

Protein:

Opening the Door to Dairy's Opportunity



Dairy Management Inc.™

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Executive summary

Protein is an essential dietary component, and sufficient intake is crucial for a healthy and balanced diet. Today, consumers are slowly becoming increasingly aware of and knowledgeable about the benefits of protein in the diet, recognizing the important role it plays in helping manage hunger, sustain energy levels and maximize performance.

This white paper examines consumer attitudes, behaviors and trends around protein intake, how proteins are perceived and consumed, and what protein-based innovation opportunities exist to leverage new nutrition science highlighting the broad health benefits of high-quality proteins.

The opportunity for protein

In both developing countries and mature economies, there are opportunities for dairy products and ingredients to increase their share of the growing market for dietary protein.

In developing markets, increased wealth is enabling higher protein consumption, especially of animal proteins. This drives increased demand for dairy imports, which, combined with constraints on production capacity, is expected to create a demand gap that U.S. exporters are well-positioned to fill.

In mature markets, several broad trends are creating growth opportunities for products high in protein, and dramatic shifts in the relative contribution of different food groups to overall protein intake — most notably the tremendous growth in poultry — suggest that the dynamics of the protein market will continue to evolve.

Dairy offers a number of consumer-relevant benefits that potentially provide a competitive advantage over alternative sources of protein. These inherent benefits can put dairy in a strong position relative to its substitutes:

- Dairy has high credibility and consumer trust as a rich source of nutrients that's "good for my body."
- It provides critical nutrients that most consumers are not getting enough of, including more than half their daily intake of calcium and vitamin D, for only 10 percent of daily calories.
- It contains high-quality protein, a potential advantage over plant-based sources like soy.
- Whey in particular may hold promise given its strong showing in scientific research on the benefits of dietary protein as well as for its broad applicability in a variety of products — but it is a relatively small segment, and unfamiliar to most people.
- In addition to strong consumer perceptions of dairy's functional benefits, dairy enjoys high marks for taste — a potentially significant advantage.

Implications

- Solidifying U.S. Dairy exporters' role as consistent suppliers for international buyers could open doors for substantial growth in developing markets.
- The U.S. market also holds possibilities for growth, but substantial investment in marketing and innovation will probably be required to tap into that potential. The "de-commoditization" of poultry may provide a useful model for dairy.
- The competitive set for dairy protein is extremely broad, and dairy is not a top-of-mind source of protein — but its inherent advantages could be the basis for compelling marketing.

Consumer trends and insights related to protein

Consumers are slowly becoming increasingly aware of and knowledgeable about the benefits of protein in the diet, recognizing the important role it plays in a variety of desirable end-benefits. Muscle-related benefits dominate the list of attributes consumers generally associate with protein, along with energy and maintaining healthy bones and joints. Protein-involved consumers connect protein more strongly than other people to three benefit areas: Satiety and weight loss, increasing lean muscle mass and muscle recovery after exercise, and healthy aging; however, importantly for the industry, dairy is not yet strongly associated with protein in

consumers' minds.

Four key trends provide potential platforms for growth:

- The “mainstreaming” of less meat-centric diets
- The need for weight management and satiety
- The rise in demand for exercise and performance nutrition
- The needs of an aging population that’s looking to stay active

All of these trends present growth possibilities for dairy protein. A recurring theme emerges throughout the consumer research, however, that could limit growth across every one of these potential platforms. Although dairy is loved for its taste and respected for its nutrition credentials, it is not top of mind as a source of dietary protein.

Implications

The connection between dairy protein and the possibility for increased satiety, better athletic performance and healthy aging needs to be strengthened — the opportunity for marketing communication and education is great, especially for whey protein.

- Strong recognition of dairy’s nutrition benefits suggests that marketing in support of dairy protein need not overcome any real barriers — just a lack of salience.
- If the connection between dairy and protein can be made stronger, dairy’s great taste and strong nutrition credentials give it an inherent competitive advantage over other protein sources.
- In order to broaden usage, especially for performance nutrition, dairy almost certainly will need to customize its messages and, perhaps, its products.
- Health and fitness professionals can be allies, but they will not be skills: Strong scientific support for genuine benefits is key.

Protein nutrition and health — benefits, messages and claims

As nutrition-conscious consumers increasingly recognize the nutrition and health benefits of protein, there are opportunities to leverage scientific research on its broad health benefits to promote the high-quality protein from dairy. Labeling and marketing claims through a variety of channels can help consumers recognize how dairy products and ingredients can help them achieve their personal goals.

DMI has conducted extensive consumer research on claims to identify language with strong appeal, and also provides links to regulatory resources and federal guidance for industry members who are considering using claims as part of their marketing communication. Several of the tested claims are directly applicable to the key consumer trends summarized above.

Implications

- Product claims may be a useful tool for increasing the saliency of dairy products as a source of protein, and educating consumers about the benefits of dairy protein.
- Companies interested in making claims about nutrition and health benefits will find a wealth of information at [Dairy Research Institute](#) on USDairy.com.

Protein background and discussion of intake recommendations

Proteins are important components of the human body and are constantly being broken down and replaced. Adequate intake of protein is critical to repair proteins throughout the body.

While the typical American diet meets minimum daily requirements for protein, most people are consuming protein at rates that fall on the low end of the Acceptable Macronutrient Distribution Range (AMDR) recommended by the Institute of Medicine.

A growing body of scientific research indicates that some people may benefit from higher protein intakes: athletes and individuals who exercise regularly, people who are looking for ways to help manage their weight and older Americans.

Implications

- Two of the three consumer cohorts who might benefit from higher protein intake — aging boomers and people who need to lose weight — make up a large proportion of the population, suggesting that the opportunity for growth could be sizable.
- People who might benefit from additional protein may not know it, because recommended minimum amounts are more widely publicized than the wide range of nutritionally acceptable amounts, including those in the AMDR. Communication probably will be needed to offset that balance.

Protein background and discussion of intake recommendations

Research on the potential benefits of protein, and dairy protein in particular, is an ongoing focus for the dairy industry. In addition to scientific research on protein's potential effect on the health and well-being of different consumer cohorts, substantial work is being done to broaden the flexibility and range of applications for dairy protein ingredients.

Emerging research suggests two areas of opportunity for dairy protein to offer important benefits, if hypotheses are confirmed. Increasing usage throughout the day, especially at breakfast, may help with both satiety and building muscle, and protein intake greater than the RDA may be of value to older consumers.

Dairy proteins can be successfully used in a multitude of applications, and innovative new processes are enabling even broader uses. Dairy proteins can be used to address consumer needs in both developing and mature markets, whether to improve basic nutrition or to offer specific functional health benefits. Emerging technologies for dairy will give food and beverage manufacturers more flexibility for creating protein-enhanced products across a broad array of applications and flavor profiles, to better meet differing nutritional needs and consumer preferences around the world.

Implications

- Real people have real needs — for strength, flexibility and satiety, as well as taste, variety and convenience — that we believe high-quality dairy protein may help them meet.
- To optimize dairy's potential role in improving people's lives, we need to learn more: Continuing to explore hypotheses about dairy protein's effect on athletic performance, satiety, weight management and healthy aging will be critical to that effort.
- Improved ingredients and processes are already opening the door to potentially significant new product innovation using dairy proteins, and continued process innovation will fuel even greater opportunities for product innovation.

The opportunity for protein

This section provides a brief overview of the global and domestic markets for protein, gives a look at the broad competitive frame for protein-containing foods beyond dairy and outlines potential competitive advantages for dairy proteins in particular.

Global markets — developing markets

Size and growth of the global dairy market

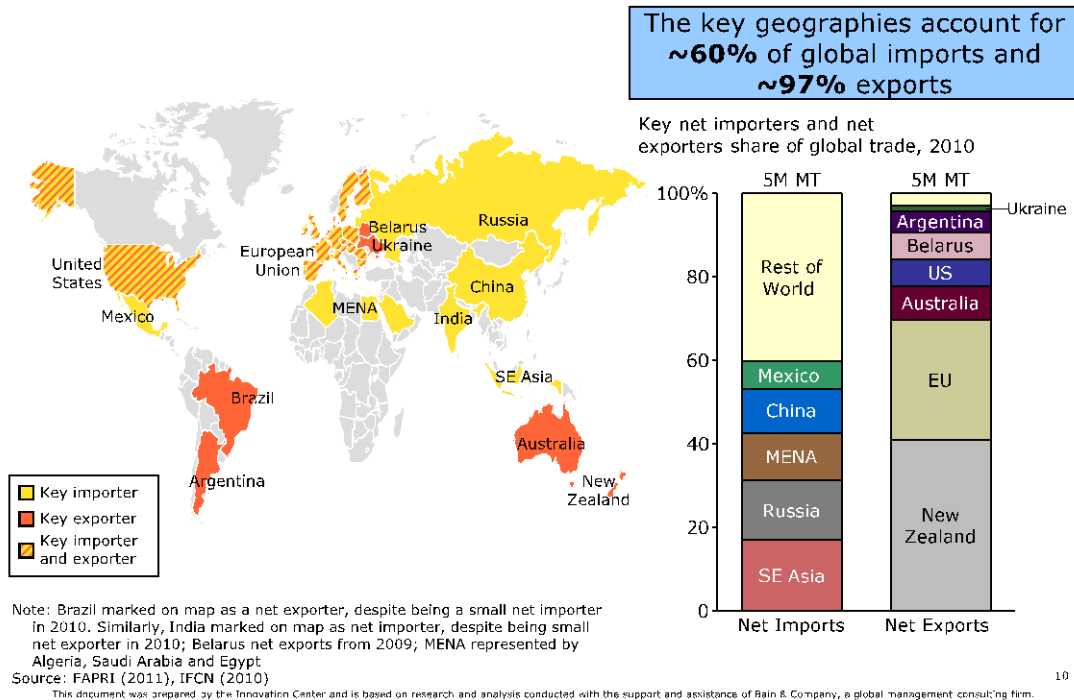
The global market for protein is large and still emerging as developing countries make continued economic progress and are able to enjoy more protein-rich diets as a result. The opportunity for dairy growth in these developing markets almost certainly exceeds growth potential in established markets like the U.S. and Europe, based on findings in a recent analysis commissioned by DMI.¹

The market for dairy protein is already significant and is likely to grow: Annual raw milk production around the world in 2009 was estimated at 455 million metric tons (about a trillion pounds). And although production

slowed in 2008 and 2009 — driven by a nearly four-point decline in the growth rate for global trade that in turn put a damper on prices — those trends are beginning to reverse: The growth rate of demand for dairy rebounded to 10.5 percent in 2009 and 2010, and prices have somewhat recovered.

The global import/export market for dairy comprises a little less than 5 million metric tons, or about 11 billion pounds, of nonfluid dairy products. This represents a small percentage of total worldwide dairy production (currently nearly 600 million metric tons) and consists mostly of cheese, butter, whole milk powder (WMP), skim milk powder (SMP) and whey.ⁱⁱ Five key geographies account for roughly 60 percent of global dairy imports, and seven account for almost all global exports (Figure 1).

Figure 1
Major Dairy Import and Export Geographies

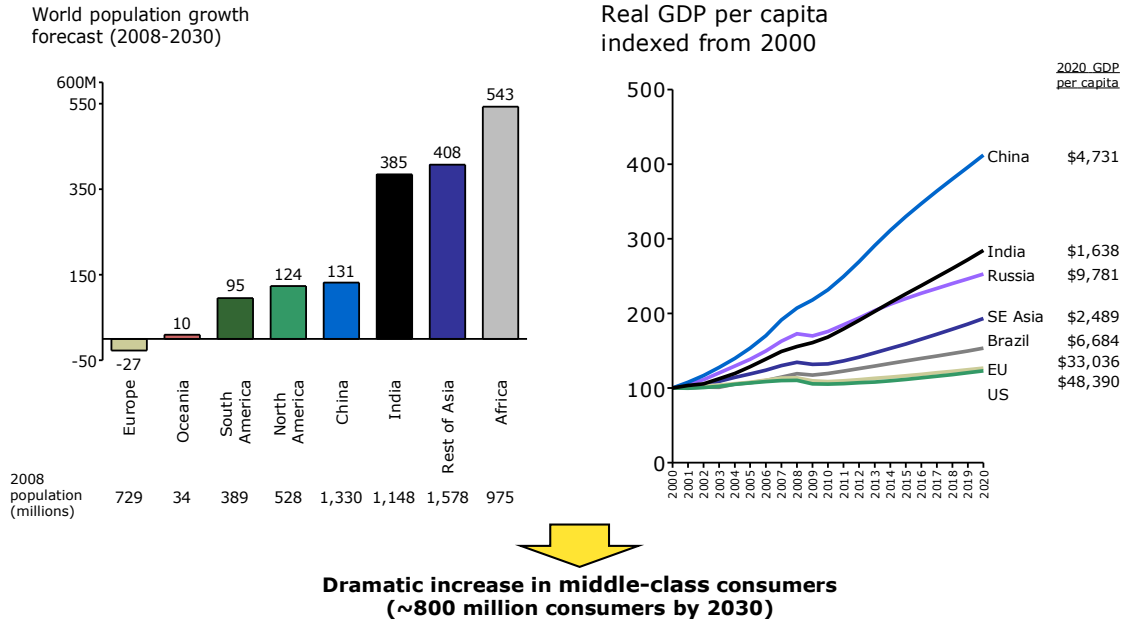


Net dairy exports are dominated by New Zealand and the European Union (EU), which together account for about two-thirds of total dairy exports. Australia, the United States (US), Belarus, Argentina and the Ukraine together contribute most of the remaining one-third of total exports. Brazil and India, though large countries with average per capita milk consumption, currently make up only a small percentage of the total dairy import/export trade (1 percent of 0.4 percent of 2009 exports, respectively).

Growth drivers

Global demand for dairy products is expected to grow, driven by rising populations, greater wealth and increasing consumption of dairy-based protein in developing nations. International census projections call for significant population growth in Africa, India and the rest of Asia, with more modest growth in China and the Americas. But populations are expected to decline in the EU. At the same time, real per capita gross domestic product (GDP) is expected to increase dramatically in China, India, Russia and South East Asia — with a two- to four-fold rise in wealth projected by 2020 (Figure 2). This shift may represent a significant opportunity for dairy.

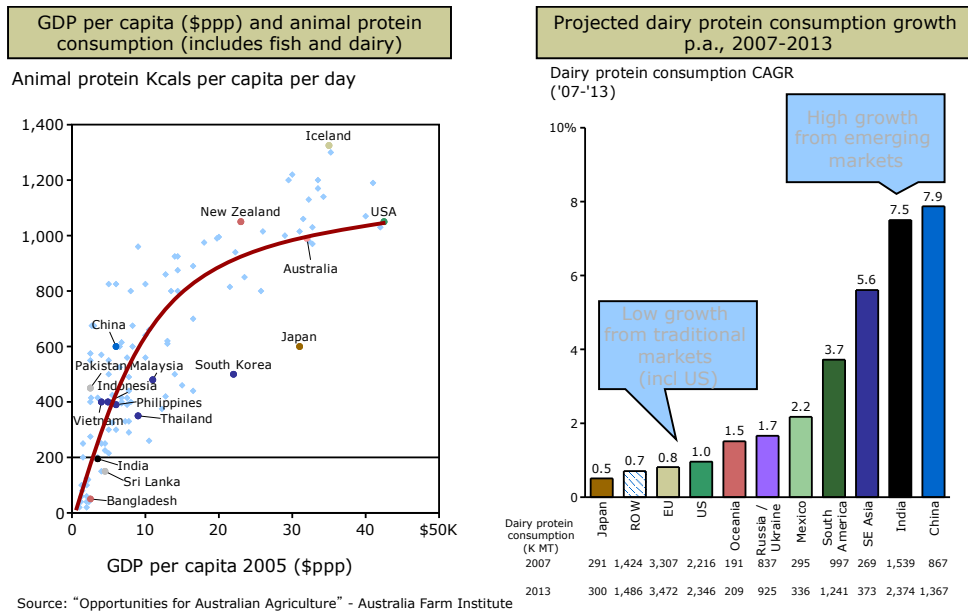
Figure 2
Population and GDP Projections For Emerging vs. Developed Economies



Source: US Census Bureau international database

As wealth increases in developing countries, so does protein consumption — and as countries become richer, animal sources of protein (both meat and dairy) begin to make up a greater proportion of people’s intake. That growth begins to level off when per capita GDP reaches about \$15,000 (Figure 3). As a result, emerging markets such as India, China and Southeast Asia are projected to see high growth in dairy consumption over the coming years, so that long-term demand for dairy products should remain strong. But more developed markets, including the United States and European Union, are expected to experience more modest growth.

