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Anatomy

18/MHS01/192

BCH 204

1a. What are coenzymes?

Coenzymes are nonprotein compounds that are necessary for the functioning of an enzyme.

b. Differentiate between fat soluble vitamins and water-soluble vitamins

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| Fat soluble vitamins | Water soluble vitamins |
| Fat soluble vitamins can be stored in the body | Water soluble vitamins cannot be stored in our body. |
| Fat soluble vitamins are dissolved in fat and stored in liver and fatty tissues | Water soluble vitamins are dissolved in water and eliminated in urine. |
| Vitamin A, D, E and K are fat soluble vitamins | Vitamin B-complex and vitamin C are water soluble vitamins. |
| Fat soluble vitamins are toxic if taken in excessive amounts | Water soluble vitamins are not toxic if taken in high amounts. |
| Fat soluble vitamins can be taken in a single large dose. | Water soluble vitamins are required on a daily basis. |

#### c. NAD as a coenzyme in electron-transfer reactions

Living organisms derive most of their energy from [redox](https://lpi.oregonstate.edu/mic/glossary#redox-reaction) reactions, which are processes involving the transfer of [electrons](https://lpi.oregonstate.edu/mic/glossary#electron). Over 400 [enzymes](https://lpi.oregonstate.edu/mic/glossary#enzyme) require the niacin [coenzymes](https://lpi.oregonstate.edu/mic/glossary#coenzyme), NAD and NADP, mainly to accept or donate electrons for redox reactions. NAD and NADP appear to support distinct functions. NAD functions most often in energy-producing reactions involving the degradation ([catabolism](https://lpi.oregonstate.edu/mic/glossary#catabolism)) of [carbohydrates](http://lpi.oregonstate.edu/infocenter/glossary.html#carbohydrate), fats, [proteins](http://lpi.oregonstate.edu/infocenter/glossary.html#protein), and alcohol. NADP generally serves in biosynthetic (anabolic) reactions, such as in the [synthesis](https://lpi.oregonstate.edu/mic/glossary#synthesis) of [fatty acids](https://lpi.oregonstate.edu/mic/glossary#fatty-acid), [steroids](https://lpi.oregonstate.edu/mic/glossary#steroid) (e.g., [cholesterol](http://lpi.oregonstate.edu/infocenter/glossary.html#cholesterol), bile acids, and steroid [hormones](https://lpi.oregonstate.edu/mic/glossary#hormone)), and building blocks of other macromolecules. NADP is also essential for the regeneration of components of detoxification and [antioxidant](https://lpi.oregonstate.edu/mic/glossary#antioxidant) systems. To support these functions, the cell maintains NAD in a largely oxidized state (NAD+) to serve as oxidizing agent for catabolic reactions, while NADP is kept largely in a reduced state (NADPH) to readily donate electrons for reductive cellular processes.

REFERENCE

[www.clinically](http://www.clinically)related.com