

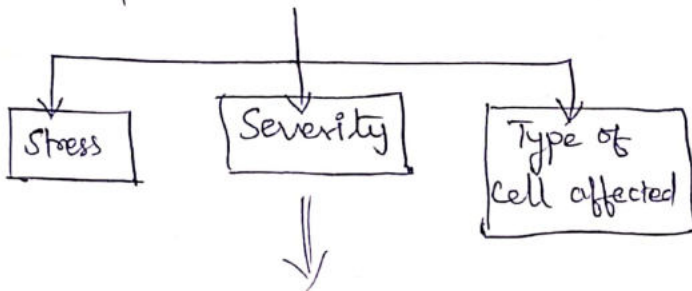
Stress.

↓
leads to makes the
Cells to adapt via
"GROWTH ADAPTATIONS"

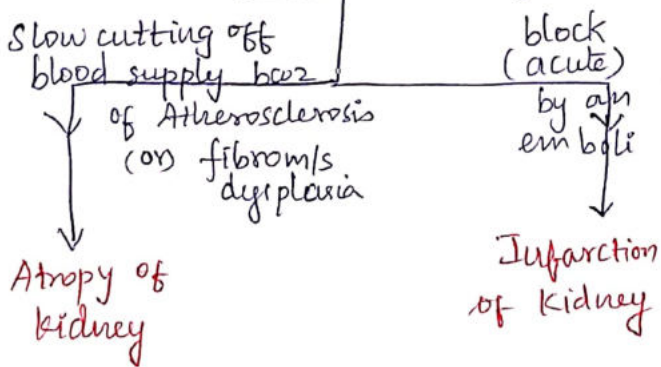
But if stress exceeds the
cell's ability to Adapt

↓
Cell gets injured.

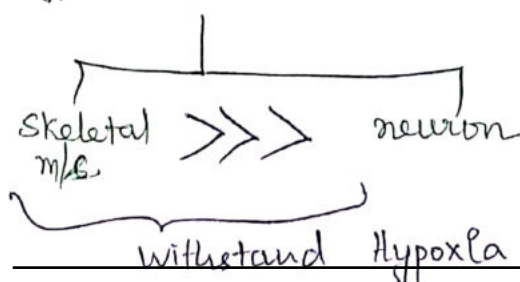
Likelihood of injury
depends on ③ factors



for eg: Renal artery



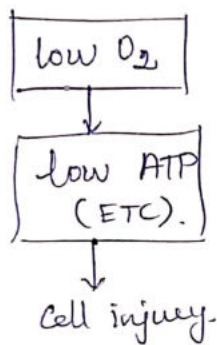
Type of cell.



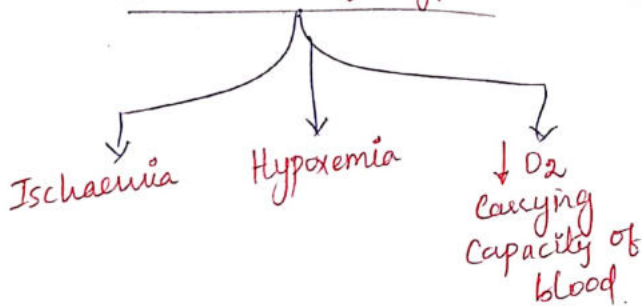
- i) Inflammation
- ii) Nutritional deficiency/excess.
- iii) Hypoxia ☒
- iv) Trauma
- v) Genetic mutations

Hypoxia:

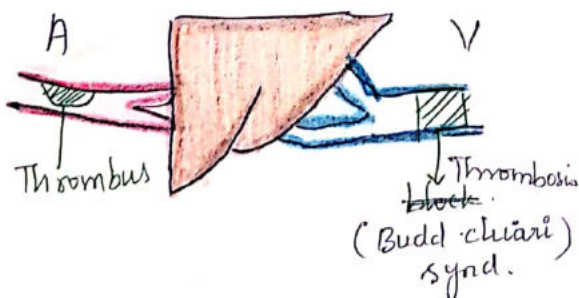
* low O_2 (delivery) to tissue



③ causes of Hypoxia



① Ischaemia ↓ blood flow thro' an organ



m/c cause:

