



➤ Product Review ◀

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A BIG PICTURE QUESTION TO BEGIN 2018 – WHAT IS THE MOST IMPORTANT YET UNDER APPRECIATED SUPPLEMENT?

INTRODUCTION

As we all know, the end of one year and the beginning of the next is traditionally a time where we reflect on where we have been and where we are going from a “big picture” perspective. As health care professionals who specialize in nutritional and/or lifestyle oriented approaches to improvement of health, primarily in individuals suffering from one or more chronic illnesses, I feel it is important to look back periodically and consider success from a large scale perspective. True, our most important determinant of success is and has always been our ability to assist our individual patients/clients in achieving their healthcare goals. How well are we doing? Over the past year, based on your feedback and the feedback from your patients who are purchasing Moss Nutrition Select supplements, we are doing quite well. Nevertheless, as I suggested above, I feel it is important for us to occasionally evaluate success from a societal chronic illness perspective. Is our success with patients making a significant dent in the overall nationwide chronic illness occurrence rate?

To answer this question I would like to present two sets of data. The first set comes from the RAND Corporation and its document entitled “Multiple chronic conditions in the United States,” which was published in 2017. The conclusions presented were based on the most recent data available (2008-2014). What the RAND Corporation found was the following:

“In 2014, 60 percent of Americans had at least one chronic condition, and 42 percent had multiple chronic conditions.”

Furthermore:

“These proportions have held steady since 2008.”

Finally, consider the following statistic that has particular relevance for us since we tend to treat middle-aged and older individuals:

“The presence of multiple chronic conditions increases with age for both genders.”

Specifically, according to the report, 50% of individuals aged 45-64 years and 81% of individuals aged 65 or older present with at least one chronic condition.

The second set of data comes from the Council for Responsible Nutrition and its 2014 survey. Of the many data points presented, the following to me were the most interesting:

- **“68% of all U.S. adults reported taking dietary supplements.”**
- **“74% of U.S. adults 55+ take dietary supplements.”**
- Of these populations the most common dietary supplement was the multivitamin/mineral. Of the individuals who reported taking dietary supplements, 75% reported taking a multivitamin/mineral product.

What were the least popular dietary supplements among supplement users? Among the lowest was protein, which only 10% of dietary supplement users reported taking.

Is there any significant relationship between the data presented by the RAND Corporation and the Council for Responsible Nutrition?

To me, there are three possible ways to answer this question. First, there may be no relationship whatsoever. Second, it could be concluded that since the incidence of chronic illness has been fairly high for older populations but somewhat stable during the time when it is probable that many, if not most of these individuals, were ingesting at least a multivitamin/mineral product, the findings could have been much worse without the supplement ingestion. However, for me, there is still a third, equally important way to answer this question. It could be concluded that chronic illness rates could have actually decreased over time if only an important but rarely used supplement were used more often.

In this “big picture” newsletter to begin the New Year, I would like to hypothesize that the third answer listed above is correct.

Furthermore, I would like to hypothesize that this rarely used supplement is protein.

MAKING THE CASE THAT LOSS OF MUSCLE MASS IS A MAJOR REASON WHY CHRONICALLY ILL PATIENTS ARE AILING AND WHY THEY RESPOND POORLY TO OTHER INTERVENTIONS.

Interestingly, our sales, which are primarily to chronically ill individuals and the practitioners who treat them, reflect the statistics indicated above. Multivitamin/mineral products are generally among our best-sellers and protein/amino acid products are among our lowest. In this newsletter, I am going to make an effort to convince you that, if the supplement sales and recommendations in your practice reflect these statistics, no matter how good your results are with your chronically ill patients, you will do better if you increase your recommendations of protein/amino acid-based products. Furthermore, given the simplicity and low cost of this recommendation, it is very likely this recommendation will improve the health of those people you casually encounter who are not directly involved in your practice, leading, quite possibly, to a decrease in the up

to now level occurrence rate of chronic illness nationwide that I pointed out above.

Of course, I realize that many of you at this point in this monograph may be thinking that what I am hypothesizing is little more than an unrealistic “pipedream” that wildly oversimplifies a complex scenario. Surely loss of muscle mass and its restoration can’t be *that important* to the resolution of chief complaints!! Therefore, to assist me in my effort to convince you, I am going to employ a recently written paper by one of the world’s leading authorities in the use of protein and amino acid supplements in the clinical setting, Robert R. Wolfe, Ph.D. For those of you who have been following my previous newsletters and lectures, this name may be familiar to you. As you probably know, I have been a strong advocate for increased use of protein/amino acid supplementation clinically for years and have often used Wolfe’s papers as a reference. His most recent paper entitled “The 2017 Sir David P Cuthbertson lecture, Amino acids and muscle protein metabolism in critical care” (Wolfe RR. *Clin Nutr*, published online ahead of print, December 21, 2017), for me, makes it clear that, for sick people, loss of protein, particularly in the form of muscle mass, is a major issue impeding successful recovery.