Figure 3
Animal Protein Consumption as GDP Increases, Projected Dairy Growth



DMI's analysis of the international dairy marketⁱⁱⁱ predicts over the next several years, demand for dairy protein will exceed supply in several of these large and developing regions, especially China, India and Southeast Asia, so that these countries will become, or will continue to be, net importers of dairy protein.

The analysis also suggests traditional sources of supply are constrained and will not be adequate to meet the expected growth in demand — both because domestic production capacity in developing countries is unlikely to increase quickly enough, and because key exporting countries have limited headroom for increasing production.

Domestic dairy production in the key developing markets is expected to fall short of growing consumption, for several reasons. China's production was hurt by the melamine crisis in 2008 and 2009, and its current industry structure makes large production increases unlikely without major investments in large, industrial farms. Southeast Asia has increased milk production more quickly than expected, but local production still covers less than one-tenth of consumption. In India, supply has also not kept up with demand, so although India's import market is currently inaccessible to U.S. exporters, its growing need for imports may create opportunities for the United States elsewhere in the world.

At the same time import demand grows, some key dairy-exporting countries will struggle to overcome inherent constraints on production and are predicted to be unable to meet the burgeoning demand in developing nations. Production in New Zealand, the biggest exporter today, is expected to grow at a compound annual rate of about 2 percent until 2020, but flatten out after that. Its trade minister has reportedly stated that as consumption of dairy grows, they will be able to increase our exports, but there is no possibility of their feeding the Asian middle class. Australia's production also is expected to grow, but ultimately will be constrained by limited water, frequent bad weather and little potential to improve yields. Recent setbacks in Brazil and the Ukraine suggest that significant production increases in those countries may be years away from becoming reality. And though a handful of European Union countries may see significant increases, overall European Union production also is projected to grow at only modest rates.

The upshot is that there will be a sizable window of opportunity for globally traded dairy products in the near- to medium-term, with a latent demand gap of greater than 6.5 to 7 billion pounds between global import demand and available supply, which could open a finite but real window of opportunity for U.S. dairy exporters, according to the *Dairy Globalization Refresh: 2011 Update*. A significant portion of this opportunity will lie in delivering on the *protein* needs of customers globally. But there are some challenges to be considered.

Global industry challenges

Most of the countries that are currently net importers are undertaking efforts to increase domestic production, and as a result the governments of several have tightened restrictions on import trade. India's and Russia's policies essentially block U.S. imports, and the current state of regulations in China and Mexico also create barriers. Political unrest in MENA is a concern, though reforms could ultimately spur economic growth and therefore opportunity for dairy imports there. These barriers are admittedly difficult to control, but should be acknowledged.

There are also challenges internal to the industry that could dampen export growth opportunities. A survey of global dairy buyers from key importing countries found that many express desire for a change in the way U.S. exporters approach global trade. These buyers assert that in order to develop a robust trade relationship U.S. importers would need to make a commitment to providing a predictably stable supply, backed up with longer-term contracts, and also would need to work to align their product portfolios with global ingredient specifications.

All that having been said, global dairy buyers have expressed a real need for alternative sources of supply, and have affirmed that they believe the United States is well-positioned to meet that growing demand.

If key external and internal industry challenges can be successfully resolved, the opportunity for growth in U.S. dairy exports is significant.

Summary

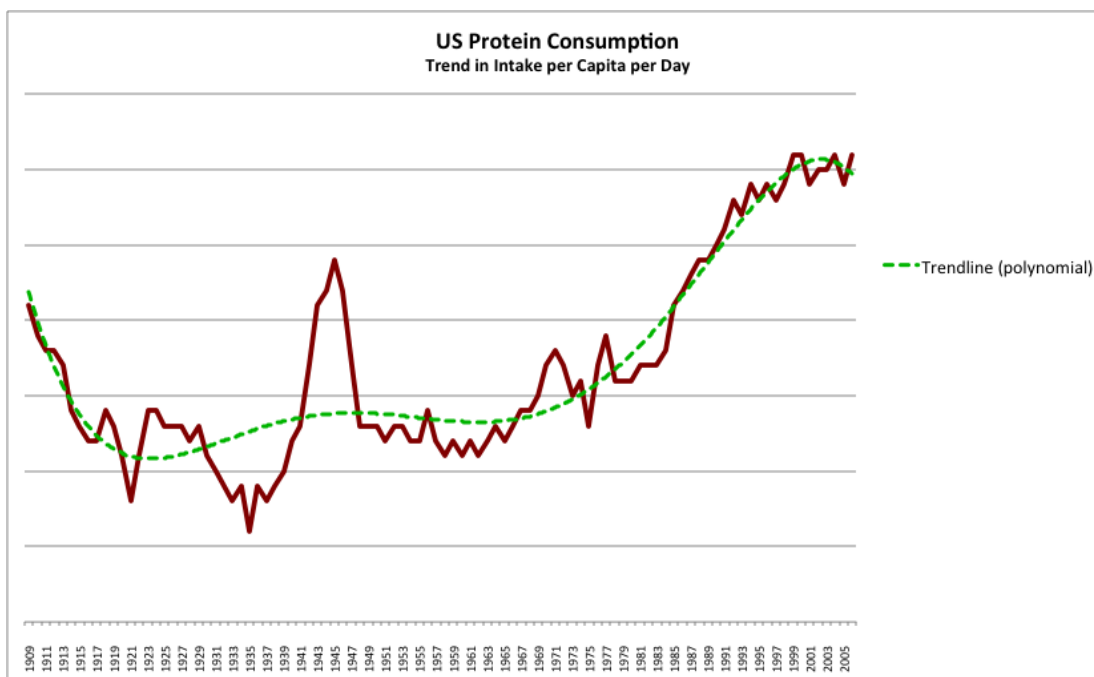
- The global market for dairy is large and expected to grow, and several factors are converging to create a sizable opportunity for U.S. dairy exports.
- Having mostly recovered from economic setbacks in 2008 and 2009, global dairy consumption is increasing, and conditions point to sustained growth in demand for dairy imports, primarily in emerging markets.
- At the same time, traditional sources of supply are constrained and are expected to fall short of projected demand, creating a gap.
- This projected gap between demand and supply is likely to be wider than originally anticipated, and represents a potential growth opportunity for the U.S. dairy industry, but some barriers must be addressed to enable that growth.
- Global buyers have expressed a need for alternative sources of supply, and have affirmed that the U.S. is well-positioned to meet this need.

U.S. domestic market — mature markets

Size and growth of the domestic market for protein

The average American consumed on average 111 grams of protein each day in 2006, about 10 percent more than in 1909, when the USDA first began tracking nutrient intakes. Dairy makes up nearly 20 percent of that. After several decades of relative stability (with a blip upward in the mid-'40s), overall protein consumption in the United States began to grow modestly but steadily in the latter part of the 20th century, with a compound annual growth rate of 1 percent between 1976 and 2006 (Figure 4).

Figure 4
U.S. Protein Consumption Trend

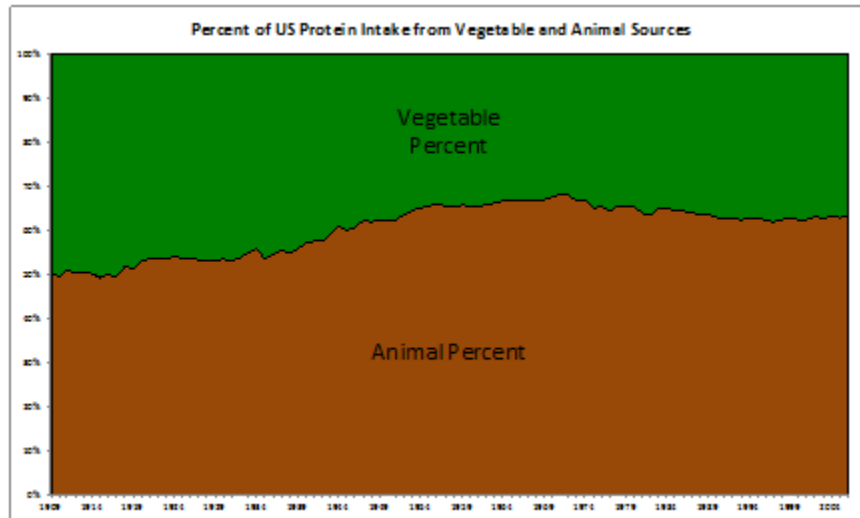


Source: U.S. Department of Agriculture, Agricultural Research Service. 2010. USDA National Nutrient Database for Standard Reference, Release 23. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>

Until the middle of the 20th century, the proportion of U.S. protein consumption coming from animal sources grew — from half of total protein to nearly two-thirds — as wealth increased and the middle class came to dominate. That 65/35 animal-vegetable ratio largely stabilized in the '50s and '60s, as the bulk of the American population achieved a comfortable standard of living (Figure 5).

This shift in the balance of dietary protein contribution from vegetable to animal sources in the U.S. is modest by comparison to what we see developing nations. For example, the amount of total protein in China’s diet has more than doubled over the last 50 years, and the amount of animal protein has increased eightfold. Yet as a developing economy, China still gets only 38 percent of its total protein from animal sources, thus there remains substantial headroom for growth as the middle class emerges there.^{iv} As noted in the global analysis above, this contrast suggests that the very high level of inherent growth in animal protein consumption typically seen in developing economies is not to be expected in a mature market such as the United States.

Figure 5
U.S. Dietary Protein Percent Contribution From Animal vs. Vegetable Sources



Growth drivers and industry challenges

The maturity of the U.S. market for protein does not imply that growth for dairy protein is unattainable. As we will explore in the [Consumer Trends and Insights](#) section of this paper, there is a growing interest in protein among several key consumer targets, and four key trends point to opportunity specifically for dairy protein:

- Diets in which red meat plays a lesser role are becoming more common, so that alternative sources of high-quality protein should gain importance.
- Weight management has become a broad public need, and protein has been shown to offer satiety benefits to hungry dieters.
- The performance nutrition industry continues to grow and become more mainstream, and among younger adults, we see broadening understanding of protein’s contribution to maintaining and building muscle.
- And finally, the size and growth of America’s older population will expand the market for products that can help people age healthfully by maintaining strength and mobility.

These four trends all have the potential to be strong platforms for driving growth in the market for dairy protein.

There are also, however, some challenges for dairy in efforts to capitalize on emerging opportunities based on the benefits of protein, and these fall into two basic categories: limited public understanding of the potential benefits of higher protein levels for some populations, and lack of saliency of dairy as a source of high-quality protein.

As will be addressed in more depth in the [Protein Science and Innovation](#) section of this paper, current and emerging science suggests that additional dietary protein could be beneficial to some segments of the population. But understanding (and even awareness) of the difference between minimum requirements and the accepted range for protein intake is not widespread. To add to the confusion, overconsumption of protein has been called out as a “danger” by at least one public figure in the health and wellness arena.

As we will see in the [Consumer Trends and Insights](#) section of this paper, the proportion of the population actively changing their behavior to get additional protein into their diets is still relatively small. But more importantly for the dairy industry, even among this slowly but steadily growing cohort of people who are trying to get more protein, dairy products are not top of mind as a good source. This lack of saliency is especially pronounced for whey protein, despite its well-documented benefits as an easily utilized source of high-quality protein.

Summary

- Protein-containing foods represent a sizable and growing market in the United States, but in this well-developed economy, we are unlikely to see levels of endemic growth on the kind of scale that's expected for developing nations.
- Nevertheless, shifting demographics, new patterns of eating and changing views of health and well-being may hold promise for protein overall, and could provide platforms for dairy to regain its fair share of American protein consumption.
- Though there is a growing body of evidence that some segments of the population could benefit by increasing their protein intake above minimum daily requirements, understanding of this potential is not widespread.
- Even among consumers seeking to add protein to their diets, dairy protein — especially whey — is not top of mind as a source.

Market analysis

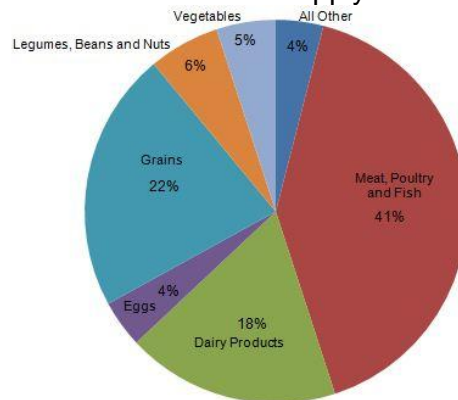
Competitive structure for protein-containing foods

This analysis focuses on the evolution of the competitive frame for protein-containing foods in the United States. Although global markets will not behave identically, and the specific substitutes for dairy proteins will undoubtedly be different, it also provides at least a basic starting point for thinking about how protein consumption may evolve, both in other mature markets and in developing countries, as their economies mature and wealth increases.

The competitive frame for dairy is extremely broad when viewed in terms of the actual proportion of daily protein intake provided by different food groups — and the relative contribution provided by different food groups has shifted drastically, suggesting that the market is by no means static.

Perhaps not surprisingly, the dominant source of dietary protein in the United States is animal muscle: meat, poultry and fish. Grains, which in the early 1900s accounted for nearly 40 percent of the nation's protein intake, now provide less than one-fourth; however, they still actually contribute more protein to the average American's diet than dairy products. Dairy products are the third-largest protein source, accounting for 18 percent of total protein intake (Figure 6).

Figure 6
Percent of Protein in the U.S. Food Supply Contributed by Food Group

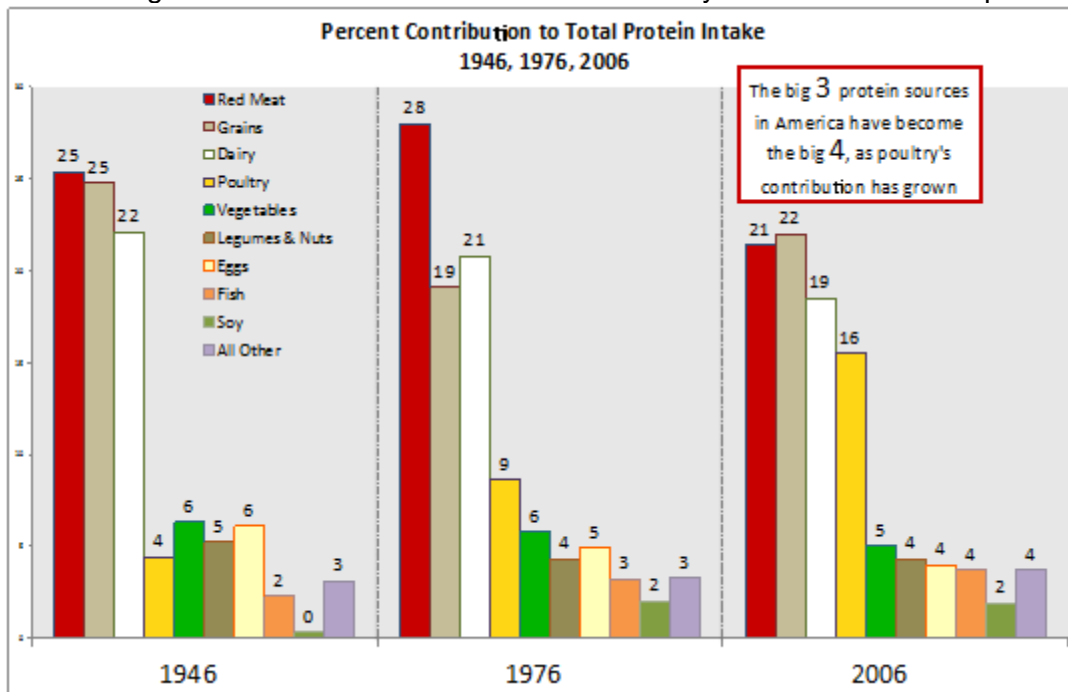


Source: USDA.com, Nutrient Content of the U.S. Food Supply.