i) polycythemia vera

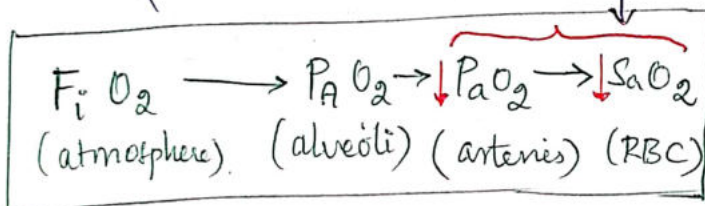
ii) Lupus pt.

iii) shock.

2) Hypoxemia

low PO_2 in blood

($PO_2 < 60\text{ mm Hg}$),
($SO_2 < 90\%$).



eg: 1) At High Altitude

$F_i O_2 \downarrow \rightarrow P_A O_2 \downarrow \rightarrow P_a O_2 \downarrow \rightarrow S_a O_2 \downarrow$

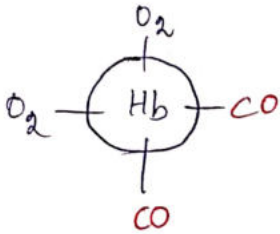
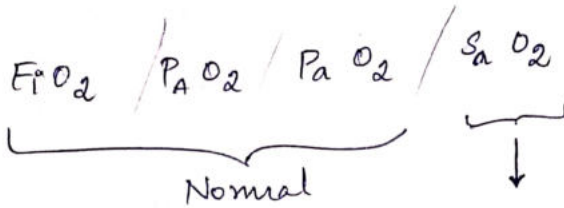
2) Hypoventilation, COPD

$\downarrow P_A O_2 \rightarrow \downarrow P_a O_2 \rightarrow \downarrow S_a O_2$
 $\uparrow P_A CO_2$

3) $\downarrow O_2$ Carrying Capacity arises with Hb loss/dysfunction.

eg: 1) Anemia ($\downarrow$ in RBC mass)

$\downarrow \downarrow$
 $P_a O_2$ & $S_a O_2$ normal.



- Causes:
- (i) Smokes from fires
 - (ii) exhaust from cars.
(or) gas heaters.

Classic finding: (CF).

CHERRY RED APPEARANCE of Skin.

↓
bcz Hb is so tightly bound to Co.

Sign:

early sign - Headache

Signif. exposure - Coma & death

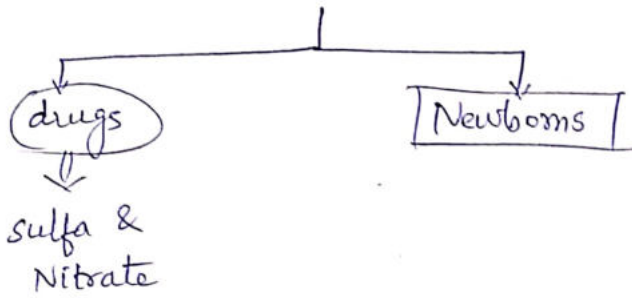
(iii) Methemoglobinemia

* iron in Hb → Fe^{2+} (Normally).
↓
binds with O_2

* If $Fe^{2+} \xrightarrow{(O)} Fe^{3+}$

$FiO_2 / PaO_2 / PaO_2$ SaO_2
Normal Decreased.

oxidant stress.



Physiologically

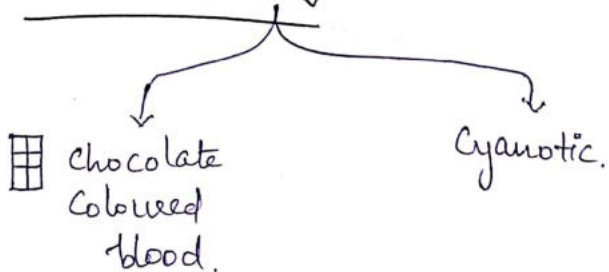
* low conc. of Met-Hb is present & formed

But continuously reverted back to Normal Fe^{2+} by certain enzymes.

