

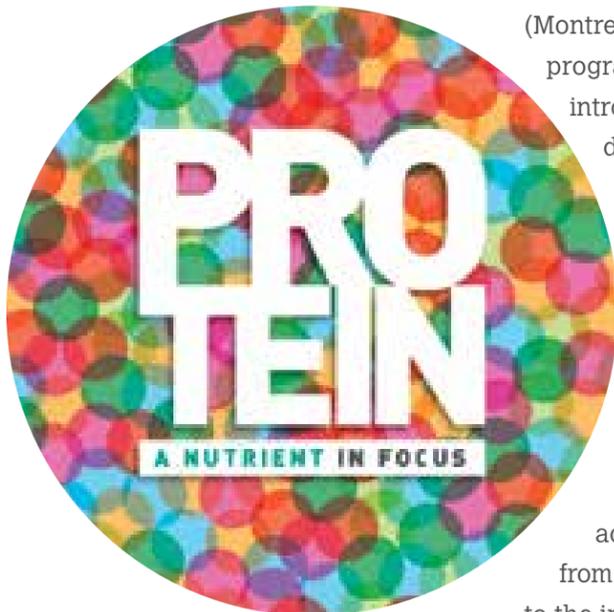
SYMPOSIUM REPORT

This is a report on one of the four Symposia held in Edmonton, Toronto, Montreal and Moncton

SYMPOSIUM 2013 NUTRITION AND HEALTH

Dairy Farmers of Canada (DFC) held its 13th annual symposium in December 2013. Building on the tradition from previous years, internationally-respected speakers were invited to present thought-provoking nutritional research and insights in separate events in Edmonton, Toronto, Montreal and Moncton.

As in previous years, the four half-day events attracted a loyal following of dietitians and other health professionals with a passion for nutrition. Two of the four events were also accessible via webcast for those who could not attend the live events.



Moderated by registered dietitians Douglas Cook (Edmonton and Toronto) and Paule Bernier

(Montreal and Moncton), the program began with a brief introductory talk by DFC director of nutrition

Isabelle Neiderer, who noted the worldwide interest in protein and touched on the macronutrient's wide-ranging health benefits.

The featured speakers addressed issues ranging from daily protein requirements to the increasingly recognized role of protein in healthy aging and weight management. A demonstration of user-friendly protein-rich recipes rounded

out the presentations, leaving audiences with fresh ideas for reinforcing protein-rich foods to their clientele.

The following report highlights the presentations and includes selected questions from the Q&A period that followed.

This meeting coverage from Dairy Farmers of Canada Symposium is printed as a service to health professionals.

Watch the Symposium Webcast at

dairynutrition.ca/symposium

WELCOMING REMARKS



Isabelle Neiderer

Director of Nutrition
Dairy Farmers of Canada

Why focus on protein this year?

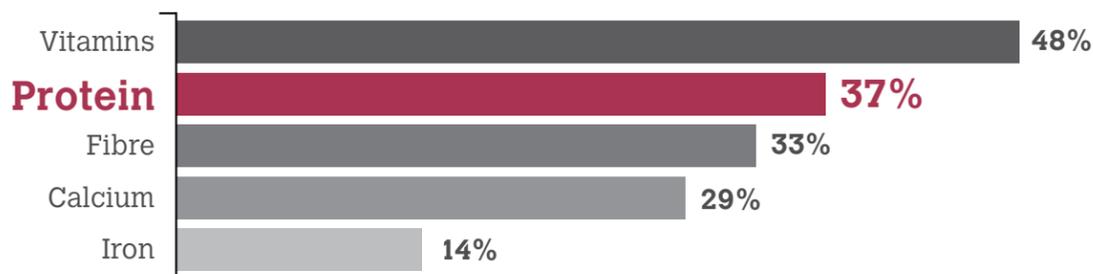
"Research is revealing that protein may have more benefits than previously believed," said Neiderer. Not only does protein—particularly dairy protein—maintain and improve bone health, she said, but it can also improve body composition and induce satiety, thus serving as an important weapon in weight management.