The relative contribution of different food groups to total dietary protein in the food supply has seen meaningful shifts over the course of years, suggesting that although dietary changes rarely happen overnight, the market for protein is not static. As grains, red meat and dairy have seen some ups and downs in their importance as protein sources, poultry has relentlessly grown by leaps and bounds, so that it now contributes double the percentage it made up in 1976 and four times its 1946 share of protein intake (Figure 7).

The drivers for poultry’s growth may hold some parallels for dairy as it competes against other forms of protein. Big, well-organized poultry companies developed improved processing methods that helped keep prices low, while the vertical integration and branded differentiation of poultry products that emerged in the late 1960s brought increased salience of the products’ benefits.

Figure 7
Change in Percent of U.S. Protein Contributed by Different Food Groups



Near the end of the 20th century, growth in protein consumption accelerated: The average American is eating 14 percent more protein in 2006 than in 1976. But dairy did not benefit from that growth — consumption of dairy protein has been essentially flat for 50 years (Figure 8). But dairy’s percent contribution to the U.S. protein supply has shrunk, and the form in which dairy protein is consumed has changed substantially: Milk drinking has declined drastically while cheese has seen significant growth (Figure 9). As suggested in the previous note on poultry’s rise in the market for protein, it may be worth considering the extent to which branded differentiation and marketing has driven growth for cheese, and whether milk might benefit from a similar approach.

Whey protein products, although they contribute less than 2 percent of total protein in the food supply, have grown tremendously in the last few years as well, and continued growth is anticipated. We will discuss opportunities and challenges for whey protein in more depth throughout this white paper (see also Frost and Sullivan research for a more detailed look at the size, growth and market drivers for whey^v).

Figure 8
Relative Size of U.S. Protein Supply From Nondairy vs. Dairy Sources

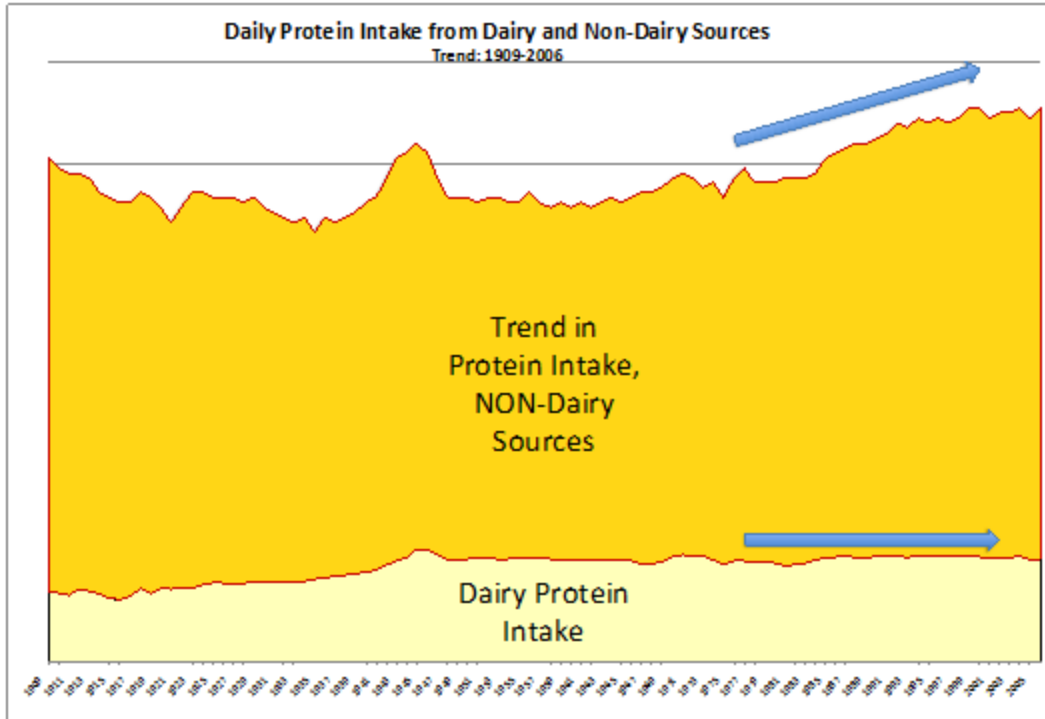
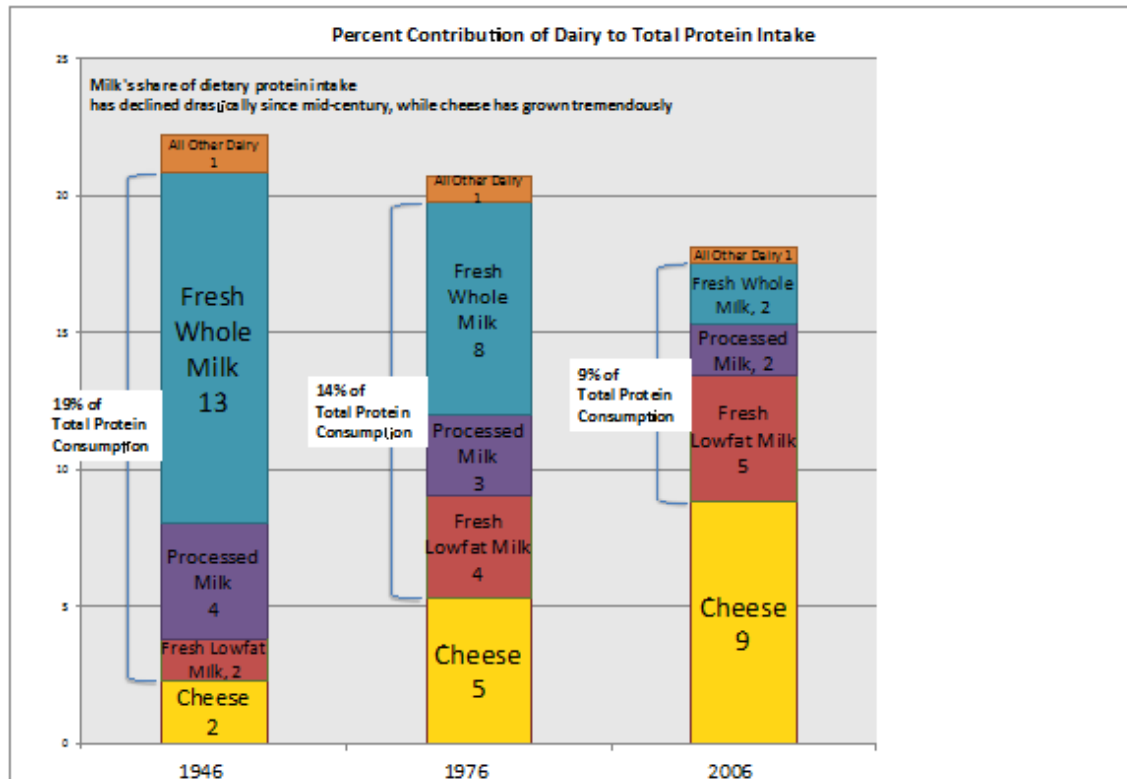


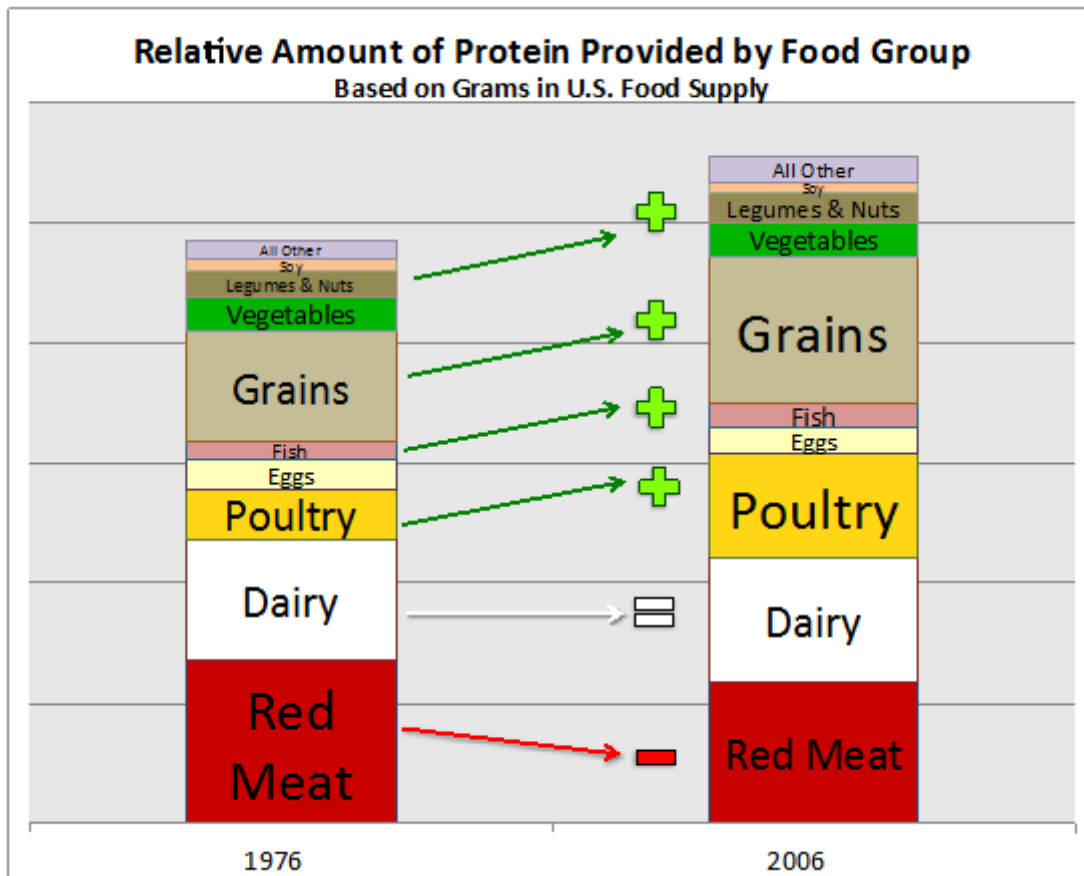
Figure 9
Breakdown of Dairy Forms' Contribution to Total Protein



Source: USDA.com Nutrient content of the U.S. Food Supply

At the same time that overall dairy intake has stayed fairly flat, relative consumption of red meat has shrunk, as people have increased the amount of protein they get from grains, fish and alternative sources such as nuts and soy, in addition to the big poultry boom already mentioned (Figure 10). As we will discuss in more detail, this emerging trend toward diets that are less dependent on red meat could signal opportunity for dairy protein to regain ground in the coming years.

Figure 10
Change in Relative Amount of Protein Provided by Food, 1976 – 2006



Why dairy protein?

Dairy has some inherent advantages as a source of protein that put it in a potentially strong position relative to its substitutes. Leveraging these may help the dairy industry get its “fair share” of the global protein opportunity.

Dairy has strong nutritional credibility and enjoys a high degree of consumer trust. Eight in 10 people say milk is a good source of many nutrients beyond calcium, and 70 percent say dairy processors are honestly marketing a healthy product.^{vi} In quantitative satiety research,^{vii} consumers rated dairy products in general at 8.7 on a scale of 10 for being a rich source of nutrition and being “good for my body” and higher than 8 of 10 on every other nutrition-related attribute studied. When people were asked which statements would make them want to consume more whey, nearly 60 percent said because “it’s made from milk.”^{viii}

This high consumer esteem for dairy’s nutrition credentials is well-founded and may provide a marketing advantage over other protein sources: Dairy provides only 10 percent of the calories people consume each day, but it contributes more than half of their daily intake of calcium and vitamin D, as well as meaningful amounts of several other critical nutrients. But the majority of Americans are falling short of the recommended servings of dairy each day (Figure 11), with the result that nearly two-thirds of the population is failing to get adequate amounts calcium in their diets, and roughly 70 percent aren’t getting enough vitamin D.^{ix}

Figure 11
Dairy Contribution to Calorie and Nutrient Intake

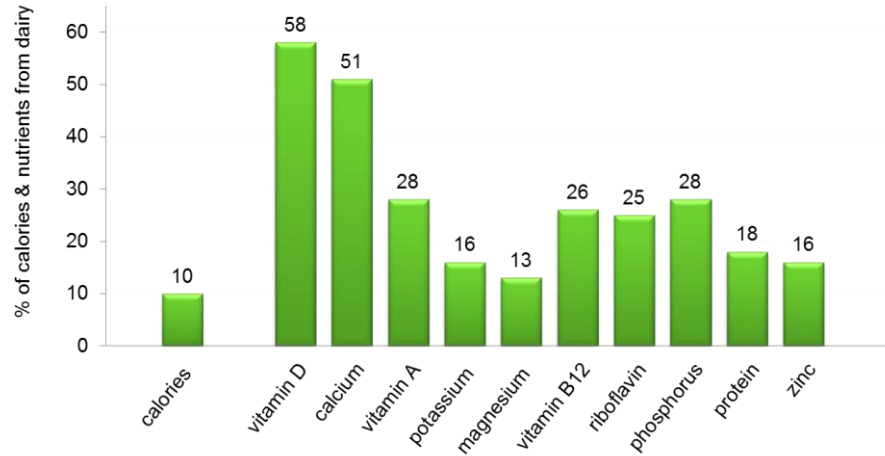
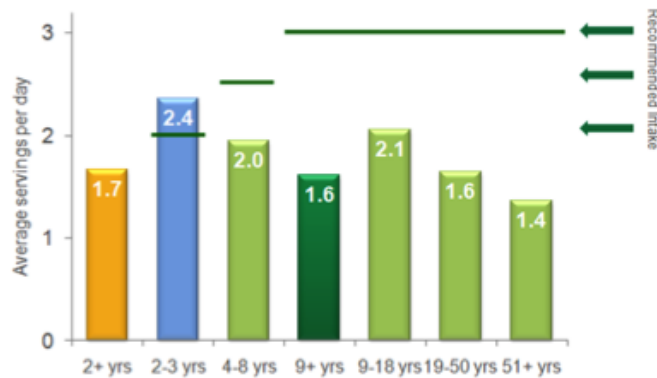


Figure 12
Daily Consumption of Milk and Milk Products in the U.S.

Daily consumption of milk and milk products in the U.S.



Source: Dairy Research Institute, NHANES (2003-2006). Ages 2 to 18 years. Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, [2003-2004; 2005-2006]. [http://www.cdc.gov/nhanes.htm]

The fact that dairy provides all the necessary amino acids is also an advantage. High quality may matter as much as quantity to those who are seeking protein in their diets,^x so dairy's status as a complete protein offers a potential advantage over grains and other vegetal sources, including soy.