These enzymes not well developed in Newborns

Met-Hb in newborns

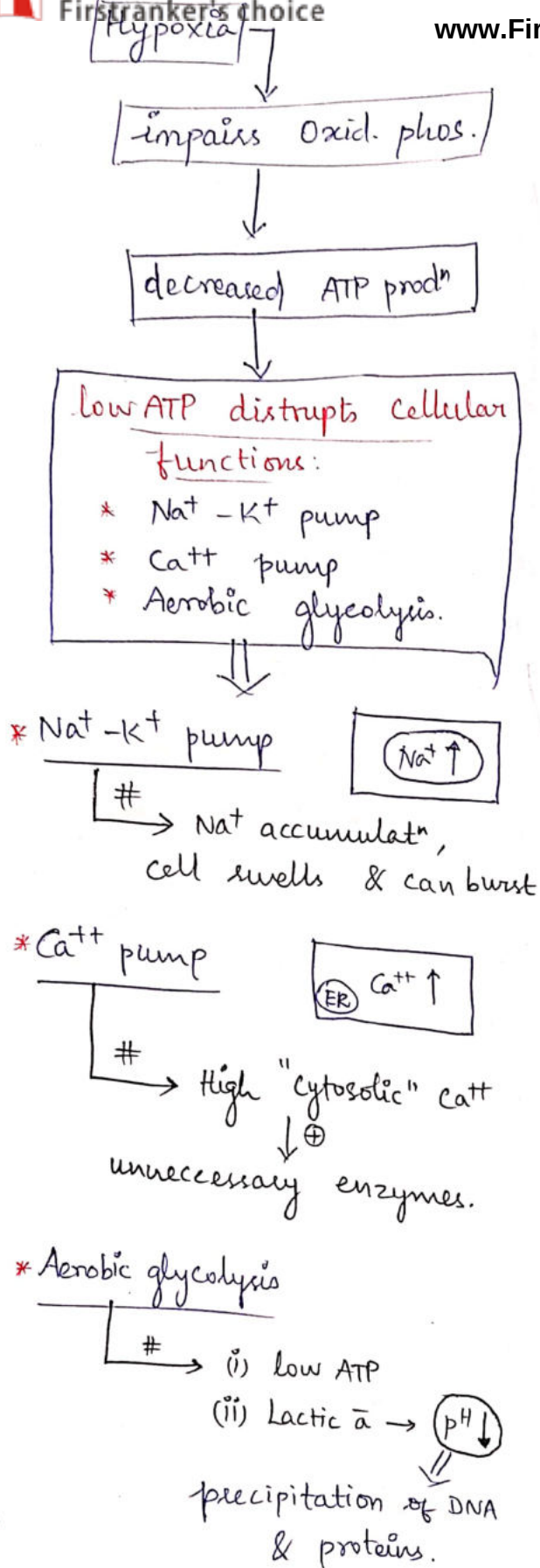
Classic finding: (CF).



Treatment:

