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**PHARMACOLOGY**

**18/MHS07/006**

**BCH 204**

**QUESTION**

1a. What are coenzymes

b. Differentiate between fat and water soluble vitamins

c. Describe niacin in relation to its coenzymic function

**Answer**

1a. Coenzyme: A substance that enhances the action of an enzyme. (An enzyme is a protein that functions as a catalyst to mediate and speed a chemical reaction).

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 (Apo enzyme) to form the active enzyme (holoenzyme).

1b. Water-soluble vitamins dissolve in water, which means these vitamins and nutrients dissolve quickly in the body. Unlike fat-soluble vitamins, water-soluble vitamins are carried to the body's tissues, but the body cannot store them. Any excess amounts of water-soluble vitamins simply pass through the body.

1c. Niacin is a coenzyme, like thiamine and riboflavin, that is responsible for energy release from carbohydrates. A niacin deficiency can lead to pellagra, a disabling disease with symptoms that may be characterized by four “Ds”: depression, diarrhea, delirium and dementia.

Niacin is found in fortified breads and cereals. Protein foods, such as eggs, fish, meat, dairy milk and poultry, are naturally rich in niacin. They are also plentiful in the amino acid tryptophan, which can be synthesized into niacin by the liver. Chicken breast, ground beef, halibut, tuna and turkey are particularly good sources of tryptophan. In the vegetable kingdom, asparagus, baked potatoes and cantaloupe have significant amounts of tryptophan.

Niacin has been used to lower LDL cholesterol and raise HDL cholesterol when administered as a drug under medical guidance. In heavy doses, niacin has been known to cause a “niacin flush” due to the capillaries increasing in size. This condition can lead to fatigue and even liver damage. Caution should be used if one is taking niacin or B-complex supplements.

Sources of niacin: eggs, fish, legumes, meats nuts, peanuts, poultry, pork

Roles in body: coenzyme, digestive and nervous system functions, healthy skin

Deficiency: appetite loss, confusion, fatigue, flaky skin, indigestion, pellagra

Toxicity: cramping, flushing, headaches, irregular heartbeat, irritated ulcers, liver dysfunction

Cooking Foods with Niacin

Niacin is one of the more stable water-soluble vitamins and is minimally at risk for destruction by air, heat or light.

The adult RDA for niacin is 14 to 16 milligrams of niacin equivalents (NE) daily [4, 12].