Whey, in particular, may have a competitive advantage given its strong showing in emerging scientific research on the benefits of protein (see [Protein Scientific Background and Discussion of Intake Recommendations](#) and [Protein Science and Innovation](#) sections), as well as the potential breadth of its applications across a variety of protein-enhanced product innovations (see [Protein Science and Innovation](#) section). But as mentioned above, and as we will discuss at greater length in the pages to come, whey is still a small segment relative to other dairy products and is unfamiliar to the vast majority of consumers.

It seems clear that dairy's strong nutrition credentials can be an important leverage point in growing its presence as a source of protein. But the industry may have one even greater advantage over other protein-containing foods: As we'll see again and again across the research cited in this paper, dairy consistently gets

high consumer ratings on taste relative to most alternative sources of protein.

If consumers can begin to make a stronger link between dairy and protein, its nutrition and taste advantages may provide a real competitive lever for dairy to gain its fair share of the protein market.

Summary

- The competitive set for dairy protein is broad in terms of the food's contribution to total protein intake, and the relative contribution provided by different food groups has shifted drastically, suggesting that the U.S. market for protein is by no means static.
- Although average per capita protein intake increased by 14 percent from 1976 to 2006, dairy protein did not benefit from that growth, and shifts in relative contribution of dietary protein favored other sources, especially poultry and nonmeat sources such as grains. Importantly, the tremendous increase in poultry consumption coincided with vertical integration, branding and product innovation by big, well-organized companies.
- Dairy has inherent benefits as a source of protein that should put it in a strong position relative to its substitutes:
 - High nutritional credibility and trust from consumers as a rich source of nutrients that are “good for my body”
 - Provides critical nutrients of which most consumers aren't getting enough
 - Dairy provides more than half the daily intake of calcium and vitamin D, but only 10 percent of daily calories in the U.S. diet
 - Is high-quality protein, a potential advantage over plant-based sources, including soy
 - Whey, in particular, may hold promise given its strong showing in scientific studies of the benefits of dietary protein and its potential for inclusion in a variety of products — but it is a small segment, and unfamiliar to most people
 - In addition to strong consumer perceptions of dairy's functional benefits, dairy enjoys high marks for taste — a potential advantage to be leveraged over competitive sources of protein

Consumer trends and insights related to protein

This section provides an overall summary of consumer attitudes and beliefs about protein, then explores in more depth four key trends that point to opportunity for growth.

Consumers are slowly becoming increasingly aware of and knowledgeable about the benefits of protein in the diet, recognizing the important role it plays in a variety of desirable end-benefits, including helping manage hunger, sustaining energy levels and maximizing performance.

Behind this emerging consumer recognition of protein's benefits are four key trends that may point to potential opportunities for dairy protein:

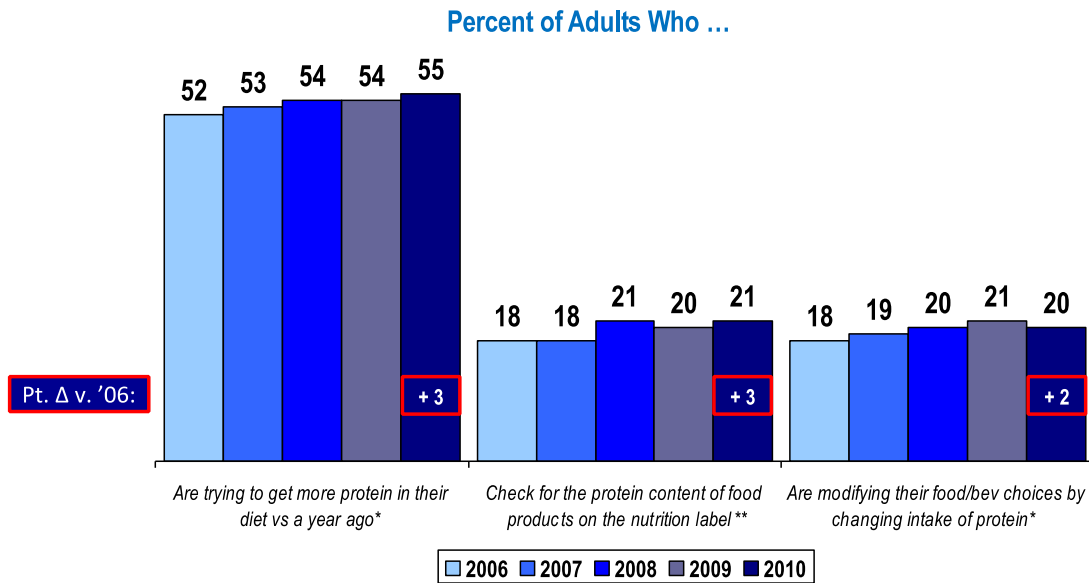
1. Emerging diets
2. Satiety and weight management
3. Sports nutrition and performance
4. Healthy aging

This section will first provide an overview of consumer awareness, interest and understanding of protein, including dairy protein, followed by a deeper dive into each of these promising trends.

Overview: Consumer awareness, interest and understanding of protein

More than half of U.S. consumers express interest in getting more protein in their diets, and this percentage has crept slowly but steadily upward for the past five years, with compound annual growth between 1 and 3 percent depending on the data source. Roughly 20 percent of people say they're actually doing something (e.g., reading labels or changing their diets) to achieve that goal (Figure 13).

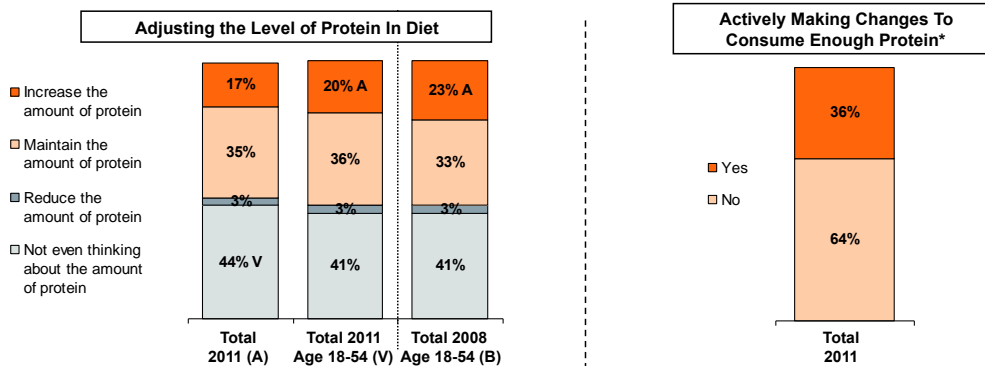
Figure 13
Percent of Adults Trying to Get More Protein, Reading Labels, Modifying Diet



Source: *The NPD Group/National Eating Trends, Years Ending February; **The NPD Group/Dieting Monitor, 2010 Waves
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Though it's too early to say for sure, the growth in interest in protein may be starting to level off. Recent survey data^{xi} show that the percent of consumers saying they want to increase or maintain the level of protein in their diets is flat versus 2008 — but that same study suggests a slightly higher percentage of consumers (36 percent) claiming actually to be changing their behavior to be sure they get enough protein (Figure 14). Continued monitoring of the trend across data sources will help clarify inherent shifts in general attitudes toward protein.

Figure 14
Percent of Consumers Claiming Changes in Protein Consumption

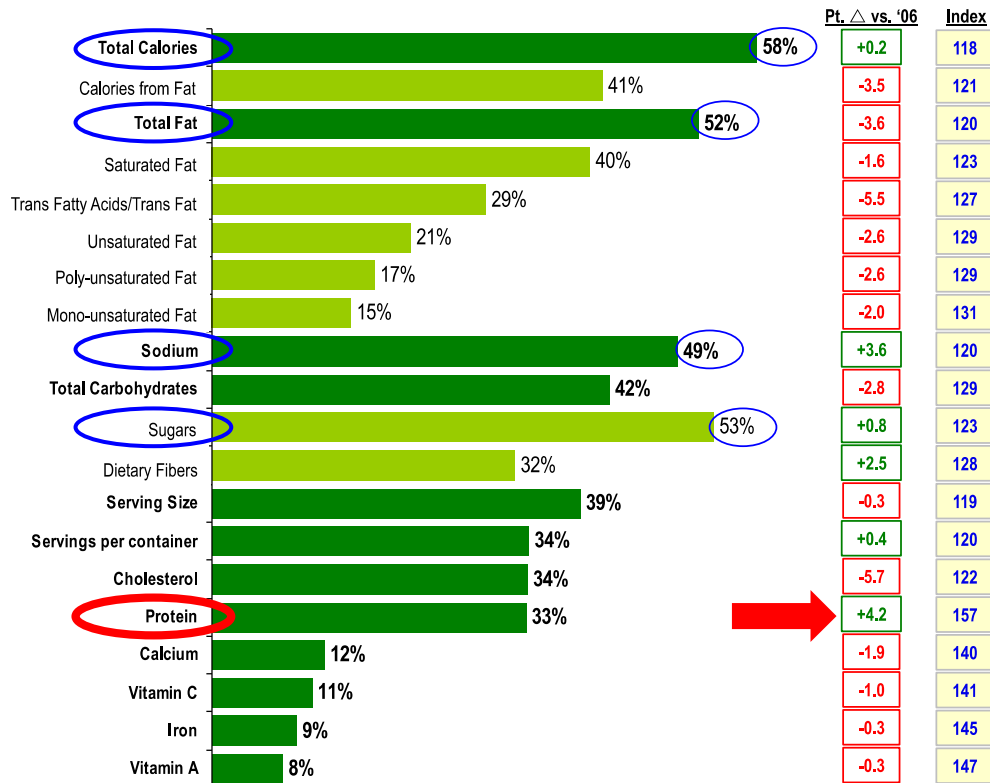


Source: DMI 2011 Consumer Protein Tracker Update

Despite their claimed interest in protein, people don't pay nearly as much attention to protein content in foods as they do to other nutritional details. Calories, fat, sugar and sodium are given far greater scrutiny as consumers scan food labels — this is true even among people who say they're trying to get more protein into their diets. Note, however, that attention to protein content has increased more than attention to any other nutrient over the past five years (Figure 15).

Figure 15
Percent Looking for Nutrient on Nutrition Facts Panel

What do you usually look for on the “Nutrition Facts” label? (% of Protein Seekers* Who Indicate They Check for ...)



*Protein Seekers defined here as adults who say they're trying to get more protein in their diet vs. a year ago

Index >120 is above average.

Source: The NPD Group/Dieting Monitor, 2010 Waves; average for boxed areas indicates index to Total Adults
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Muscle-related benefits dominate the list of attributes consumers generally associate with protein, along with energy and maintaining healthy bones and joints.

People who are more involved with protein show some interesting differences compared with less-involved consumers. Not surprisingly, people looking to increase their protein intake make stronger associations between protein and wellness benefits across the board — the average difference across all benefits is plus 8 percentage points. But we see substantially greater interest in three main areas (Table 1):

- Satiety and weight management
- Increasing lean muscle mass and recovery after exercise
- Prevention of muscle loss during aging

As noted above, we believe there is an important connection between consumers' interest in these broader benefit areas and the steady increase we've seen in protein-seeking behavior over the years.

Table 1
Perceived Benefits of Protein, With Differences by Protein Involvement

	2011 Total Sample	Looking to Increase Protein	Maintain, Reduce or Don't Care	Difference
Helps build and maintain muscle	69	74	68	6
Helps give you energy throughout the day	64	63	64	-1
Helps increase lean muscle mass	58	68	56	12
Helps muscles recover more completely after exercise	57	68	55	13
Helps prevent muscle loss during aging	54	65	52	13
Helps maintain healthy bones and joints*	51	52	51	1
Helps you stay active as you get older*	50	57	49	8
Helps keep you from feeling hungry between meals*	49	59	47	12
Helps improve brain function	43	50	42	8
Helps you burn fat and lose weight	41	62	37	25
Helps prevent bone loss during aging	36	38	36	2
Helps improve the responsiveness of the immune system	35	36	35	1
Helps improve digestive health	28	24	28	<1
Promotes fat loss around your waist	26	43	23	20
Helps manage and possibly prevent the onset of diabetes	24	30	22	8
Helps to reduce cholesterol	20	25	19	6
Helps to reduce inflammation	19	25	17	8
None (no potential benefits)	6	0	7	-7

*New question in 2011

Source: DMI 2011 Consumer Protein Tracker Update

There are also some demographic differences in the benefits people associate with protein, most of them not surprising, but still potentially valuable. Compared with men, women are considerably more interested in energy, satiety and weight management. Older adults connect protein more strongly than younger adults with aging-related benefits, including prevention of bone and muscle loss, staying active, maintaining healthy joints and immune system responsiveness (Table 2).

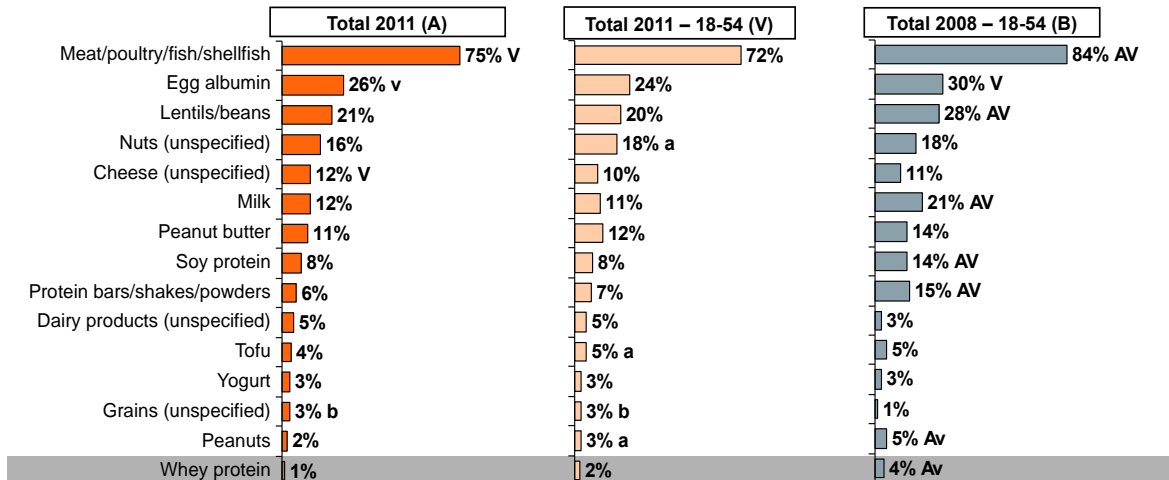
Table 2
Demographic Differences in Protein Benefit Associations

Demographic Differences in Protein Benefit Associations			Young Adults (18-34)	Oldest Adults (65+)
	Males	Females		
Helps build and maintain muscle	68	71	62	73
Helps give you energy throughout the day	57	71	53	69
Helps increase lean muscle mass	56	60	55	56
Helps muscles recover more completely after exercise	57	57	53	53
Helps prevent muscle loss during aging	54	54	44	63
Helps maintain healthy bones and joints*	48	54	38	69
Helps you stay active as you get older*	49	52	44	63
Helps keep you from feeling hungry between meals*	38	61	47	53
Helps improve brain function	42	45	38	48
Helps you burn fat and lose weight	35	47	36	43
Helps prevent bone loss during aging	36	36	29	44
Helps improve the responsiveness of the immune system	34	36	26	39
Helps improve digestive health	32	23	24	30
Promotes fat loss around your waist	25	28	32	18
Helps manage and possibly prevent the onset of diabetes	23	24	19	25
Helps to reduce cholesterol	19	20	19	18
Helps to reduce inflammation	20	17	17	15
None (no potential benefits)	8	3	8	3
Average difference versus comparison population		+3.2		+7.7

Source: DMI 2011 Consumer Protein Tracker Update

Importantly for the dairy industry, top-of-mind awareness of dairy products as good sources of protein falls far below awareness of meat, poultry and fish — and even below eggs, legumes and nuts. Additionally, between 2008 and 2011, we’ve seen a significant drop in top-of-mind awareness of both milk and whey as protein sources. If dairy is to get its fair share of the growing market for protein, this lack of saliency is a clear area of opportunity^{xii} (Figure 16).