According to Neiderer, protein has moved up the collective health agenda. "People are looking for more protein in their diets and are concerned about not getting enough," she said. A 2011 DFC online survey brings home the point: As shown in the graph, 37 percent of survey respondents expressed more concern about their protein intake than about calcium, iron or even fibre.

Protein hasn't escaped food manufacturers' notice, either. "They've responded to the demand with an abundance of protein-based or protein-fortified products," said Neiderer. In fact, 19 percent of the new products launched in the U.S. in 2012 had protein-related claims.

Consumers looking for more protein

(% respondents*)



Survey question: Thinking about the nutritional content of food, what, if anything, are you most concerned about getting enough of?
*DFC Ongoing Nutrition Tracking, 2011

That's why "media sources such as the *Wall Street Journal* view protein as the new buzzword to help sell food."

For many of us, protein conjures images of steak or roast ham. "Only one in 10 consumers report turning to eggs, poultry and dairy products to meet their protein needs," Neiderer confirmed. What's more, "Consumers who use whey powder for added protein don't always realize that whey comes from milk." Adding to the confusion, public health guidelines (e.g., MyPlate

in the US) sometimes list dairy separately from protein.

The health benefits of milk products extend beyond protein, said Neiderer. That's why it makes sense to "encourage consumers to get at least some of their protein from dairy—especially if the alternative is processed foods." Unfortunately, lack of consumer awareness has led to what Neiderer described as an unfortunate health gap: "The vast majority of Canadians don't consume enough milk products," she said.

A 2011 Food and Agriculture Organization (FAO) report which describes a new, accurate method to assess the quality of dietary protein argues that

“the match between dietary supply and human protein needs is vital to support the health and well-being of human populations.”



Rajavel Elango, PhD
Assistant Professor
School of Population and Public Health
University of British Columbia

PROTEIN REQUIREMENTS

The word protein is derived from the Greek word—*proteos*, which means “of primary importance.” “It’s an apt term, because protein is a critical component of our diet,” said Dr. Elango. That’s because “protein is part and parcel of all our cells.” Proteins play a role in virtually every cell function, from storage to transport to speeding up chemical reactions. Antibodies, enzymes, and hormones are all proteins. Dr. Elango defined dietary protein requirements as “the amount of protein you need to eat to maintain the body and—in the case of children—to grow.”

Proteins are constructed from a set of 20 amino acids. Some of them, called “essential amino acids,” need to come from the diet because the body can’t manufacture them on its own. The remaining amino acids are split into conditionally essential—because they need to come from diet in populations such as neonates, or in disease; and non-essential amino acids—because our body can make them. But Dr. Elango takes issue with the term—non-essential amino acids. “Our body still needs all the 20 amino acids to make protein,” he explained.

Protein-deficient diets are almost certain to be generally nutrient-poor diets... and also often associated with other environmental factors that can adversely influence health.

Protein and Amino Acid Requirements in Human Nutrition, WHO Technical Report, 2007

Protein sources that contain all the essential amino acids in the correct balance are called complete proteins—a category that includes milk products and eggs. By contrast, soy protein has a relative deficiency of methionine and wheat protein is low in lysine. Dr. Elango expects that the next 10 years will see “a lot of attention paid to the quality of the proteins we consume.”

Of course, quantity also counts. Dr. Elango noted the distinction between Estimated Average Requirement (EAR), the intake level that covers the needs of half the population, and Recommended Dietary Allowance (RDA), which covers the needs of 97 percent of

the population. “This doesn’t mean the RDA represents a high ceiling on intake,” he hastened to add. “It’s actually a minimum requirement.”

