Coenzyme Q10 for the treatment and prevention of heart disease- the Q-SYMBIO and KISEL-10 clinical studies.

INTRODUCTION

Coenzyme Q10 (CoQ10) is a naturally occurring vitamin-like substance that has three characteristics of relevance to normal cardiovascular function: (i) its key role in the biochemical process supplying cardiac cells with energy; (ii) its role as an antioxidant protecting cardiac cells from damage by free radicals; (iii) its direct effect on genes supplying cardiac cells with energy; (ii) its key role in the biochemical process occurring vitamin-like substance that describes two recent clinical studies, Q-SYMBIO and KISEL-10, of relevance to the treatment or prevention of heart disease respectively.

THE Q-SYMBIO STUDY

Q-SYMBIO was a multi-national trial with CoQ10 as an adjunctive treatment in chronic heart failure, headed by Prof S Mortensen of Copenhagen University Hospital, Denmark. The study was carried out in patients with chronic heart failure, and the effects of CoQ10 supplementation on symptoms and biomarker status (hence Q-SYMBIO) were assessed.

Q-SYMBIO was a long term (2 year) randomised double-blind placebo-controlled multi-centre trial involving 420 patients with chronic heart failure (New York Heart Association class III or IV). Patients were given 3 x 100mg CoQ10 (Bio-Quinone Q10) daily (or placebo), in addition to conventional medication such as ACE inhibitors and beta-blockers. What makes this outcome more remarkable is that this improvement in survival occurred in patients receiving conventional drugs for the treatment of heart failure. Presumably this is a consequence of the therapeutic targeting of a different area of cell metabolism i.e. energy production, rather than the blocking of neurohormonal responses associated with conventional therapy.

THE KISEL-10 STUDY

The KISEL-10 study was carried out on the normal elderly population of the Kinda region of Stockholm, with participants given supplemental selenium and CoQ10. This was a randomised double-blind five year study headed by Prof Urban Alehagen, in which 440 elderly individuals aged 70-88 years were supplemented with 200 mcg selenium (SelenoPrecise) and 200 mg of CoQ10 (Bio-Quinone Q10) per day, or placebo. Patients were assessed by clinical examination, echocardiography and biomarker (proBNP) measurements.

There was no significant difference in adverse events between the CoQ10 treated and placebo groups over the duration of the study. CoQ10 has therefore been reported as the first novel drug (i.e. one addressing heart cell energy depletion) to improve heart failure mortality, since the introduction of ACE inhibitors and beta blockers. The question arises as to why the KISEL-10 study was so successful in reducing the risk of death from heart disease. As people age, the capacity of the body to produce CoQ10 decreases; optimal production occurs around the middle twenties, with a continual decline thereafter. By the age of 80, the level of CoQ10 in heart tissue has fallen by more than 50%. Reduced levels of CoQ10 in blood and cardiac tissue are a risk factor for cardiovascular disease. In addition, the populations of many EU countries, including Sweden and the UK, are deficient in their dietary intake of selenium. This is a consequence of a low selenium level in the soil, which is manifest upwards through the food chain. The importance of an adequate dietary intake of selenium for normal cardiovascular function is highlighted by the incidence of Keshan disease, a cardiomyopathy endemic to regions of China with selenium depleted soils.

Thus, the levels of both CoQ10 and selenium may be depleted in elderly people, and these deficiencies were corrected by the supplementation regime used in the KISEL-10 study.

THE IMPORTANCE OF SUPPLEMENT BIOAVAILABILITY

The Q-SYMBIO and KISEL-10 clinical trials represent landmark studies in the treatment and prevention of cardiovascular disease. However, the bioavailability of supplemental CoQ10 used in such studies is of key importance. The type of CoQ10 used in the Q-SYMBIO and KISEL-10 studies, Bio-Quinone Q10 (licensed in the EU as Myoqinon), was chosen because of its documented bioavailability; specifically the ability of a defined dosage to raise blood CoQ10 levels above the threshold of 3mcg/ml required for clinical efficacy in cardiovascular disease.

Similarly, the type of selenium supplement used in the KISEL-10 study was chosen because of its high organic selenium content (particularly l-selenomethionine), and documented bioavailability of approximately 90%.

REFERENCES