LE Magazine February 1996

REPORT

Life Extension Breakthrough: CoQ10 For Cancer

Recent clinical cases in the U.S. and Denmark indicate that CoQ, in appropriately high doses, may be a remarkable breakthrough treatment for various types of cancer. In last month's issue of *LIFE EXTENSION* Magazine, we revealed in our article "How To Prevent Breast Cancer" that high doses (390 mg per day) of CoQ had been able to induce the complete regression of breast tumors to an extent never observed before by a clinical oncologist with 35 years of experience. In this issue, we present evidence of CoQ's ability to regress tumors In patients with other types of cancer. It must be emphasized that just a few cases have been reported, and that there haven't yet been any large or controlled studies with CoQ in cancer patients. On the other hand, the published reports of these cases are compelling and, given the safety and proven health benefits of CoQ, it makes sense for cancer patients to seriously consider taking high of doses of CoQ under the care of their physician. it also makes sense for healthy people to consider upping their daily health-building dosage of CoQ to 100-200 mg/day.

ADDITIONAL COQ CANCER CASE

Last month we described the cases of described women whose breast tumors regressed completely after taking 390 mg/day of CoQ for relatively short periods of time (1-3 months). We quoted Dr. Knud Lockwood, who treated these patients at a private clinic in Copenhagen, that he had *"never seen a spontaneous complete regression of a 1.5-2.0 cm breast tumor, and had never seen a comparable regression with any conventional anti-tumor therapy."* These five cases are the only CoQ cases published to date, but the Danish physicians are continuing to treat cancer patients with CoQ, and an up-to-date report on their results will be presented at the next international Biomedical Conference on CoQ in Milan, Italy in May 1996. We'll be informing you further about this conference in future issues of LIFE EXTENSION.

A CASE OF UNIQUE IMPORTANCE

Since the last issue of the magazine, we've found out more about the three most recently reported cases of CoQ treatment for breast cancer, and we'd like to provide you with greater details about one of these cases (patient A-MRH) who developed Ever metastases before taking CoQ. The remarkable success of CoQ treatment in this patient provoked the following comment from the Danish scientists:

"Cancer metastases in the liver can be regarded as a prelude to imminent death...It has been estimated that a single circulating tumor cell will become a metastatic nodule on the basis of 1 million:1...Therefore, the apparent regression of metastases in the liver of patient A-MRH is of unique importance...The disappearance of liver metastases in even one potent with breast cancer is extraordinarily salient for urgent future research."

Here is the entire extraordinary case report of patient A-MRH, as it appears on P. 174, Vol. 212, No. 1995 of the journal Biochemical And Biophysical Research Communications:

"Breast Cancer, Case Raport AMRH: A 44-year old woman had a bilateral mastectomy performed in September 1992 in the right armpit (axilla). There were metastases in 2 out of 12 lymph nodes. No metastases were found in the left axilla. Microscopic examination demonstrated an invasive intraductal carcinoma of the breast on both sides. The tumors were estrogen receptor positive. The patient underwent a series of 10 treatments with cyclophosphamide, methotrexate and 5-fluorouracil. A bilateral breast reconstruction was performed by on echography of the liver April 8, 1994. This examination revealed numerous metastases in the liver. A fine needle biopsy showed metastases from on intraductal carcinoma of the breast. Treatment was supplemented with tamoxifen, 30 mg daily. Since the mastectomy and after the liver metastases, the dose of CoQ10 was increased to 390 mg daily. Echoscans of the liver were repeated in August 1994, November 1994, and March 1995. This last echogram showed that the liver metastases had disappeared. The patient a in excellent condition in April 1995, and no signs of metastases have been found everywhere."

TREATING OTHER TYPES OF CANCER WITH COQ

The remarkable ability of high doses of CoQ to improve the condition of breast cancer patients, even to the point of complete regressive of breast tumors, was discovered by accident as an outgrowth of the treatment of patients with heart failure by Dr. Karl Folkers in Texas. In treating large numbers of patients for their cardiac problems, Dr Folkers encountered some heart patients who

also had cancer. As Dr Folkers explained it in Biochemlcal And Biophysical Research Communications (Vol.192, No. 1, 1993):

"Patients in heart failure were available who also had cancer and were treated with CoQ 70 primarily for their heart failure, but with monitoring of their clinical status of cancer. One of these patients on CoQ10 revealed no symptoms of heart failure or a positive test for cancer in nine years. Another patient had not even one positive blood test for active cancer during dosage on CoQ, therapy for three years. Another patient remained on CoQ, for ten years without the recurrence of cancer. Another patient having inoperable bronchogenic carcinoma of the left lung, small cell type and massive mediastinal metastasis has survived to January, 1993, for 15 years, with no evidence of cancer."

