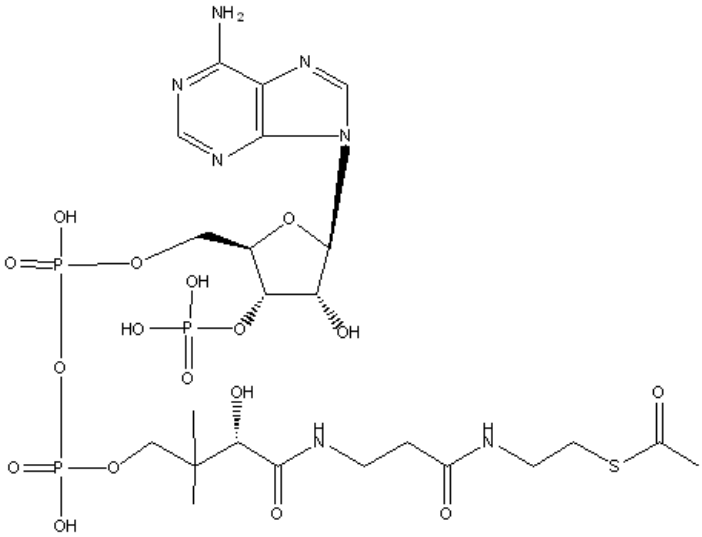
Catalog Number: 100490

Acetyl Coenzyme A, Trilithium Salt, Trihydrate

Structure:



Molecular Formula: $C_{23}H_{35}Li_3N_7O_{17}P_3S \cdot 3H_2O$

Molecular Weight: 881.1

CAS # 75520-41-1

Synonym: Acetyl-CoA

Solubility: Soluble in water (100 mg/ml - clear, colorless solution). Generally stable in neutral and moderately acidic solutions. Aqueous solutions at pH 3.5-5 can be heated to 100°C without decomposition.[1] Hydrolyzes in strong acid, and hydrolyzes more rapidly in alkaline solutions.

E^{M}:

(260 nm): 16,400 (water)[1]
(259): 15,400 (0.1 M PO4 buffer, pH 7)
(232 nm): 8,700 (water)[1]

Description: Acetyl-CoA is produced via beta-oxidation of fatty acids, via the metabolism of carbohydrates - glucose 6-phosphate to pyruvate to acetyl-CoA and via the catabolism of amino acids. Acetyl-CoA has a number of metabolic opportunities. It is metabolized in the tricarboxylic acid cycle to produce carbon dioxide, water and energy. It can also be metabolized to fatty acids, cholesterol and steroid hormones. Acetyl-CoA also participates in a number of acetylation reactions, including the formation of acetylcholine, melatonin, N-acetylglucosamine, N-acetylgalactosamine and N-acetylneuraminic acid. Acetyl-CoA is involved in the acetylation of proteins and peptides. Histone acetylation is an epigenetic mechanism of gene regulation. In general, chromatin fractions enriched in actively transcribed genes are also enriched in highly acetylated core histones, whereas silent genes are associated with nucleosomes with a low level of acetylation. Nucleosomes are the fundamental units of chromosomes.[2]

Acetyl coenzyme A is an essential cofactor and carrier of acyl groups in enzymatic acetyl transfer reactions. It is a key precursor in lipid biosynthesis, and the source of all fatty acid carbons. It is a positive regulator of pyruvate carboxylase. It is a percursor of the neurotransmitter acetylcholine.

The acetic acid moiety which is bound by a high-energy bond (free energy 34.3 kJ/mol) to the -SH group of coenzyme A is a precursor to fatty acids, steroids and other naturally occurring compounds, such as terpenes and acetogenins present in plants.[4,6] The biosynthetic pathways for acetyl-CoA have been published.[4]

In the transfer reaction by acetyl-CoA of the C2 acetyl fragment, either the carboxyl group or the methyl group may react (electrophilic vs. nucleophilic reaction, respectively).[6]

References:

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2. www.pdrhealth.com
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4. Lehninger, A.L., *Biochemistry*, p. 534, Worth Publishers, Inc. (1972).
5. Meyers, R.A., *Molecular Biology and Biotechnology: A comprehensive desk reference*., p. 960, VCH Publishers, Inc., New York (1995).
6. Scott, T., and Eagleson, M., *Concise Encyclopedia: Biochemistry, 2nd ed.*, p. 4, Walter de Guyter Press, New York (1988).
7. Szutowicz, A., "Key role of acetyl-CoA in cytoplasm of nerve terminals in disturbances of acetylcholine metabolism in brain." *Folia Neuropathol.*, **v. 35**, 241 (1997).