

## 6) Hypoxia

Hypoxia means the lac of  $O_2$  in the body. Hypoxia is classified into 4 four types -

- I) Hypoxic hypoxia (Due to diminished  $O_2$  tension)
- II) Anemic hypoxia (diminished quantity of functioning Hb in blood)
- III) Stagnant hypoxia (diminished blood flow through the tissues due to sluggish circulation.)
- IV) Cytotoxic hypoxia. (due to poisoning with cyanides or sulphides)  
: ~~due~~ <sup>due to</sup> ~~utilization~~ <sup>nil utilization</sup> of  $O_2$  by the tissues)

I) Hypoxic hypoxia → This type of hypoxia is caused due to low partial pressure of  $O_2$  in the ~~to~~ body.  
This type of hypoxic hypoxia occurs due to the following reasons -

i) Bulbar polymyelitis → The respiratory centres, i.e. DRG and VRG lie in the bulbar region of brain. During polymyelitis of bulbar region these centres do not function normally and respiration is irregular ~~forming~~ resulting lac of  $O_2$  in the body.

ii) Cervical transection → Due to cervical transection, the phrenic and intercostal nerves do not ~~supply to the~~ innervate the ~~the~~ diaphragm and intercostal muscle. Thus respiration becomes irregular and lac of  $O_2$  ~~happens~~ occurs.

iii) Obstruction of respiratory passage → During obstruction of respiratory passage ventilation ~~does~~ <sup>does</sup> not take place.

iv) Pulmonary oedema → Gaseous exchange is inhibited due to pulmonary ~~oed~~ oedema and the  $PO_2$  falls.

v) Thickening of alveolar membrane → Thick alveolar membrane is impermeable for gaseous exchange.

vi) Congenital heart disease → In congenital heart disease ~~flow~~ state of blood flow in the lungs becomes less and  $O_2$  exchange in the blood vessels is inhibited.

## II) Anemic hypoxia →

This type of hypoxia results from anemia, i.e., the lac of Hb or RBC in the circulating blood. As the number of RBC or quantity of Hb is low, the transport system is not fully available for the transport of  $O_2$  in the ~~to~~ to the tissues.

(i) In normal arterial blood ~~per~~ <sup>each</sup> 100 ml  $O_2$ /dl from which only 5 ml is supplied to the tissues. But in case of ~~anemia~~ anemia where the quantity of Hb decreases to about half, it can carry <sup>the</sup> half ~~per~~ quantity  $O_2$ . But, 5 ml  $O_2$  can be easily supplied. So, ~~it~~ the problem may not ~~be~~ ~~noticed~~ ~~at~~ ~~seen~~ in resting state but it arises in time of ~~exercise~~ exercise <sup>when need of  $O_2$  rises.</sup>. These patients ~~are~~ <sup>are</sup> not supplied with more  $O_2$  and become fatigued quickly.

(ii) In case of altered Hb, such as, poisoning with nitrate, nitric oxide, CO poisoning and <sup>in</sup> meth Hb anemic hypoxia may occur.

## III) Stagnant hypoxia →

Due to poor blood circulation this type of hypoxia occurs. In this case, blood flow decreases and blood stays in the capillaries for long time and nearly all the  $O_2$  of the arterial blood ~~is~~ is exhausted and the next tissues suffer lac of  $O_2$  and hypoxia ~~is~~ is found. Stagnant hypoxia may occur due to -

- (i) decreased cardiac output
- (ii) decreased venous return
- (iii) hemorrhage, and
- (iv) left ventricular failure.

Usually the suffering subjects faint due to hypoxia in the brain and becomes fatigued due to hypoxia in the muscles.

## IV) Cytotoxic hypoxia → (histotoxic hypoxia)

Due to exposure of ~~some~~ toxic products in the cells and tissues, they cannot utilize  $O_2$  and cytotoxic hypoxia occurs.

It usually happens due to -CN poisoning. -CN is the inhibitor of cytochrome oxidase <sup>enzyme</sup>, i.e., the end stage of electron ~~transport~~ transport chain of ~~TEA~~ ~~cycle~~.