·29 mL / 100 mL of blood

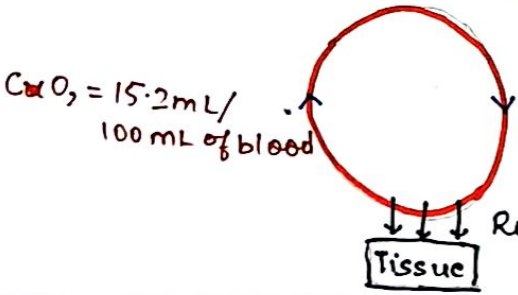
∴ CaO_2 ⇒ 19·5 + 0·29 ≃ 19·8 mL / 100 mL of blood.

Venous blood

1 g Hb → 75% of 1·34 mL of O_2 (at 75% sat.)

15 g Hb → 15 × 75% of 1·34 ml of O_2 ∵ Dissolved O_2 = 0·12 mL / 100 mL of blood

∴ Overall CvO_2 ⇒ 15·08 + 0·12 ≃ 15·2 mL / 100 mL of blood



Release = 19·8 − 15·2 ⇒ 4·6 mL ≃ 5 mL delivered @ tissue from every 100 mL of blood.