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REPORT

CoQ10's New Benefits

Unexpected Findings Support the Remarkable Effects of CoQ10 in Fighting Melanoma, Diabetes, Endothelial Dysfunction, and More! By Russell Martin



Since the Life Extension Foundation first introduced coenzyme Q10 (CoQ10) to the United States in 1983, hundreds of published, peer-reviewed studies have demonstrated how this natural supplement combats heart disease, cancer, and other disorders of aging.

While CoQ10 is widely recognized by Life Extension members as a nutrient that protects heart health,¹ provocative new research indicates that CoQ10 may have a wide range of benefits that include preventing skin cancer and photoaging,²⁻⁴ guarding against prostate and breast cancers,⁵⁻⁷ supporting healthy blood sugar levels in diabetics,⁸⁻¹⁰ and averting endothelial dysfunction and vascular disease.^{11,12}

Scientists around the globe also report additional novel uses of CoQ10, such as helping to slow the progression of Parkinson's disease,¹³⁻¹⁵ preventing crippling migraine headaches,^{16,17} supporting immune health,¹⁸⁻²⁰ guarding against periodontal disease,^{1,10} preserving healthy vision,^{21,22} and boosting male fertility.¹⁰

In this article, we review a wide array of compelling studies that support CoQ10 supplementation as a cornerstone of a scientific health-protection program. Moreover, we examine the differences between natural, bioidentical forms of CoQ10 and their synthetic analogs, and how you can ensure that your supplement contains the most effective form of CoQ10.

Protecting Against Melanoma and Photoaging

One of the most important new applications for CoQ10 may be the prevention of deadly melanoma. Worldwide, doctors are witnessing a dramatic increase in skin cancer cases. Recently, scientists in Italy have found that CoQ10 may play a significant role in deterring the growth of skin cancer cells. In a study published earlier this year, Italian researchers discovered that 117 melanoma patients had abnormally low CoQ10 levels compared to 125 study participants who were free of the cancer. CoQ10 levels also were significantly lower in melanoma patients who developed metastases than in metastasis-free patients. These results suggest that measuring CoQ10 levels may help determine whether an individual's melanoma is likely to metastasize. While additional studies are needed to determine whether CoQ10 can successfully block the spread of melanoma, these initial findings offer hope that CoQ10 may help in the fight against this deadliest of skin cancers.²

In addition to CoQ10's promise in protecting against melanoma, recent research suggests that topically applied CoQ10 may also protect the skin against photoaging, or skin aging caused by exposure to ultraviolet light. German scientists demonstrated that topically applied CoQ10 penetrates the skin's surface to the living layers of the epidermis, where it reduced oxidative stress, a known contributor to aging and disease. They also noted a marked reduction in the depth of wrinkles following the application of CoQ10. In addition, topical CoQ10 helped protect the skin from the effects of UVA rays, a particularly harmful, DNA-damaging spectrum of ultraviolet light that conventional sunscreens do not block effectively. (See "The Sunscreen Paradox," Life Extension, June 2006.) The German researchers concluded that CoQ10 may offset the effects of photoaging and thus promote more youthful-looking skin.³



CoQ10's benefits for skin health were broadly confirmed in a study at the University of Scranton in Pennsylvania, where scientists found that daily treatment with a topical CoQ10 lotion provided antioxidant protection to the skin of both young and middle-aged study subjects.

The natural, yeast-derived form of CoQ10 used in the study was also much better absorbed than synthetic formulations. The researchers stated that daily topical application of antioxidants such as CoQ10 may form the basis of a lifelong strategy to protect the skin against the effects of oxidative stress.⁴

KANEKA: SUPERIOR BIOIDENTICAL COQ10 FROM JAPAN

Tantalizing findings about CoQ10's many potential health benefits have fueled growing demand for this energizing nutrient. Since introducing members to the benefits of CoQ10 23 years ago, Life Extension has sought the safest, most bioavailable form of this nutrient available. Life Extension has found that, due to its bioidentical structure and superior safety profile, CoQ10 manufactured in Japan by the Kaneka Corporation stands head and shoulders above the competition.