One might think that the RDA value for protein would be settled by

YEAR	ORGANIZATION	RDA/safe intake*
1936	League of Nations	1
1957	FAO	0.66
1965	FAO/WHO	0.89
1973	FAO/WHO	0.57
1985	FAO/WHO/UNU	0.75
2005	DRI	0.8
2007	FAO/WHO/UNU	0.83

*Grams per kilogram of body weight per day

Adapted from Skov AR et al. IJO 1999;23:528.

now, but Dr. Elango said the figure continues to shift. As he put it, “We can put a man on the moon, but we can’t come to a consensus of how much protein to give him on Earth.” In the 1970s, when the public tide turned briefly against protein, “The official protein requirements decreased significantly,” said Dr. Elango, adding that “the changes were based on politics rather than science.” Studies have clearly shown that “the 1973 figure wouldn’t meet the requirements for adult men.”

Traditionally, protein intake recommendations have been derived from the nitrogen balance method. A key building block of protein, nitrogen “practically equates to protein in some people’s minds,” said Dr. Elango. As such, scientists have assumed that when nitrogen is balanced—that is, when nitrogen intake minus nitrogen loss equals zero—the body has met its need for protein.

It’s an elegant concept, but not without problems. For one thing, Dr. Elango said it takes up to seven days for urinary nitrogen excretion to reflect dietary protein intake. What’s more, “Nitrogen losses occur from many sources other than urine, including hair and breath,” he said. “The nitrogen balance method doesn’t take these other losses into account.” To further muddy the waters, “It’s a challenge to get accurate measurements on either side of the equation.” Finally, many RDA calculations have ignored the results of studies with a positive nitrogen balance, which typically involve a high-protein diet.

According to Dr. Elango, these sources of error have the net effect of underestimating our protein needs.

Reasoning that they needed to use a different pathway to define protein requirements, Dr. Elango and his colleagues turned to the Indicator Amino Acid Oxidation (IAAO) method.¹ Originally developed to determine amino acid requirements in growing pigs, the minimally invasive method has recently gained currency in humans. Dr. Elango described IAAO as “robust, rapid and reliable,” making it possible to determine amino acid and protein requirements in vulnerable populations such as infants, pregnant women, the elderly, and people with diseases.

The method rests on the concept that “when one indispensable

For women aged 80 and over, Dr. Elango arrived at an EAR of 0.85 and an RDA of 1.15, and landed on similar figures for women aged 65 to 85. This means current recommendations are 30 percent lower than they should be. (He is currently conducting similar studies in older men.) In step with the greying of the Canadian population, Dr. Elango predicts a surge in nutrition studies with elderly subjects. “It’s especially important to ensure that elderly women get adequate protein, given what we know about the high risk of protein deficiency in this group,” he said.

Dr. Elango also documented a significant and stage-specific increase in the protein needs of pregnant women: an EAR of 1.2 in early gestation (11 to 20 weeks) and 1.5 in late gestation (30 to 38 weeks). Once again, these figures exceed the current EAR of 0.88. None of this surprises Dr. Elango, who noted that “the growth of the fetus results in extra protein deposition.”

Dr. Elango said these findings could have important implications for hospital nutrition services, homes for the elderly, and global programs combating malnutrition. In the meantime, he called for “a serious discussion about protein recommendations at various stages of the life cycle.”

	RECOMMENDED PROTEIN BASED ON DRI 2005 (GRAMS/KG/DAY)	RECOMMENDED PROTEIN BASED ON IAAO (GRAMS/KG/DAY)	% OF TOTAL CALORIES BASED ON IAAO
ADULTS			
EAR	0.66	0.93	about 10%
RDA	0.80	1.2	about 13%
CHILDREN			
EAR	0.76	1.3	about 9%
RDA	0.95	1.55	about 10%
ELDERLY WOMEN			
EAR	0.66	0.85	
RDA	0.80	1.15	

amino acid is lacking, protein synthesis will not occur appropriately and amino acids will be oxidized,” he explained. Boosting the intake of the lacking amino acid decreases the oxidation, reflecting increasing incorporation of amino acids into protein. The EAR is the intake at which oxidation levels off, the RDA two standard deviations higher.

