



➤ Product Review ◀ #266 May 2014

SARCOSELECT™ – A MULTINUTRIENT FUNCTIONAL FOOD DESIGNED TO OPTIMIZE QUALITY OF LIFE IN TODAY'S CHRONICALLY ILL PATIENT – PART I

Over the last 3-4 decades, how often have we seen promises of enhanced quality of life, disease prevention, and long life, similar to the one stated in the title above, from manufacturers of multinutrient products, in particular multivitamin/mineral products? If you are like me, the answer to this question is far too often to count. Unfortunately, as current research and anecdotal reports suggest, multivitamin/mineral supplements, despite ever increasing utilization by the American public, have failed to a significant extent to deliver on this promise. Why? For me, it is not that they are worthless, as suggested by many in the research community and the mass media. For, if they were worthless, why are they still recommended as enteral or parenteral feeds for hospitalized patients by some of the most esteemed medical journals and textbooks? Of course, some would answer this question by stating that, unlike hospitalized patients, the outpatient population in the US is largely healthy, which precludes the need for multivitamin/mineral supplementation. How true is this comeback, though, that the US population is predominately healthy? To me, it seems that research suggesting that diabetes is epidemic, two-thirds of the population is overweight, and one-third is obese makes it clear that this comeback is based more on emotion and agenda rather than a careful and dispassionate examination of the current data.

If multivitamin/mineral supplements are not “worthless,” then why are they performing so poorly from an efficacy standpoint, in so many studies? To answer this question, I would like to go

back to my discussion from my February 2014 newsletter #263, on **MultiSelect™** and discuss Beethoven's 9th symphony and a typical orchestra that plays it. As we all know, many instruments are needed to play the symphony in the way we typically expect. In contrast, if only one or two instruments are playing, we most assuredly would point out that this is inadequate and not the way the symphony is supposed to sound. Can we say, though, that just because one or two instruments are inadequate to play Beethoven's 9th, these two instruments are “worthless?”

For me, claiming that multivitamin supplements are “worthless” because they cannot prevent or cure major diseases is just as ridiculous as claiming that two instruments in the symphony orchestra are “worthless” because they cannot play Beethoven's 9th symphony alone. Therefore, as I suggested in the February 2014 product newsletter #263, products like **MultiSelect™** can be highly efficacious when, as educated and conscientious clinicians, we take the time to qualify patients in terms of who would most benefit from their use.

Nevertheless, the above answer still leaves us in a quandary in terms of the following question that nutritionally oriented clinicians ask more than any other:

“Is there one product I can give to virtually all of my patients that is highly likely to lead to improvements in quality of life and disease prevention?”

Interestingly, at one time several decades ago, the answer to this question was, indeed, a multivitamin/mineral supplement. Why? To answer this question, we need to look at the reality of diet and lifestyle before World War II when the initial research and clinical application of multivitamin/mineral supplements first

began. What was different then compared to now? Consider the following:

1. Crisis care and pharmaceutical development was in its infancy compared to now. This, plus the fact that a significant portion of the population was exposed to cigarette smoke either primarily or secondarily, led to lifespans that are much shorter than what is seen today. In contrast, what we see today are people who are living longer but experiencing massive losses in quality of life as they age.
2. With the above in mind, acute, short-term stress situations tended to be the norm whereas today, certainly because of longer lifespans but other reasons as well, chronic, long-term stress tends to be the norm.
3. The lack of modern, “labor-saving” conveniences that became popular after World War II meant that during the 1930s and earlier, manual labor and daily physical activity was not only more common but vital to have a satisfying and productive existence.
4. The processed food industry was in its infancy. Granted, ingestion of refined sugar and breakfast cereals was and had been significant for several years. In addition, mass-produced frozen foods had been available since the 1920s. Nevertheless, widespread availability of the supermarket, convenience store, and fast-food restaurant was still several decades away. Therefore, I feel it is safe to assume that the macronutrient content of the American diet was much more balanced from a protein/carbohydrate standpoint and of much higher quality than what we see today. In contrast, given the lack of universal, year-round availability of fresh plant-based foods, mainly due to food transport and preservation technologies that cannot even begin to compare to what we take for granted today, micronutrient deficiency, particularly of alkaline minerals, vitamin C, and certain B vitamins, was widespread.
5. Modern, labor-saving conveniences were quite rare. Therefore, activities both on the job and at home involved much more

movement and muscle usage than what we typically see today.

In short, from a diet and lifestyle standpoint, while life was far from perfect, it looked fairly good based on our current norms. However, one notable exception stands out:

Deficiency of key micronutrients was widespread.

With the above in mind, it should not be surprising that the clinical results seen with the first multivitamin/mineral supplements before World War II were as phenomenal as the reports back then suggested.

What do we see today that differs from the above?

