Coenzyme Q10; 200, 100 and 60 mg

DESCRIPTION

Coenzyme Q10 is a small, organic molecule intimately involved with energy utilization in the mitochondria – the biosynthesis of ATP, GTP and UTP from foods. CoQ10 is not readily available in significant amounts from most sources and should be supplemented to maintain adult health.

FORMULAS

Product no.	*Coenzyme Q10*	*Capsule form*	*capsule counts/bottle*
0165	200 mg	softgel gelatin	30 and 60
0198	100 mg	softgel gelatin	30 and 60
0199	60 mg	hardshell gelatin	30 and 60

BENEFITS

- A potent antioxidant; helps maintain healthy mitochondrial and lysosomal levels of CoQ10
- An anti-aging nutritional. Regular supplementation with large, therapeutic doses of Co Q10 has been documented to slow the progression of Parkinson's disease[1]
- Helps offset the decline of CoQ10 levels for those individuals taking HMG-CoA reductase inhibitors[2] (prescription medications [statins] to reduce serum cholesterol levels)
- Helps avoid the pro-inflammatory state by limiting ceramide[3] release from membranes under oxidative stress – ceramides initiate activation of caspases (proteolytic enzymes) leading to cell death (apoptosis)[4]
- Large amounts (300 mg/day) may be therapeutic for relief of migraine attacks[5]

DIRECTIONS: One or more capsules daily or as directed by your health professional. Since CoQ10 is fat-soluble, it is important to take with a little dietary fat in a meal, to aid transport into the bloodstream.

KEY FEATURES

■ All natural CoQ10, free of coloring agents and produced without addition of a plethora of excipients
■ Our coenzyme Q10 is sourced from Japan and not obtained *via* polymer synthesis from petroleum
■ Smaller capsule size than many formulations; easy to-swallow softgel capsules for the larger amounts
■ Free of yeast, corn, wheat, grain, egg and milk ingredients
■ Softgels provide a fatty acid suspension of CoQ10 in safflower oil to improve digestion & bioavailability

CONTRAINDICATIONS: Individuals taking anti-coagulant medications, such as warfarin, should consult with their health professional before use.

BACKROUND: Coenzyme Q10, also known as ubiquinone, is a fat-soluble, water insoluble coenzyme normally synthesized in the body in small quantities. This coenzyme is absolutely required for the proper function of mitochondria and lysosomes; these are subcellular organelles, partitions, within every living cell. CoQ10 is an integral component of the electron transport chain within mitochondria, gathering reducing power from several enzymes of the fatty acid and Krebs cycles and passing this reducing power to important cytochromes of the electron transport pathway. This eventually ends with reduction of atmospheric oxygen to water and the biosynthesis of ATP from ADP and phosphate[6] (which is why we breathe). As humans age, the amount of CoQ10 synthesized by cells decreases dramatically and the decline affects all organs of the body[2]. It is wise to begin supplementation of this nutrient well before old age to keep a large number of viable mitochondria and lysosomes in each cell. Some clinical reasons follow -

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Because CoQ10 plays a central role in the production of ATP, supplementation with CoQ10 has been shown beneficial for heart health and skeletal muscle health. Muscle samples from aged patients before and after hip surgery displayed significant improvement in the fiber type composition – towards younger type muscles - for those[7] on CoQ10. In a 6 year study of 500 patients with histories of CVD, 250 taking statin drugs and 250 controls, those taking the statin drug exhibited both reduced plasma cholesterol and lower CoQ10 concentrations[8]. The results were not surprising but importantly, the investigators also found this significant drop of plasma CoQ10 did not encourage more cardiovascular problems within the statin group, who did better than the control group (those not taking medication). Another study followed two matched groups of patients who had all suffered acute myocardial infarctions; results demonstrated the numbers of serious events, including death, were reduced significantly in the group taking 120 mg CoQ10/day[9]. We can reconcile these superficial conflicts by suggesting while statin drugs are beneficial, the combination of CoQ10 along with statin therapy is even better for those with CVD. This is also consistent with studies of myopathy for those taking statin drugs where some patients complain of skeletal muscle aches and pains – a possible effect of low CoQ10 levels in muscles. Patients with well-developed atherosclerosis[8] exhibited much less fatigue when taking CoQ10 than not. Clinicians might be advised to enquire if the patient is currently taking statins if unexplained lower back, hip or leg pains persist despite therapy. Symptoms often respond to CoQ10 and/or vitamin D3 supplementation.