The IAAO method has led experts to revise some individual amino acid requirements, and Dr. Elango hopes that protein intake guidelines will come to rely on the method. Based on his studies to date, he said current recommendations underestimate protein requirements in adults and elderly women by as much as 30 percent.^{2,3} “We’ve come full circle,” he noted. “It turns out the 1936 figures weren’t far off the mark.” Extending his analyses to children, Dr. Elango has found that current recommendations are 70 percent lower than they should be for 6-to-10-year-olds.⁴

- References**
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 2. Elango et al. *Curr Opin Clin Nutr Metab Care* 2008;11:34.
 3. Rafii et al. *Faseb JB* 2013;27:1075.
 4. Humayun et al. *Am J Clin Nutr* 2007;995.

SUMMARY

- Current protein recommendations appear to be underestimated by ~ 30% for adults and elderly women and 70% for children
- The currently used nitrogen balance method underestimates human protein requirements
- The reliable and non-invasive IAAO method estimates protein requirements more accurately
- Vulnerable populations, such as the sick and the elderly, may derive particular benefit from increasing protein intake



Douglas Paddon-Jones, PhD

Professor
Department of Nutrition and Metabolism
University of Texas Medical Branch

A few years ago, Dr. Paddon-Jones asked himself a question: “*What would happen if we gave people simple, high-quality protein food?*” He and his research team gave subjects a 100-gram serving of lean beef and, over the next four hours, measured their response to the protein-rich meal. “*We saw a robust improvement in protein synthesis,*” he reported. Particularly encouraging was that a similar surge occurred in young and elderly adults. “*This suggests that aging doesn’t impair our ability to turn dietary protein into muscle.*”

Dr. Paddon-Jones then turned his attention to an equally fertile question: “*How much protein do we need, and when?*” Curious to find out whether boosting protein intake could spur the body to increase protein synthesis, he gave young adults a 12-ounce portion of beef and asked them to clean their plates. The results showed a clear pattern: Up to a protein intake about 30 grams (in one meal), muscle protein synthesis increased in lockstep with consumption. “*After the 30-gram threshold muscle building and repair levelled off,*” Dr. Paddon-Jones explained.¹ What this means is that “*you don’t need mountains of protein. Moderate protein consumption gives muscles all the fuel they need.*”

Not surprisingly, skimping on protein comes at a cost to the muscles. “*When we reduced protein intake from 30 to 15 grams [in one feeding] in young people, muscle protein synthesis dropped by half,*”

said Dr. Paddon-Jones. Repeating the experiment in an older population, he learned that “*the drop is much more precipitous in this group.*”² In other words: a young adult may get away with eating only 14 grams of protein in a meal, but an older one will pay for it with a steep drop in muscle buildup and maintenance.

To incorporate this research into our eating habits, Dr. Paddon-Jones said we may have to rethink the Western style of eating. While total protein consumption in western

The 30/30/30 rule

“If you’re going to eat 90 grams of protein in a day, you’ll get the greatest bang for your buck by distributing it evenly between your meals: 30 grams each for breakfast, lunch and supper.”

Dr. Douglas Paddon-Jones

countries may well reach 90 grams over three meals, “**The distribution is skewed. Breakfast is usually a carb-based meal, while dinner tends to be a protein extravaganza.**” For example, a bowl of oatmeal—a common western breakfast—yields only about 10 grams of protein. “*Particularly for an older adult, this falls significantly short of the amount needed to maximize protein synthesis.*” At dinner, meanwhile, our typical western

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eater may polish off a steak containing 55 grams of protein—25 grams more than he can use for protein synthesis at that time.

The obvious solution, said Dr. Paddon-Jones, is to **distribute daily protein intake more evenly.**³

Move it or lose it

Then there’s exercise. Young or old, human muscles get a boost from activity. When Dr. Paddon-Jones had his subjects exercise around the time they ingested protein, “*They showed an extra 50-percent increase in protein synthesis—at all ages,*” he said. This reinforced the age-old message: Eat well and move.