In 1978, Dr. Peter Mitchell was awarded a Nobel Prize for his research on CoQ10's role in mitochondrial energy transduction. That same year, Kaneka Corporation began producing an exclusive, yeast-fermented CoQ10 that is chemically identical to the CoQ10 produced in the body.²³ Scientists believe that this bioidentical form may be much more readily assimilated into the body's tissues than are synthetic formulations.²³

Until just three years ago, CoQ10 was subject to pharmaceutical regulation in Japan, where it was approved as a prescription drug for the treatment of congestive heart failure.¹ CoQ10's classification as a "drug" spurred Kaneka and its Japanese competitors to work vigorously to perfect its applicability and market it widely in that country. Only Kaneka, however, has formulated and patented the yeast-fermentation process that produces a CoQ10 that is identical to the body's own.

In an interview with Life Extension, Tom Schrier, Kaneka's national sales manager for the US, noted that because "CoQ10 was first approved as a pharmaceutical drug in Japan in 1974, much research on safety and efficacy was required in advance of this approval."²⁴

Indeed, a recent double-blind, placebo-controlled study confirmed that Kaneka's CoQ10 is safe, even at very high dosages.²⁵ Eighty-eight adult participants were given 300 mg, 600 mg, or 900 mg of CoQ10, or a placebo, over a four-week period. Kaneka's CoQ10 was safe and well tolerated at doses of up to 900 mg a day, with no side effects reported.^{25,26}

Since CoQ10 was deregulated in Japan in 2003, Kaneka has been challenged to meet exploding worldwide demand for its product, particularly in the US, which accounts for 65% of the world's total CoQ10 consumption. To meet this demand, Kaneka will open a new manufacturing facility in Pasadena, TX, this summer. The Texas plant will be capable of producing 100 metric tons of its natural yeast-derived CoQ10 each year.²⁵

Schrier believes that America's scientific and medical communities have been slow to recognize CoQ10's health benefits precisely because it has never been regulated as a pharmaceutical in this the US. "Historically, the terms 'all-natural' and 'dietary supplement' have been less than embraced by pharmaceutical companies," he says.²⁴

Schrier adds that US drug companies continue to ignore the critical importance of supplementing with CoQ10 when taking statin drugs to control cholesterol. "The Canadian brochure for Lipitor® explains that CoQ10 in the body is depleted by Lipitor® due to its inhibition of HMG-CoA reductase, which is a key enzyme of biosynthesis for both cholesterol and CoQ10," he explains. "But the American Lipitor® brochure does not provide this same insight. CoQ10 supplementation is necessary for statin users to prevent the drug's negative side effects. Kaneka plans a campaign to raise consumer awareness of this, so patients can make educated decisions about their personal health."²

Helping Avert Prostate and Breast Cancers

Scientists are fascinated by CoQ10's potential for preventing different types of cancer. Exciting new studies are presenting unique possibilities in the discipline of oncology. Research now suggests that in addition to protecting against melanoma, CoQ10 may help aging men and women to avert potentially lethal prostate and breast cancers. CoQ10 likewise appears to be beneficial to cancer patients who are undergoing or have completed a course of chemotherapy.

In an important laboratory study from Spain, CoQ10 dramatically altered the growth of malignant human prostate cells without adversely affecting the growth of non-malignant prostate cells. This led the Spanish research team to propose that CoQ10 may be an important preventive therapy for prostate cancer.⁵



For women undergoing conventional treatment for breast cancer, CoQ10 may play an important role in improving their outcomes. In a Danish clinical trial, 32 women with breast cancer were treated with CoQ10 in conjunction with conventional cancer therapy. All 32 subjects survived for the two-year duration of the study. Six patients experienced partial tumor regression and two saw a complete remission of their cancer. CoQ10 may thus help extend survival following conventional treatment for breast cancer.¹

Many scientists believe that CoQ10 affords other important protective benefits for people undergoing other forms of cancer treatment. For example, CoQ10 can help shield against possible damage to heart muscle that can occur during use of the chemotherapy drug Adriamycin® (doxorubicin).⁶ CoQ10's antioxidant and immune-enhancing properties may

benefit patients both during and after cancer chemotherapy.¹ Renowned integrative physician Andrew Weil, MD, founder and chairman of the University of Arizona's Program in Integrative Medicine, suggests that chemotherapy patients may benefit from supplementing with 300 mg per day of CoQ10.⁷

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Improving Blood Sugar in Diabetes Sufferers

Diabetes has now reached epidemic levels in the United States and shows no sign of abating. Doctors are

overwhelmed with new cases and the horrific complications that accompany the disease. Two important clinical trials indicate that CoQ10 can help maintain optimal blood sugar control and thus avert the potentially lethal complications of this insidious disease.

