

Pantothenic Acid (Vitamin B5)

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Pantothenic acid, also called vitamin B5, is a water-soluble vitamin used as a cofactor in many important biochemical reactions such as: acetyl-CoA synthesis and Krebs cycle of energy production. Pantothenic acid is important for our bodies to properly use carbohydrates, proteins, and lipids and for healthy skin. It is naturally occurring in both plants and animals including meat, vegetables, cereal grains, legumes, eggs, and milk.

After absorption, pantothenic acid is converted to a sulfur-containing compound called pantetheine. Pantetheine is then converted into coenzyme A, which is the only known biologically active form of pantothenic acid.

RESEARCH PROVEN BENEFITS

- **Alcohol Detoxification**
Participates in the metabolism of acetaldehyde, a by product of ethanol metabolism^{4, 5, 10}
- **Anti-stress Effect**
Synthesis of steroid hormones and proper functioning of the adrenal glands⁹
- **Biochemical Reactions**
Coenzyme A (CoA), which is the active form of pantothenic acid, helps transfer two-carbon units (acetyl groups) in a wide variety of biochemical reactions.¹²
- **Cholesterol and Tryglicerides lowering**
Pantethine, a metabolite of pantothenic acid,¹⁸ seems to have a beneficial effect on triglyceride and lipoprotein levels by producing cystamine. The hydrolysis product cystamine inhibits acetyl-CoA carboxylase, which in turn reduces triglyceride synthesis. Pantethine might also reduce cholesterol synthesis by inhibiting HMG-CoA reductase, by inhibiting the conversion of lanosterol to cholesterol.^{21, 22}
- **Energy Metabolism**
Enhances the release of energy from carbohydrates in the Krebs cycle^{12, 17}
- **Fat Synthesis**
Involved in synthesis of phospholipids, fats, cholesterol, and bile acids¹²
- **Fighting infections**
Was shown to help the immune system fight viral hepatitis¹¹
- **Neurotransmitter Synthesis**
Involved in synthesis of acetylcholine¹²
- **Red Blood Cells**
Involved in synthesis of porphyrin in the hemoglobin of red blood cells¹²
- **Surgery And Wound Healing**
In combination, pantothenic acid and ascorbic acid significantly enhance post surgical therapy and wound healing.^{6, 15} Another study found that vitamin B5 accelerated the healing process of conjunctiva and the cornea after reconstructive surgery of the epithelium.⁷ Pantothenic acid also appears to be essential to normal epithelial function.¹⁶

Dosage/Administration: ORAL

LIKELY SAFE when used orally and appropriately. Amounts up to 10 grams have been ingested without significant adverse effects.

PREGNANCY/LACTATION: LIKELY SAFE when used orally in amounts not exceeding the recommended daily allowance (RDA). The RDA during pregnancy/lactating is 6/7 mg. There is insufficient reliable information about the safety of using pantothenic acid in amounts exceeding the RDA during pregnancy/lactating; avoid using.

Interactions with Herbs & Supplements/Drugs: None known. Do not take pantothenic acid if you have the blood disorder called hemophilia. It can increase the risk of bleeding.

“Study of the corticosteroid content in the adrenals and blood of rats under pantothenate deficiency has demonstrated a decrease in adrenocortical function. A single administration of pantothenate in a dose of 3.3 mg/kg reduced the influence of hypovitaminosis on the adrenals. The pantothenate derivatives (pantethine, 4'-phosphopantothenate and CoA in particular) injected to intact animals in a single dose equimolar to 3.3 mg/kg calcium pantothenate per kg bw had a marked steroidogenous effect.”¹³

“The effect of calcium D-pantothenate on the migration, proliferation and protein synthesis of human dermal fibroblasts from three different donors was investigated. The migration of cells into a wounded area was dose-dependently stimulated by Ca D-pantothenate....The protein synthesis was modulated, since two unidentified proteins were more strongly expressed in pantothenate supplemented cultures. In conclusion, Ca D-pantothenate accelerates the wound healing process by increasing the number of migrating cells, their distance and hence their speed. In addition, cell division is increased and the protein synthesis changed. These results suggest that higher quantities of pantothenate are locally required to enhance wound healing.”¹⁵

“The antitoxic effect of preparations of pantothenic acid is not mediated by CoA-dependent reactions of detoxication, but most probably is due to intensification of ET (ethanol) oxidation and perhaps to its elimination from the organism.”¹⁰

“Increased cytoplasmic synthesis of CoA by addition of 5 mM pantothenate (vitamin B5) increased the thermogenic response to glucose more in mdx than in control muscles. We conclude that the low energy turnover in mdx-mouse muscle fibres is not due to a decrease of intracellular glucose availability, but rather to a decreased oxidative utilization of glucose and free fatty acids. We suggest that some enzyme complex of the tricarboxylic acid cycle or inefficiency of CoA transport in the mitochondria could be involved.”¹⁷

“27 diabetics (15 NIDDM and 12 IDDM) with dyslipidemia (14 type IV, 8 type IIa and 5 type IIb) were divided in 3 groups and treated with 3 different hypolipemic drugs (Group A: pantethine 600 mg/day.... Pantethine and acipimox were more effective on triglycerides (-37.7% and -23.3% respectively).”¹⁸

“A one-year clinical trial with pantethine (a metabolite of Pantothenic acid) was conducted in 24 patients with established dyslipidemia.... Blood lipid assays repeated after 1, 3, 6, 9, and 12 months of treatment revealed consistent and statistically significant reductions of all atherogenic lipid fractions (total cholesterol, low-density lipoprotein cholesterol, and apolipoprotein B) with parallel increases of high-density lipoprotein cholesterol and apolipoprotein A. The results were equally good in patients with uncomplicated dyslipidemia and in those with associated diabetes mellitus. The authors conclude that pantethine (a drug entity related to the natural compound, pantethine) represents a valid therapeutic support for patients with dyslipidemia not amenable to satisfactory correction of blood lipids by diet alone.”²⁰

“Pantethine (P), (a metabolite of Pantothenic acid) and major component and precursor of coenzyme A, was evaluated within a double-blind protocol (8 weeks for P or for a corresponding placebo) in 29 patients, 11 with type IIB hyperlipoproteinemia, 15 with type IV, and 3 with an isolated reduction of high density lipoprotein cholesterol (HDL-C) levels.....P (300 mg t.i.d.) determined a highly significant lowering of plasma total and low density lipoprotein (LDL) associated cholesterol (-13.5% for both parameters)..... In the same patients, HDL-C levels increased about 10% at the end of treatment.plasma triglyceride levels were reduced around 30%....This study provides evidence for a significant hypocholesterolemic effect of P, a natural compound free of overt side effects. It also indicates that P may raise HDL-C levels in type IIB patients, while moderately reducing triglyceridemia.”¹⁹

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