1. As I mentioned, because of advances in crisis care, pharmaceutical development, and decreases in smoking, people are living longer. However, accompanying long life, all too often, is a major decrease in quality of life.
2. All too often long life means long-term stress.
3. Lifestyles that promote optimal muscle mass and function are increasingly rare.
4. From a nutrient content and quality standpoint, the situation is virtually reversed from that which existed. Because of the massive increase in intake of processed, convenience foods, macronutrient quality and optimal protein/carbohydrate ratio has massively decreased. On the other hand, due to large scale ingestion of micronutrient supplements and an exponential increase in the ingestion of micronutrient fortified processed foods, micronutrient deficiency, (while still a concern) is not nearly as widespread and health-compromising an issue as it was when multivitamin/mineral supplements were first introduced and the first glowing clinical reports were issued in the 1930s.

With the above in mind, it should come as no surprise that multivitamin/mineral supplements today do not deliver the clinical outcomes that were noted when these products were first marketed to the public in the 1930s. However, similar to the violin that cannot play all of Beethoven’s 9th, can we say that just because

multivitamin/mineral supplements are not enough to deliver predictable positive clinical outcomes in the large majority of the population whose metabolic and biochemical imbalances are infinitely more complicated than that seen in the people who first started ingesting multivitamin/mineral supplements in the 1930s, then multivitamin/mineral supplements are “worthless?” I feel the answer is obvious. Therefore, it seems to me that both logic and good science dictates that, in relation to the needs of today’s metabolically and biochemically imbalanced population, we must view supplemental vitamins and minerals as merely a foundational place to begin in terms of creating a multinutrient product that is truly capable of attaining the goal of improvements in quality of life and disease prevention in a large segment of the population.

WHAT OVERRIDING METABOLIC CRITERIA SHOULD BE USED TO DETERMINE WHAT SUBSTANCES, BEYOND MICRONUTRIENTS, SHOULD BE INCLUDED IN THIS FOUNDATIONAL FORMULA?

Beyond the multivitamin/mineral base, what criteria can we use to determine what to include in this product whose goal is to provide tangible results for real people who need to cope with the realities of today’s world? While there are probably many good answers to this question, I feel one of the best, based on the studies I am about to present and the many studies I have already presented to you over the last 1-2 years, is optimization of muscle mass and function.

As the studies I have presented to you in newsletters, videos, and seminars over the last 3-4 years make clear, loss of muscle mass and function as is seen with sarcopenia is both prevalent and highly correlated with significant decreases in quality of life in a large portion of the American population. Interestingly, though, because most of the research on loss of muscle mass and quality is performed on older populations, sarcopenia is traditionally thought to be of clinical significance only in patients

over 50 years of age. In contrast, recent research is now demonstrating that in the large portion of our society that is overweight sarcopenia can be of concern at virtually any age.

In “Body mass index from age 15 years onwards and muscle mass, strength, and quality in early old age: Findings from the MRC National Survey of Health and Development” by Cooper et al (Cooper R et al. *J Gerontol A Biol Sci Med Sci*, published online 2014) the authors considered measurements of muscle mass and function in 1,511 men and women who had BMI measurements at 15, 20, 26, 36, 43, 53, and 60-64 years of age. As you will see in the quote below, high BMI even as young as 15 years of age is associated with adverse effects on muscle:

“Higher BMI from age 15 years was associated with lower odds of low appendicular lean mass but higher odds of low muscle quality...”

Therefore, it appears that we should be concerned about issues relating to muscle mass and function in virtually every patient we see no matter how young.

What about clinical presentation, though? Are there some conditions for which it is not necessary to address muscle mass and function? As you will see from the research I am about to present, the answer is clearly no. First, consider this quote from the study “Muscle contractile and metabolic dysfunction is a common feature of sarcopenia of aging and chronic diseases: From sarcopenic obesity to cachexia” by Biolo et al (Biolo G et al. *Clin Nutr*, published online ahead of print 2014):

“Sarcopenia, which includes muscle loss and dysfunction, is a common feature of virtually all chronic diseases with inflammation and involves impairment of either contractile, metabolic and endocrine functions of skeletal muscle.”

In addition, three of the nation’s most common diseases that lead many, if not most users of multivitamin/mineral products to make their purchase, all involve compromises in muscle quality and function.

Cancer

In “Importance of lean body mass in the oncologic patient” by Tsai (Tsai S. *Nutr Clin Pract*, Vol. 27, pp. 593-598, 2012) the following is stated:

“Low lean body mass is a predictor of adverse events among the elderly and patients with cancer. The evaluation of lean body mass may be a useful adjunct in managing patients with cancer and may improve patient selection for therapies through the identification of high-risk individuals and appropriate initiation of early supportive care.”

Furthermore:

“Some evidence suggests that lean body mass catabolism may be reversible...”