An Australian study found that patients with type II diabetes who took 200 mg of CoQ10 a day over 12 weeks showed improved blood sugar control. Supplementation produced, on average, a threefold increase in CoQ10 levels in the trial subjects, while decreasing their blood pressure and hemoglobin A1C, a long-term indicator of blood sugar control. By improving blood pressure and optimizing blood sugar, CoQ10 may help prevent the dangerous metabolic complications of diabetes.⁸

What Is Coenzyme Q10?

CoQ10 is a powerful, fat-soluble compound that is found naturally in all forms of animal life. Biosynthesized in the membranes of cells, CoQ10 plays a vital role in the production of cellular energy.

CoQ10 was first isolated in 1957 and named “ubiquinone” in recognition of its presence in every human cell. It functions in concert with enzymes—that is, acts as a “coenzyme”—as part of essential chemical reactions in the cells. It is especially crucial for preserving the health of cells and tissues that require abundant energy, such as those of the cardiovascular and immune systems. In addition to its vital role in cellular energy production, CoQ10 is a powerful antioxidant that prevents oxidative damage caused by free radicals.¹

In yet another study focused on diabetes, CoQ10 helped patients to optimize their blood sugar levels while guarding against a dangerous condition called diabetic ketoacidosis. In this trial, 39 diabetic patients received 120 mg of a CoQ10 analog for 2-18 weeks. In approximately one third of the patients, blood sugar levels fell dramatically, declining by at least 30%. Additionally, more than half of the patients showed decreased levels of ketone bodies, which are breakdown products of fatty acid metabolism. Excessively high levels of ketone bodies can lead to diabetic ketoacidosis, a condition marked by excessive blood acidity that can result in a loss of consciousness.⁹

These encouraging study results suggest CoQ10 may prove to be an asset in helping people with diabetes to successfully manage their condition and guard against perilous complications associated with the disease.

CoQ10 May Counter Endothelial Dysfunction

CoQ10’s ability to improve heart health is the property that first attracted scientists and health-conscious adults to this vitally important nutrient. For years, scientists have known that by supporting energy production in the heart tissues, CoQ10 may aid conditions such as congestive heart failure, angina, arrhythmia, mitral valve prolapse, and high blood pressure.¹⁰ Compelling new evidence suggests that CoQ10 may fight an instigating factor in heart disease—the insidious threat known as endothelial dysfunction.

Endothelial dysfunction occurs when the blood vessels are unable to dilate in response to increased demand for blood flow. Endothelial dysfunction plays a central role in the development of cardiovascular disease, America’s number-one cause of premature death.

In an exciting study from Germany, researchers found that when men with impaired endothelial function received supplemental CoQ10, they demonstrated improved endothelial function of the brachial artery, which supplies blood to the arms and hands.¹¹ This important finding suggests that CoQ10 supplementation may help prevent and treat endothelial dysfunction, thus protecting the cardiovascular system against an initiating cause of atherosclerosis.

An extensive eight-year clinical trial found that CoQ10 helped patients with existing cardiovascular disease to improve their condition and decrease their reliance on heart medications. After 18 months of CoQ10 supplementation, an impressive 58% improved their American Heart Association scores by one “class,” or health gradient, while 28% improved by two classes. Most importantly, nearly half of all participants demonstrated a decreased need for medications.¹²

Scientists and physicians agree that statin drugs commonly used to treat high cholesterol can deplete levels of CoQ10 in the body.¹⁰ Life Extension advises individuals who use statin drugs to supplement with CoQ10 to counter a detrimental nutritional deficiency.

