

LE Magazine April 2000

ABSTRACTS

FEATURED:

CoQ10

Antioxidant defenses

Cardiovascular therapy

ADHD

CoQ10
Antioxidant defenses
The chemoprotective effect of coenzyme Q on lipids in the paint and lacquer industry workers

Int J Occup Med Environ Health 1998;11(2):153-63

The influence of coenzyme Q on the lipid parameters in the paint and lacquer industry workers is presented. The examinations were carried out in the group of 24 workers employed at the paint and lacquer production, who received coenzyme Q10 as a chemoprotective agent. Serum concentration of basic lipid parameters: total cholesterol (TC), high density lipoproteins (HDL), low density lipoproteins (LDL), triglycerides (TG); lipid peroxidation products: malonyldialdehyde (MDA) together with 4-hydroxynonenal (4-HNE) and two antioxidant enzymes: superoxide dismutase (SOD) and glutathione peroxidase (GPx) were examined. The above parameters were measured in workers exposed to organic solvents and then after 4 weeks of coenzyme Q treatment. In order to explain, whether the occupational exposure is responsible for the changed level of some parameters, the reference group, not employed in the paint and lacquer industry, was used. The results indicated that the preliminary blood serum concentration of MDA + 4-HNE in workers exposed to organic solvents was significantly elevated in comparison to the control group. Statistically significant decrease in MDA + 4HNE concentration was observed after coenzyme Q treatment what lead to the conclusion that coenzyme Q could be considered as a protective agent against lipid peroxidation in occupational exposure. The changes in other parameters were statistically insignificant.

Lipid peroxidation and changes in the ubiquinone content and the respiratory chain enzymes of submitochondrial particles

Free Radic Biol Med 1997;22(3):391-400

The relationship between, lipid peroxidation induced by ascorbate and adenosine ADP/Fe³⁺, and its effect on the respiratory chain activities of beef heart submitochondrial particles has been investigated. Lipid peroxidation, measured as thiobarbituric acid reactive substance formation, resulted in an inhibition of the NADH and succinate oxidase activities. Examination of several partial reactions of the respiratory chain revealed inactivation primarily of those involving endogenous ubiquinone, i.e., NADH- and succinate-ubiquinone1 and cytochrome c reductases. Ubiquinol-cytochrome c reductase, measured with reduced ubiquinone2 as electron donor, was unaffected. The amount of NADH- or succinate-reducible cytochrome b in the presence of cyanide was strongly decreased, but could be recovered by the addition of antimycin. There occurred a substantial decrease of the ubiquinone content in the course of lipid peroxidation, with a linear relationship between this decrease and the NADH and succinate oxidase activities. The results are consistent with the conclusion that the ubiquinone pool undergoes an oxidative modification during lipid peroxidation, to a form that can no longer function as a component of the respiratory chain. Lipid peroxidation also led to a partial inhibition of the succinate dehydrogenase and cytochrome c oxidase activities and a minor decrease of the cytochrome c and cytochrome a contents. Reduction of endogenous ubiquinone prevented lipid peroxidation as well as the concomitant modification of ubiquinone and inactivation of the respiratory chain. These observations suggest that the destruction of ubiquinone through lipid peroxidation is the primary cause of inactivation of the respiratory chain, and emphasize the antioxidant role of ubiquinol in preventing these effects. The possible implications of these findings for regulation of the cellular turnover of ubiquinone by the prevailing oxidative stress are discussed.

Inhibition of NADH-linked mitochondrial respiration by 4-hydroxy-2-nonenal

Biochemistry 1998 Jan 13;37(2):552-7

During the progression of certain degenerative conditions, including myocardial ischemia-reperfusion injury, mitochondria are a source of increased free-radical generation and exhibit declines in respiratory function(s). It has therefore been suggested that oxidative damage to mitochondrial components plays a critical role in the pathology of these processes. Polyunsaturated fatty acids of membrane lipids are prime molecular targets of free-radical damage. A major product of lipid peroxidation, 4-hydroxy-2-nonenal (HNE), is highly cytotoxic and can readily react with and damage protein. In this study, the effects of HNE on intact cardiac mitochondria were investigated to gain insight into potential mechanisms by which free radicals mediate mitochondrial dysfunction. Exposure of mitochondria to micromolar concentrations of HNE caused rapid declines in NADH-linked but not succinate-linked state 3 and uncoupled respiration. The activity of complex I was unaffected by HNE under the conditions of our experiments. Loss of respiratory activity reflected the inability of HNE-treated mitochondria to meet NADH demand during maximum rates of O₂ consumption. HNE exerted its effects on intact mitochondria by inactivating alpha-ketoglutarate dehydrogenase. These results therefore identify a potentially important mechanism by which free radicals bring about declines in mitochondrial respiration.

