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COQ10

PARTIAL AND COMPLETE REGRESSION OF BREAST CANCER IN PATIENTS IN RELATION TO DOSAGE OF COENZYME Q_{10}

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SUMMARY. - Relationships of nutrition and vitamins to the genesis and prevention of cancer are increasingly evident. In a clinical protocol, 32 patients having -"high-risk"- breast cancer were treated with anti-oxidants, fatty acids, and 90 mg. of CoQ_{10}. Six of the 32 patients showed partial tumor regression. In one of these 6 cases, the dosage of CoQ_{10} was increased to 390 mg. In one month, the tumor was no longer palpable and in another month, mammography confirmed the absence of tumor. Encouraged, another case having a verified breast tumor, after non-radical surgery and with verified residual tumor in the tumor bed was then treated with 300 mg. CoQ_{10}. After 3 months, the patient was in excellent clinical condition and there was no residual tumor tissue. The bioenergetic activity of CoQ_{10}, expressed as hematological or immunological activity, may be the dominant but not the sole molecular mechanism causing the regression of breast cancer.

RELEVANT PRIOR RESEARCH. - The National Research Council (1) comprehensively reviewed the relationship of nutrition to cancer. Differences in the occurence of diverse cancers in different human populations are often correlated with differences in nutrition. The data of Folkers et al. (2) support a function of coenzyme Q_{10} (vitamin Q_{10}) in the immune system.

Folkers et al. (3) recorded the immunological significance of increased levels of IgG in 8 patients, 3 with cancer, treated with only 60 mg. of CoQ_{10}; the increases occurred within 28-97 days, and in a range of significance up to $P<0.001$. The increases in IgG were presumed to be based on transcriptional increases in mRNA and a translational increase in apoenzymes for CoQ_{10}-enzymes; refer to Walker et al. (4). Sigamura et al. (5), Azuma et al. (6), and Niotani et al. (7) published studies on CoQ_{10} and immune mechanisms.

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Folkers et al.(8) recorded greater deficiencies of CoQ_{10} in the blood of cancer patients than for control subjects which was a rationale for trials on the immuno-therapy of cancer with CoQ_{10}. They considered an impaired biosynthesis of CoQ_{10} occurred in cancer patients, because of general nutritional deficiencies, and particularly because of specific requirements for certain vitamins for the biosynthesis of CoQ_{10} from phenylalanine.

Folkers critiqued (9), 1992, 30 years of research on the hematopoietic and immunological activities of CoQ_{10} and the potentiality for therapy of cancer. Breast cancer causes more deaths than any other cancer for women. Although breast cancer is associated with hormonal activities, nutrition was implicated as having a major role in breast cancer in 1973.

Of 83 American cancer cases, Folkers et al.(10) found that 20% of breast cases (N=20) had blood levels of CoQ_{10} of 0.5 μg/ml and lower. Of 116 Swedish cancer patients, Folkers et al.(11) found that 23% of breast cases (N=13) also had blood levels of CoQ_{10} which were 0.5 μg/ml or lower; this incidence of 20-23% is significantly higher ($P<0.05$) than that for ordinary people in Sweden and America. The common level of CoQ_{10} is 0.9 ± 0.2 μg/ml in human blood. The nearly identical incidence of a deficiency of CoQ_{10} in breast cases of Swedish and American cancer patients is noteworthy.

Folkers et al.(12) summarized the case histories of 10 cancer patients who were treated with CoQ_{10} and survived for periods of 5-15 years. For some of these patients, evidence of cancer was no longer present.

CURRENT CLINICAL RESEARCH. - Lockwood et al.(13) reported at the Eighth International Symposium on the Biomedical and Clinical Aspects of Coenzyme Q, November, 1993, in Stockholm, on the apparent partial remission of breast cancer in six of thirty-two "high-risk" patients who were supplemented with nutritional anti-oxidants, essential fatty acids, and with coenzyme Q_{10} (vitamin Q_{10}). They were treated with 1.2g of Γ linolenic acid, 3.5g n-3 fatty acids, antioxidants (58 mg β-carotene, 2.8g vitamin C, 2500 IU vitamin E, 385 μg selenium) and 90 mg of CoQ_{10} daily (Bio-Quinone Q_{10}, Pharma Nord, Denmark). No patient died and all expressed a feeling of well-being. These clinical results are remarkable since about 4 deaths would have been expected. Now, after 24 months, all still survive; about 6 deaths would have been expected.

There was apparent remission of breast tumors in 6 of these 32 patients of 48, 54, 55, 70, 70, and 82 years. Variously, morphine dosage was reduced, distant metastases were not observed, and clinical conditions became excellent. Antioxidant parameters in blood significantly increased.

