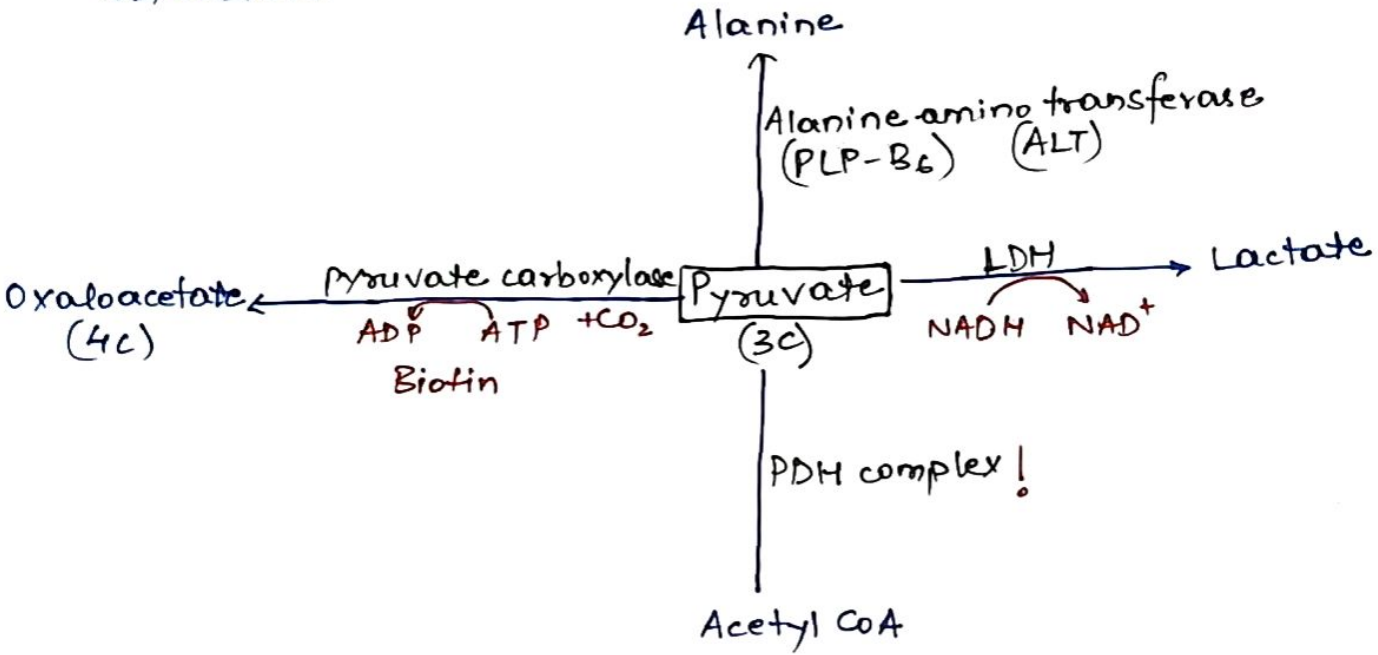
FATE OF PYRUVATE

Glucose → Pyruvate

GLYCOLYSIS



PDH Complex Reaction

Aka
Oxidative decarboxylation / Link reaction

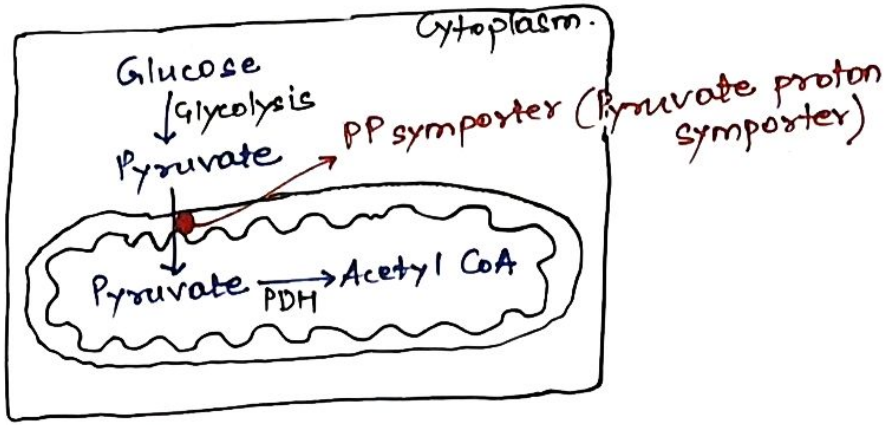
$$\text{Pyruvate} \xrightarrow[NAD^+ \rightarrow NADH]{\text{PDH complex}} \text{Acetyl CoA} + CO_2$$

