

CoEnzyme Q10

By Dallas Cloutre, Ph.D.

The importance of coenzyme Q10 as a supplement continues to be confirmed by new science. Recent research indicates that potencies considerably higher than those previously recommended in the past (up to 1,200 mg) may be useful in practice. A second look at the history and science of this compound helps to explain its growing popularity.

Coenzyme Q10 is known as ubiquinone because it is so widely present in plant and animal cells. There are other ubiquinones with other numbers, but only CoQ10 is active in humans. This coenzyme was first isolated in pure form at the University of Wisconsin in 1957. That same year it was proven that CoQ10 is essential to the functioning of the mitochondria, the chief site of energy production within cells. Not long afterwards, Karl Folkers re-isolated CoQ10 from beef heart muscle and synthesized the pure compound by fermentation. Folkers also demonstrated that CoQ10 possesses vitamin-like catalytic functions. Chemically, its structure is related to that of vitamin E and K.

CoQ10 is part of the mitochondrial electron transport system and is synthesized in all cells. It is essential to the body's production of energy in the form of adenosine triphosphate (ATP). This holds special importance for the heart, which is spectacularly endowed with mitochondria and has the body's highest concentration of CoQ10. In descending order of tissue concentration, CoQ10 is found in significant amounts in the liver, kidney, spleen, and pancreas. Since the mid-1960s, CoQ10

has been used in Japan as a dietary supplement for humans, with regard to cardiac health and function. Aging reduces internal synthesis and, likewise, access to dietary CoQ10.

CoQ10 is present in cell membranes, where it helps to maintain flexibility and performs some of its antioxidant functions. Cell membranes are largely constructed of lipids and CoQ10 itself is lipophilic. Lipids are often the targets of free radicals, for instance, the membranes of low-density lipoprotein cholesterol (LDL cholesterol). Supplementation with CoQ10 provides lipoprotein with increased resistance to oxidation. Moreover, CoQ10 is required to regenerate (reduce) the vitamin E radical.

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This suggests that in order to fully realize the antioxidant benefits of vitamin E, co-supplementation with CoQ10 may be required.

CoQ10 has a multitude of physiologic associations, some, but not all of which are the result of its antioxidant qualities. It is well established that statin drugs act by inhibiting the enzyme HMG-CoA reductase. Inhibition of the HMG-CoA reductase enzyme, however, blocks the biosynthesis of CoQ10 and leads to a reduced level of CoQ10 in blood plasma and tissues. Statins also increase muscle myopathies and mitochondrial dysfunctions (leading to muscle pain and weakness), another indication of CoQ10 depletion. Because statin medications have been shown to decrease CoQ10 levels in the body, CoQ10 supplementation may be beneficial when taking these drugs.

CoQ10 levels are associated with immune health and, interestingly, with healthy weight. Blood serum tests for levels of CoQ10 indicate that these levels in almost 50% of obese subjects are deficient compared with those of normal weight individuals.

On one hand, CoQ10 may interact with certain blood pressure medications, including diltiazem, metoprolol, enalapril, and nitrate. On the other hand, CoQ10 may reduce the anticoagulant effect of warfarin.

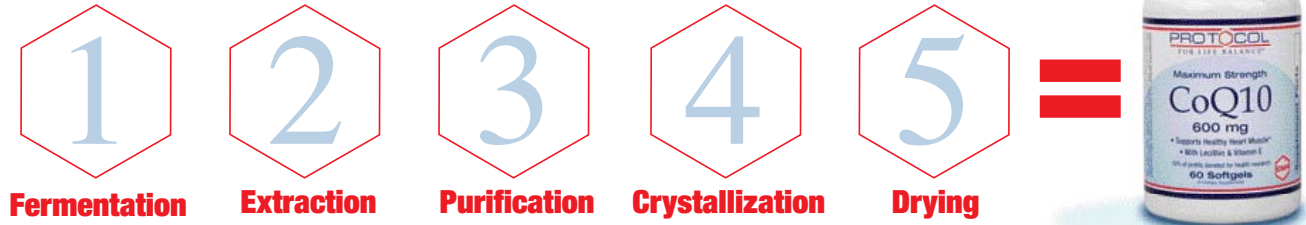
CoQ10 has a remarkable record of safety.