A recently discovered, exciting benefit of CoQ10 supplementation has been reported for those suffering Parkinson's Disease (PD). This is a disease of the central nervous system which has been linked to decline in the viability and number of neural cell mitochondria and possibly with CoQ10 levels. When people first diagnosed with PD were supplemented with large amounts of CoQ10 (either 600 or 1200 mg/d) the progression of the disease appeared to slow, as shown by a double-blind, placebo-controlled, 16-month study[10]. Recent reports indicate CoQ10 might be protecting human dopaminergic neurons from ROS damage induced by agents such as inorganic iron[11]. The authors suggest CoQ10 to be as important a preventative against mitochondrial damage and cell death as glutathione. (As of yet there appears no strong connection between statin usage and induction of PD.)

Evidence is mounting that CoQ10 might be effective in treating some migraine headache conditions, too[12]. A small, open label study of chronic migraine patients with 150 mg CoQ10/day showed a drop in attacks to less than ½ after 3 months of therapy[13]. Again, nutritional CoQ10 is suggested to relieve headache pain by supplementing an adult deficiency, hence reducing mitochondrial and lysosomal damage and cell apoptosis.

A new role of CoQ10 is being explored as the proton donor for lysosomes. These are organelles responsible for digesting damaged enzymes and membranes within all cells. Lysosomes are synthesized from the endoplasmic reticulum and are responsible for cell "housekeeping". Impairment of lysosomes leads to accumulated cell debris in older cells and reduced cell efficiency. Lysosomes run at lower pH than the cytoplasm and CoQ10 provides the necessary protons[14] to lower lysosomal pH for digestive enzymes.

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[1] Bonakdar RA and Guarneri E (2005). *Coenzyme Q10.* **Am. Fam. Phys. 72,** 1065-1070.
[2] Crane FL (2001). *Biochemical functions of coenzyme Q10.* **J. Am. Coll. Nutr. 20,** 591-598.
[3] *Ceramides* are a specific type of lipids often associated with cell membranes.
[4] Navas P, *et al.* (2002). *Ceramide-dependent caspase 3 activation is prevented by coenzyme Q from plasma membrane in serum-deprived cells.* **Free Radic. Res. 36,** 369-374.
[5] Sandor PS, *et al.* (2005). *Efficacy of coenzyme Q10 in migraine prophylaxis: a randomized controlled trial.* **Neurology 64,** 713-715.
[6] Mathews CK and Van Holde KE (1996). Biochemistry, 2nd Edition, Benjamin/Cummings, Menlo Park, CA, pp. 528-529.
[7] Linnane AW *et al.* (2002). *Cellular redox activity of coenzyme Q10: effect of CoQ10 supplementation on human skeletal muscle.* **Free Radic. Res. 36,** 445-453.
[8] Stocker R, *et al.* (2006). *Neither plasma coenzyme Q10 concentration, nor its decline during pravastatin therapy, is linked to recurrent cardiovascular disease events: a prospective case-control study from the LIPID study.* **Atherosclerosis 187,** 198-204.
[9] Singh RB, *et al.* (2003). *Effect of coenzyme Q10 on risk of atherosclerosis in patients with recent myocardial infarction.* **Mol. Cell Biochem. 246,** 75-82.
[10] Shults CW, *et al.* (2002). *Effects of coenzyme Q10 in early Parkinson's disease: evidence of slowing of the functional decline.* **Arch. Neurol. 59**, 1541-1550.
[11] Koocumchoo P, *et al.* (2006). *Coenzyme Q10 provides neuroprotection in iron-induced apoptosis in dopaminergic neurons*. **J. Mol. Neurosci. 28**, 125-141.
[12] Bigal ME and Lipton RB (2006). *The preventative treatment of migraine.* **Neurologist 12,** 204-213.
[13] Rozen TD, *et al.* (2002). *Open label trial of coenzyme Q10 as a migraine preventative.* **Cephalalgia 22,** 137-141.
[14] Gille L and Nohl H (2000). *The existence of a lysosomal redox chain and the role of ubiquinone.* **Arch. Biochem. Biophys. 375**, 347-354.