Before proceeding with my review and commentary of this paper, I would like to offer a clarification. As you may have noted, the title of the paper suggests that it only applies to critically ill patients, not chronically ill patients. As I have pointed out in many past newsletters, a large body of research makes it clear that the basic mechanisms leading to loss of protein and muscle mass are the same in both critically and chronically ill individuals, with the only difference being a matter of degree. In turn, the success with protein/amino acid supplementation pointed out by Wolfe in critically ill patients from another paper I will discuss can be successfully extrapolated to chronically ill patients. Therefore, I feel very confident that application of what Wolfe is recommending for critically ill patients will lead

to success with those many chronically ill patients who have both low dietary and supplemental protein intake.

The first quote from the Wolfe paper I would like to feature points out the futility of the high carbohydrate diet whether given therapeutically as noted by Wolfe or employed by patient personal choice in the outpatient, chronic illness situation:

“...adverse effects of excessive caloric intake, particularly in the form of glucose became evident. For example, we found that glucose given at rates in excess of caloric requirement stimulated fat synthesis in the liver...”

Therefore, as I mentioned, the theme of this paper is that, with sick individuals, it is generally advisable to increase intake of protein/amino acids.

What is it, specifically, from a metabolic standpoint that makes increased dietary protein and amino acids so important to recovery? This question can be answered by the following two quotes. First:

“Studies have confirmed that an increase in resting energy expenditure occurs in almost all forms of critical illness and injury.”

Thus, during sickness, the body will tend to metabolize more lean body mass to meet this need for increased energy. In turn:

“The primary focus of nutritional support should be the net loss of body protein.”

Are your chronically ill patients experiencing net loss of body protein? As I have suggested in the past, simple grip strength and bioelectric impedance measurements will prove that the answer is “yes” in many if not most of these individuals.

In the healthy individual, protein synthesis is higher than the rate of protein breakdown right after a healthy meal. However, between meals, during the “post-absorptive state,” the reverse is true:

“The rate of protein breakdown exceeds the rate of protein synthesis at the whole body level in the post-absorptive state in all

circumstances, including in normal subjects. Protein breakdown will always exceed the rate of protein synthesis in the post-absorptive state because the essential amino acids (EAAs) that are required for protein synthesis cannot be produced in the body. In the post-absorptive state the only source of EAAs is protein breakdown, and some of the EAAs released from protein breakdown are oxidized and thus not available as precursors for protein synthesis. The obligatory oxidation of some of the EAAs released from protein breakdown explains the negative protein balance in the controls values of 36 normal men and women...”

Therefore, as noted by this quote, between meals, no matter how healthy the individual or high quality the meal, there will always be a loss of body protein between meals because some of the amino acids need to be oxidized to provide energy to maintain optimal between meal functioning. However, as I mentioned, in the healthy situation this loss of body protein will be more than offset by the next meal.

However, what about the sick person mentioned above who has increased energy expenditure and increased breakdown of body protein, a condition that Wolfe describes as a “catabolic state”:

“Regardless of the catabolic state, there is a significant acceleration of whole body protein breakdown relative to the rate of synthesis in the post-absorptive state. On average, the net loss of body protein is approximately doubled in the catabolic state. The clinical management of catabolic patients must therefore place a high priority on maintaining the body protein pool with adequate nutritional and metabolic support to balance the potential adverse effects of a rapid loss of lean body mass.”

Are your chronically ill patients experiencing the doubling of the normal rate of protein breakdown noted by Wolfe above? Probably not. Nevertheless, research on chronically ill patients, particularly those who are middle-aged or older, suggests their catabolic rate of protein loss is still significant.

What is the impact of loss of body protein on chances for recovery? As I have suggested:

“The net loss of body protein can be so extensive in catabolic states that both acute as well as long-term recovery is adversely affected.”

What might be the best solution to loss of body protein? Wolfe states:

“...accelerated muscle protein breakdown, and not impaired muscle protein synthesis, drives the catabolic response. It would therefore seem logical to target suppressing the accelerated rate of muscle protein breakdown with nutritional and metabolic therapy.”