Slowing Parkinson's and Neurodegenerative Diseases

To date, there is no known cure for Parkinson's disease, a neurodegenerative disorder often characterized by muscle rigidity, tremor, and a diminishment or loss of physical movement. However, CoQ10 may play a role in slowing the progression of this devastating disease, as well as in preventing other neurodegenerative disorders.

At the prestigious University of California at San Diego, scientists conducted a randomized, placebo-controlled clinical trial to examine CoQ10's effects in slowing the functional decline brought on by Parkinson's. Eighty patients with early Parkinson's disease who did not yet require treatment for their condition were randomly assigned to receive 300 mg, 600 mg, or 1200 mg of CoQ10 daily, or a placebo. They were followed for up to 16 months or until their condition required pharmaceutical therapy.

At the end of the trial, patients who received the largest dose of CoQ10 demonstrated an impressive 44% slower rate of decline compared to the placebo group. All subjects who received CoQ10 experienced less disability than did the placebo group, and the benefits were greatest in the 1200-mg group. In addition, all patients who received CoQ10 had significantly higher blood levels of the nutrient and tolerated the supplementation without complications.¹³

Scientists believe that along with slowing the progression of Parkinson's disease, CoQ10 may hold promise in preventing or managing other neurological conditions related to impaired energy production and oxidative stress, such as Huntington's disease, Friedrich's ataxia, amyotrophic lateral sclerosis (ALS), and Alzheimer's disease.^{14,15} While research in these areas is still in the preliminary stages, CoQ10's ability to enhance energy production and quench oxidative stress may eventually help aging adults fend off a host of neurodegenerative disorders.



Synthetic vs. Natural CoQ10

CoQ10 can occur as one of two isomers, which are molecules that share the same chemical formula but have different physical arrangements in space.

Animals, fish, and humans naturally make the trans isomer of CoQ10. By contrast, the cis isomer of CoQ10 does not occur naturally in animals or humans, and can only be created in a synthetic process in the laboratory.

While the benefits of natural trans CoQ10 are well documented, scientists have not yet determined whether the cis form of CoQ10 can be utilized by the human body, or whether it confers the same protective benefits as naturally occurring trans CoQ10. Kaneka's yeast-fermented CoQ10 provides the trans isomer, while many synthetic CoQ10 products on the market today contain the unproven cis form of CoQ10.

Potential Role in Preventing Migraine

Helping to reduce the frequency of debilitating migraine headaches is proving to be another of CoQ10's multifaceted health benefits.

To further explore this potential application, research scientists designed an open-label trial in 2002, in which 32 patients with a history of episodic migraine were treated with 150 mg of CoQ10 daily. More than 60% of the patients experienced a 50% or greater reduction in the number of days they suffered headaches. After three months of supplementation, their migraine frequency fell by an average of 55%, a statistically significant reduction.¹⁶

In a related study conducted in 2005, Swiss researchers oversaw a randomized, controlled clinical trial to examine CoQ10's effects on preventing migraine. In this trial of 42 patients, 47% of those who received 300 mg of CoQ10 daily experienced less than half of their normal number of monthly headaches, compared to only 14% who experienced similar results with placebo. Furthermore, treatment with CoQ10 was superior to placebo in reducing frequency of attacks, number of days with headache, and number of days with nausea.¹⁷

The Swiss team and other migraine researchers believe that by improving mitochondrial energy metabolism, CoQ10 may thus help to reduce migraine incidence.

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Strengthening the Body's Immune Response

Because CoQ10 enhances the ability of immune cells to disable invading pathogens,¹⁰ scientists believe it may benefit people confronted with various challenges to the immune system, ranging from allergies to HIV infection.

