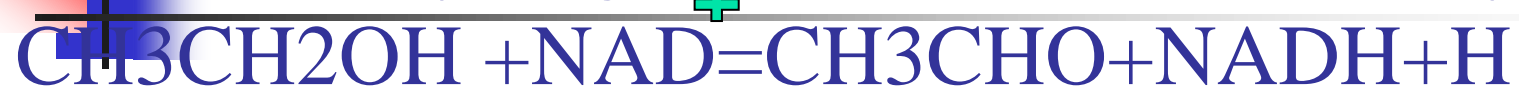


(Ethanol metabolism)



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biochemistry

- Ethanol is oxidized in the liver by cytosolic alcohol dehydrogenase to form acetaldehyde :



- Acetaldehyde is further oxidized to acetate by a mitochondrial aldehyde dehydrogenase :



- Much of the acetate produced from ethanol leaves the liver and is converted to acetyl CoA which enter TCA cycle and convert into ATP, CO₂ and H₂O .

- Acetyl CoA may also be formed in the liver and used as a precursor for lipid biosynthesis .

- The increased $\text{NADH} / \text{NAD}^+$ ratio causes a shift to left in the equilibrium :

(malate = oxaloacetate)

which may reduce activity of the CAC .

- The increased $\text{NADH} / \text{NAD}^+$ ratio also causes increased lactate / pyruvate resulting in hyperlacticacidemia which decreases excretion of uric acid, aggravating gout .

-Other effect may include increased cholesterol synthesis from acetyl CoA .

-The net effect of inhibiting FA oxidation by ethanol is to causes increased esterfication of fatty acid in triacylglycerol which appears to be the cause of the fatty liver .

- Ethanol also inhibit the metabolism of some drug (i.e : barbiturates) and prolong the time remain effective in the body . (Hydroxylation of barbitual in liver cell is inhibited by ethanol) .

Notes :

1-Disulfiram is a drug use in treatment of ethanol, it inhibited aldehyde dehydrogenase by competing with NAD for binding site of the enzyme, so increase the level of acetaldehyde in the blood causing symptoms of vomiting, thirst, sweat and head achalasia.

Q : The person who drink alcohol become fat ?
Why

This because acetyl CoA convert to fat and accumulate in the body.

2 . Women have less alcohol dehydrogenase in their stomach than men , meaning that they do not metabolize alcohol quickly .

Additionally , older males and people suffering from liver damage , also have less alcohol dehydrogenase in their stomachs .

3 . Adult hemoglobin (Hb A) consists of four polypeptide chains (two alpha and two beta chains) , each containing a molecule of heme . Each molecule of hemoglobin contain four molecules of heme while myoglobin contain one molecule of heme .

4 . In sickle cell anemia the B-chain of hemoglobin contain a valine instead of glutamate at position 6 .
RBCs that contain large complexes of (Hb S) molecules can assume a sickle shape .These cells undergo hemolysis and an anemia result .

5 . Proteins can be denaturated by agents such as heat and urea that causing unfolding of polypeptide chains without causing hydrolysis of peptide chains .
If a denaturated proteins returns to its native state after the denaturing agent is removed , the process is called renaturation .