Blood levels of CoQ_{10} significantly increased from 0.80 $\pm$ 0.28 μg/ml to 1.60 $\pm$ 0.19 μg/ml after one year on the 90 mg dose of CoQ_{10}.

INCREASED DOSAGE OF CoQ_{10} FROM 90 TO 300 AND TO 390 MG DAILY. - In clinical cardiology, P. Langsjoen et al.(14) and H. Langsjoen (15) summarized 8 years (1985-1993) of the successful therapy of 424 cardiac patients, with various forms of cardiovascular disease, by treatment with CoQ_{10} at a dosage range of 75-600 mg per day. Primarily, dosage was guided by the clinical response of patients, and to increase blood levels to 2 μg/ml and higher (average, 2.92 μg/ml, N=297).

In this study of treating breast cancer with CoQ_{10}, the dosage was increased from 90 mg to 390 mg daily for the first case and to 300 mg for a second case, as follows.

CASE REPORT. -K.M., female, 59 years, with family disposition for cancer of the breast. July 9, 1991: The patient was operated on for removal of a tumor in the left breast. The histologic diagnosis was intraductal carcinoma and intraductal carcinoma *in situ*. Tumor tissue had not been removed radically and mammography performed 2 months later still showed a malignant tumor. A non-malignant tumor was removed from the left areola, February, 1992. Microscopy revealed a fibroadenoma with no signs of malignancy. Mammography in May, 1992, demonstrated a widely spread tumor in the left axillary process in the breast. The patient was operated on again in July, 1993, because of a palpable tumor in the left breast. The microscopy again showed an intraductal carcinoma. Mammography confirmed a tumor in the left breast. The patient had been supplemented since October, 1991. Since October, 1993, the patient was further supplemented with 300 mg of Q_{10}, *i.e.* the total Q_{10} dose was 390 mg. per day. In November, 1993, the tumor was no longer palpable. A mammography in December, 1993, confirmed normal conditions with no signs of tumor or microcalcifications.

Encouraged by this complete regression of a breast tumor, even in a first case, we treated a new breast case with just 300 mg. of CoQ_{10}.

CASE REPORT.- K.B., female, 74 years, Sept. 1, 1993: A palpable 1-cm. tumor was at the base of the axillary process in the right breast. Under local anesthesia, tumor was removed on Sept. 16, 1993, histological verification was performed and the diagnosis was intraductal carcinoma and *foci* of carcinoma *in situ*. The slides revealed remaining carcinoma in the tumor bed. The patient refused further surgical intervention and on October 12, 1993, she was initiated on 300 mg. CoQ_{10} daily. On January 25, 1994, clinical examination revealed no evidence of tumor or distant metastases. Mammography revealed no residual tumor. As of February 1994, therapy continues with 300 mg. CoQ_{10}. Clinical condition is excellent.

DISCUSSION OF TREATMENT WITH 300 AND 390 MG CoQ_{10} DAILY. - During therapy of K.M. for about 1 year with 90 mg of CoQ_{10}, the size of the tumor had seemingly "stabilized" at 1.5-2 cm. After 2-3 additional months on 390 mg of CoQ_{10}, the tumor was no longer present, and all necessary examinations were confirmatory.

Regression of a tumor of 1.5-2 cm in size in up to 3 months on a dosage of 390 mg of CoQ_{10}, but not in about 1 year on 90 mg in the same protocol indicates that CoQ_{10} was dominant in the complete regression over and above any benefit from the nutritional supplements. CoQ_{10} has bioenergetic activity, and the molecular mechanism causing a dominant tumor regression by CoQ_{10} may be an expression of the known hematological and immunological activity of this vitamin.

OVERVIEW.- A total of 4 cases of breast cancer on 90 mg. of CoQ_{10} over many months and 2 cases on 300-390 mg. of CoQ_{10} over just a few months showing a range of tumor regression from partial to complete is unexpected but seemingly valid. These clinical results from a conventional treatment protocol with CoQ_{10} are significantly supported by the data on a deficiency of CoQ_{10} in the blood of American and Swedish cancer patients (10,11), and particularly by survival data on 10 diverse cancer patients for periods of 5-15 years with some absence of malignancy (12), and justify the necessity of testing a very large number of breast cases. Breast cancer caused about 180,000 deaths in 1993 (16) which is more than that of any other category of cancer. Even if the lives of only 1 out of 5 breast cases were saved by CoQ_{10} that would be about 36,000 women and mothers. More patients with other tumors must now be treated with a higher dosage of CoQ_{10}, and optimism for regression is plausible on the basis of the survival data (12) for cancer of the lung, colon, and prostate.

One of us (K.L.), in a practice of oncology has treated ca. 200 cases of breast cancer per year for 35 years, and has never seen a spontaneous complete regression of a 1.5-2.0 cm. breast tumor, and has never seen a comparable regression on any conventional anti-tumor therapy.

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