



⇒ Product Review ⇐

February, 2018 #310

HOW & WHEN TO SUPPLEMENT PROTEIN TO GET THE BEST RESULTS

Last month, to start the new year, I did my best to convince you that, with your middle-aged or older patients demonstrating any sort of chronic ailment, the best place to begin supplementally, (given that the vast majority are already ingesting a multivitamin/mineral supplement), is with protein. This month I would like to discuss some practical application issues related to getting the best result in terms of increasing muscle mass when giving protein supplementation. This discussion will be based on recommendations made in two recently published studies. The first is “Supplementing breakfast with a vitamin D and leucine-enriched whey protein medical nutrition drink enhances postprandial muscle protein synthesis and muscle mass in healthy older men” by Chanet et al (Chanet A et al. *J Nutr*, Vol. 147, No. 12, pp. 2262-71, December 2017) and the second is “Protein ingestion before sleep increases overnight muscle protein synthesis rates in healthy older men: A randomized controlled trial” by Kouw et al (Kouw IWK et al. *J Nutr*, Vol. 147, No. 12, pp. 2252-61, December 2017). I will also highlight some thoughts made in a commentary on these two papers, “Muscle protein synthesis and muscle mass in healthy older men” by Tome (Tome D. *J Nutr*, Vol. 147, No. 12, pp. 2209-10, December 2017). The first quotes I would like to feature from these papers point out the need for increased protein in aging individuals.

Loss of muscle as a public health problem and the role of dietary protein in its resolution

The following quotes from the Tome paper summarize much of what I stated last month in terms of the nature of the problem and the role of diet in its resolution:

“The age-related loss of skeletal muscle mass and function is a major public health problem. These changes have been attributed to the blunted anabolic sensitivity of the response of muscle protein to protein intake due to a disruption in the regulation of muscle protein turnover and the imbalance between protein synthesis and breakdown. Sarcopenia, the age-related pathological loss of skeletal muscle mass and muscle function, is largely related to an impaired sensitivity of muscle protein synthesis to postprandial anabolic stimuli induced by amino acids, insulin, and other protein metabolism-related nutrients and hormones.”

Concerning dietary interventions, the author states:

“Not only the quantity and the quality of protein and nutrient supply matter but the pattern of protein and nutrient distribution between meals and over the day is also important in improving protein synthesis and muscle mass. Different studies have shown that the consumption of multiple meals with adequate high-quality protein content more adequately stimulates muscle protein synthesis and is positively associated with muscle protein synthesis, lean mass, and muscle performance.”

Why do aging patients need more protein?

To answer this question first consider this quote by Kouw et al:

“Age-related changes in skeletal muscle mass are attributed to a disruption in the regulation of muscle protein synthesis and breakdown rates. Protein ingestion stimulates muscle protein synthesis and forms an important

factor in maintaining skeletal muscle mass over the lifespan. The ingestion of 20 g protein increases muscle protein synthesis rates by ~75% in young individuals, whereas ~40g protein seems to be required to allow a similar postprandial rise in muscle protein synthesis rates in the older population.”

Before continuing, please note again from the above quote that, to obtain similar gains in muscle mass, older individuals need to ingest twice as much protein compared to younger individuals.

The next quote I would like to feature from this paper points out a fact I have discussed repeatedly over the years – supplemental protein works better when some additional leucine is added:

“Besides ingesting larger amounts of protein, fortifying lower amounts of protein with free leucine has been shown to increase postprandial muscle protein synthesis rates.”

The following quote from the Chanet et al paper supports what was stated above:

“Sarcopenia, the age-related loss of skeletal muscle mass and function, is partly the result of an impaired activation of postprandial muscle protein synthesis by anabolic stimuli [i.e., amino acids (AAs) and insulin]. In addition to increasing daily protein intake, nutritional strategies on providing an adequate amount of protein per meal and using high-quality protein with readily available essential AAs (EAAs) and high leucine content.”