* PDH = multienzyme complex
  = 3 enzymes (E_1, E_2, E_3) ; 5 coenzymes

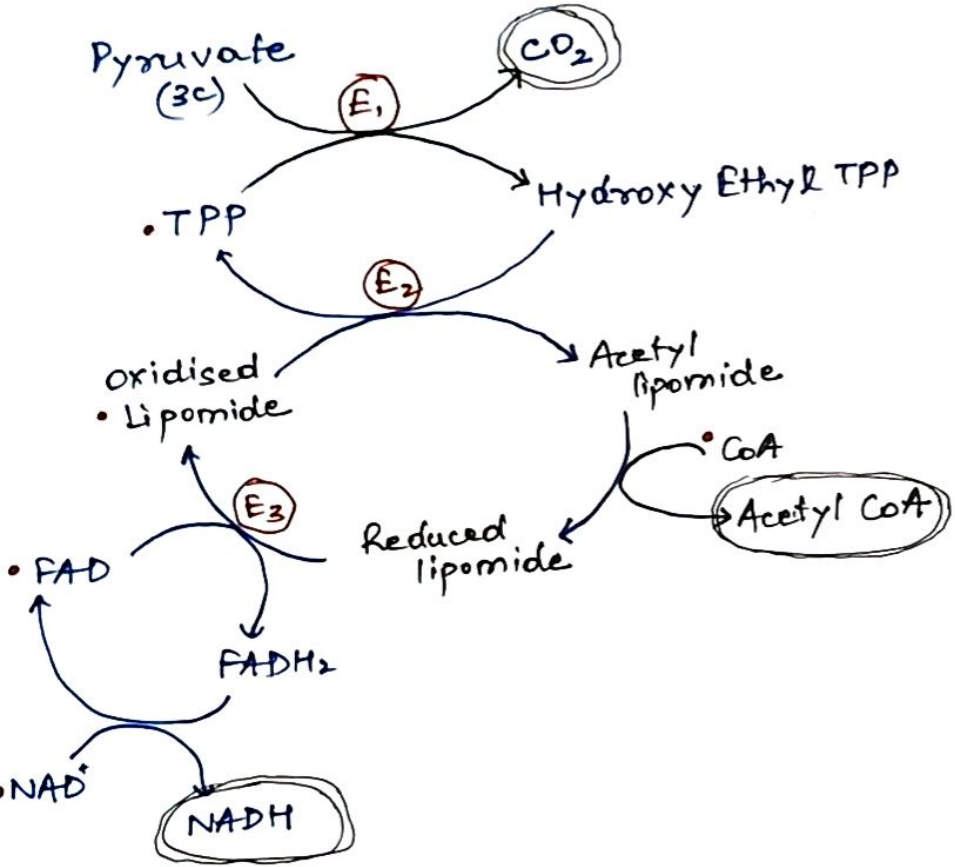
- E_1 = PDH
- E_2 = Dihydrolipoyl transacetylase
- E_3 = Dihydrolipomide dehydrogenase

- TPP (Thiamine pyrophosphate) (Vit B_1)
- Lipomide
- CoA (Vit B_5)
- FAD (Vit B_2)
- NAD (Vit B_3)

* Site :- Mitochondria



Reaction :-



Inhibitor :-

Arsenite $\xrightarrow{\ominus}$ Lipoic acid

$\therefore$ PDH is inhibited.

Regulation of PDH reaction !