Figure 16
Unaided Awareness of Foods as Sources of Protein (All Mentions)



Summary

- Consumer interest in protein has slowly grown over the years, with more than half the population saying they’re trying to get more protein into their diets, and more than 20 percent actually doing something to make that happen.
- This growth may be starting to level off, but it’s too soon to tell — continued monitoring of multiple data sources is recommended.
- Attention to protein on food labels is still well below that for calories, fat, sugar and salt — but attention to protein has grown more than for any other label nutrient.
- Muscle-related benefits dominate the list of attributes consumers generally associate with protein, along with energy and maintaining healthy bones and joints.
- People who are trying to increase their protein intake show substantially higher interest than other people in benefits in three key areas: satiety and weight management, increasing lean muscle mass and recovery after exercise, and prevention of muscle loss during aging.
- Importantly for the industry, dairy is not yet strongly associated with protein in consumers’ minds.

Key trend #1: Emerging diets and dairy protein

The traditional American diet appears to be shifting somewhat toward less meat-centric ways of eating, as increasing numbers of people seek to reduce their red meat consumption in favor of “flexitarian” or semi-vegetarian diets — by eating smaller portions of meat, switching to poultry or fish, having more meatless meals and skipping meat entirely on some days.^{xiii}

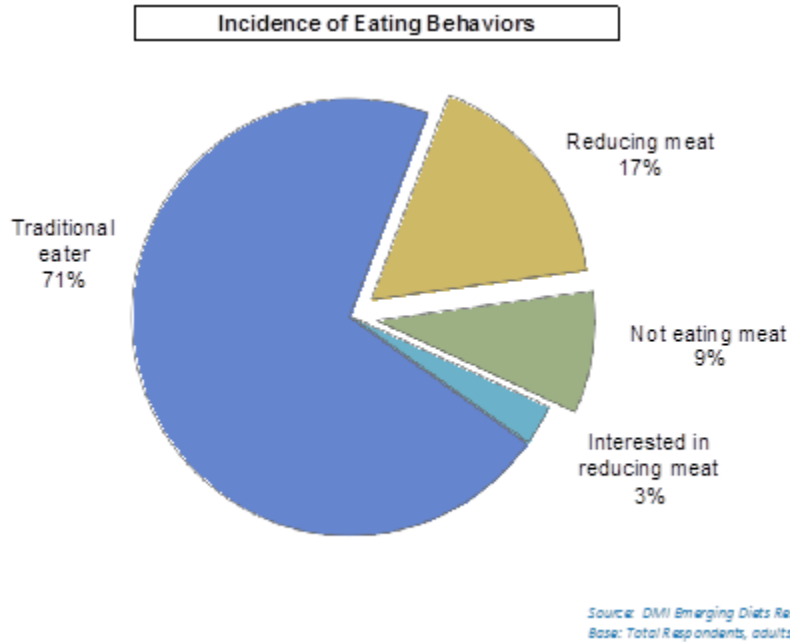
These meat reducers are now part of the mainstream, making up about one-fourth of the U.S. population (Figure 17) (and perhaps as much as 45 percent of the British).^{xiv} Meat-reducers tend to describe their behavior in mainstream ways as well, rejecting labels for their behavior. They are more likely to say they’re eating more healthfully or eating more vegetables and grains than to label their diets as semi-vegetarian, plant-based or “green.”

In contrast to people who are simply cutting down on red meat consumption, consumers who claim to follow strictly vegan or vegetarian diets are a very small group (less than 3 percent of the population)^{xv} that is not growing much.^{xvi}

Figure 17

Incidence of Meat Eating Behaviors in the U.S.

REDUCED MEAT CONSUMPTION IS FAIRLY MAINSTREAM:



Among adults who are reducing meat consumption, many seem to perceive doing so is more healthful. Lowering fat and cholesterol, eating a balanced diet, losing weight and reducing exposure to hormones/antibiotics are the reasons consumers cite most often for eating less meat.

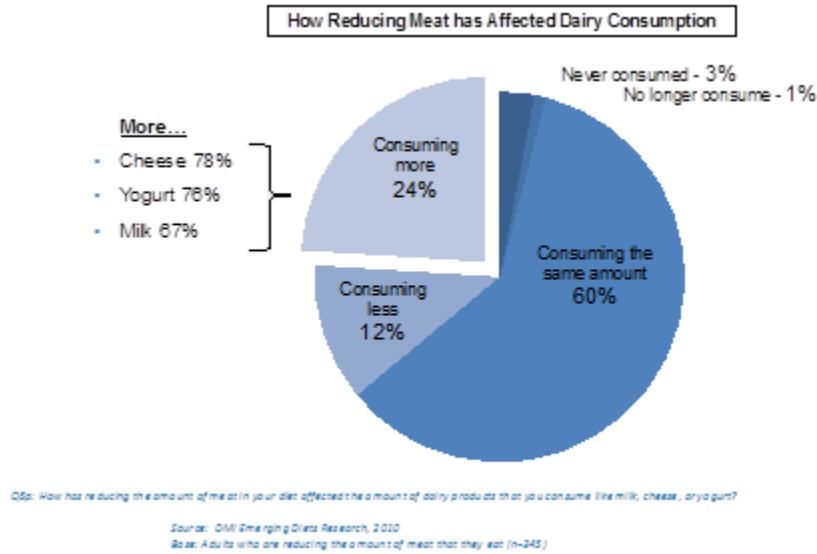
Teenagers are more likely than adults to say they want to eat less meat, but less likely to report that they are actually doing so. Only 16 percent of teens say they're eating less meat or not eating meat at all, compared with more than 25 percent of adults.

But this does not suggest younger people's attitudes should be ignored. In DMI's research on emerging diets, teens' stated motivation for cutting back tends to be more around perceived moral and philosophical reasons such as "feeling good knowing that your food choices are supporting something you believe in," "helping reduce the slaughter of animals" and "showing concern for farming practices and the treatment of animals." In a similar vein, a Just Kid Inc. study found 88 percent of kids felt plants and animals have just as much right as humans to exist. So, while very few teens are currently eliminating either meat or dairy from their diets, dairy should position itself favorably to this segment to protect against future animal welfare concerns.^{xvii}

The emerging trend away from traditional eating and toward a deliberate reduction of meat consumption creates a strong potential opportunity for the dairy industry, but there are challenges for dairy to address if it is to claim its fair share as a substitute for meat protein.

The majority of meat reducers are consuming the same amount of dairy as before, and nearly a quarter of them are consuming more — so dairy is already part of their food repertoire (Figure 18).

Figure 18
Effect of meat reduction on dairy consumption

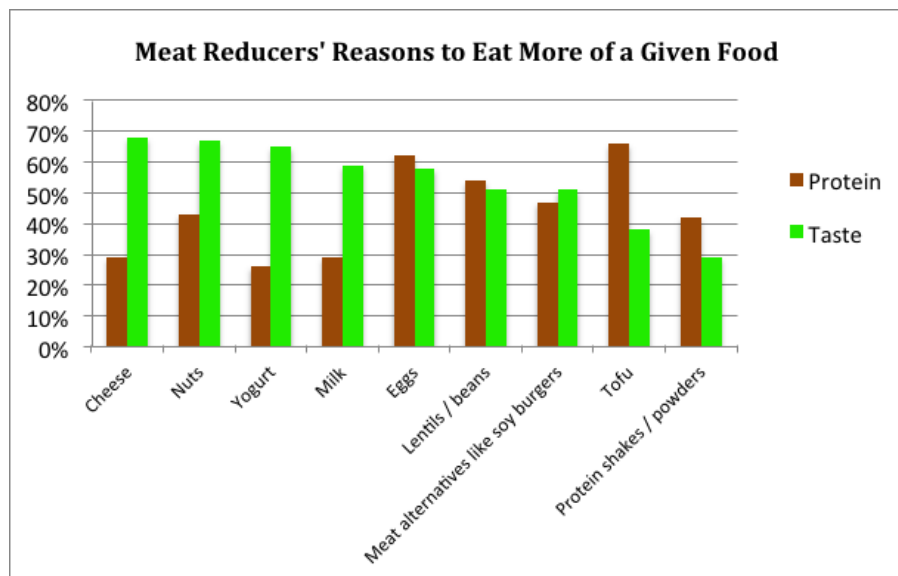


But dairy's contribution as a source of protein is not well-established, even among people who are reducing their meat consumption. Among nonmeat protein sources, dairy products — especially cheese — are less salient than eggs, legumes, meat alternatives and tofu as foods consumers look to when seeking protein. As mentioned earlier in this paper, chicken may actually be dairy's most plausible competitor as an alternative source of protein, whose prevalence as a substitute for red meat should not be underestimated. As reported in Datamonitor's 2009 report on Trends in Protein Intake^{xviii}

"In 2004, the United States Department of Agriculture (USDA) reported that per capita consumption of beef was 66.1 lbs per person, from a high point of 88.5 lbs per person in 1975 (a drop of 25 percent). This contrasts with the rise of chicken consumption, which more than doubled from 38.7 lbs to 84.3 lbs per person over the same time period."

But dairy foods hold a potentially strong position in the competition for a share of consumers' protein intake. In contrast to other protein sources, dairy foods including cheese, yogurt and milk are much more likely to be chosen for their taste than for their protein contribution (Figure 19).

Figure 19
Reasons Given for Eating More of a Given Food When Reducing Meat



Though it indicates a lack of awareness of dairy products' value as a protein source, this dominance of taste as a motivator for eating dairy is in some ways very good news for the industry, as taste is a critical driver of consumption of foods and beverages in general. If dairy's status as a source of high-quality protein can be better established in consumers' minds, dairy has an inherent advantage over other nonmeat protein sources.

In addition to its high taste appeal, dairy also enjoys strong nutrition status among meat-reducing dairy users. Though dairy may not leap immediately to mind as a source of protein, and consumers rate calcium, bone health and general nutrition benefits higher than protein as reasons to consume dairy, protein is not far behind once people are reminded. When prompted, consumers give dairy high marks for being a good source of high-quality protein (Table 3).

This suggests establishing dairy's status as a top-of-mind alternative to meat protein may be more about reinforcing the connection between dairy and protein in a memorable way than about overcoming any real skepticism at the idea.

Table 3
Reasons for Consuming More Dairy Products When Reducing Meat

Top Reasons Why Adults who are Reducing Meat are Consuming More Dairy Products

Reason	Rating on a 10 pt scale
• Dairy products are good for <u>bones/bone health</u>	9.0
• Dairy products are a rich source of <u>nutrition</u>	8.7
• Dairy products are <u>good for my body</u>	8.7
• I want to get my <u>calcium from a food</u> vs. a supplement	8.7
• I like the way dairy products <u>taste</u>	8.6
• Dairy products are a source of <u>high quality protein</u>	8.4
• Dairy products are a good source of <u>protein</u>	8.3
• Dairy products have <u>multiple nutrients</u>	8.3
• Dairy products are <u>real/natural/whole foods</u>	8.2
• Dairy products are good for <u>dental health</u>	8.2

Q6q2: Below is a list of possible reasons why you are consuming more dairy products such as milk, cheese, or yogurt. On a scale of 1 to 10 please rate the importance of each reason.

Source: DMI Emerging Diet Research, 2010
Base: Adults who are reducing the amount of meat in their diet AND consuming more dairy (n=82)

Summary

- A fair number of consumers are moving away from traditional “meat and potatoes” diets, largely driven by a perception that doing so is more healthful.
- Most people who are eating less meat are consuming at least as much dairy as before, and one-fourth of them are consuming more.
- Dairy's potential as a source of protein is not well-established, even among people who are eating less meat. The main reason they give for consuming more dairy is taste.
- However, when *prompted* to consider dairy in the light of protein, consumers give it high marks — not far behind ratings for bone health, calcium and overall nutrition — suggesting that marketing in support of dairy protein need not overcome any real barriers — just a lack of salience.
- If the connection between dairy and protein can be made stronger, dairy's great taste and strong

nutrition credentials give it an inherent competitive advantage over other nonmeat protein sources.

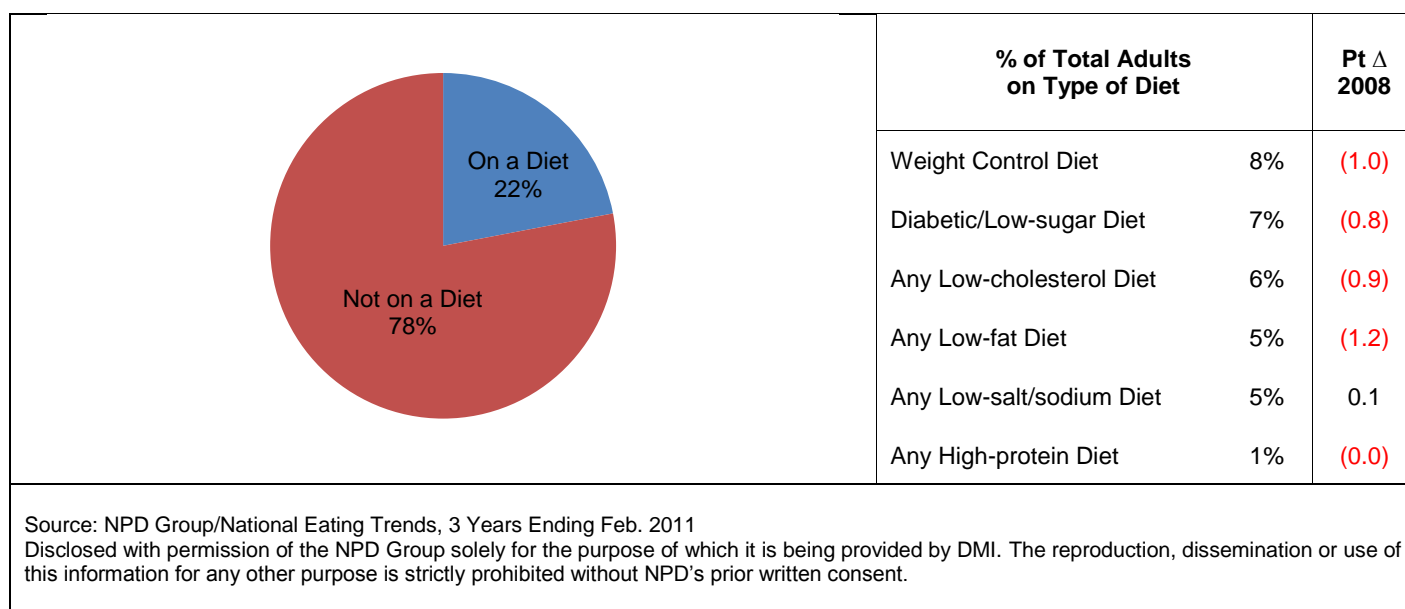
Note: See the [Protein Nutrition and Health — Benefits, Messages and Claims](#) section for additional examples of potential messages and claims related to this key trend. Also, see the *Appendix* for a full summary of messages and claims tested, including those that score lower in terms of mass appeal, but, nevertheless, might be highly effective for specific consumer targets.

Key trend #2: Satiety and weight management

Satiety — a feeling of fullness or satisfaction after you eat or drink something — is a benefit whose relevance to hungry dieters is clear.

Rising obesity rates, and rising public awareness of the health issues surrounding it, have put a spotlight on the need for effective weight management. At the same time, consumers’ acceptance of formal “diets” has fallen steadily over the years as people take matters into their own hands (Figure 20). Efforts at weight control are increasingly more likely to take the form of “my own diet.”