A MATTER OF LIFE AND DEATH

In following up these patients with both heart disease and cancer Dr. Folkers found that patients who took CoQ generally improved and continued to do well as long as they continued to take CoQ, while those who stopped taking CoQ generally got worse. Here are summaries of two cases of patients with lung cancer which illustrate this rather dramatic contrast in outcomes in Dr. Folkers 1993 paper:

DEATH AFTER STOPPING COQ

J.M. female, 52 years, diagnosed with lung cancer on 10/4/83. Adriamycin was started (10/14/83) and discontinued (12/2/83) due cardiotoxicity. Cardiac function deteriorated to Class IV congestive failure (CHF) The patient was placed on coenzyme Q10 for her heart failure (1/22/84) and remained on CoQ10 for 30 months, during which the CHF resolved to Class II and the cancer appeared to be in remission. Sixty days after stopping CoQ10 therapy the patient was admitted to the hospital for shortness of breath and pulmonary edema. Death occurred on 9/22/86. Clinical findings left heart failure, pulmonary edema, and cancer cells in both lungs.

LIFE WHILE CONTINUING TO TAKE COQ

"D.E.E., male, 67 years 21/2 year history of known laryngeal carcinoma which was treated initially with radiation therapy He had many follow-up visits with negative biopsies; however, recently he had another positive biopsy. He was being evaluated for operative cord stripping when he was found to have primary squamous cell carcinoma of the right upper lobe of his lung. He was operated on and had a successful right upper-lobectomy, plus a cord stripping which was positive. He was started on CoQ_{10} at a dose of 300 mg a day. He was rechecked approximately three weeks later and to have a clinically positive as a recurrence. He was referred to the Medical Center for evaluation. He was recommended that a total laryngectomy be done but the patient refused. He another cord stripping which was negative. He has been evaluated monthly and all subsequent biopsies have been negative follow-up from his lung surgery (as of January 1993) shown no evidence of recurrence."

There findings demonstrate that CoQ can be highly effective in treating cancer patients-either by itself- or with conventional anti-cancer therapies. Although further research is clearly needed, the remarkable results reported by Dr. Folkers with CoQ. In cancer patients, the extraordinary safety of CoQ, its mechanisms of action, and the lethal nature cancer lead to the conclusion that cancer patients should consider taking high doses (300-400 mg per day) of CoQ (under the care of their physician), and suggest that lower doses of CoQ (80-200 mg per day) may be effective In preventing cancer. In healthy people!

DOUBLE-BLIND TRIALS WITH COQ10 IN MUSCULAR DYSTROPHY PATIENTS

In Biochemical et Biophysica Acta (127:281-286, 1995), Dr. Karl Folkers recalled the story of a patient he had treated many years ago:

"An adult with a late onset form of muscular dystrophy had been by his neurologist that he mentally prepare himself for a wheel chair within two years. He was a lawyer and with a devastated morale he volunteered to be placed on CoQ_{10}. His neurologist remarked if this patient could be kept out of wheelchair for five years, we should take on even greeter interest in CoQ_{10} to treat muscular dystrophy. After not five, but six years, he not only was not in a wheelchair but he would swim, bowl and play golf frequently and conducted a vigorous business life in his legal profession."

Over the years,there have been several studies showing that CoQ can improve the condition of animals and humans with various types of muscular dystrophy Recently, Dr. Folkers joined with Rodney Simon of the institute for Biomedical Research in Austin, Texas to conduct two double-blind clinical trials of CoQ in patient suffering from various forms of muscular dystrophy.

RESULTS OF CLINICAL TRIALS

In the first trial, 12 patients, age 7-69, with conditions such as the Duchenne, Becker, and limb-girdle dystrophies, myotonic dystrophy Charcot-Marie-Tooth disease, and Welander disease were treated for 3 months with 100 mg per day of CoQ or placebo.

Patients with these diseases often die of heart failure. The results showed improved muscular and cardiac function in 4 of 8 patients treated with CoQ compared to none of 4 placebo patients. When the placebo patients were later given CoQ, three of them improved significantly.

