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What is CoQ10?

By: James L. Holly, MD

Webster's Ninth New Collegiate Dictionary defines "coenzyme Q" as "ubiquinone," suggesting its widespread occurrence in nature, and describes it as "a quinone that functions as an electron transfer agent between cytochromes in the Krebs cycle." The Krebs cycle is the biochemical pathway through which the food we eat is turned into energy which can be used by the body.

Today, in a version known as coenzyme Q-10 (CoQ-10) or ubiquinol, this nutrient has become a popular seller and a product that is synonymous with increasing cellular energy. Further, studies have suggested, it has value in combating various forms of cardiovascular disease, reducing the number and size of some tumors and treating gum disease. In some animal studies it has appeared to contribute to the extension of the life span of laboratory animals by up to 56%. What this means in humans is still not established.

In the book All About Coenzyme Q-10, Ray Sahelian, M.D., reports that CoQ-10's discovery dates all the way to 1957. It was then that Frederick Crane, Ph.D., working at the University of Wisconsin, isolated an orange substance from the mitochondria of beef heart. The following year Karl Folkers, Ph.D. and coworkers at Merck, Sharpe and Dohme synthesized the orange molecule in the laboratory.

Technically speaking, CoQ-10 is not a vitamin as vitamins are nutrients that cannot be manufactured by the body, but must be ingested. CoQ-10 is manufactured by the body, but rarely in sufficient amounts to confer significant health benefits. Therefore, CoQ-10 is "vitamin-like" in that supplementation is needed.

In the mid 1970's, the Japanese perfected the industrial technology of fermentation to produce pure CoQ10 in significant quantities. To this day, virtually all CoQ10 still comes from Japan. There are two different methods of manufacture. One is via fermentation and the other is via a combination of fermentation and synthesis.

In the early 1970s, there were discoveries that people with gum disease and heart disease were deficient in CoQ-10. The momentum began to build and, by the early 1980's, CoQ-10 had reached a level of consumption in Japan that rivaled that country's five top medications. In fact, all along, it has been the Japanese and the Europeans who have conducted the majority of clinical trials using CoQ-10

Energy: Need More of it?

Just about everyone could use a little more energy, a higher level of fitness. Couldn't you? If so, there are a few basic things you should be doing to make sure that you have the energy and fitness you need. First: Get the fuel your body needs in the form of a proper diet, not a

"junk food" diet. Second: Get enough rest and exercise.

Finding time for just one, (rest or exercise) much less both seems to be a problem for almost all of us. Unfortunately, there is no magic way to add extra hours to the day. But, if you don't get both the sleep and the exercise your body needs, the less you will be able to do. It is a cumulative effect. And what's even worse, the less you do physically, the less you will want to do. A nutrient-depleted diet, a lack of sleep and little or no real exercise on top of a stress filled, fast-paced life that many of us live does not bode well for a "full tank of gas". Our fitness needs are high. Our reserves of energy are low.

If you suffer from a lack of energy, vitality and fitness then you should certainly discuss the problem with your healthcare professional to make sure there is nothing seriously wrong. Then, take it one step at a time. Getting the proper sleep, exercise and nutrition for your age and lifestyle will go a long way to getting yourself to the fitness and energy level you want and need.

What about those "Miracle Energy Pills"? No such pill exists, so don't buy them or take them. Also, some of these so-called "Miracle Energy Pills" even contain Ephedra. Ephedra can be a very dangerous supplement to take having been linked to a number of deaths. (The FDA has received over 140 reports of "adverse events" over the last three years that may be directly related to use of ephedra.) Many other "Miracle Energy Pills" are loaded with caffeine. If you want to get your energy from a jolt of caffeine, consider drinking tea. Tea, especially Green Tea, is chock full of polyphenols, a phytochemical with about one hundred times the antioxidant power of Vitamin C.

In any event, you should thoroughly research the ingredients in any pill promising you "miracle energy" or "miracle fitness". Why? Because, there is no short cut to increasing your fitness and energy levels. You must cover the basics of rest, proper nutrition and exercise. Another positive pro-active approach would be to consider taking CoQ10.

Additional Facts about CoQ10 (Coenzyme Q10)

It is a fat-soluble antioxidant, which means that for it to be popular absorbed it should be taken with meals. It has a structure similar to vitamin K. CoQ10 is found naturally in foods, mainly meat and seafood. Natural human CoQ10 levels go down with age. Really low levels of CoQ10 have been seen in people with heart failure, cardiomyopathies, and cancer.

CoQ10 is a carrier for electron-transfer inside the inner cell membrane. It plays a vital role in ATP production (energy creation) which is the end-product of the Krebs Cycle in the body. CoQ10 may slightly increase the pumping strength of the heart. The highest natural CoQ10 levels are found in the heart.

