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DEPARTMENT: PHARMACOLOGY

ASSIGNMENT TITLE: VITAMINS AND COENZYMES

COURSE TITLE: MEDICAL BIOCHEMISTRY II

COURSE CODE: BCH 204

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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

**ASSIGNMENT**

1. **MEDICAL DEFINITION OF COENZYME**

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 nonprotein molecules that bind with the protein molecule (apoenzyme) to form the active enzyme (holoenzyme).

A coenzyme is an organic non-protein compound that binds with an enzyme to catalyze a reaction.

2. COMPARISON OF WATER-VERSUS FAT-SOLUBLE VITAMINS.

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| --- | --- | --- |
|  | Water soluble vitamins | Fat-soluble vitamins |
| Vitamins | B, C | A, D, E, K |
| Site of Absorption | Small intestines | Small intestine |
| Dietary Intake | Excess intake usually detected and  excreted by the kidneys | Excess intake tends to be stored in fat  -storage sites |
| Solubility | Hydrophilic | Hydrophobic |
| Capitalize | Easily absorbed the blood, travels freely in  the bloodstream | Absorbed into the lymphatic system,  many require protein carriers to travel  in the blood |
| Body storage | Not generally | Yes |
| Deficiency | Deficiency symptoms appear relatively  quickly | Deficiency symptoms are slow to  develop |
| Toxicity | Low risk | Higher risk |
| Need for daily consumption | Yes | No |
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**3. NIACIN**

Niacin (vB3) is defined as a group of compounds with biological activities similar to nicotinamide (nicotinic acid amide itself, nicotinic acid, and other molecules with similar structures and functions).

Niacin is one of the most stable vitamins, resisting most cooking and preserving processes. Apart from its value as a vitamin, niacin is used in small daily doses to reduce high cholesterol levels in the blood.

**NIACIN IN RELATION TO ITS COENZYMIC FUNCTION**

As a vitamin, niacin functions as a coenzyme essential to tissue respiration, lipid metabolism, and glycogenolysis. Niacin deficiency causes pellagra, which causes dermatitis, diarrhea, and dementia; administration of niacin cures pellagra. Niacin lowers cholesterol and triglyceride levels by an unknown mechanism.

Niacin plays a critical role in the metabolism of fat, carbohydrates and amino acids. It functions in the body primarily in the form of two coenzymes: NAD and NADPH. NAD is used in the breakdown of sugar and the oxidation of fatty acids for energy production while NADPH is used in folate metabolism and the synthesis of fatty acids, cholesterol, steroid hormones and important precursors of DNA. Outside of its functions as a coenzyme, niacin is also involved in DNA repair and gene stability.