In the second trial, CoQ was given to 15 patients with progressive muscular dystrophy syndromes similar the ones in the first trial. Since these patients tend to have heart problems, cardiac function was monitored during the trial. The majority of the patients displayed improved physical function, decreased fatigue, and improved cardiac function.

In retrospect, the Texas scientists believe that 100 mg a day of CoQ was too low a dose to obtain optimal benefits in muscular dystrophy patients, and will be trying higher doses of CoQ in patients with these syndromes. They consider CoQ to be a *"breakthrough therapy"* for patients with these degenerative conditions It is now evident, they state, that *"muscular dystrophies have a deficiency of coenzyme Q_{10}. Oral therapy with CoQ_{10} can reduce or eliminate the symptoms of these muscular diseases and restore a well-being and physical capacity, which have frequently been normal"*

TREATMENT OF PERIODONTAL DISEASE

Scientists have reported a significant deficiency of CoQ in gingival tissue in individuals with periodontal disease (inflammation of the gums), and there have been several studies indicating that CoQ therapy can reduce the symptoms of this disease. One such study was conducted by researchers at the Osaka University Faculty of Dentistry in Japan.

Eight patients (7 males and 1 female) with moderately or severely inflamed gums were given 60 mg/day of CoQ for 8 weeks. During this period, the patient did not receive any periodontal therapy other than CoQ. Clinical examinations including reflectance spectrophotometry manual inspection, and blood testing were made before CoQ treatment was initiated, after 4 weeks of CoQ treatment, and after 8 weeks of CoQ treatment.

The results showed that CoQ was *"effective in suppressing gingival inflammation as assessed by gingival index, pocket depth, and tooth mobility score."* The scientists also found that CoQ improved oxygen utilization in gingival tissue, but did not affect tissue blood volume. They interpreted these findings to mean that it was *"due to an increase in oxygen extraction from hemoglobin, along with increased oxygen consumption in the gingival tissue."*

COQ10 AS AN ANTIOXIDANT

In addition to CoQ's vital role as an energy (electron and proton) carrier, it also plays an important role as an antioxidant to neutralize potentially damaging free radicals created in part by the energy-generating process. As an energy carrier CoQ is continually going through an oxidation-reduction cycle. As each CoQ molecule accepts electrons, it is reduced, when it gives up electrons, it becomes oxidized again. In CoQ's reduced form (ubiquinol) the CoQ molecule holds electrons loosely and will quite easily give up one or two electrons to neutralize free radicals.

In its electron-rich, reduced form, CoQ is as potent an antioxidant as vitamin E and can probably substitute for vitamin E as a fat-soluble antioxidant. CoQ's main role as an antioxidant is in the cauldron (energy production the mitochondria where it first participates in the process by which free radicals are generated and then helps to quench the extra free radicals that threaten such critical cell components as DNA, RNA, and cell membranes.

One of CoQ's key antioxidant actions is within the cell membrane, where it counters the oxidative attack of polyunsaturated lipids (lipid peroxidation), which causes damage in a self-propagating, destructive chain reaction that ultimately results in membrane degeneration leading to cell death and, if unchecked, to the death of organs and the death of the entire organism. CoQ, vitamin E, and melatonin are an chain breaking antioxidants that protect our cells - especially our brain cells-- from this type of damage.

IS COQ LNVOLVED IN THE FORMATION OF FREE RADICALS?

Since CoQ is directly involved the generation of energy which also leads to the production of free radicals, it has been suggested that CoQ may play a role in the first superoxide free radicals - the first stage in the free free radical generating process. This suggestion has been given a modicum of weight by studies showing that a specific form of CoQ - semiquinone - may be involved in the generation of superoxide radicals.

This hypothesis has been discredited in an exhaustive review of the evidence by Robert Beyer of the Laboratory of Chemical Biology at the University of Michigan in Ann Arbor (Life Extension Abstracts). Dr. Beyer points out that - in spite of considerable speculation on the issue - *"no direct evidence has been presented in these studies that coenzyme Q is the chemical species involved in superoxide radical formation."*

He then goes on to cite a vast amount of evidence from dozens of studies showing that CoQ is a highly potent antioxidant that

breaks lipid peroxide chains and protects DNA and RNA from free radical damage. He also points out that the clinical benefits with CoQ in patients with free radical mediated diseases is further evidence of its antioxidant properties.

Dr. Beyer's review was published in 1992. Since then there has been a great deal more evidence, much of which is discussed in this article, to support the benefits of CoQ for conditions as diverse as heart disease, cancer, and muscular dystrophy which lends even more support for the idea that CoQ is a potent antioxidant that is essential for life and health.