It is possible that an existing CoQ10 deficiency may be necessary to see any benefit from taking it as a supplement. Several studies have documented benefits from taking CoQ10 on heart performance, symptoms, and quality of life in patients with class 2 to class 4 heart failure. (The classes of heart failure are based on the limitations of activity with class 4 being the worst and being defined as shortness of breath at rest.) However, one double-blind study

of 30 patients with significant heart failure found no evidence of improved function nor did CoQ10 supplements improve echocardiographic measurements of heart function.

Coumadin and CoQ10

Several case reports have noted a lowered response to warfarin (Coumadin) when CoQ10 is added. This could be due to the similar structure of CoQ10 to vitamin K. If you are taking Coumadin and you decide to start taking CoQ10 be sure and let your healthcare provider know so that your prothrombin time and your INR can be monitored carefully for the first two to four weeks that you are taking both.

Cholesterol-lowering drugs and CoQ10:

Cholesterol-lowering drugs have been reported to lower CoQ10 levels. The biological chain for the metabolism of CoQ10 is the same for the cholesterol-lowering drugs called “statins.” If you are going to take a “statin,” you should take supplemental CoQ10, usually in the 100 to 200 mg range. CoQ10 will not affect the activity of the “statin.”

Diabetes Mellitus and CoQ10:

There are several studies which show improvement in response to treatment on the part of diabetics. In one three-year study in both Type 1 and Type II diabetics, improvement in glycemic control was seen in patients with supplemental CoQ10.

Side Effects of CoQ10

CoQ10 is generally well tolerated. Insomnia has been reported with higher dosages. Adults with heart failure may take 50 to 200mg in gel form daily with a fatty meal to help absorption. Potency varies from manufacturer to manufacturer. CoQ10 is absorbed and used by the body better if taken with fats. A soybean oil suspension had a higher bioavailability than 2 other formulas tested (Weis 1994).

CoQ10 is beginning to be talked about in the main stream press:

For years, CoQ10 was the subject of discussion only by “health food” advocates and by the very profitable “supplements” industry. But more and more, the main-stream press is awakening to the benefits of this very important substance. This year, ABC news reported on the benefits of CoQ10 in several diseases. While the benefit of CoQ10 in patients with congestive heart failure is still argued for and against, there are studies which suggest that in elderly patients who undergo heart surgery, CoQ10 is beneficial.

About 30 years ago, medical researchers began noticing patients with heart failure also had lost much of their supply of CoQ10. Supplementing them with the nutrient led to normalized levels and also clinical improvements in many patients. Further studies have backed up this important finding.

Research conducted at the Alfred Hospital in Melbourne, and funded by the National Heart

Foundation of Australia, has shown that CoQ10 may be very valuable to those who undergo heart surgery. Investigators found that elderly heart bypass patients given 300 milligrams of CoQ10 (considered a high dose) recovered better and more quickly than those on placebo. The CoQ10 helped the heart muscle to pump more efficiently and to better tolerate stress.

A series of studies conducted in Japan have reached similar conclusions. Additional research points to CoQ10's ability to help reduce complications and further heart problems after a patient has experienced a first heart attack. It has also been shown that CoQ10 can help relax the heart muscle. If further research is convincing, then this in itself may prove to be a major boon for cardiology. And for us all.

As we age, the heart loses its ability to relax. And less relaxation means it can't fill itself with enough blood to pump efficiently. The payoff is: better pumping with CoQ10. That better pumping may also have an indirect effect: a modest reduction of blood pressure.

Angina Patients Also May Benefit Then there's the preliminary research on angina — a temporary chest pain or a sensation of pressure in the chest that occurs when the heart isn't receiving enough oxygen — showing that patients on the nutrient appear to do better on exercise tolerance tests. Again, this may be due, in part, to overall strengthening of the heart.

Nutrient May Prevent Oxidation, a Key to Neurodegenerative Diseases

CoQ10 is known to prevent oxidation, a complex process that damages cells and tissues. Granted, CoQ10 brain studies have not kept pace with the pioneering heart studies but the effects of oxidation on brain cells is not exactly a minor issue in science these days. But, recent studies have suggested that CoQ10 may be beneficial in degenerative diseases like Parkinsonism and Alzheimer's.

Roland Stocker at the Heart Research Institute in Sydney has shown that CoQ10 has the ability to target a nasty substance involved in oxidation known as "peroxynitrite." What's important for consideration here is that this substance is, for example, implicated in chronic inflammation, which is a hot topic in research on Alzheimer's disease and other neurodegenerative disorders.

Should you take CoQ10? Probably, but ask your healthcare provider. Remember, it is your life and it is your health.