① Allosteric regulation

- ↑ATP : ADP ratio
- ↑NADH : NAD^+ ratio
- ↑Acetyl CoA : CoA ratio

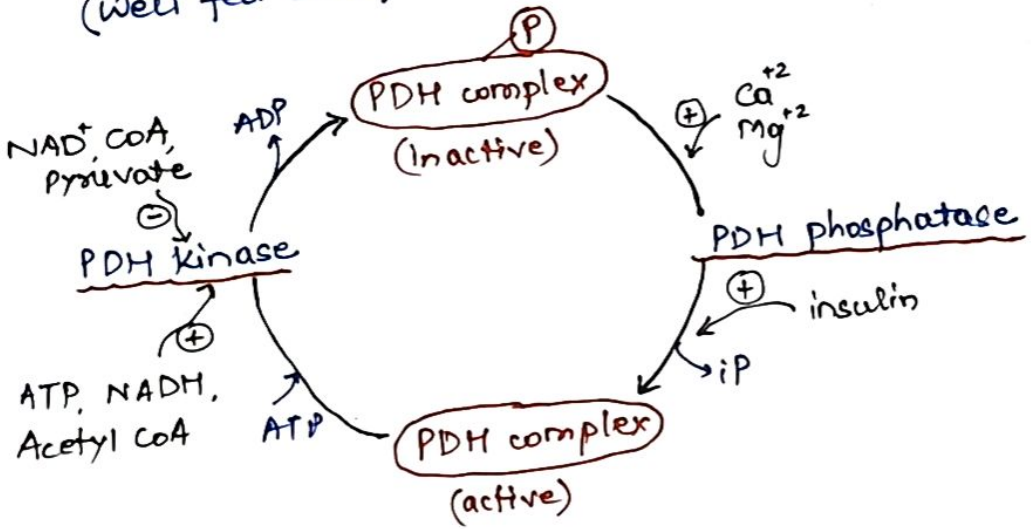
→ PDH is inhibited

(High Energy state)

② Covalent modification

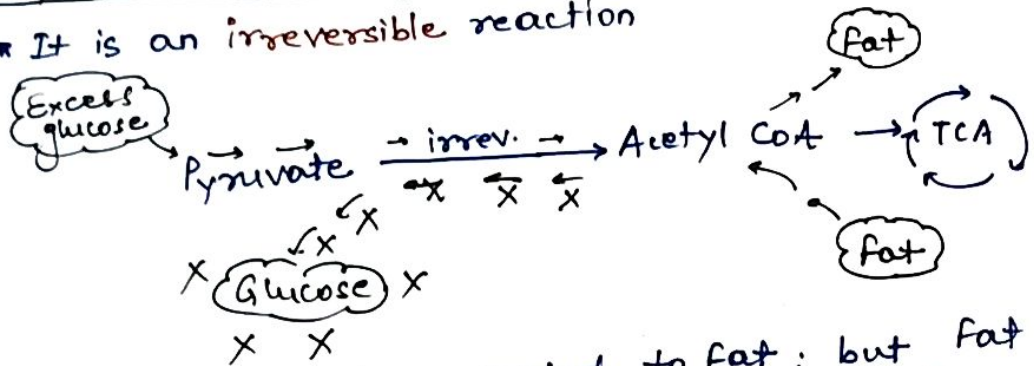
↑Insulin : Glucagon ratio ≡ PDH dephosphorylated (Active)

(Well fed state)



* Importance of PDH !

* It is an irreversible reaction



* Excess glucose is converted to fat ; but fat cannot be converted to glucose. [Exception :- Glycerol & Propionyl CoA]

* Chronic alcoholics are prone for dev. of Lactic acidosis

↓

Are chronically deficient in (vit B_1) :- is a coenzyme in PDH complex

↓

Are chronically Hypoglycemic

→ if excess glucose given :-

Glucose

↓

Pyruvate ⟹ Lactate (Lactic acidosis)

× | PDH

↓

Acetyl CoA

∴ we give :- (i.v. B_1) → followed by → (Glucos e

* chronic alcoholics
↓
Deficient in
Vit B_1 (Thiamine) ; B_6 ; B_9 ; B_{12}

K/a Wernicke-Korsakoff psychosis

Gr :- Global confusion
O :- Ophthalmoplegia
A :- Ataxia

Tx :- iv. Vit. B_1
↓ followed by
Glucose

FATE of Acetyl CoA

- TCA cycle
- Acetylation reaction
- FA synthesis
- cholesterol synthesis
- TAG & phospholipid synthesis
- KB synthesis