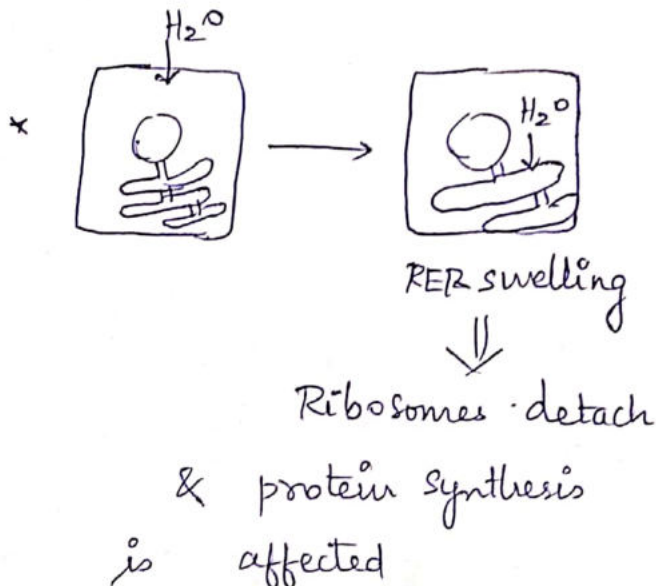
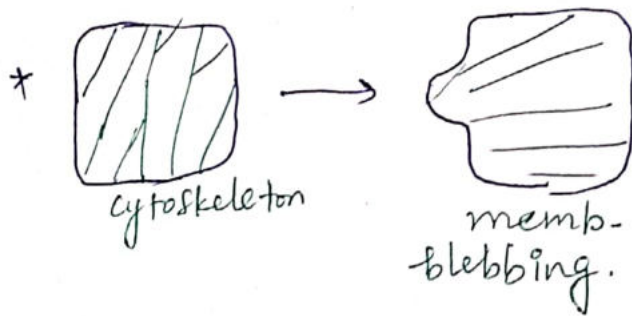
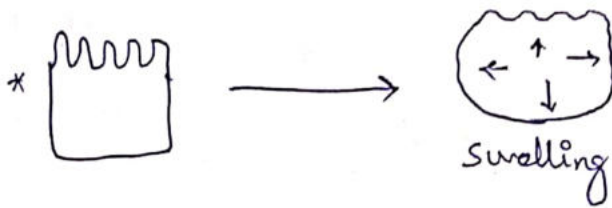
IV methylene blue.

Fe^{3+} Fe^{2+}
(Normal)



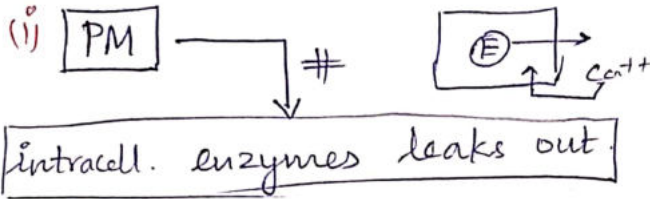
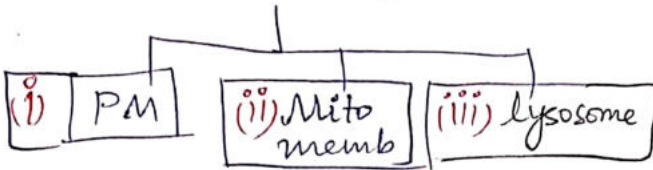
features:

- (i) Cellular swelling [key principle]
- (ii) * loss of microvilli,
* membrane blebbing,
+ swelling of RER.



damage.

③ memb. of cell



eg: In Myocardial infarcⁿ,
irrev. damage occurs &
Troponin leaks out.

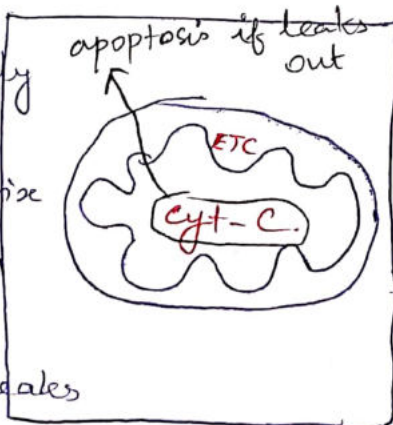
&
Also Ca^{++} enters inside cell.

(ii) Mitochondrial memb

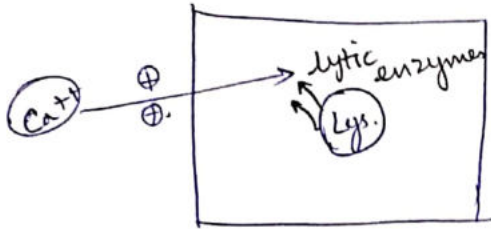
* ETC. ← #
impaired.

(ATP can't be produced
even when suff. O_2 is
present),
&

* Cyt-C
is carefully
restricted
to mito. matrix
so if
damage
occurs,
Cyt-C. leaks



& causes APOPTOSIS.



- * lytic enzymes released.
- * which are ~~cleared~~ ^{activated} by Ca^{++}

End Result: CELL-DEATH.