According to Dr. Paddon-Jones, exercise packs a particularly strong punch when paired with the 30/30/30 rule. “*While it’s best to exercise within an hour or two of eating protein, people who balance protein intake throughout the day don’t need to worry about timing as much, because they always have protein on board,*” he said. By the same token, “*While exercise at any time is good, you may not experience the full benefits of a morning exercise routine if you wait until the afternoon to consume protein.*”

Avoiding movement altogether does the muscles a still greater disfavor. In one of Dr. Paddon-Jones’s studies, young adults on strict bed rest lost more than a pound of leg muscle over 28 days. To make the research

more clinically relevant, he put a group of older patients (average ~70 years) on bed rest for 10 days—the typical length of stay in a community hospital. “*The result was horrifying: they were losing two to three times as much muscle as the younger population.*”⁴ This is not to say that the inability to exercise dooms people to muscle atrophy. “*We found that dietary supplementation with amino acids helps combat muscle loss during inactivity,*” said Dr. Paddon-Jones. “*This could have implications for rehab.*”

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2. Katsanos CS et al. *Am J Clin Nutr* 2005;82:1065.
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SUMMARY

- Ideally, people should consume about 30 grams of protein at each meal
- Exercising within one or two hours of consuming protein yields the greatest boost in protein synthesis
- Age does not impair the body’s ability to use dietary protein to build muscle
- After a threshold of 30 grams in a meal, muscle protein synthesis levels off
- A moderate protein consumption meets muscles’ anabolic needs

PROTEIN IN THE KITCHEN



Stephanie Clairmont MHS, RD

Demos for Dietitians

Theory plays only a background role in Stephanie Clairmont’s approach to nutrition education. “*Both Adam and I teach nutrition through real food,*” said Clairmont by way of introduction to Demos for Dietitians, a company that she co-founded with fellow dietitian and culinary expert Adam Hudson. When educating her clients, Clairmont finds it helpful to use familiar foods loved by all (such as pasta) and to modify recipes to suit individual preferences. “*Otherwise people get stuck on the fact that they don’t like blueberries,*” she joked.

Without further ado, Clairmont proceeded to the “meat” of her presentation: three protein-rich recipes that meet the top two criteria for food-loving consumers on the go: convenience and taste. The simplified recipes appear below.

Yogurt parfait 18 g protein per serving Prep time 10 minutes, 4 servings	Chicken quesadilla 35 g protein per serving Prep time 8 minutes, 4 servings	Sweet Pepper Beans & Broccoli Pasta 31 g protein per serving, prep time 15 minutes, 4 servings	
<p>1 cup (250 mL) rolled oats ¼ cup (50 mL) chopped nuts (and/or seeds if preferred) 2 tbsp (30 mL) ground flax seeds 3 cups (750 mL) 2% plain yogurt 3 tbsp (45 mL) brown sugar 1 tsp (5 mL) vanilla extract 2 cups (500 mL) sliced fruit</p> <ol style="list-style-type: none"> 1. Over medium heat, toast oats and nuts in a skillet, stirring until golden. Transfer to a bowl and let cool. Stir in flax seeds. 2. In another bowl, whisk together yogurt, sugar and vanilla. 3. Layer oat mixture, yogurt mixture and sliced fruit into four tall glasses or containers with a lid. Seal or cover with wrap and refrigerate for 8 hours to 2 days. 	<p>8 small whole-wheat flour tortillas 6 oz (175 g) Brie cheese, thinly sliced 2 cups (500 mL) shredded cooked chicken (can substitute mashed chickpeas if preferred) 1 cup (250 mL) shredded baby spinach 1 sweet pepper, sliced into thin strips 1 apple, thinly sliced Olive oil or butter for cooking</p> <ol style="list-style-type: none"> 1. Divide the cheese into 8 portions. Place one portion of cheese on half of each tortilla. Top with chicken, spinach, pepper, apple, and another cheese portion. 2. Fold uncovered half of tortillas over filling and press gently to seal. 3. Place a skillet over medium heat and add a little olive oil or butter. Place one tortilla at a time in the pan and cook for 2 minutes until browned. Flip and cook the other side for 2 additional minutes. 	<p>300 g pasta (fusilli or your favourite) 4 cups (1 litre) broccoli, diced 2 tbsp (30 mL) butter ¼ (50 mL) cup finely chopped shallot or onion ½ (2 mL) tsp chili pepper flakes 2 cloves garlic, minced</p> <ol style="list-style-type: none"> 1. Cook pasta in salted boiling water until al dente. Add broccoli in last 3 minutes of cooking. 2. Meanwhile, melt butter in a saucepan over medium heat, then add onion and chili flakes. Cook 2 minutes, then add garlic and cook for 2 more minutes. 3. Add flour and stir for 1 to 2 more minutes, until mixture starts turning golden brown. Gradually whisk in milk, stirring constantly. Add peppers and continue whisking until the mixture boils. 4. Reduce heat and simmer, whisking frequently until the sauce thickens, about 5 minutes. Season with salt and pepper as desired. 5. Drain pasta and broccoli and toss with sauce. Top with cheese and serve immediately. 	<p>2 tbsp (30 mL) white flour 2 cups (500 mL) milk 1 red bell pepper, finely sliced 2 cups (500 mL) red or white kidney beans, drained and rinsed ½ cup (125 mL) Provolone cheese, grated</p>



