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Physiology

BCH 204

Questions

1a. What are coenzymes

b. Differentiate between fat and water soluble vitamins

c. Describe niacin in relation to its coenzymic function

Answers.

1a. Coenzymes are **small organic molecules** that link to enzymes and whose presence is essential to the activity of those enzymes. Coenzymes belong to the larger group called cofactors, which also includes metal ions; cofactor is the more general term for small molecules required for the activity of their associated enzymes.

b. Water-soluble vitamins are those that are dissolved in water and readily absorbed into tissues for immediate use. Because they are not stored in the body, they need to be replenished regularly in our diet. Any excess of water-soluble vitamins is quickly excreted in urine and will rarely accumulate to toxic levels. With that being said, certain types of water-soluble vitamin, such as [vitamin C](https://www.verywellhealth.com/the-benefits-of-vitamin-c-supplements-89083), can cause diarrhea if taken in excess **while** Fat-soluble vitamins are dissolved in fats. They are absorbed by fat globules that travel through the small intestines and distributed through the body in the bloodstream. Unlike water-soluble vitamins, excess fat-soluble vitamins are stored in the liver and fatty (adipose) tissues for future use They are found most abundantly in high-fat foods and are better absorbed if eaten with fat. Because fat-soluble vitamins are not readily excreted, they can accumulate to toxic levels if taken in excess. Where a well-balanced diet can't cause toxicity, overdosing on fat-soluble vitamin supplements can. Vitamin A, D, E and K are **fat soluble vitamins** and Vitamin B-complex and vitamin C are **water soluble vitamins**.

c. **NIACIN(VITAMIN B3):** Generally referred to as niacin, is a water-soluble vitamin. This vitamin can generally be found in two distinctive forms, namely nicotinic acid and nicotinamide. These substances are used by the body to form the coenzymes NAD and NADP. Niacin coenzymes degrade carbohydrates, fats, proteins and alcohols and synthesize fatty acids and cholesterol. They play a role in cell signaling.

**Functions Vitamin B3**: Niacin assists functions of the nervous and digestive system. It plays a role in food metabolism and in the formation of red blood cells and skin. NAD and NADP are coenzymes that are part of the energy production system of the body. This system works by means of oxidation and reduction (redox) reactions. Niacin deficiency occurrence causes many symptoms, such as fatigue, headaches, dry skin, loss of appetite, ulcers and emotional instability. On rare occasions (mainly in developing countries) people may experience severe deficiency, which leads to a condition known as pellagra. This conditions is commonly characterized by the 4 D's: dermatitis, diarrhoea, dementia and death. Pellagra literally means raw skin. The conditions was named this because the skin of a patient develops a dark pigmented rash on areas exposed to bright sunlight.

**Vitamin B3 in food**: Niacin is part of a range of foods, for example meat, fish, bread, yeast, nuts, seeds, soy beans, potatoes, dried fruit, tomatoes and peas. Milk, green-leaved vegeatbles and coffee and tea also provide some niacin.

**Vitamin B3 as a supplement**: Niacin is recommended for dizziness, Post Menstrual Syndrome (PMS) and arthritis. It is a useful preparation for burn treatment. Niacin can also be useful for alcohol addicts and people with high cholesterol, mental problems, severe stress problems or hyperthyroid, for athletes and for elderly people. Niacin is suspected to decrease the possibility of introduction of certain types of cancer such as leukaemia, as a result of increased levels of DNA-repairing coenzymes (NAD). People suffering from HIV may be given extra niacin to postpone symptoms and elongate their life.