Figure 20
Incidence and Type of Dieting, with Change 2011 vs. 2008

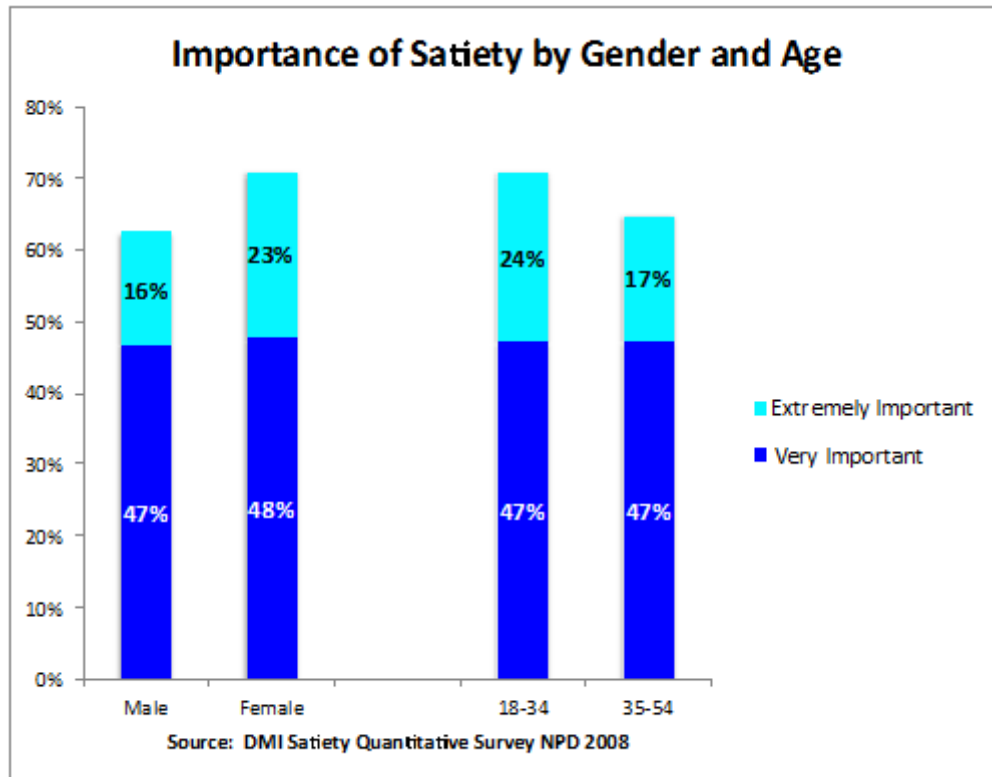


But as many of us know, managing weight is not easy. People want to eat right, and they want to be healthy, but they don’t like to feel hungry. As reported in Datamonitor’s *Trends in Protein Intake: Attitudes and Behaviors*:

“... 90 percent of 2,250 U.S. adults said that losing weight was ‘hard’ or ‘very hard’... more than half (53 percent) of American dieters say that they cheat on their diet because they are hungry. In fact, 31 percent of dieters feel that they ‘are starving themselves while on a diet.’”^{xix}

For good reason, then, satiety-enhancing products are beginning to attract interest among health- and weight-conscious consumers. Two-thirds of adults in the United States say satiety is extremely or very important, and the intensity of the perceived need is even greater for women and young adults (Figure 21).

Figure 21
Importance of Satiety by Gender and Age



But as with other wellness-related behaviors, the focus on satiety is not yet a global phenomenon, and there is still more talk than action. In Datamonitor’s survey of 15 countries only 17 percent of respondents claimed to actively seek specific foods that make them feel full, while 64 percent reported making no change at all. The United States showed above-average rates of satiety-seeking at 24 percent.^{xx}

Consumer-perceived benefits of satiety fall into two primary themes: avoiding food and feeling good. In DMI’s quantitative survey on satiety,^{xxi} the main reasons given for wanting to feel full were that satiety reduces cravings for unhealthy snacks, “helps me eat less,” “makes me satisfied and content,” and “I don’t like to feel hungry.” And people want that unhungry feeling to last: To feel satiated, the average respondents say a product should make them feel full for about 2½ hours.

The potential role of protein in satiety is well-supported in scientific research (see [Protein Scientific Background and Discussion of Intake Recommendations](#) section), and now consumers also are beginning to understand that protein can play a part in helping them feel satiated. For example, more than half of people in DMI’s satiety study said they thought protein enrichment in foods and beverages would increase their satiation.

Nevertheless, it appears that consumers still haven’t fully embraced protein’s potential role in increased satiety. When asked which of a dozen things they might typically do to stave off hunger before mealtime, people chose “eat something high in protein” last (Table 4).

Table 4
What People Do When They're Hungry but It's Not Yet Time for a Meal

Current Behaviors When Hungry Before Mealtime

	Total (n=1278)
Do Something (Total)	89%
Drink a big glass of water	43
Find something healthy to snack on	32
Eat some kind of salty snack	24
Drink coffee/tea	22
Chew gum	21
Eat some kind of sweets/candy	21
Find something low-calorie to snack on	21
Distract myself mentally	16
Eat my next meal earlier	16
Eat a balanced snack	12
Distract myself physically	12
Eat something high in protein	10

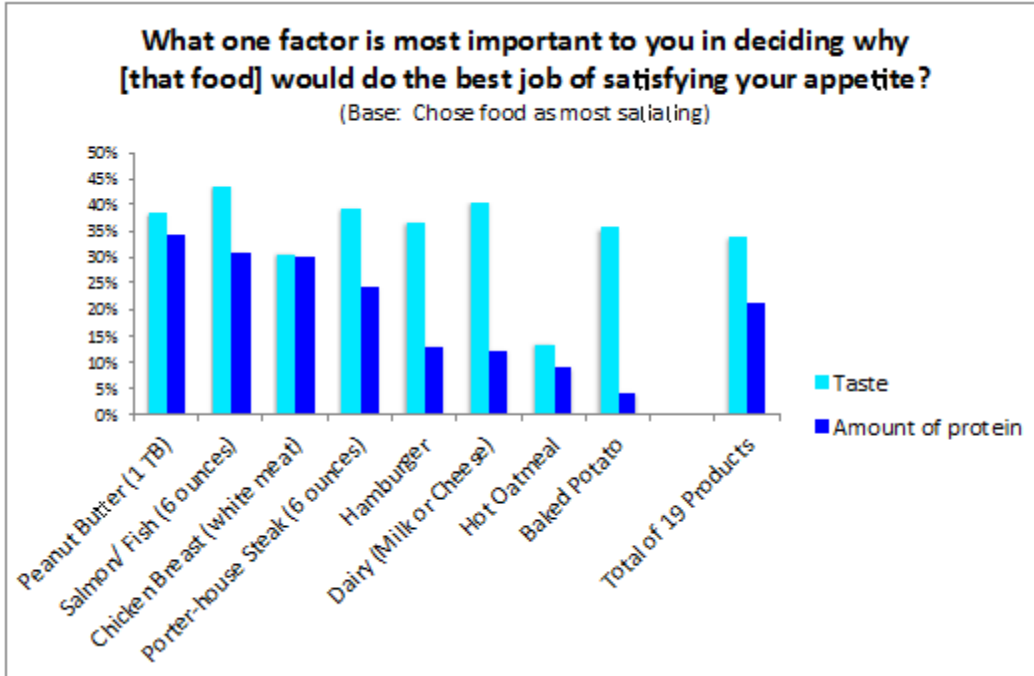
Source: DMI Satiety Quantitative NPD Survey 2008

However, there is evidence of an opportunity for growth if the dairy industry can reinforce the newly emerging connection between dietary protein and increased feelings of satiety. In quantitative research to assess the relative effectiveness of 32 broadly varied messages about dairy, messages that spelled out dairy protein's connection to satiety were among the strongest, driving increases in consumer purchase intent.^{xxii}

To drive growth in dairy as a source of protein, these seeds of understanding must be nurtured, as, again, the connection between protein and satiety is through achieving a higher-protein diet (within the acceptable range of protein intakes). Dairy and other foods that contain at least a good source of protein can help consumers achieve a higher-protein diet. (Average protein intake is currently toward the lower end of the acceptable range.)

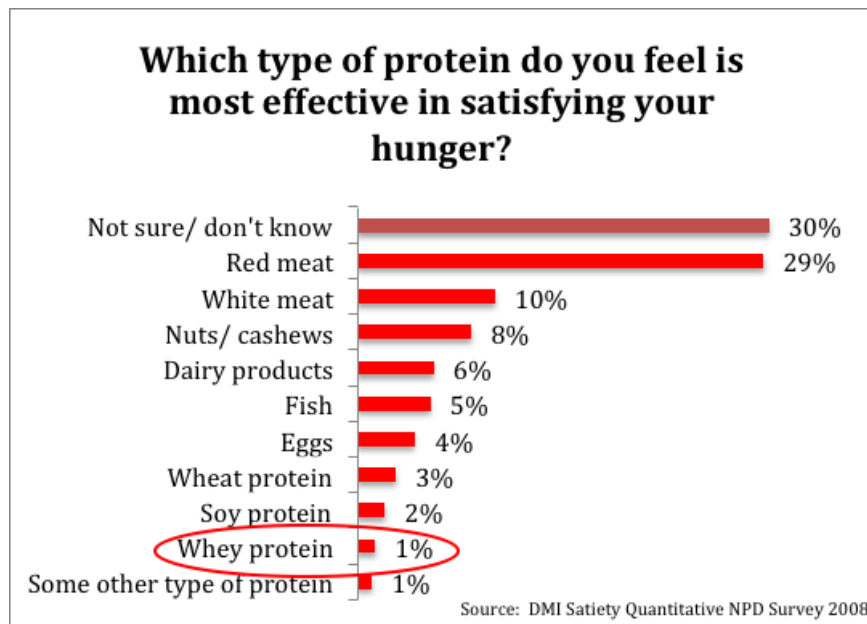
In DMI's consumer research related to satiety, dairy products were viewed by consumers as reasonably satiating — not seen as filling as meat, pasta, fruit and nuts, but on par with oatmeal and soup and more filling than snacks such as cookies and potato chips. But, since their protein contribution is not top of mind for consumers, there is perhaps additional opportunity to position dairy products in consumers' minds as satiating foods as long as marketers are mindful of regulatory guidelines. As noted, dairy foods do not themselves have satiation potential, only as part of a higher-protein diet, which is associated with satiety benefits. Among reasons for choosing a given food to satisfy one's appetite, the dominance of taste over protein is considerably greater for dairy products than for steak, fish, chicken and even peanut butter (Figure 22).

Figure 22
Main Reason Why a Food Would Do the Best Job of Satisfying Appetite



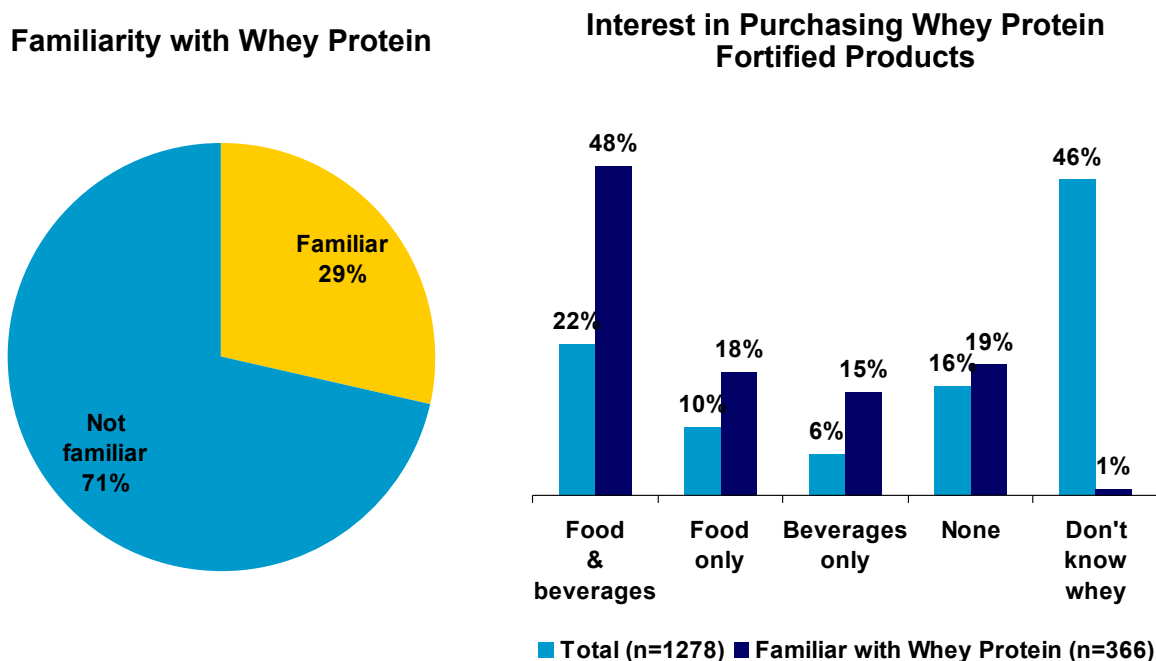
This lack of consumer connection between dairy protein and satiety is especially evident for whey protein, which, despite being well-supported in scientific research as a satiety enhancer (i.e., as part of a higher-protein diet) was at the bottom of the list of protein sources consumers say would be most effective in satisfying hunger (Figure 23).

Figure 23
Type of Protein Named as Most Effective in Satisfying Hunger



There appears to be a real growth opportunity in promoting whey protein’s ability to be part of a higher-protein diet consistent with satiety benefits. Interest in purchasing products fortified with whey protein is more than double among consumers who are familiar with the ingredient versus those who are not, even though survey respondents expected to pay more for protein-fortified products. But, as noted previously, the majority of consumers don’t know what whey is (Figure 24).

Figure 24
Familiarity with Whey Protein and Effect on Interest in Buying Whey Protein-fortified Products



A note on breakfast and its value in satiety

Datamonitor cites scientific research suggesting that timing of protein intake matters — that eating protein early in the day results in a greater feeling of fullness throughout the day.^{xxiii} (Note: National Dairy Council’s review of research does not support this conclusion. See the scientific backgrounder posted on the [regulatory section](#) of USDairy.com.) Consumers seem to understand this on some level. Despite the national habit of eating a small (or no) breakfast and eating a big meat-centered dinner, people do say they think morning is the most important time to eat something satiating.^{xxiv} Dairy foods like milk, cheese and yogurt fit naturally into morning meal and snack occasions, so that this may be a good “entry point” for marketing the idea that the protein in dairy foods can support higher-protein diets consistent with satiety benefits.

Summary

- Rising obesity and its attendant health woes are in the public spotlight, but people are becoming less enamored of traditional diets.
- Managing one’s weight is hard, and feeling hungry can sabotage efforts.
- Satiety-enhancing products are therefore beginning to get the attention of health-conscious consumers, both to help them avoid overeating and to help them feel good.
- As with many emerging health-related behaviors, active pursuit of higher-protein diets consistent with satiety benefits is not yet widespread.
- Even among consumers interested in greater satiety, gaps remain in their understanding of protein’s potential role; however, there is evidence that dairy protein messages can be compelling.
- The connection between dairy protein and the possibility for increased satiety as part of a higher-protein diet can be strengthened — the opportunity for marketing communication and education is great, especially for whey protein, and, perhaps, especially for breakfast and morning snacking occasions.

Note: See the [Protein Nutrition and Health — Benefits, Messages and Claims](#) section for an in-depth discussion of consumer messages and claims and additional examples of potential messages and claims related to this key trend.