The effect of coenzyme Q10 on sperm motility

Mol Aspects Med 1997;18 Suppl:S213-9

In sperm cells, the majority of coenzyme Q10 (CoQ10) an energy promoting agent and antioxidant, is concentrated in the mitochondria of the midpiece, so that the energy for movement and all other energy-dependent processes in the sperm cell also depend on the availability of CoQ10. The reduced form of CoQ10-ubiquinol also acts as an antioxidant, preventing lipid peroxidation in sperm membranes. The objective of the study was to evaluate the effect of CoQ10 on sperm motility in vitro, after incubation with 38 samples of asthenospermic and normal motility sperm, and to evaluate the effect of CoQ10 administration in vivo in 17 patients with low fertilization rates after in vitro fertilization with intracytoplasmic sperm injection (ICSI) for male factor infertility. All 38 sperm samples from patients registered in our infertility clinic had normal concentrations and morphology. Of these, 16 patients had normal motility (mean 47.5%) and 22 patients were asthenospermic (mean motility 19.1%). Sperm samples were divided into four equal parts and incubated for 24 h in: HAM's medium alone, in HAM's medium with 1% DMSO and HAM's with 5 microM or 50 microM CoQ10. While no significant change in motility after incubation was observed in the samples with initial normal motility, a significant increase in motility was observed in the 50 microM CoQ10 subgroup of sperm from asthenospermic men, with a motility rate of 35.7 +/- 19.5%, as compared to 19.1 +/- 9.3% in the controls ($P < 0.05$). The 17 patients with low fertilization rates after ICSI were treated with oral CoQ10, 60 mg/day, for a mean of 103 days before the next ICSI treatment. No significant change was noted in most sperm parameters, but a significant improvement was noted in fertilization rates, from a mean of 10.3 +/- 10.5% in their previous cycles, to 26.3 +/- 22.8% after CoQ10 ($P < 0.05$). In conclusion, the administration of CoQ10 may result in improvement in sperm functions in selective patients. Further investigation into the mechanisms related to these effects is needed.

Biochemical rationale and myocardial tissue data on the effective therapy of cardiomyopathy with coenzyme Q10

Proc Natl Acad Sci U S A 1985 Feb;82(3):901-4

The tissue levels of coenzyme Q10 (CoQ10) in endomyocardial biopsy samples and blood from 43 patients with cardiomyopathy were determined by steps of extraction, purification, and HPLC. The biopsy samples were obtained from the patients after a routine heart catheterization. Six patients were of class I, 18 of class II, 11 of class III, and 8 of class IV (classified according to guidelines of the New York Heart Association). True control biopsies of healthy hearts are not available for ethical reasons, but the data of the four classes by severity of disease may be justifiably compared. Patients of class IV had lower (P less than 0.01) levels of CoQ10 than those of class I. Patients of classes III and IV had a lower (P less than 0.0001) level than those of classes I and II. Biopsy samples were obtained from five patients after treatment with CoQ10 for 2-8 months. The increases of CoQ10 levels ranged from 20% to 85%; the mean value was higher (P less than 0.02) than before treatment. Blood deficiencies also increase with severity of disease, but not as markedly as for the biopsies. These data reveal a myocardial deficiency of CoQ10, which is higher with increasing severity of disease and is reduced by therapy. This biochemistry correlates with the effective treatment of cardiomyopathy with CoQ10.

