

# Pantethine

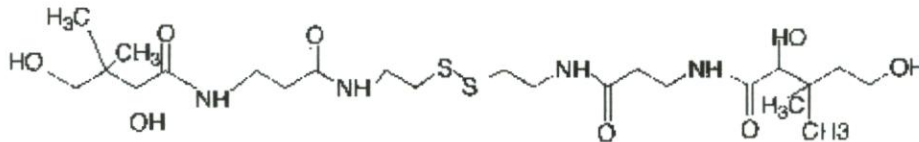
## TRADE NAMES

Pantethine 500 (Westlake Laboratories)

## DESCRIPTION

Pantethine is the disulfide dimer of pantetheine, the 4'-phosphate derivative of which is an intermediate in the conversion of the B vitamin pantothenic acid to coenzyme A (see Pantothenic Acid). Pantethine is found naturally in small quantities in most forms of life, and therefore, in food sources. Very large doses of pantethine have been found to have lipid-lowering effects, and pantethine is used in Europe and Japan as a lipid-lowering agent. Pantethine is marketed in the United States as a nutritional supplement.

Pantethine is also known as D-bis(N-pantotheryl-beta-aminoethyl)disulfide and (R)-N,N'-[dithiobis(ethyleneimino-carbonyl)ethylene] bis (2, 4-dihydroxy-3, 3-dimethylbutyramide). Its molecular formula is  $C_{22}H_{42}N_4O_8S_2$  and its molecular weight is 554.73 daltons. Pantethine is represented by the following chemical structure:



Pantethine

## ACTIONS AND PHARMACOLOGY

### ACTIONS

Pantethine may have lipid-modulating activity. It has putative antiatherogenic, ophthalmoprotective and detoxification activities.

### MECHANISM OF ACTION

Pantethine has been found to decrease serum levels of total cholesterol, low-density lipoprotein cholesterol (LDL-C), apolipoprotein B and triglycerides. It has also been found to increase high-density lipoprotein cholesterol (HDL-C) and apolipoprotein A1 levels. The mechanism of the possible lipid-modulating activity of pantethine is not understood. In isolated hepatocytes, pantethine has been shown to inhibit both cholesterol and fatty acid synthesis. It is speculated that pantethine, by acting as a precursor of coenzyme A, may enhance the beta-oxidation of fatty acids. However, this has not been confirmed. Another hypothesis is that the lipid-modulating effect of pantethine may be mediated via its metabolite cysteamine. It is argued that there is little pantethine found in the serum following its ingestion and that most of a dose is metabolized to pantothenic acid and cysteamine. Since pantothenic acid does not possess lipid-modulatory activity, cysteamine might. This lipid-modulatory activity could occur via the inhibition of acetyl coenzyme A carboxylase activity and the stimulation of hepatic fatty acid oxidation, resulting in lowered triglyceride levels, and via the inhibition of HMG-CoA reductase activity, resulting in lowered cholesterol