Angelo Tremblay, PhD
Professor, Department of Kinesiology,
Laval University

Just as several factors play a role in obesity, several approaches can help surmount it. “Recent literature reviews have documented the role of protein in obesity management,” said Dr. Tremblay. The reason? For one thing, “We know that protein is more satiating than other macronutrients.” Thus, “A higher-protein diet combined with a reduced caloric intake might help people lose weight without feeling hungry.”

How does this work? As Dr. Tremblay explained it, proteins put the brakes on carbohydrate metabolism, resulting in improved glycemic stability and prevention of mild hypoglycemic episodes. Protein consumption may also help keep ghrelin, the appetite hormone, in check.

Yet another reason protein can help combat weight gain: “Compared to carbohydrates and fat, protein induces greater thermogenesis,” said Dr. Tremblay. When we eat protein, our bodies use 25 to 30 percent of those calories to process the macronutrient. By contrast, we use only 2 to 3 percent of ingested calories to process fat, and 5 to 20 percent for carbohydrates.

A study from the University of Copenhagen has yielded some of the strongest evidence for the fat-busting properties of a higher-protein diet. The simple, elegantly designed study had obese individuals follow either a high-protein diet (25 percent of calories) or normal-protein diet (12 percent of calories) for 6 months.¹

[Note: the high-protein diet had a lower carbohydrate content than the normal-protein diet, and both diets had the same fat content.]

During the study, the high-protein group experienced “a significant decrease in spontaneous eating,” said Dr. Tremblay. By the end of the study, the high-protein group had

VARIABLE	HIGH-PROTEIN DIET	NORMAL-PROTEIN DIET
Protein intake (% cal)	25	12
Carbohydrate intake	45	58
Fat intake	30	30
Energy intake (kcal/day)	1,195	1,482
Change in body weight (kg)	-8.9	-5.1
Change in fat mass (kg)	-7.6	-4.3

Adapted from Skov AR et al. *IJO* 1999;23:528.

lost 8.9 kilos—about 75 percent more than the normal-protein group. The study group also lost 77 percent more fat mass than the control group.