COQ AND NICOTINAMIDE PROTECT AGAINST NEUROTOXICITY

MPTP is a neurotoxin that produces clinical, biochemical, and neuropathologic changes in both animals and humans, which are analogous to those found in Parkinson's Disease. Doctors discovered that MPTP could induce Parkinsonism when young using street drugs began to exhibit the symptoms of Parkinson's Disease.

Since Parkinson's Disease is characterized by the deterioration of dopamine-producing cells and the excessive degradation of dopamine by the enzyme monoamine oxidase B *(MAO-B)*, the life extension drug, deprenyl, which is a selective MAO-B inhibitor and antioxidant can effectively counter the neurotoxic effects of MPTP.

Now there is a new study from the Neurochemistry Laboratory at Harvard Medical School showing that CoQ and/or nicotinomide can counter the effects of mild and moderate MTPT neurotoxicity, and that the combination of both compounds is more effective than either one alone.

NADH, HIGH ENERGY COMPOUND

Nicotinamide, in its reduced form NADH, is a high energy compound which is essential for energy production within cells, and which also stimulates the biosynthesis of dopamine, the neurotransmiter which is depleted in Parkinson's Disease. In the June 1995 issue of *LIFE EXTENSION* Magazine, we reported that NADH has been used effectively by Dr. Georg Birkmayer of the University of Graz in Vienna to treat patients with Parkinson's Disease, Alzheimer's Disease, and depression.

This new study provides further support for the use of NADH for the treatment of Parkinson's Disease and suggests that the combination of CoQ and NADH could be an effective treatment for this disease. It also lends support to the hypothesis that the decline in energy production with advancing age plays a critical role in the genesis and expression of *all* the disease of aging.

LOWERING THE RISK OF SURGERY

It is scandalous that patients who undergo surgery in the U.S. (and abroad) are not routinely premedicated with potent antioxidants and antitoxins such as Coenzyme Q10, vitamin E, and melatonin. Then have been a multitude of studies showing that such premedication protects surgery patients against free radical and toxin induced damages caused by ischemia and reperfusion of sensitive tissues and organs.

One recent study that illustrates this principle was conducted at several hospitals in Italy. The scientists randomly divided 40 patients about to undergo elective coronary artery bypass into two groups. The patients in the first group received 150 mg/day of CoQ for 7 days before their surgery, while those in the second group served as controls.

The results of the study showed that the CoQ group had significantly lower levels of lipid peroxide radicals and a lower incidence of abnormal cardiac arrhythmias. None of the patients in either group suffered severe damage or died, but many patients do indeed suffer severe consequences (including death) as a result of surgery the risk of which can be diminished by premedication with antioxidants such as CoQ.

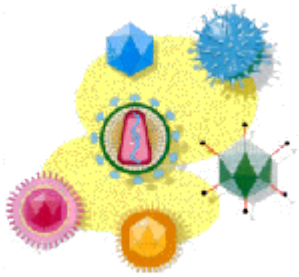
COQ IMPROVES EXERCISE PERFORMANCE IN LUNG DISEASE PATIENTS

It's hard to find patients suffering from any disease who cannot be improved by treatment with CoQ. Another example of this was demonstrated in a study in patients with lung disease at the Osaka City University Medical School in Japan. Eight of 21 patients with chronic obstructive pulmonary disease (COPD), were given 90 mg/day of CoQ for 8 weeks.

Favorable effects were observed on exercise performance, muscular energy metabolism, and oxygen transport to the patients' muscles. These findings showed significant improvement that might have been better if they had received higher doses of CoQ.

COQ IMPROVES IMMUNE FUNCTION

The cells of the immune system have to protect us from viruses, bacteria, toxic chemicals, radiation, and other lethal invaders. Some immune cells have to kill hostile invaders, others have to neutralize them, still others have to do battle with parasites, free radicals, and other threats to our existence. It is, therefore, not surprising that immune cells need a great deal of energy to do their job properly, or that the decline with advancing age of critical energy compounds such as CoQ would weaken the immune system.



There have been relatively few studies of the effects of CoQ on human immunity, but in those studies that were performed, clear cut improvements in immune function were observed. For example, in the 1970s, Dr. Emile G. Bliznakov first demonstrated pronounced suppression of humoral immune function in aging (22 month old) mice compared to young (10 week old) mice. He then showed that a single intravenous injection of CoQ restored much of the lost humoral immune function in the elderly animals.