Coenzyme Q10 and coronary artery disease

Clin Investig 1993;71(8 Suppl):S112-5

It has been postulated that oxidatively modified low-density lipoprotein (LDL) contributes to the genesis of atherosclerosis. Ubiquinone has been suggested to be an important physiological lipid-soluble antioxidant and is found in LDL fractions in the blood. We measured plasma level of ubiquinone using high-performance liquid chromatography and plasma levels of total cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides in 245 normal subjects (186 males, 59 females) and in 104 patients (55 males, 49 females) who had coronary artery disease not receiving pravastatin and 29 patients (12 males, 17 females) receiving pravastatin. In the normal subjects, the plasma ubiquinone levels did not vary with age. In the patient groups, the plasma total cholesterol and LDL levels were higher and the plasma ubiquinone level lower than in the normal subject group. The LDL/ubiquinone ratio was higher in the patient groups. We found that ubiquinone level, either alone or when expressed in relation to LDL levels, was significantly lower in the patient groups compared with the normal subject group. The 3-hydroxy-3-methylglutaryl coenzyme A (HMG CoA) reductase inhibitor is thought to prevent atherosclerosis, however, it also inhibits ubiquinone production. The present study revealed that HMG CoA reductase inhibitor decreased plasma cholesterol level, and that it did not improve either the ubiquinone level or the LDL/ubiquinone ratio. From these results, the LDL/ubiquinone ratio is likely to be a risk factor for atherogenesis, and administration of ubiquinone to patients at risk might be needed.

Treatment of essential hypertension with coenzyme Q10

Mol Aspects Med 1994;15 Suppl:S265-72

A total of 109 patients with symptomatic essential hypertension presenting to a private cardiology practice were observed after the addition of CoQ10 (average dose, 225 mg/day by mouth) to their existing antihypertensive drug regimen. In 80 per cent of patients, the diagnosis of essential hypertension was established for a year or more prior to starting CoQ10 (average 9.2 years). Only one patient was dropped from analysis due to noncompliance. The dosage of CoQ10 was not fixed and was adjusted according to clinical response and blood CoQ10 levels. Our aim was to attain blood levels greater than 2.0 micrograms/ml (average 3.02 micrograms/ml on CoQ10). Patients were followed closely with frequent clinic visits to record blood pressure and clinical status and make necessary adjustments in drug therapy. Echocardiograms were obtained at baseline in 88% of patients and both at baseline and during treatment in 39% of patients. A definite and gradual improvement in functional status was observed with the concomitant need to gradually decrease antihypertensive drug therapy within the first one to six months. Thereafter, clinical status and cardiovascular drug requirements stabilized with a significantly improved systolic and diastolic blood pressure. Overall New York Heart Association (NYHA) functional class improved from a mean of 2.40 to 1.36 ($P < 0.001$) and 51% of patients came completely off of between one and three antihypertensive drugs at an average of 4.4 months after starting CoQ10. Only 3% of patients required the addition of one antihypertensive drug. In the 9.4% of patients with echocardiograms both before and during treatment, we observed a highly significant improvement in left ventricular wall thickness and diastolic function.

Use of echocardiography in the management of congestive heart failure in the community

J Am Coll Cardiol 1999 Jan;33(1):164-70

OBJECTIVES: We evaluated the use and the impact of echocardiography in patients receiving an initial diagnosis of congestive heart failure in Olmsted County, Minnesota, in 1991. **BACKGROUND:** The American College of Cardiology/American Heart Association clinical practice guidelines recommend echocardiography in all patients with suspected congestive heart failure. No data are available on use and impact of echocardiography in management of congestive heart failure in a community. **METHODS:** The medical records linkage system of the Rochester Epidemiology Project was used to identify all 216 patients who satisfied the Framingham criteria for congestive heart failure. Of these, 137 (63%) underwent echocardiography within 3 weeks before or after the episode of congestive heart failure (Echo group), and the other 79 patients constitute the No-Echo group. **RESULTS:** The No-Echo group patients were older ($p=0.022$), were more likely to be female ($p=0.072$), had milder symptoms ($p=0.001$) and were less often hospitalized at diagnosis ($p=0.001$). Fewer patients in the No-Echo group were treated with angiotensin-converting enzyme inhibitors ($p=0.001$). Advanced age ($> \text{ or } = 80$ years), lower New York Heart Association functional class, absence of a fourth heart sound on examination, absence of cardiomegaly or signs of congestive heart failure on chest radiography and absence of known valve disease were independently related to the decision not to obtain an echocardiogram. Survival after adjustment for age, functional class and gender was lower in the No-Echo group than the Echo group (risk ratio=0.607, $p=0.017$). **CONCLUSIONS:** The underuse of echocardiography appears to be associated with poorer survival and underuse of angiotensin-converting enzyme inhibitor therapy.