In a related study, Antoun et al (Antoun S et al. Impact of sarcopenia on the prognosis and treatment toxicities in patients diagnosed with cancer, *Curr Opin Support Palliat Care*, Vol. 7, No. 4, pp. 383-9, December 2013) state the following about chemotherapy toxicity and its relationship to muscle:

“Evidence for a strong link between sarcopenia and chemotherapy toxicity is increasing.”

Cardiovascular disease

In “Sarcopenic obesity and risk of cardiovascular disease and mortality: A population-based cohort study of older men” by Atkins et al (Atkins JL et al. *J Am Geriatr Soc*, Vol. 62, pp. 253-260, 2014) the authors state:

“Sarcopenia and central adiposity were associated with greater cardiovascular mortality and all-cause mortality.”

Diabetes

In a provocatively titled editorial by Landi et al (Landi F et al. Sarcopenia and diabetes: Two sides of the same coin, *JAMDA*, Vol. 14, pp. 540-541, 2013), the authors suggest that diabetes and loss of muscle mass are inextricably linked. Why? One of the main reasons and is that most insulin receptors in the body are in muscle. Landi et al elaborate:

“...the insulin resistance of skeletal muscle is probably the most important link between sarcopenia and diabetes. Insulin resistance is defined as a reduced response of target tissues, such as skeletal muscle, to insulin.

Muscle insulin resistance is considered to be the starting or key defect that is evident decades before β -cell failure.”

As we all know and, more importantly, the public knows due to publicity of many studies by the mass media, multivitamin/mineral supplements have performed poorly in relationship to prevention of the three very common ailments mentioned above. Could the reason be, as I suggested in my commentary above, multivitamin/mineral supplements will perform better concerning disease prevention if constituents are added that are designed to enhance and optimize muscle mass and function? I believe that a large volume of published research and anecdotal data make it very clear that the answer to this question is an emphatic yes. In turn, I also believe that, because it is, in essence a multivitamin/mineral product with added constituents such high quality protein, leucine and a research documented herb with significant anti-inflammatory properties, will demonstrate much better success with the goals that the typical multivitamin/mineral product was supposed to meet but, currently, rarely does.

How can I be so sure that use of **SarcoSelect™** will lead to increases in muscle mass? To answer this question, please consider the following study that forms the basis for the **SarcoSelect™** formulation.

THE RESEARCH BASIS FOR SARCOSELECT™ - “MUSCLE PROTEIN SYNTHESIS IN CANCER PATIENTS CAN BE STIMULATED WITH A SPECIALLY FORMULATED MEDICAL FOOD” BY DEUTZ ET AL

Before beginning my review and commentary of this important and fascinating study, it should be noted that **SarcoSelect™** is based upon but not identical to the experimental formulation employed (For example, the food in the study contained both whey and casein.

SarcoSelect™ only employs whey as a protein source). Therefore, while the experimental formulation is described in the study as a “medical food,” **SarcoSelect™** cannot be

described using the same designation. Rather, more accurately, **SarcoSelect™** should be referred to as a “functional food.”

In “Muscle protein synthesis in cancer patients can be stimulated with a specially formulated medical food” by Deutz et al (Deutz NEP et al. *Clin Nutr*, Vol. 30, No. 6, pp. 759-768, December 2011) 25 cancer patients aged 40 years or more were evaluated. They were divided into two groups:

“The experimental group ($n = 13$) received a medical food containing 40 g protein, based on casein and whey protein and enriched with 10% free leucine and other specific components, while the control group ($n = 12$) was given a conventionally used medical food based on casein protein alone.”

What were all the “specific components”? While there were several, one in particular deserves special mention – fish oil. Why? Deutz et al comment:

“In the presence of systemic inflammation, it appears to be extremely difficult to achieve whole body protein anabolism in cancer patients. It therefore seems that although food intake should be increased in cachectic cancer patients, gains in lean body mass are difficult to achieve unless specific metabolic abnormalities, like inflammation, are targeted.”

Fish oil, though, was not used in **SarcoSelect™** for one simple reason. Since the experimental food used by Deutz et al was in the form of a liquid, it was mechanistically very easy to add fish oil. In contrast, **SarcoSelect™** is in the form of a powder, making fish oil incorporation impossible. Instead, we employed a well-documented, effective, and unique anti-inflammatory herb— a specialized form of curcumin called Meriva®, a curcumin-phosphatidylcholine complex. I will discuss Meriva® in great detail in part II of this series, which includes a review of research on Meriva® along with comments on other key constituents of **SarcoSelect™**.

How were changes in muscle mass measured?

First, the patients were infused with a tracer isotope – $^{13}\text{C}_6$ -phenylalanine. Then by assessing

levels of the tracer, levels of muscle protein synthesis were ascertained:

“A muscle biopsy was performed 2 h after the start of isotope infusion and again at 5 h in order to determine the basal rate of muscle protein synthesis.”