A specific meal-based supplemental program to improve muscle mass in the elderly

Traditionally, supplemental protein to improve muscle mass has been provided at meals. The study I am about to review by Chanet et al provides a specific dietary supplemental program that not only includes protein but vitamin D and extra leucine. In this study, 24 healthy men aged 71 ± 4 years were evaluated. Of these 24, the test group received a drink containing 21 g of leucine enriched whey protein, 9 g carbohydrates, 3 g fat, and 800 IU cholecalciferol (vitamin D3) before breakfast for

six weeks. The rest received a placebo. The test drink contained a total of 3 g leucine derived from both the whey protein and added leucine. The duration of the experiment was 6 weeks.

Concerning vitamin D, please note the following:

“The mean 25-hydroxyvitamin D concentration was low in the study population at baseline. Similar to other studies supplementing with vitamin D, we observed a noticeable improvement in the plasma 25-hydroxyvitamin D concentration. After supplementation for 6 wk, the mean exceeded the recommendation for older adults of >50 nmol/L.”

However, was the test supplement successful in the primary objective, improving muscle protein synthesis? The authors state:

“This ‘proof of principle’ study showed that the acute postprandial muscle protein synthesis response in healthy older men almost doubled when breakfast was supplemented with a vitamin D and leucine-enriched whey protein medical nutrition drink. Moreover, the test group gained appendicular muscle mass after 6-wk supplementation, with a predominant gain in leg lean mass.”

In our Moss Nutrition line the product that provides quality protein, extra leucine and vitamin D3 is **SarcoSelect**, which we provide in both whey- and pea-protein based formats.

Can protein supplementation be effective when provided at other times of the day besides meal time?

As I mentioned, meal time has traditionally been regarded as the best time for patients to ingest supplemental protein. However, the reality of older patients who may have digestive and appetite issues often dictates that there may be compliance issues with protein supplementation at meal time mainly because of the simple fact that quality protein is quite filling. Because of this, it may be ideal for many older patients to ingest supplemental protein away from meals. Can ingesting supplemental protein away from meals be effective in terms of

improving muscle protein synthesis? This question was answered by the above mentioned study by Kouw et al.

In this study 48 healthy men aged 72 ± 1 yr were assigned to one four groups: 40 g casein, 20 g casein, 20 g casein plus 1.5 g of crystalline leucine, or placebo. Ingestion occurred one time only before bedtime. What were the results in terms of muscle protein synthesis? Only 40 g protein was more effective compared to placebo:

“Ingestion of 40 g protein before sleep increased overnight muscle protein synthesis rates compared with the placebo treatment. Ingesting a smaller (20 g) dose of protein, with or without additional leucine, did not significantly increase overnight muscle protein synthesis rates compared with the placebo intervention.”

Of course, from a patient compliance standpoint, you may be wondering about two key issues. First, was sleep affected in any way? As you will see in the following quote, there was no difference between the groups:

“The treatment groups were similar in bedtime, get-up time, sleep onset latency (the time between bedtime and falling asleep), sleep duration (in hours), and sleep efficiency (percentage of sleep duration expressed as a percentage of time in bed)...”

Second, was hunger or satiety adversely affected in the morning? The authors state:

“There were no differences between groups in the...hunger and satiety scores taken before protein ingestion or after the overnight period before ad libitum breakfast ingestion...”

With these results in mind the authors concluded:

“Protein ingested before sleep is properly digested and absorbed throughout the night, providing precursors for myofibrillar protein synthesis during sleep in older men. Ingestion of 40 g protein before sleep increases myofibrillar protein synthesis rates during overnight sleep. These findings provide the scientific basis for a novel nutritional strategy to support muscle mass preservation in aging and disease.”

As we all know, while supplemental protein can be extremely important in improving the health of chronically ill patients, compliance can sometime be difficult to attain, especially in the elderly, when the time of ingestion is limited to meals. Therefore, knowing that protein supplementation away from meals can also be effective in terms of stimulating muscle protein synthesis can give us options so that patient compliance will be less of a limiting factor.

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

Proteins

SarcoSelect (Whey)

SarcoSelect DF (Pea protein)

Select Meal Vanilla (Whey)

Select Meal Chocolate (Whey)

Select Meal DF Vanilla (Pea protein)

Select Meal DF Chocolate (Pea protein)

Select Whey Unflavored

Select Whey Vanilla

Select Whey Chocolate

Organic Select Pea Unflavored

Organic Select Pea Vanilla

Amino acids

Amino Acid Select

L-Leucine