ADHD**Attention deficit hyperactivity disorder**

Prof Care Mother Child 1998;8(2):35-7

In summary, ADHD is a mental disorder whose diagnosis is based on a child manifesting the symptoms of inattention, hyperactivity and impulsivity to the extent that the symptoms impair the child's ability to function. The main beneficial treatments are two nonspecific treatments, stimulant medication and behavioural interventions, preferably in combination. Dietary interventions have included diets that restrict allergenic foods, starting with a generally restricted diet and adding those foods that do not worsen the child's behaviour; a diet that restricts food additives and preservatives, referred to as the Feingold diet; and diets that restrict sugar. These dietary interventions either have not been proved to be efficacious or still require more study to determine their effects.

Effect of nutritional supplements on attentional-deficit hyperactivity disorder

Integr Physiol Behav Sci 1998 Jan-Mar;33(1):49-60

This study reports the effects of two nutritional products upon the severity of symptoms in children with confirmed diagnoses of Attention-Deficit Hyperactivity Disorder (ADHD): a glyconutritional product containing saccharides known to be important in healthy functioning and a phytonutritional product containing flash-dried fruits and vegetables. Seventeen ADHD children were recruited from a local parent support group. Parents of five of the subjects did not have their children on methylphenidate. Of the remaining twelve, all on methylphenidate, six were left on prescribed doses (random assignment). The other six had their doses reduced by half after two weeks (study duration was six weeks). The subjects were assessed initially and three subsequent times over a period of six weeks (longitudinal nonrandomized design). The behavior disorder items for ADHD, Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD) as listed in the Diagnostic and Statistical Manual for Mental Disorders (DSM IV) (American Psychiatric Association, 1994) were rated by teachers and parents on a 3-point scale. Also included was a Side Effects Scale described by Barkley (1990). The children received the glyconutritional supplement for the entire six weeks. After three weeks, the phytonutritional supplement was added to the diet to increase the probability of positive results. The glyconutritional supplement decreased the number and severity of ADHD, associated ODD and CD symptoms, and side effects in all groups during the first two weeks of the study. There was little further reduction with the addition of the phytonutritional supplement. The three study groups did not differ statistically in degree of reduction over observations. Present results suggest that symptoms of ADHD may be reduced by the addition to the diet of saccharides used by the body in glycoconjugate synthesis.

Body dissatisfaction and unhealthy weight-control practices among adolescents with and without chronic illness: a population-based study

Arch Pediatr Adolesc Med 1995 Dec;149(12):1330-5

OBJECTIVE: To compare body dissatisfaction and unhealthy weight-loss practices among adolescents with and without chronic illness. DESIGN: Survey. PARTICIPANTS: The sample consisted of 2149 adolescent boys and girls with diabetes, asthma, attention deficit disorder, physical disabilities, or seizure disorders; and a comparison group of 1381 adolescents without chronic illness. MAIN OUTCOME MEASURES: Body concerns, binge eating, frequent dieting, vomiting, and laxative or diuretic use among adolescents. RESULTS: Adolescents with chronic illness reported higher body dissatisfaction and engaged in more high-risk weight-loss practices than adolescents without chronic illness. This trend was consistent across the different conditions and was not limited to those with a nutrition-related condition such as diabetes. The trend remained after conducting logistic regression and controlling for age, race, socioeconomic status, and body mass index. CONCLUSIONS: Adolescents with chronic illness are at high risk for engaging in unhealthy weight-loss practices and should be screened and targeted for prevention and treatment.

Foods and additives are common causes of the attention deficit hyperactive disorder in children

Ann Allergy 1994 May;72(5):462-8

The attention deficit hyperactive disorder (ADHD) is a neurophysiologic problem that is detrimental to children and their parents. Despite previous studies on the role of foods, preservatives and artificial colorings in ADHD this issue remains controversial. This investigation evaluated 26 children who meet the criteria for ADHD. Treatment with a multiple item elimination diet showed 19 children (73%) responded favorably, $P < .001$. On open challenge, all 19 children reacted to many foods, dyes, and/or preservatives. A double-blind placebo controlled food challenge (DBPCFC) was completed in 16 children. There was a significant improvement on placebo days compared with challenge days ($P = .003$). Atopic children with ADHD had a significantly higher response rate than the nonatopic group. This study demonstrates a beneficial effect of eliminating reactive foods and artificial colors in children with ADHD. Dietary factors may play a significant role in the etiology of the majority of children with ADHD.

Does sucrose or aspartame cause hyperactivity in children?