The Professional Educator™

AUGUST-SEPTEMBER 2007

Fermentation Process by Mitsubishi



Safety Data

Safety Data of Protocol For Life Balance Coenzyme Q10

Mutagenicity

Ames test	negative
Chromosome aberration test	negative
Micronucleus test	negative

Oral Toxicity test (rat)

Acute toxicity test	LD50 >5000mg/kg
52-week chronic toxicity test	no toxicity at 1000mg/kg/day

4-Week Human Toxicity Test

no adverse effects at 900mg/day

Facts and History

CoQ10, also called ubiquinone, is present in almost all cells, and is necessary for mitochondrial energy production. The body's highest concentrations of CoQ10 are found in the heart, where constant chemical energy availability is imperative. In addition to its benefits for cardiac function through energy production, CoQ10 also acts as a powerful fat-soluble antioxidant that provides protection against free radical attack of vascular structures and other tissues.

It has been suggested that CoQ10 is a conditionally essential nutrient. Conditionally essential nutrients are organic compounds that ordinarily are produced by the body in amounts sufficient to meet physiological requirements. However, under physiologically stressful conditions, the biosynthesis of conditionally essential nutrients may be inadequate. Under these circumstances, such conditionally essential nutrients may become essential nutrients, comparable to vitamins. In a journal article entitled, "Systematic Review of Effect of Coenzyme CoQ10 in Physical Exercise, Hypertension and Heart Failure," trends toward improvements in cardiovascular support were noted.

CoQ10 was first discovered by Dr. Frederick Crane of the University of Wisconsin in 1957. One year later, Professor Karl Folkers and others at Merck Inc. identified and recorded CoQ10's chemical structure, and were the first to produce it through fermentation. Intermittent research led to its use in Japan for cardiac insufficiencies during the 1960's. Dr. Folkers championed more intensive research into CoQ10's role in cardiovascular health in 1972, after he and an Italian scientist, Gian Paolo Littarru, discovered that persons with cardiac insufficiencies had very low levels of CoQ10, and supplementation increased CoQ10 levels and positively affected heart health. Soon afterwards, the Japanese developed a method that allowed pure CoQ10 to be produced in quantities large enough for significant clinical trials. During the 1980's this method was perfected in Japan, and medical technology finally allowed scientists to measure CoQ10 levels in blood and tissues, leading to a surge in further research. It was during this time that a Swedish researcher, Lars Ernster, drew attention to CoQ10's role as a free radical-scavenging antioxidant. Today a multitude of research supports CoQ10's health benefits.

These statements have not been evaluated by the FDA. These products are not intended to diagnose, treat, cure or prevent any disease.

P3182 Serving Size 1 Softgels

Calories	10
Calories from Fat	5
Total Fat	0.5 g
Trans Fat.....	0 g
Total Carbohydrate.....	< 1 g
Vitamin E (as d-alpha Tocopherol)	30 IU
Zinc (from Zinc Oxide).....	4 mg
Coenzyme Q10 (CoQ10).....	600 mg
Soy Lecithin	50 mg

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CoQ10

CoQ10 100% Pure Powder

CoQ10 60 mg + 250 mg Omega-3 Oils

CoQ10 100 mg Softgels + Vitamin E

CoQ10 100 mg / TSP Liquid - Orange

CoQ10 200 mg Lozenges

CoQ10 400 mg Softgels

CoQ10 600 mg Softgels

- Superior Value, Affordable
- Two-sided, Full Disclosure Labeling
- Better Technical Support
- GMP 'A' Rating
- 10% Donated to Health Research
- Education Driven
- Exclusive Practitioner Brand

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