Vitamin B5 (Pantothenate)

Vitamin B5 is a water-soluble vitamin, also called pantothenic acid. This vitamin is essential for the synthesis of coenzyme A. Its utilization as a cofactor is essential for pyruvate dehydrogenase and fatty acid synthase, which are needed for glucose metabolism and fatty acid synthesis, respectively. A deficiency can present with non-specific signs of alopecia, dermatitis and enteritis. Additionally, the vitamin deficiency can result in adrenal insufficiency due to its role in fatty acid and hormone synthesis.



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Mechanism

Pantothenate
Pantheon
Pantothenate is an alternative name for vitamin B5.

Pyruvate Dehydrogenase
Pie-root Dehydrator
Pyruvate dehydrogenase converts pyruvate to acetyl CoA, which then enters the TCA cycle (Krebs cycle) for ATP production.

Coenzyme A
Coin-A
Pantothenate, or vitamin B5, is required for the synthesis of coenzyme A. CoA is important in energy metabolism for pyruvate to enter the TCA cycle. It is also necessary for the formation of fatty acids, cholesterol and acetylcholine.

Fatty Acid Synthase
Bacon Acidic-lemon synthase
Fatty acid synthase is another enzyme which requires coenzyme A. This enzyme is used in the synthesis of fatty acids.

Deficiency Signs and Symptoms

Enteritis
Enter-small-intestine
Enteritis, or inflammation of the small intestine, can result from a deficiency in vitamin B5.

Dermatitis
Dermatologist Examining Rash
A nonspecific rash can result from a deficiency in vitamin B5.

Alopecia
Aloe-plant on bald head
Alopecia, which means hair loss, can result from a deficiency in vitamin B5.

Adrenal Insufficiency
Adrenaline-junkie with insufficient adrenals
Adrenal insufficiency can result from the vitamin B5 deficiency. This occurs as a direct result of the limited ability to synthesize hormones due to decreased production of fatty acids necessary to make hormones.

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