Nutr Rev 1994 May;52(5):173-5

Anecdotal evidence has led to the hypothesis that there is a relationship between sugar intake and hyperactive behavior. To assess this hypothesis, a recent study using a range of behavioral and cognitive measures evaluated the effects of diets high in sucrose, aspartame, and saccharin on the performance of school-aged children believed to be sensitive to sugar, and preschool children. Although intakes exceeded average dietary levels, neither sucrose nor aspartame negatively affected behavior. Taken together with previous work, these results indicate that sugar is not a major cause of hyperactivity.

Effects of a few food diet in attention deficit disorder

Arch Dis Child 1993 Nov;69(5):564-8

Seventy-eight children, referred to a diet clinic because of hyperactive behaviour, were placed on a 'few foods' elimination diet. Fifty nine improved in behaviour during this open trial. For 19 of these children it was possible to disguise foods or additives, or both, that reliably provoked behavioural problems by mixing them with other tolerated foods and to test their effect in a placebo controlled double blind challenge protocol. The results of a crossover trial on these 19 children showed a significant effect for the provoking foods to worsen ratings of behaviour and to impair psychological test performance. This study shows that observations of change in behaviour associated with diet made by parents and other people with a role in the child's care can be reproduced using double blind methodology and objective assessments. Clinicians should give weight to the accounts of parents and consider this treatment in selected children with a suggestive medical history.

Hyperactivity (attention-deficit disorder)

J Fam Pract 1984 Sep;19(3):367-9, 372-3, 376-7 passim

Hyperactivity, or attention-deficit disorder, is a common disorder of childhood and has serious sequelae. Patients with this problem present frequently to the family physician's office. The physician should be able to perform a thorough evaluation that includes a family interview, a teacher consultation, and referral for psychological testing. Once the diagnosis of hyperactivity (attention-deficit disorder) is made, a comprehensive treatment plan is initiated that includes the use of stimulants, family counseling with an emphasis on behavioral management of the child and support of the parents and siblings, and initiation of school intervention. Many parents inquire about diet therapy, which may be of help with some children but should not be used to the exclusion of other treatment approaches.

The role of diet and behaviour in childhood

J Paediatr Child Health 1997 Jun;33(3):190-4

This short review summarizes the most important research, particularly that from 1985 to 1995, on the relationship between diet and behaviour. Relevant studies particularly those using double-blind placebo controlled food challenge methodology were selected, and are presented within a historical context. Summary tables of the early development of concepts and later pertinent studies are provided. The research has shown that diet definitely affects some children. Rather than becoming simpler the issue has become demonstrably more complex. The range of suspect food items has broadened, and some non-food items are relevant. Symptoms which may change include those seen in attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD), sleep problems and physical symptoms, with later research emphasizing particularly changes in mood. The reports also show the range of individual differences both in the food substances producing reactions and in the areas of change.

Current drug therapy recommendations for the treatment of attention deficit hyperactivity disorder

Drugs 1998 Aug;56(2):215-23

Attention deficit hyperactivity disorder (ADHD) is characterised by symptoms of inattentiveness and/or hyperactivity-impulsivity which are not appropriate to the child's age. This disorder usually manifests by age 3 and affects up to 5% of school-age children. Although the aetiology is unknown, ADHD appears to have a strong genetic component and to involve dysregulation of the CNS dopaminergic system. Psychostimulants are the mainstay of therapy. The majority of patients will respond to an adequate trial of one of the 3 available stimulants, methylphenidate, dexamphetamine or pemoline. Use of the tricyclic antidepressants as second-line agents is supported by substantial literature. Third-line agents include amfebutamone (bupropion) and clonidine. Other modalities have been studied, but sufficient research is not available to recommend their use over the abovementioned treatments. Assessment of response is best achieved by objective rating scales which allow for input from various environments.

[Back to the Magazine Forum](#)

All Contents Copyright © 1995-2009 Life Extension Foundation All rights reserved.

LifeExtension®

These statements have not been evaluated by the FDA. These products are not intended to diagnose, treat, cure or prevent any disease. The information provided on this site is for informational purposes only and is not intended as a substitute for advice from your physician or other health care professional or any information contained on or in any product label or packaging. You should not use the information on this site for diagnosis or treatment of any health problem or for prescription of any medication or other treatment. You should consult with a healthcare professional before starting any diet, exercise or supplementation program, before taking any medication, or if you have or suspect you might have a health problem. You should not stop taking any medication without first consulting your physician.