

Mitochondrial Cofactors

Cellular Energy Formula*

The body is a complex organism that requires substantial energy for everyday functioning. The energy that drives biological activity comes from adenosine triphosphate (ATP), which contains high-energy bonds for use in biochemical reactions. Because ATP cannot be stored, it must constantly be replenished. ATP is produced in a series of enzymatic steps within the mitochondria. If this process is disturbed by nutrient deficiencies, stress, or a myriad of other conditions, fatigue can occur.*

Mitochondrial Cofactors (Cellular Energy Formula*) contains coenzyme Q10, PANMOL® NADH, acetyl-L-carnitine, magnesium, and vitamin B6 as pyridoxal-5-phosphate. These bioactive cofactors have been shown to enhance energy production, with particular benefits for skeletal muscles, heart, and brain.*



#58270

90 vegetarian capsules

Key Features

- Supports ATP production by activating key mitochondrial enzymes.*
- Facilitates the transport of fatty acids into the mitochondria for use as fuel.*
- May alleviate normal everyday mental and physical fatigue.*



CoQ10 Ubiquinone (Ubidecarenone) is an excellent source of coenzyme Q10, a cofactor that has both bioenergetic and antioxidant properties.* The main function of CoQ10 is to transfer electrons along the complexes of the mitochondrial electron transport chain, culminating in the formation of ATP.* Low levels of CoQ10 are consistently associated with fatigue.* In human studies, supplementation with CoQ10 increased mitochondrial efficiency in the brain.* Healthy adults consuming CoQ10 experienced significantly less fatigue and greater exercise capacity compared to placebo groups.*

NADH (PANMOL®) is a microencapsulated form of nicotinamide adenine dinucleotide (NADH), a bioactive derivative of niacin (vitamin B3).* NADH serves an electron carrier for the ultimate production of ATP.* An analysis of human mitochondria revealed that NADH metabolism was one of the most important biological determinants of fatigue.* In a clinical study, individuals were asked to rate the extent to which fatigue had interfered with certain aspects of their day-to-day functioning.* Those who received supplemental NADH, along with CoQ10, reported improvements in physical and cognitive functioning after eight weeks.*

Acetyl-L-Carnitine is a short-chain ester of L-carnitine that is naturally produced in the body.* However, the biosynthesis of carnitine only accounts for 25% of daily needs.* Carnitine plays a key role in energy metabolism, since it enables fatty acids to enter the mitochondria, where they are broken down to form ATP.* Low blood and tissue carnitine levels often correlate with fatigue.* Supplemental carnitine was shown to increase energy production in the brain and to reduce muscle fatigue under various conditions.* In clinical studies, individuals receiving carnitine reported greater subjective energy levels compared to placebo groups.*

Pyridoxal-5-phosphate (PLP, also known as P5P) is a form of vitamin B6 that serves as a cofactor for numerous biosynthetic enzymes.* PLP is needed for the synthesis of heme, the oxygen-binding molecule within hemoglobin, which supplies oxygen to every tissue in the body.* A supply of PLP is important for normal heart and skeletal muscle contractions.* The intake of vitamin B6 also upregulates pathways that promote the growth and repair of skeletal muscle.* Low PLP levels are associated with decreased mitochondrial oxidative capacity and fatigue.*

Magnesium Bisglycinate Chelate is a highly soluble form of magnesium that is chelated with the neutral amino acid, glycine.* Magnesium influences the rate of ATP production by stimulating the activity of several enzymes in the trichloroacetic acid cycle (TCA, also known as the Krebs' cycle).* Additionally, magnesium plays a pivotal role in the activity of the mitochondrial ATP synthase, the enzyme that produces the bulk of cellular ATP.* Human and animal studies have shown that magnesium supports the normal daily functioning of the heart, brain, and skeletal muscle.* Healthy adults experiencing fatigue reported improved energy levels after magnesium supplementation.*

Supplement Facts

Serving Size	3 Capsules	
Servings Per Container	30	
Amount Per Serving	% Daily Value**	
Vitamin B6 (as Pyridoxal-5-Phosphate)	25 mg	1470%
Magnesium (as Magnesium Bisglycinate)	100 mg	23%
Acetyl-L-Carnitine	300 mg	†
Coenzyme Q10 (Ubiquinone)	100 mg	†
NADH (PANMOL® NADH) (Reduced B-Nicotinamide Adenine Dinucleotide)	5 mg	†
† Daily value not established.		
**Percent Daily Value are based on a 2,000 calorie diet.		

Other ingredients: Hydroxypropyl methylcellulose, microcrystalline cellulose, silicon dioxide, calcium palmitate, stearic acid.

Suggested Use: As a dietary supplement, 3 capsules, one or two times daily with meals, or as directed by a healthcare practitioner.

PANMOL®
NADH

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