The next quote describes the sequence of experimental food ingestion:

“Blood was taken from the sampling forearm catheter periodically for the determination of plasma phenylalanine enrichment (tracer/trace ratio). Immediately following the second muscle biopsy, one dose of the medical food (200 ml) was ingested, followed by a second dose (200 ml) 20 min after the first sip of the first dose. Each dose was consumed within 10 min. Blood samples were then drawn over the next 5 h. A third muscle biopsy was taken 300 min after the first sip of the first dose of the medical food. All muscle biopsies were taken from the same muscle via the same incision.”

Can the results of this short term quantitative study be extrapolated concerning the long term, quality of life effects of the experimental food?

Of course, this is an important question since this is our main concern from a clinical standpoint when recommending use of **SarcoSelect™**. Therefore, it is good to know that, according to Deutz et al, the answer to this question is yes:

“...we anticipate that acute stimulation of fractional rate of muscle protein synthesis (FSR) would translate to a sustained improved muscle function when such a medical food is consumed for a longer period.”

What were the results of the study?

First, consider the raw data:

“The cancer patients were in an inflammatory state, as reflected by high levels of C-reactive protein, IL-1 β , and TNF- α , but were not insulin resistant. After ingestion of the experimental medical food, plasma leucine increased to about 400 μM as compared to the peak value of 200 μM after the control medical food. Ingestion of the experimental medical food increased muscle protein FSR from 0.073 (SD: 0.023) to 0.097 (SD: 0.033 %/h ($p = 0.0269$)). In contrast, ingestion of the control medical food did not increase

muscle FSR; 0.073 (SD: 0.022) and 0.065 (SD: 0.028)%/h.”

Based on these findings the authors offer the following comment in the discussion section of their paper:

“Our results demonstrate that it is possible to stimulate muscle protein synthesis in catabolic cancer patients with involuntary weight loss with a specially formulated medical food, rich in leucine and protein. Cachexia is defined as a state in which muscle mass is lost at a rate greater than would be anticipated from reduced food intake alone. A corollary of this definition is that decreased responsiveness to the normal anabolic effect of a meal would be expected. Consistent with the expectation of decreased responsiveness in cachexia, our results show that a medical food with a composition in the same range as commercially available medical foods did not stimulate muscle protein synthesis.”

Two other portions of the discussion also deserve to be highlighted. First, concerning the leucine content of the experimental food, the authors state:

“Ingestion of leucine-enriched amino acid solutions rapidly and potently activates the mammalian target of rapamycin signaling pathway and protein synthesis in human skeletal muscle. This most likely explains the enhanced muscle protein synthesis that is observed when increasing the percentage of leucine in a meal. In particular, when leucine is added to a protein meal in elderly, the ability of the meal to stimulate protein synthesis is improved.”

With the above in mind, Deutz et al feel that the main reason the experimental food worked so well was the enhanced leucine content:

“The addition of an extra amount of leucine to a balanced amino acid composition improved the response above the level of the control medical food as observed in the present study.”

Do the authors feel that the anti-inflammatory effect of the added fish oil could partially account for the positive findings? Due to the short term nature of the study, probably not. However, they strongly feel that reducing inflammation via fish oil can be helpful in optimizing muscle protein synthesis:

“...ingestion of an EPA/DHA mixture potentially is a new approach to improving muscle protein synthesis. A recent study has confirmed an improved muscle protein synthesis by 8 weeks treatment with EPA/DHA.”

Deutz et al conclude their study by pointing out that the unique combination of constituents found in the experimental food, which is very similar to that found in **SarcoSelect™**, can have a very positive effect on muscle protein synthesis even in cancer patients for whom it has been traditionally thought muscle regeneration was difficult if not impossible:

“Our results demonstrated that when a medical food is optimized for protein, leucine, fish oil components, carbohydrates and fiber, muscle fractional protein synthesis rate can be stimulated. Therefore, the results of our acute study clearly show that absence of improvement of muscle protein synthesis in catabolic cancer patients with involuntary weight loss is related to the composition of the medical food and not to the unresponsiveness of muscle in these cancer patients, per se. In cancer patients, a specially formulated medical food can overcome the anabolic resistance to a conventional food supplement.”

If a formula similar to **SarcoSelect™** can have such a positive effect on muscle mass in very difficult cancer patients, just imagine what it can do for the vast majority of our patient population who are not cachectic but are suffering from varying degrees of muscle loss plus the clinical sequelae of that muscle loss!

Please contact us to learn more about **SarcoSelect™** and all it can do to assist in the optimization of muscle mass, muscle function, chief complaints, and overall quality of life in your patients. We are very excited about this new product!

Next month, I will comment on Meriva® and other key constituents of **SarcoSelect™**.

SarcoSelect™ - Moss Nutrition Select

Contents: 585 g (14 servings)