More information on why ailing individuals are more prone to loss of body protein

Recall from the text above that loss of body protein is a natural phenomenon between meals that serves to mobilize protein to other areas of need. However, in the healthy situation this is of no clinical significance since the next meal effectively repletes what was previously lost. Unfortunately, in ailing populations the protein losses are accelerated to the point where repletion is sometimes very difficult. The following quotes elaborate on the nature of this ebb and flow:

“There is normally a net breakdown of muscle protein and release of amino acids into the blood in the post-absorptive state. This response provides EAAs to tissues and organs that are so central to physiological function that even short periods of net loss of protein would have adverse consequences. When EAAs become available in the blood after consumption of dietary protein, the loss of muscle protein is reversed to replete what was lost in the post-absorptive state. The periodic loss and gain of muscle protein throughout the day is a normal physiological response. The accelerated loss in the catabolic state amplifies this normal response to provide a greater supply of EAAs for the functions required in the catabolic patient not normally encountered such as acute phase protein synthesis, wound healing and immune function.”

Before continuing please note again the last sentence of the above quote, particularly the phrase **“acute phase protein synthesis.”**

What are acute phase proteins? They are inflammatory mediators such as C-reactive protein. As we all know, the vast majority of our chronically ill patients demonstrate chronic inflammation as seen by elevated levels of C-reactive protein and other indicators such as white cell count, liver enzymes, etc. Where does the protein come from to create these increased levels of inflammatory mediators? As noted in the quote above, the source is muscle. Furthermore, if your chronically ill patient has increased need for wound healing or increased immune function due to infection (Lyme’s disease, etc.), protein will also be taken from muscle to serve this need. This is why your chronically ill patient will have accelerated loss of muscle mass to the point where it cannot be restored with the usual dietary intake. In addition, as suggested in the following quote, this accelerated loss of muscle mass will make it more difficult to resolve chief complaints no matter what the clinical presentation:

“The extent of loss of muscle mass in critical illness is related to poor survival and slow return to normal function after recovery.”

In short, the loss of muscle mass is an adaptive response that becomes detrimental when it goes on too long:

“...it is provocative to consider that the accelerated breakdown of muscle protein in the catabolic state is an initially adaptive response which becomes counterproductive over time as muscle mass is depleted.”

Furthermore:

“The distinction between the clearly adaptive nature of the *normal* daily loss of muscle protein in the post-absorptive state as compared to the accelerated loss of muscle protein in the severely catabolic state is that the normal loss of muscle protein is balanced by the net gain of muscle protein in the post-prandial state. The overall result of the normal cycling between periods of net loss and net gain of muscle protein is a relatively constant amount of muscle mass over time.

In the catabolic state, the rate of loss of muscle protein may be accelerated to the point where it becomes physiologically detrimental.”

Compounding the problem is the fact that, when the patient reaches a certain point of catabolic physiology, the body will start to become resistant to the anabolic effects of dietary protein:

“...there is a resistance to the ability of dietary protein to replete the muscle protein in the catabolic state.”

The net result is the following:

“Thus, what is a short-term adaptive response of muscle protein to the normal pattern of food intake becomes a liability in stressed patients who cannot maintain a balance between muscle protein synthesis and breakdown over the course of the day.”

The inability of sick people to restore muscle protein with the usual dietary protein intake is referred to as “anabolic resistance”:

“The failure of nutritional support to elicit the normal anabolic response is generally referred to as ‘anabolic resistance’. Anabolic resistance plays an important role in accelerated rate of loss of muscle protein in catabolic states.”

EVIDENCE THAT FEEDING PROTEIN AND/OR AMINO ACIDS WILL ASSIST IN THE OPTIMIZATION OF MUSCLE MASS

Is optimization of protein/amino acid intake in ailing individuals a solution to the accelerated loss of muscle mass? To answer this question, please consider another paper co-authored by Wolfe, “Proteins and amino acids are fundamental to optimal nutrition support in critically ill patients” (Weijs PJM et al. *Critical Care*, Vol. 18, No. 591, published online 2014). In the conclusion of this paper the authors state:

“...proteins and amino acids are fundamental to recovery and survival, not only to preserve active tissue (protein) mass but also to maintain a variety of other essential functions.

The scientific recognition of the importance of protein is growing, and although optimal protein dosing studies are not available, expert opinion supports administering in excess of 1.2 g/kg/day.”

Of course, as those of you who regularly treat chronically ill patients may have noticed, it can be very difficult to get the average chronically ill patient to ingest that amount of protein through diet alone. This is where protein and amino acid supplementation enters the picture. At the end of this monograph I will list the protein/amino acid products available from Moss Nutrition.

IS OPTIMAL PROTEIN INTAKE ENOUGH TO OPTIMIZE MUSCLE MASS IN AILING PATIENTS?

To answer this question I would like to go back to the Wolfe paper I first discussed. In this paper the following is stated:

“The information presented above leads to the conclusion that the catabolic response accelerates net protein breakdown to an extent that cannot be entirely reversed by nutritional support alone. Consequently, we have investigated a wide range of anabolic agents in the setting of severe injury. To be effective, a potentially anabolic agent must work in conjunction with optimal amino acid and protein nutrition...”