Some scientists describe allergies as conditions in which the body's immune system reacts to generally harmless substances as though they were dangerous invaders. Researchers have demonstrated that people with asthma related to allergies have decreased blood levels of CoQ10, leading them to suggest CoQ10 supplementation as a way to modulate allergic conditions such as hay fever.¹⁸ Researchers in Texas similarly encountered low CoQ10 levels in people suffering from rhinitis and other allergies; they believe that further studies may elucidate a role for CoQ10 in managing a wide array of allergy syndromes.¹⁹

Individuals suffering from active HIV infection are often vulnerable to a range of infections due to their weakened immune function, and typically demonstrate diminished levels of CoQ10. Supplemental CoQ10 at a dose of 200 mg daily has been found to help improve the ratio of beneficial T-helper immune cells to detrimental T-suppressor immune cells.¹⁰

A recent report suggests another potential role for CoQ10 in patients with HIV. A drug commonly used to treat HIV, called zidovudine or azidothymidine (AZT), is associated with the potential side effect of muscle disorders. In 2005, Australian researchers reported a case history in which CoQ10 treatment relieved zidovudine-associated muscle disease. The resolution of the patient's myopathy allowed him to continue receiving treatment with zidovudine.²⁰

These studies suggest that CoQ10 may provide valuable assistance to people battling various allergic conditions, as well as enhanced immune support for HIV-infected individuals.

Enhancing Vision, Dental Health, and Male Fertility

As scientists continue to probe the many benefits of CoQ10, they are investigating a variety of novel applications for this wonder nutrient. CoQ10's broad-spectrum health benefits are underscored by research published in peer-reviewed journals around the world. In these studies, scientists report innovative uses for CoQ10 in treating disorders as disparate as age-related macular degeneration, periodontal disease, and male infertility.

CoQ10 may be essential to preserving healthy visual function in adults. People with age-related macular degeneration,

a common cause of vision loss in adults, have lower plasma CoQ10 levels than do unaffected individuals.²¹ A recent double-blind, placebo-controlled clinical trial demonstrated that adults with early macular degeneration who supplemented with a combination of CoQ10, acetyl-L-carnitine, and omega-3 fatty acids for one year improved their visual function. Only 2% of the supplemented participants saw a worsening of visual function, compared to 17% of those who received placebo.²² Thus, a nutrient combination that includes CoQ10 may help to ensure a lifetime of healthy visual function.

CoQ10 may also have important applications in preventing and managing periodontal disease, which is characterized by wasting of the gum tissue. People with advanced periodontal disease demonstrate low levels of CoQ10 in gum tissues. Topical CoQ10 application improves the gum health of people suffering from periodontal disease, and also speeds tissue healing following periodontal surgery.^{1,10}

Intriguing evidence suggests that CoQ10 may even help to improve male fertility.¹⁰ Two common causes of infertility in men are low sperm count and impaired sperm motility.²⁷ In an early study, supplementation with a CoQ10 analog resulted in significant increases in both sperm count and motility.¹⁰ In a more recent trial, infertile men who supplemented with CoQ10 for six months demonstrated improved sperm motility and increased levels of CoQ10 in the sperm and seminal fluid.²⁸ Scientists believe that CoQ10 may positively modulate male fertility by supporting mitochondrial energy production and by protecting sperm against oxidative stress.^{27,28} CoQ10 thus offers hope to couples seeking to overcome the challenges posed by impaired fertility.

Conclusion

The late Nobel Prize-winning physician and scientist Linus Pauling believed that adding CoQ10 to a daily nutritional regimen can increase energy production in heart muscle cells, help normalize blood pressure, increase energy levels, and improve longevity.¹

However, as the aforementioned studies suggest, the health benefits attributable to CoQ10 are not only growing in number, but appear nearly limitless in their variety. CoQ10's latest applications—in fighting skin and other cancers, photoaging, high blood sugar, endothelial dysfunction, migraine headaches, and Parkinson's disease, to name just a few—further bolster its standing as an essential, energizing super-nutrient. This comes as no surprise to scientists who are intimately familiar with this remarkable nutrient.

“Since CoQ10 is essential to the optimal function of all cell types, it is not surprising to find a seemingly diverse number of disease states that respond favorably to CoQ10 supplementation,” says Dr. Peter Langsjoen, one of the world's foremost authorities on CoQ10. Dr. Langsjoen believes that CoQ10 is as fundamentally important as vitamin C for maintaining optimal health and longevity.²⁹

“The clinical experience with CoQ10 in heart failure is nothing short of dramatic, and it is reasonable to believe that the entire field of medicine should be re-evaluated in light of this growing knowledge,” notes Dr. Langsjoen. “We have only scratched the surface of the biomedical and clinical applications of CoQ10.”²⁹

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