Dr Bliznakov's CoQ mice showed improved ability to kill bacteria and fight off vital infections. They also showed improved ability to produce antibodies to antigens (sensitizing agents) to which the mice were exposed, and to help fight off parasites.

It has also been reported (by Dr Folkers) that, in several studies, CoQ significantly increased blood levels of immune system components such as IgG, as well as hematologic function in monkeys, rabbits, chickens, and humans.

AN EXPLORATORY STUDY IN AIDS PATIENTS

The energy and immune boosting benefits of CoQ, as well as evidence that AIDS patients show significant reduction in their blood levels of CoQ, persuaded Dr Folkers and associates at the University of Texas to conduct an exploratory trial of 4-7 months of daily doses of 200 mg/day of CoQ in seven patients with AIDS or ARC (the precursor to AIDS).

All seven patients (3 AIDS, 4 ARC) reported feeling better soon after starting on CoQ. One patient was lost to follow-up. Another patient died after stopping CoQ, while the five others (two AIDS, 3 ARC) survived, showed systematic improvement and had no opportunistic infections after 4-7 months on CoQ. (The T4/T8 ratios of 3 or these 5 patients increased.) The scientists concluded that in spite of *"very poor compliance in 5 of the 7 patients, the overall results were very encouraging and at times were even striking."*

These findings are from a manuscript dated April 25, 1988, with no indication of whether (or where) it may have been published. No evidence has been found of any published follow-up on these patients, or of any other studies conducted with CoQ in AIDS patients.

EFFECT OF COQ ON LIFESPAN

Several studies have shown that there is a significant decrease in CoQ levels in the heart, kidney, and muscles of aging mice. **(Table 3)** Three studies, the results of which were never published, have demonstrated marked lifespan extension in mice given supplemental CoQ.

Table 3Age (months)

Tissue	**2**	**18**	**25**
Heart	1134	2036	825
Kidney	501	883	688
Gastrocnemius*	210	340	233
DVL	365	522	408
Soleus	364	338	240

* Deep (red) portion of the vastus lateralis muscle.

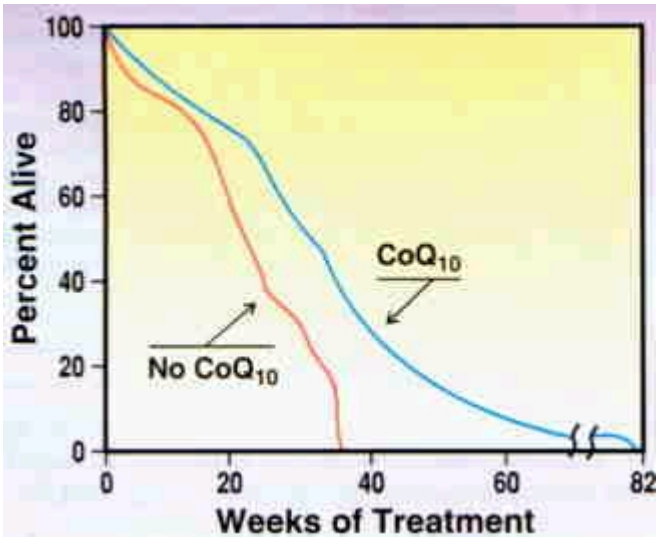
Dr. Bliznakov reported that he extended lifespan in female mice by 56% by giving them weekly injections of 50 meg of CoQ, starting at 17 months of age. According to Bliznakov, the control mice were all dead in about 38 weeks, while the last CoQ animal survived for 82 weeks. **(Figure 5)** A follow up study by Dr Gregory M. Fahy confirmed this finding in female mice of a different strain, although no effect on the mean lifespan of the male mice was seen.

FIGURE 5

Effect of CoQ10 on death of CF-1 female mice due to aging.

Starting age 17 months. 50 micrograms per mouse per week by injection. 50 mice in each group.

Years later, Dr. Steve Harris (at UCLA Medical Center)creased the mean, but not maximum lifespan of long-lived hybrid mice by giving them CoQ at 1% of their dry diet...a dose roughly equivalent to 750 mg/day of CoQ in humans. This high dietary dose of CoQ enabled the experimental mice to reach old age in exceedingly good shape before they died (mostly of lymphoma) their death, the elderly mice appeared in much better shape than the surviving control mice. They looked better were much more active, had less grey hair, and had a lower incidence of arthritis than the control animals



Back to the Magazine Forum