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QUESTION

- 1a. What are coenzymes
- b. Differentiate between fat and water soluble vitamins
- c. Describe niacin in relation to its coenzymic function

ANSWERS

1a. Coenzym are substances that enhance the action of an enzyme. (An enzyme is a protein that functions as a catalyst to mediate and speed a chemical reaction). Also Coenzymes are small molecules. They cannot by themselves catalyze a reaction but they can help enzymes to do so. In technical terms, coenzymes are organic non protein molecules that bind with the protein molecule (apoenzyme) to form the active enzyme (holoenzyme).

b. Difference between fat and water soluble vitamin

1. Fat soluble vitamins absorb first to the lymph and then to the blood while Water soluble vitamin absorbed directly into the blood

2. The transport for fat soluble vitamin many requires protein carriers while The transport for water soluble vitamin travels freely

3. Fat soluble vitamins are not soluble in water while Water soluble vitamin are soluble in water

4. Fat soluble vitamins are less readily excreted and tends to remain in fat storage site while Water soluble vitamin the kidney detect and remove excess in urine for excretion

5. Fat soluble vitamins are likely to reach toxic levels when consumed from supplements while Water soluble vitamin are possible to reach toxic levels when consumed from supplements

c. Niacin in relation to its coenzyme function :The coenzyme are for oxidation reduction reaction, NAD⁺ and NADP⁺ are involved in various oxidation and reduction reactions catalyzed by dehydrogenases in metabolism.

Enzyme	Pathway / Reaction
NAD dependent Glyceraldehyde-3-phosphate dehydrogenase Pyruvate dehydrogenase	Glycolysis: Glyceraldehyde-3 phosphate to 1,3-bisphosphoglycerate

<p> α-Ketoglutarate dehydrogenase β-Hydroxy acyl-CoA dehydrogenase </p>	<p> Oxidative decarboxylation of pyruvate to acetyl-CoA TCA cycle: α-ketoglutarate to succinyl-CoA β-Oxidation of fatty acid: β- Hydroxy acyl-CoA to β-Keto acyl-CoA </p>
<p> NADP dependent Glucose-6-phosphate dehydrogenase Malic enzyme </p>	<p> Pentose phosphate pathway: Glucose 6-phosphate to 6-phosphogluconolactone Transfer of acetyl-CoA from mitochondria to cytosol </p>
<p> NADPH dependent 3-Ketoacyl reductase HMG CoA reductase </p>	<p> Fatty acid synthesis: 3 Ketoacyl enzyme to 3-Hydroxyacyl enzyme Cholesterol synthesis: HMG-CoA to Mevalonate </p>