What is Coenzyme Q10?

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Pure coenzyme Q10 was isolated for the first time in 1957 by Professor Fredrick Crane and four associates at the University of Wisconsin. They demonstrated that coenzyme Q10 is essential to the bioenergetics of the mitochondria, and thus is essential for human life to exist.
Coenzyme Q10 plays a critical role in the production of energy in nearly every cell of your body. Without Co Q10 you would not have enough energy to stay alive. Due to instability of Co Q10 in aerobic energy production Co Q10 is found in most living systems and for this reason was named "ubiquinone" (for "ubiquitous quinine").
Specifically it is a lipophilic electron carrier that functions in the body's defence against free radicals. It is the final component of the respiratory chain in the mitchrondrial membranes. These electron transferring carriers are arranged so that the reduced member of one redox couple is oxidides by the oxidised member of the next component in the system.
While coenzyme Q10 is neither a nucleotide not a protein, it functions like pyridine nucleotides. Coenzyme Q10 serves as a mobile electron transport. The quinine part of the molecule is alternately reduced (hydrogenated) and oxidised (dehydrogenated) as it operates between various flavin-like dehydrogenate is to take away a hydrogen atom.

CLINICAL APPLICATIONS

Agina Pectoris

In a double-blind crossover study comparing 150 mgs/day of coenzyme Q10 with a placebo on 12 patients with stable angina pectoris (1), the frequency of anginal episodes was reduced by 53%. There was also a significant increase in treadmill exercise tolerance (time to onset of chest pain). Suggesting coenzyme Q10 is a safe and effective treatment for angina pectoris.

Hypertension

Enzymatic assays revealed a coenzyme Q10 deficiency in 39% (2) of hypertensive patients compared with 6& deficiency in controls. When 60 mgs/day of coenzyme Q10 was given to 25 essential hypertensive patients for 8 weeks, there was a significant decrease in blood pressure. 54% of the patients had a mean blood pressure fall greater than 10%.
The effect of coenzyme Q10 upon blood pressure is usually not seen until after 4-12 weeks of administration. Thus, coenzyme Q10 does not act like a typical antihypertensive drug. It seems to act by correcting some metabolic abnormality, which in turn, has a favourable influence on blood pressure. Whether coenzyme Q10 deficiency is a cause of effect of hypertension correction of this deficiency may improve blood pressure control in select patients.

Beta-blockers

Propranolol and metaprolol are frequently prescribed for hypertensive patients. Both have been shown to inhibit coenzyme Q10 dependent enzymes, (3) and it is likely that this entire class of drug may have the same inhibitory effect. Thus, it is likely that in the long run, the antihypertensive effect of these drugs could be lost by a deficiency of coenzyme Q10.
Beta-blockers often cause fatigue and malaise. Coenzyme Q10 may prevent such side effects. In one study, none of the 7 patients treated with coenzyme Q10 reported any side effects, yet 3 out of 5 not given coenzyme Q10 complained of general malaise. In an other study, coenzyme Q10 60 mgs/day prevented the propranolol induced decrease in cardiac contractility in normal volunteers and increased cardiac contractility in hypertensive patients.

Congestive Heart Failure

In several studies of patients with heart failure, significant improvement has been achieved using coenzyme Q10. In one study of patients with mild congestive heart failure, all showed significant improvement and over 50% were asymptomatic after 4 weeks. Patients with mild disease tend to improve more often than those with sever disease.

Diabetes Mellitus

In a study of 120 diabetic patients, 8.3% were deficient in coenzyme Q10 compared to 1.9% in a healthy control group. The deficiency percent increased to 20% in those that were taking oral hypoglycaemic drugs. Apparently these drugs interfere with coenzyme Q10 metabolism. When given 120 mgs a day, ketone bodies fell by at least 30% in 59% of the patients and fasting blood sugar levels fell in 36% of the patients.

Periodontal Disease

A deficiency of coenzyme Q10 in gingival tissue of patients with periodontal disease has been reported in several studies and ranges from 60 to 96% among various studies. However, 86% of the patients also had a low level of coenzyme Q10 in their leukocytes, indicating a systemic imbalance of this enzyme. Oral treatment with coenzyme Q10 reverses the deficiency in the gingival tissue.

Immune System Enhancement

When patients were given coenzyme Q10 at a rate of 60mgs/day, there were significant increases in their levels if immunoglobulin G (IgG). Normally immune function tends to decline with advancing age. In mice with thymic atrophy, there was a deficiency of coenzyme Q10 in thymic tissue along with pronounced suppression of the immune response. The immune suppression was a partially reversed with coenzyme Q10. Thus it appears likely coenzyme Q10 supplementation may help prevent or reverse age-related immunosuppression.

Obesity

The tendency to be overweight may be the result of a metabolism that results in decreased caloric output. Since coenzyme Q10 is an essential factor for energy products, it is reasonable to assume a deficiency of coenzyme Q10 is a contributing factor in many cases of obesity.
In one study, 52% of morbidly obese patients were deficient in coenzyme Q10, supplementation resulted in doubling the weight loss on a low calorie diet as compared with obese patients on the same diet not receiving coenzyme Q10. The effect is most likely due to an increase in cellular respiration and caloric output.

Physical Performance

The performance on a bicycle ergometer was conducted on a study of 6 sedentary men. The improvements of the parameters assessed increased by 3&-12% after 4 weeks of therapy. The study suggests coenzyme Q10 might improve the performance of trained athletes and even relieve some cases of chronic fatigue.

Allergy
Coenzyme Q10 markedly inhibited the antigen challenge of the release of histamine and slow reacting substance of anaphylaxis upon passively sensitised guinea pig lung tissue. This study suggests coenzyme Q10 might be effective against various kind of allergic lung diseases, including bronchial asthma and anaphylactic shock.

Muscular Dystrophy
Coenzyme Q10 deficiency has been found in the muscle mitochondria of humans and muscular dystrophy. In human subjects treated with 100 mgs of coenzyme Q10, 50% showed significant improvements in increased exercise tolerance, reduced leg pain, better control of leg function and less fatigue. Certainly, coenzyme Q10 is an important advance in the treatment of such muscle disease.

The Need for Supplementation
Although there are metabolic pathways for the body to make coenzyme Q10, synthesis becomes impaired. This may occur as a result of a nutritional deficiency in one or more of the components required by the body to make coenzyme Q10. There may be a genetic or acquired defect in the ability of the body to manufacture it. Alternatively, there may be an increased body need for coenzyme Q10 as a result of a particular medical state or tissue need. Apparently, one of the key factors is simply ageing.

It Might Help
As an anti-ageing nutrient, as a free-radical scavenger, allergies, muscular dystrophy, cardiac problems, hypertension, reducing the side effects of beta-blockers, angina pectoris, congestive heart-failure, throtoxic heart failure, symptomatic mitral valve prolapse, cardiomyopathy, diabetes mellitus, periodontal disease, immunodeficiency, gastric ulcers, help with weight loss, and the potential of improvement physical performance.

DIRECTIONS ON USAGE

Safety
Basically, coenzyme Q10 is well tolerated and no serious adverse effects have been reported with long term use. However, because its safety during pregnancy and lactation has not been tested, it should only be used during these times if in the judgement of the doctor, there are potential clinical benefit.

Amounts
The usual amount given is between 20-25 mgs/day. It is not yet clear whether larger amounts are needed for clinical indications. The amount should be adjusted upward according to the response of the patient. In cases of severe cardiac disease and muscular dystrophy, larger amounts such as 100 mgs/day or more might be required for at least 8 weeks.

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