

Acetyl CoA Pathway

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Acetyl-CoA pathway

- The acetyl coenzyme A (CoA) pathway, commonly referred to as the Wood-Ljungdahl pathway or the reductive acetyl-CoA pathway.
- Methanogenic archaea and probably most extreme thermophiles incorporate CO_2 by the reductive acetyl-CoA pathway.
- A similar pathway also is present in acetogenic bacteria and autotrophic sulfate-reducing bacteria.
- This specific pathway is characterized by the use of hydrogen as an electron donor and carbon dioxide as an electron acceptor to produce acetyl-CoA as the final product.
- In this pathway carbon dioxide is reduced to carbon monoxide and formic acid or directly into a formyl group, the formyl group is reduced to a methyl group and then combined with the carbon monoxide and Coenzyme A to produce acetyl-CoA.

Enzymes of Acetyl-CoA pathway

- The acetyl-CoA pathway utilizes two major enzymes in the production of acetyl-CoA: carbon monoxide dehydrogenase and acetyl-CoA synthase.
 - **Carbon monoxide dehydrogenase** catalyzes the reduction of the CO_2
 - **Acetyl-CoA synthase** functions in combining carbon monoxide and a methyl group to produce acetyl-CoA.
- Another cobamide containing enzyme (**corrinoid-iron-sulfur protein**) involved in methyl transfers.

Wood-Ljungdahl pathway

- Where,
- THF = tetrahydrofolate
- Co-FeS-P = corrinoid-iron-sulfur protein

