AUGOYE OMESIRI

ANATOMY

18/MHS01/094

COENZYMES

1. WHAT ARE COENZYMES?

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

1. DIFFERENCE BETWEEN FAT SOLUBLE AND WATER SOLUBLE

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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 |

1. **Niacin**, also called **nicotinic acid** and **vitamin B3**, water-soluble [vitamin](https://www.britannica.com/science/vitamin) of the B complex. It is also called the [pellagra-preventive](https://www.britannica.com/science/pellagra) vitamin because an adequate amount in the diet prevents [pellagra](https://www.britannica.com/science/pellagra), a chronic disease characterized by skin lesions, gastrointestinal disturbance, and nervous symptoms. Niacin is interchangeable in metabolism with its [amide](https://www.britannica.com/science/amide), niacinamide (nicotinamide). Like the vitamins [thiamin](https://www.britannica.com/science/thiamin) (vitamin B1) and [riboflavin](https://www.britannica.com/science/riboflavin) (vitamin B2), niacin functions as part of a coenzyme involved in the metabolism of carbohydrates and acts to catalyze the oxidation of sugar derivatives and other substances. 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 acts directly on peripheral vessels, dilating cutaneous vessels and increasing blood flow, predominantly in the face, neck, and chest.Mechanism of action is unknown. Nicotinic acid inhibits lipolysis in adipose tissues, decreases hepatic esterification of triglyceride, and increases lipoprotein lipase activity. It reduces serum cholesterol and triglyceride levels. Niacin, which was identified as a pellagra preventive in 1937, is widely distributed among plants and animals. Lean meat is generally a good source. Approximately 15 mg per day (1 mg = 0.001 gram) of nicotinic acid is required by humans. In the intestinal tract, the [amino acid](https://www.britannica.com/science/amino-acid) [tryptophan](https://www.britannica.com/science/tryptophan) can be converted to niacin by bacterial action and thus can serve as a source for part of the required niacin. This explains scientists’ early observation that the protein in such foods as eggs and milk, both poor sources of niacin, can nevertheless prevent or cure pellagra.

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](https://www.britannica.com/science/cholesterol) levels in the blood.