Also, see the *Appendix* for a full summary of claims tested, including claims that score lower in terms of mass appeal, but nevertheless might be highly effective for specific consumer targets.

Key trend #3: Sports and exercise nutrition

Despite, or perhaps because of public concern over obesity rates and sedentary lifestyles, people are spending more of their leisure time in physical activity than they before. The Centers for Disease Control and Prevention reports that the percentage of the population claiming “No leisure time activity” declined from 31 percent to 25 percent over a 20-year period. At the same time, the U.S. Bureau of Labor Statistics reports that the average incidence of citizens participating in sports or exercise each day has increased by 1.2 percentage points, and the average time spent exercising has increased by two minutes per day. That may not sound like much, but it means on an average day 2.7 million more people are exercising than in 2003, and well over a billion more total hours of exercise are being done each year.

This trend can potentially benefit the dairy industry, as exercisers are substantially more likely than nonexercisers to look to protein to help them build and maintain strong, healthy muscles.

The value of dietary protein has long been associated with sports nutrition and performance. People who exercise are considerably more interested in protein than less active individuals, with 36 percent saying they look for products that contain protein, compared with 14 percent of nonexercisers and 29 percent saying they’d pay more for a product with added protein (versus only 6 percent of nonexercisers).^{xv} Interest in protein goes up as exercise levels increase (Figure 25).

These more active people are more likely to be male: Males over age 15 spend more than twice as much time as females participating in sports, exercise and active recreation, and that gap has widened, not narrowed, since 2003 (Figure 26). They are also likely to be younger: In DMI’s 2009 Consumer Protein Tracker (p. 74) only about half of respondents age 45 to 55 claimed to exercise while nearly three-quarters of 18- to 34-year-olds did. Logically, then, the current “bull’s eye” target for sports nutrition is young men who exercise or play sports.

Figure 25
Nutrition Facts Panel Reading by Weight Concern and Exercise Involvement

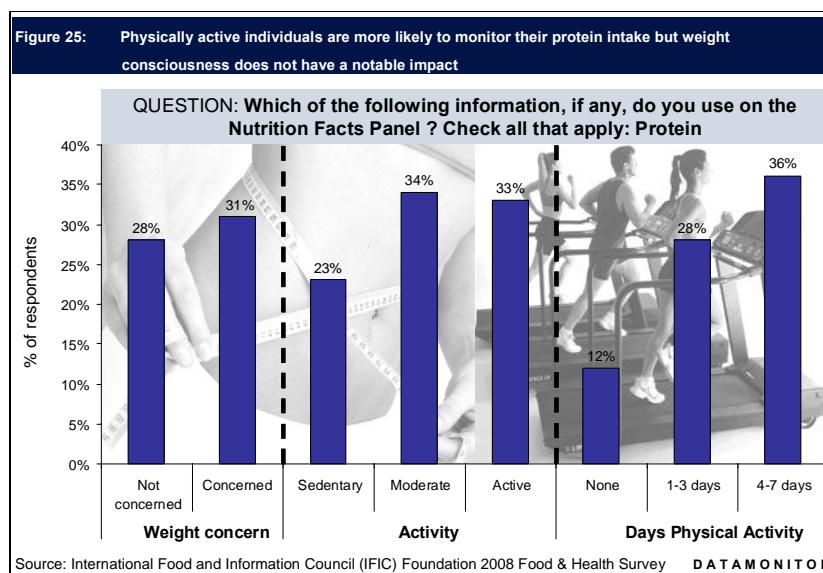
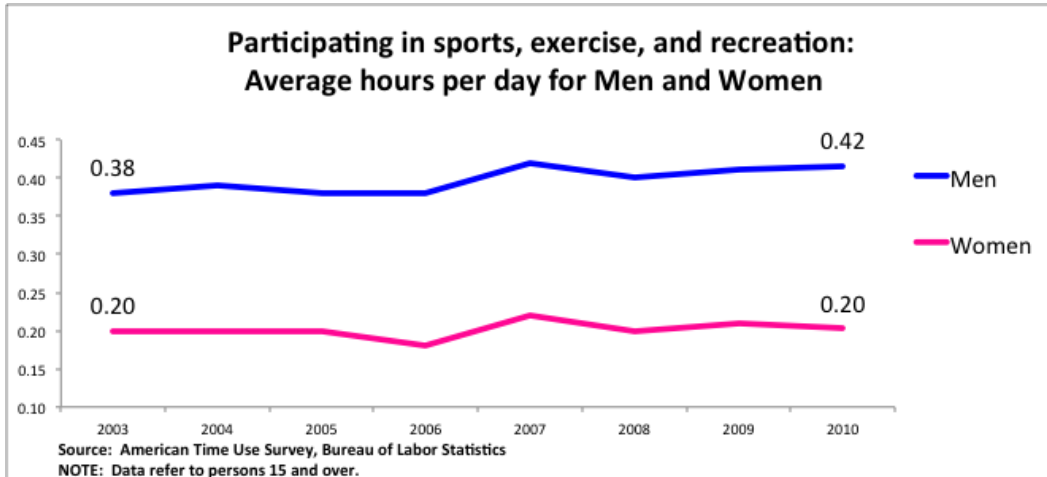


Figure 26
Hours Per Day Spent Exercising, by Gender



There is probably opportunity to grow dairy's presence in that traditional arena of athletic young men, especially for whey protein. Though young men's overall interest in increasing protein intake has fallen, and the gap has narrowed relative to young women, young males are still significantly more likely than older people of both genders, but especially older men, to say they are trying to increase the amount of protein in their diets (Table 5). They are also much more familiar with whey protein than other people, with 44 percent claiming to be extremely or very familiar with whey, compared with only 25 percent for the general population.^{xxvi}

That having been said, to grow dairy as a go-to protein source for this young male target will require marketing effort. Unaided awareness of whey protein is at only 4 percent for this cohort, higher than other people's, but down by more than half from 10 percent in 2008. Although they are slightly more likely than the average person to mention milk as a source of protein, young men's unaided awareness of cheese, yogurt and other dairy products is average at best.^{xxvii}

Table 5
Interest in Increasing Protein by Age and Gender, with Percent Change vs. 2008

	Total Sample	Males 18-34	Females 18-34	Males 35-44	Females 35-44	Males 45-54	Females 45-54	Males 55-64	Females 55-64	Males 65+	Females 65+
	A	J	K	L	M	N	O	P	Q	R	S
Trying to increase the amount of protein in your diet	17	26	24	13	23	14	14	4	19	3	15
CHANGE v. 2008 (Percentage Points)	n/a	-12	-5	-5	+7	+5	-5	n/a	n/a	n/a	n/a
<small>Uppercase letter indicates statistically higher at 95% confidence Lowercase letter indicates statistically higher at 90% confidence Source: DMI 2011 Consumer Protein Tracker Update</small>											

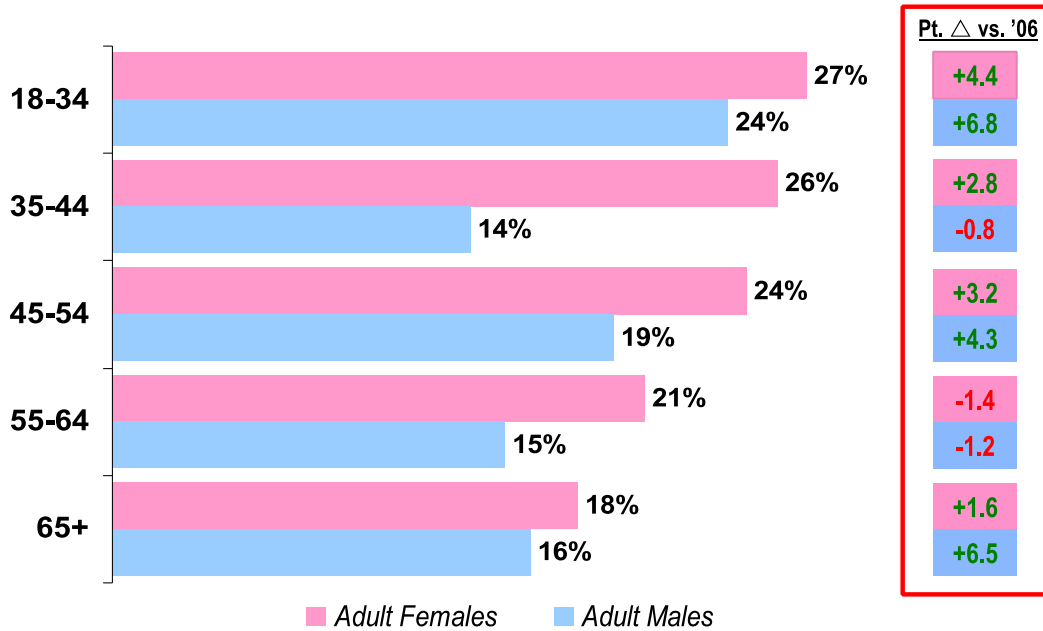
Beyond sports nutrition for young males, the larger growth will likely be in expanding protein's role as "performance nutrition" among more mainstream consumers, especially women and aging baby boomers. (We will consider these older consumers in when addressing the next key trend.)

Women are interested in protein. As shown in Table 5, women under age 45 are just as likely as young men to say they are trying to increase their protein intake, and women of all ages are more likely than their male counterparts to say they are actively modifying their diets to get more protein (Figure 27). Women also may be slightly more knowledgeable about protein sources, as they are able to name an average of 2.5 different sources, which is about 25 percent more than men.^{xxviii}

Figure 27

Percent of Females and Males Who Say They're Modifying Their Choices in Order to Get More Protein

Percent of Adults Who Indicate They're Currently Modifying Their Food and Beverage Choices in an Effort to Increase Their Intake of Protein (2011)



Source: NPD Group/National Eating Trends, Years Ending February
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Women's habits, needs and motivations are clearly different from men's. As noted previously, women spend considerably less time exercising than men, but they also do very different things, with a much lower propensity to play competitive sports (Figure 28).

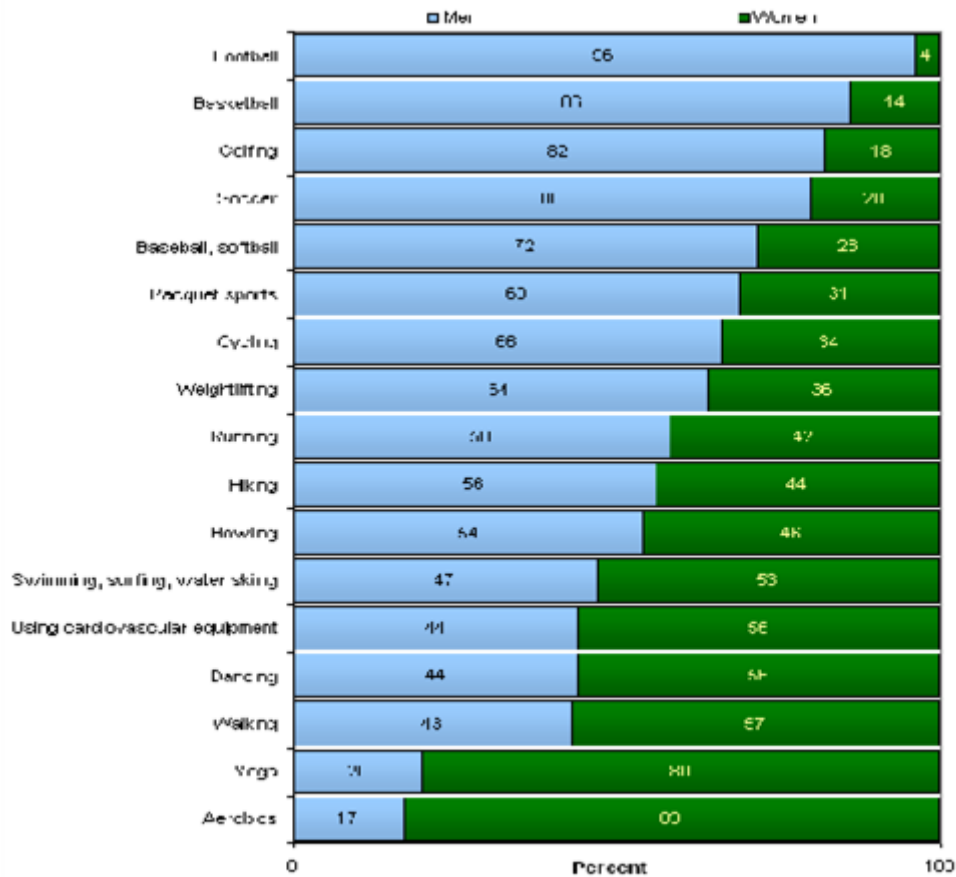
While both men and women express interest in building and maintaining lean muscle, women generally want to get smaller, not bigger. Women place high importance on protein benefits such as burning fat, losing weight, suppressing hunger between meals and promoting fat loss around the waist.^{xxix} Similarly, in qualitative exploration, women gravitated to messages about toning and shaping, but a fair number expressed concern about "bulking up."^{xxx} Interestingly, in quantitative research, only 5 percent of the total population agreed with the statement "Women shouldn't eat too much protein or their muscles can get bulky," but agreement was at 12 percent for young men under 34, more than double the average response.

Neither women nor men may be comfortable with the idea of women building big muscles, but the traditional young male athlete generally is trying to do just that. For this reason, separate marketing efforts may be needed for dairy protein to tap into the market potential of the female target without weakening appeal among men.

Figure 28

Percent Distribution by Gender of People Participating in Activity

Percent distribution by sex of people aged 15 years and older who engaged in sports or exercise activities on an average day, by activity, 2003-06



Source: American Time Use Survey, Bureau of Labor Statistics
NOTE: Data refer to persons 15 and over.

Despite the hesitancy some women have about inadvertently building excessive muscle mass, women might be quite receptive to messages about dairy protein’s benefits as “performance food” once they have a better understanding of its potential role in muscle recovery and maintenance of healthy lean muscle. In the whey message exploration mentioned previously, participants responded positively to the idea of using whey to enhance the effectiveness of their workouts, but after they had been given more information about what it was and how it might work.

But women’s unaided awareness of whey is very low (1 percent of women age 18-plus), and even other, more familiar dairy foods don’t leap to mind when they’re thinking about protein. Of the foods women name as protein sources, only 16 percent of mentions are of dairy products, compared with 64 percent for meat, eggs and legumes.^{xxxii} So, as with the traditional young male consumer target, marketing efforts directed to women will be needed to make dairy more top of mind as a protein source.

Some notes on tactical marketing for whey

Health care professionals and personal trainers are vastly more aware of the benefits of protein, especially whey protein, than the average person — but they still mention whey as a source of protein much less often than meat, eggs and even beans.^{xxxiii} They overwhelmingly look to scientific journals and sport nutrition publications endorsed by health professional organizations for information.

Marketing to professionals appears to have a positive effect. The more familiar they are with whey protein, the higher their ratings of its quality as a protein source. Professionals who recall receiving informational materials express greater familiarity, higher esteem and a higher likelihood to recommend whey to their clients.