After weight loss comes maintenance. It’s at this stage that many people eventually fall off-track, for the simple reason that “people tend to burn less energy and feel hungrier after substantial weight loss,” said Dr. Tremblay. As it turns out, protein can help prevent weight regain. A 2005 study brought home this point: after losing weight, subjects following a high-protein diet regained only a modest amount of weight over

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12 months—2.9 kg (about 6 pounds) less than a control group.²

To make matters still more interesting, a high-protein diet appears to control weight most effectively when paired with carbohydrates with a low glycemic index (GI).³ On the flip side, Dr. Tremblay cited evidence showing that “low protein and high-GI carbs

While Dr. Tremblay has found “no compelling evidence that one protein source promotes more weight or fat loss than another,” he maintains that not all protein sources are created equal. Milk products, for instance, contain not just protein, but calcium and other nutrients.

Calcium has been found to promote weight loss, especially when consumed in dairy products.⁴ It is possible that dairy products activate metabolic pathways that help people feel fuller.

As for the future, Dr. Tremblay predicts more research into the effect of gut bacteria on mood and eating behaviours. It’s theoretically plausible that altering the composition of the gut microbiome—by probiotic supplementation, for example—will help people stay away from the doughnuts, he said. “The gut-brain axis is an area that deserves our attention.”

References

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SUMMARY

- Research shows that protein can help people manage obesity and maintain weight loss
- A higher-protein diet can help people feel less hungry and thus eat less
- In healthy individuals, a higher-protein diet does not pose a risk to the kidneys

Panel Discussion

Following the presentations, the featured speakers addressed a range of thought-provoking questions from live and webcast participants. The following questions and answers were selected for their general interest.

Rajavel Elango

Question 1: How do obese people, who have more fat and less lean body mass, use the protein they consume?

Answer 1: Obesity doesn’t automatically mean less lean body mass. In fact, obese individuals often have more. In addition, protein does more than preserve lean body mass: it also induces satiety, which makes it a useful weight management tool for obese people.

Question 2: When increasing the proportion of protein in the diet, is it better to reduce carbs or fats to compensate for the extra protein?

Answer 2: A bit of both would be ideal.

Stephanie Clairmont

Question 1: How can you modify your recipes for lactose-intolerant people?

Answer 1: Tolerance can vary a lot, so you need to individualize your advice. For people who can tolerate small amounts of lactose, yogurt and cheese, which are usually well-tolerated, can be suitable options. There are also several lines of lactose-free dairy products. When recommending dairy alternatives such as plant-based beverages, it’s important to ensure that patients get adequate protein.

Question 2: Do you offer cooking demonstrations for the public?

Answer 2: Over 500 dietitians have completed our Demos for Dietitians programs. If you connect with me, I can let you know who in your area might be teaching classes.

Douglas Paddon-Jones

Question 1: How might you individualize the 30/30/30 protein requirements for various body weights and types?

Answer 1: Rather than a hard and fast rule, I advise common sense. I would suggest that most individuals aim for a protein content of at least 20 grams per meal. An older woman, however, might realistically aim for 15 to 20 grams in each meal. We need to balance protein requirements with the risk of gaining fat.

Question 2: Can a grazer, who eats small meals and snacks throughout the day, achieve optimal protein synthesis?

Answer 2: We’ve actually tested this. When we had subjects consume protein in a grazing pattern, we found their protein synthesis reverted to baseline after 90 minutes. So it seems more advantageous, from a protein synthesis perspective, to focus on three or four main meals.

Angelo Tremblay

Question 1: You mentioned a study in which people lost weight on a higher-protein diet. How can you know whether it’s the extra protein that caused the weight loss, rather than a corresponding reduction in carbohydrate intake?

Answer 1: We’re always dealing with this type of limitation in clinical trials. That’s why we look to other research, such as population or animal studies, to corroborate our hypotheses.

Question 2: You mentioned that protein and exercise work best in combination. What type and duration of exercise would most effectively help dietary protein do its job?

Answer 2: Intuitively, I would suggest that everything counts. Walking the dog is better than doing nothing. Ideally, activities that engage the skeletal musculature should be paired with activities that increase heart rate. A walking program coupled with two weekly sessions of resistance training has worked well in our studies.



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