Wolfe then goes on to discuss only pharmaceutical anabolic agents. Do non-pharmaceutical anabolic agents exist that we can readily employ as nutritional practitioners? I will discuss two – one of which you are probably aware and another of which you may not be aware.

The first is exercise, which I would guess needs no elaboration here to convince you of efficacy. However, the other, because it is less well known in the nutritional community, probably deserves some elaboration.

Beta-hydroxy-beta-methylbutyrate (HMB) – an effective anabolic agent

Beta-hydroxy-beta-methylbutyrate (HMB), which is found in our muscle support product **SarcoSelect**, is discussed in the paper “Beta-hydroxy-beta-methylbutyrate supplementation and skeletal muscle in healthy and muscle-wasting conditions” by Holecek (Holecek M. *J Cachexia, Sarcopenia and Muscle*, Vol. 8, pp. 529-541, 2017). What is HMB?

“Beta-hydroxy-beta-methylbutyrate (HMB) is a metabolite of the essential amino acid leucine that has been reported to have anabolic effects on protein metabolism.”

Is it effective in optimizing muscle mass in ailing individuals who are losing muscle mass? As you will see from the following quote, it is, as long as it is combined with exercise:

“Studies have demonstrated that HMB can prevent the development of sarcopenia in elderly subjects and that the optimal action of HMB on muscle growth and strength occurs when it is combined with exercise.”

Of course, I realize that the reality of treating chronically ill patients is that motivating them to exercise is often difficult. Therefore, please keep in mind that what I have suggested concerning the use of HMB and optimum protein amino acid intake in your chronically ill patients is not an “all or none” phenomenon. While exercise will optimize their impact, hopefully I have convinced you that, even without exercise, clinical outcomes will improve, even in your very difficult to manage chronically ill cases, when optimal protein intake through diet and supplementation is employed. Furthermore, the results seen with dietary and supplemental protein can be enhanced with the use of HMB which, as I mentioned, is a constituent of **SarcoSelect**.

SOME FINAL THOUGHTS

Throughout most of the history of the clinical nutrition movement, default thinking when considering supplementation for an ailing individual has been in terms of vitamins and minerals. Similarly, for the reasonably healthy individual who wants to stay healthy and is, therefore, requesting a supplemental “insurance

policy” as it so often has been described, vitamins and minerals are generally what first comes to mind for both patients and practitioners. Has this “vitamins and minerals first” policy towards supplements served patients and the public well over the years? In terms of quality of life concerns, I would guess that the general consensus would be yes, as suggested by not only our sales of vitamin and mineral supplements but sales nationwide. However, there is another disturbing trend that I feel is growing at an exponential rate that provides a powerful argument against a “vitamins and minerals first” approach to supplemental recommendations for everyone. To me, it suggests a need to not eliminate the “vitamins and minerals first” approach but to expand it to include, as the data above points out, another supplement all too rarely considered.

As the statistics reported above suggest, more and more people who regularly ingest vitamin and mineral supplements are or will be experiencing chronic health complaints. Does this mean vitamin and mineral supplementation is worthless, as inferred by many critics? For me, the answer is no. As more than a violin is needed to play Beethoven’s 5th symphony, there is no question, based on a large body of research, that more is needed for many of today’s chronically ill patients than vitamins and minerals. What might be the most foundational, most under-appreciated supplement that is needed to complement vitamins and minerals for this population? I hope I have convinced you that, based on the research presented above, that supplement is protein/amino acids.

As I mentioned in the beginning of this monograph, my goal to begin this New Year is to convince you that, for many people you encounter, your first thought concerning supplementation should not be vitamins and minerals but vitamins, minerals, **and protein/amino acids**. I look forward to your thoughts as to whether I have succeeded.

***FOUNDATIONAL
PROTEIN/AMINO ACID-BASED
PRODUCTS AVAILABLE FROM
MOSS NUTRITION***

Proteins:

Product Name	Servings per container	Grams of protein	Grams of added leucine	Grams of HMB
SarcoSelect (Whey Protein)	14	13	2	1.5
SarcoSelect DF (Pea protein)	14	13	2	1.5
Select Meal Vanilla (Whey)	14	19		
Select Meal Chocolate (Whey)	14	19		
Select Meal DF Vanilla (Pea protein)	14	18		
Select Meal DF Chocolate (Pea protein)	14	18		
Select Whey Unflavored	30	23	3.4	
Select Whey Vanilla	30	23	3.3	
Select Whey Chocolate	30	21	3	
Organic Select Pea Unflavored	20	20		
Organic Select Pea Vanilla	20	20		

Amino Acids:

Product Name	Servings per container	Serving Size	Grams of leucine	Notes
AminoSelect 120 VC	30	4 capsules	1.2	9 essential amino acids
Leucine Powder	30	1 scoop	2	Take with a protein-rich meal.