Overly technical descriptions of protein may not be effective. Health and fitness professionals are often hesitant to use terms such as “amino acids” and “leucine” with their more mainstream clients, and consumer reactions suggest that even using the word “whey” can cause confusion. Referring to “protein found naturally in milk” drove significantly higher appeal than saying “whey.”^{xxxiii}

Summary

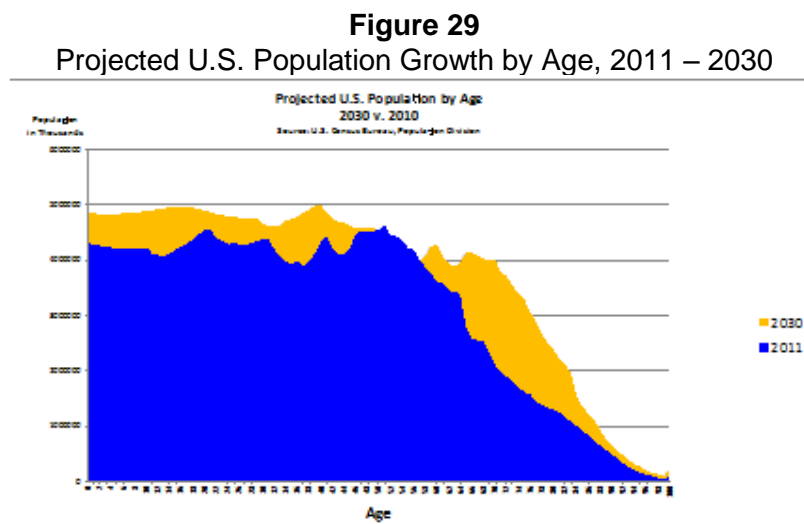
- People are exercising more than before, and the market for sports and performance nutrition continues to grow.
- Protein has long been associated with sports nutrition and performance, largely for a young male audience interested in building muscle, and though the dominance of this cohort may be lessening, there is likely still opportunity to grow dairy’s presence in that traditional niche, especially for whey protein.
- The larger growth will likely be in expanding protein’s power as “performance nutrition” to more mainstream consumers, especially women and older people.
- Motivations, habits and needs differ substantially for different ages and genders. In order to appeal to a more diverse consumer base, dairy will almost certainly need to customize its messages and, perhaps, its products as well.
- Health care professionals and personal trainers may offer leverage for the dairy industry in spreading the message about dairy protein’s benefits, but they won’t be shills for the industry. Strong scientific support for genuine benefits is key.

Note: See the [Protein Nutrition and Health — Benefits, Messages and Claims](#) section for an in-depth discussion of consumer messages and claims and additional examples of potential messages and claims related to this key trend.

Also see the *Appendix* for a full summary of claims tested, including claims that score lower in terms of mass appeal, but nevertheless might be highly effective for specific consumer targets.

Key trend #4: Healthy aging

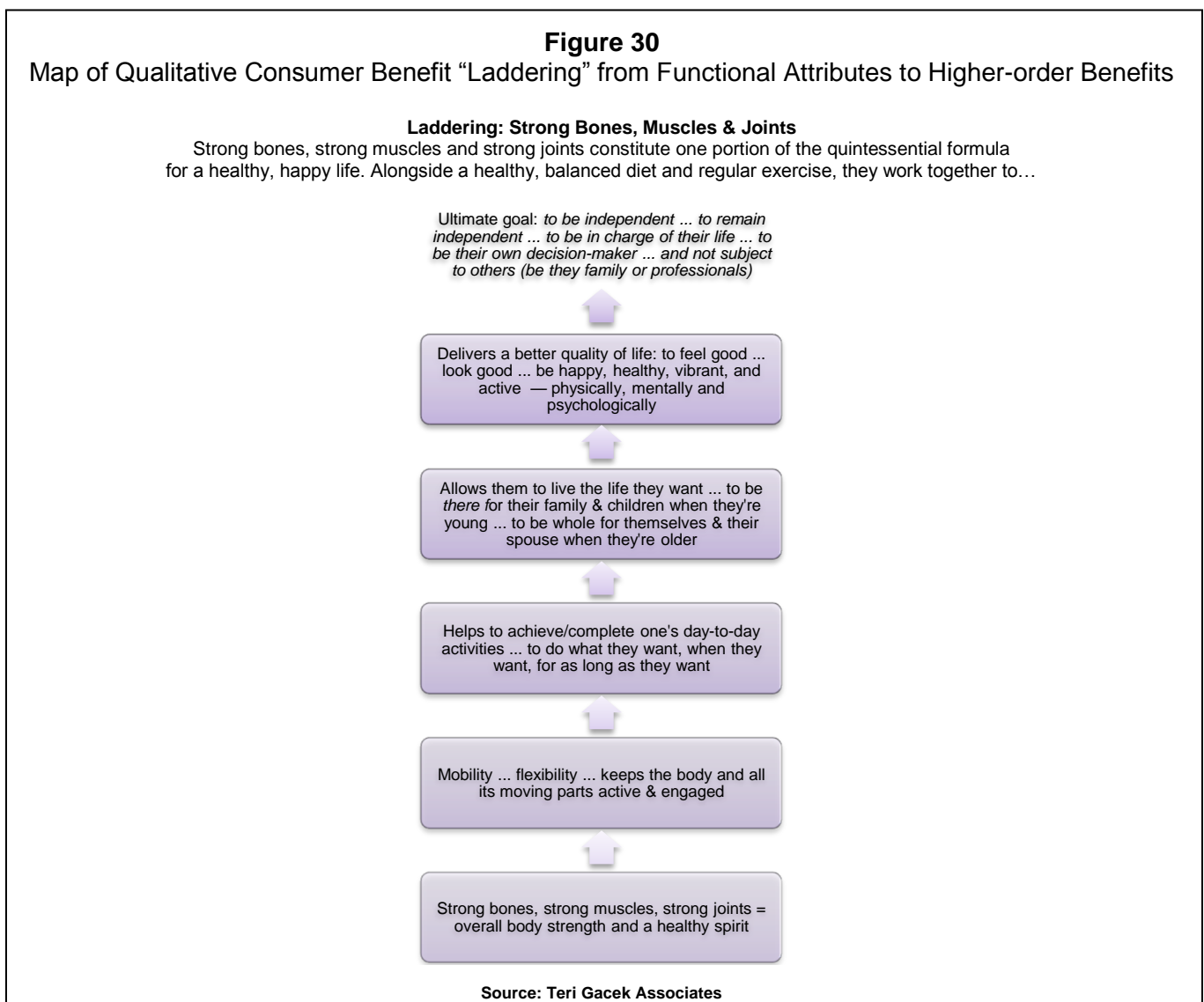
By 2030, one-fourth of the U.S. population will be over age 60 (Figure 29). As this older population grows, the need for health care and prevention of age-related chronic conditions looms large. In the public sphere, the focus is often on the economic costs of caring for a large population, as it becomes increasingly frail. But for individual consumers, the prospect of a weakening body can carry a deeper and more important fear: The loss of their independence.



People lose muscle mass as they age, and this loss (sarcopenia) is associated with a greatly increased risk of disability. Because the aging population is large and growing, chronic muscle loss is estimated to be affecting nearly 18 million people in 2010. If the current incidence of sarcopenia is not reduced, this number will swell to almost 28 million people by 2030.^{xxxiv}

Loss of independence is a key concern as consumers contemplate moving into old age. In qualitative research on perceptions about aging, people expressed strong motivations not to be a burden to their families; to be in control of their own lives, making their own decisions; not to be “trapped in your own body”; and, most important, not to be incapacitated at a nursing home.^{xxxv}

Middle-aged and older adults seem easily able to make a connection between maintaining strong bones, muscles and joints and the deeper goal of physical and emotional independence. In a benefit “laddering” exercise, respondents worked their way up from the functional benefit of bodily strength through the ability to complete day-to-day activities — to do what they want, when they want — and, ultimately, to a payoff of generally higher quality of life and happiness (Figure 30).



Older consumers also clearly understand that protein is associated with muscle- and bone-related benefits. Building and maintaining muscle is the No.1 benefit they associate with protein (Table 6).

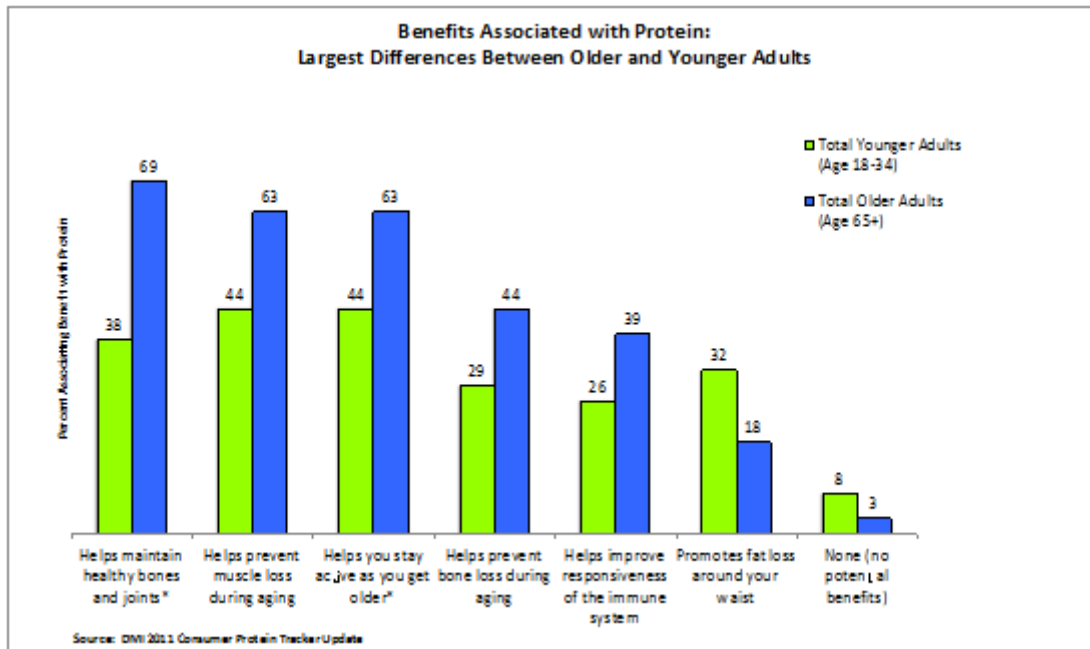
Table 6
Benefits Associated With Protein, Older Adults Compared With Younger

Top 10 Benefits Associated with Protein			
	2011 Adults Age 18-34	2011 Adults Age 65+	Index: Older v. Younger
Helps build and maintain muscle	62	73	118
Helps maintain healthy bones and joints	38	69	182
Helps give you energy throughout the day	53	69	130
Helps prevent muscle loss during aging	44	63	143
Helps you stay active as you get older	44	63	143
Helps increase lean muscle mass	55	56	102
Helps keep you from feeling hungry between meals	47	53	113
Helps muscles recover more completely after exercise	53	53	100
Helps improve brain function	38	48	126
Helps prevent bone loss during aging	29	44	152

Source: DMI 2011 Consumer Protein Tracker Update.

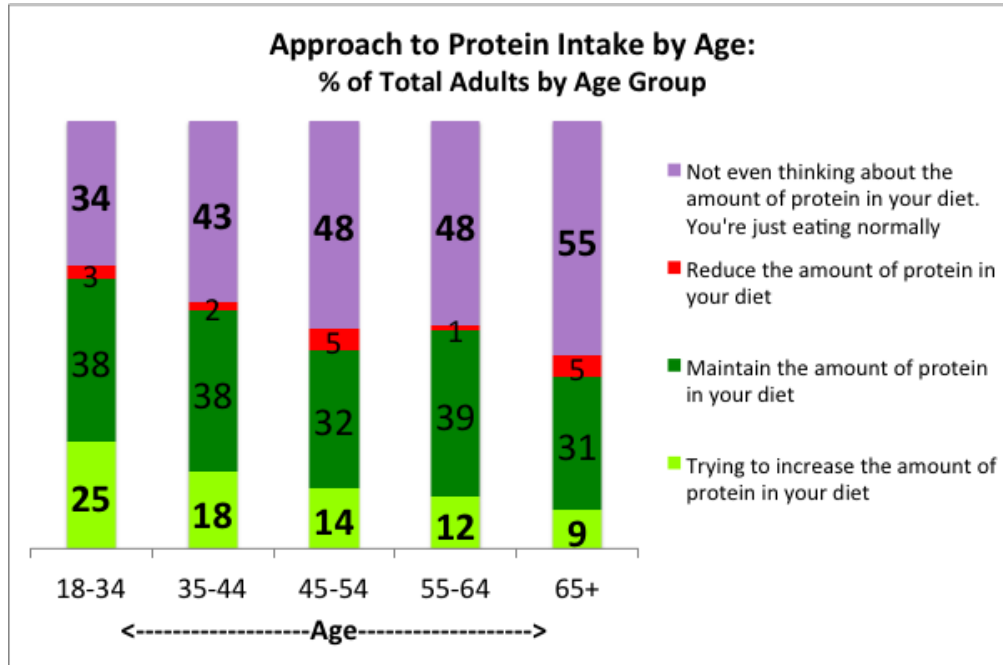
Older consumers are significantly more likely than younger respondents to associate protein with benefits such as maintaining healthy bones and joints, preventing muscle and bone loss during aging, and helping you stay active as you get older (Figure 31).

Figure 31
Attributes With the Greatest Differences Between Older and Younger Adults



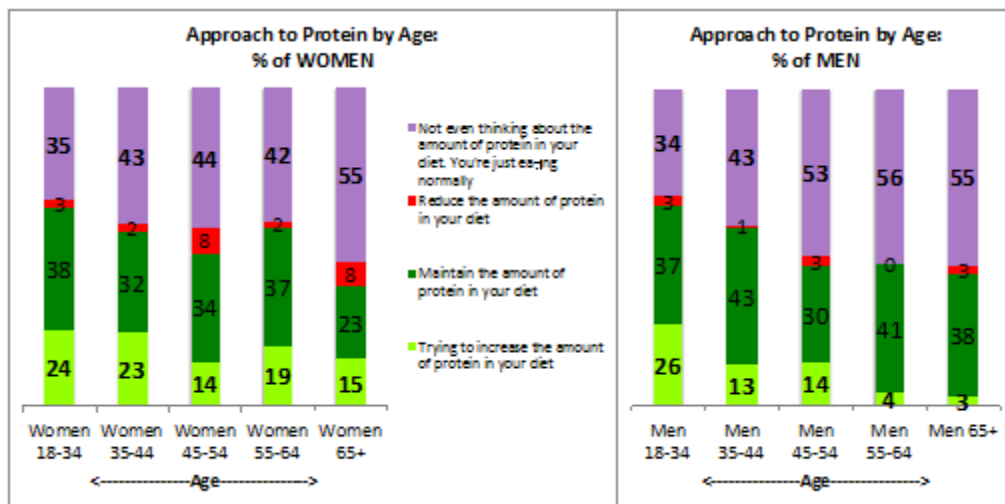
Despite their apparent understanding of the potential benefits of protein in maintaining a strong body as they age, older adults — especially men — are considerably less likely than their younger counterparts to say they're seeking additional protein in their diets (Figure 32).

Figure 32
Percent of Adults Increasing, Maintaining, Reducing or Ignoring Protein



Women may be the best (and perhaps only) avenue to helping aging Americans get the protein they need. While older women are less protein-conscious than younger ones, there is still a reasonable percentage trying to increase protein intake. For men, the drop in interest in increasing protein intake is dramatic: While 26 percent of men age 18 to 34 say they're trying to increase their protein, almost none of the men age 55 or over are (Figure 33).

Figure 33
Percent Increasing, Maintaining, Reducing or Ignoring Protein by Gender



Similar to younger people, older adults are unlikely to think of dairy sources first when they do look for protein-containing foods; however, the oldest adults show much higher top-of-mind awareness of dairy than their boomer counterparts (Table 7). The connection between protein and healthy aging may therefore be more important for older consumers than the linkage of protein and dairy.

Table 7
Unaided Awareness of Protein Sources, Older Adults vs. Total Sample

Unaided Awareness of Protein Sources			
	Total Sample	Age 55-64	Age 65+
Meat/poultry/fish/shellfish	75	80	84
Eggs/egg whites/albumin	26	30	31
Lentils/beans/legumes	24	24	26
Nuts	19	15	13
Cheese (unspecified)	12	8	24
Milk	12	10	18
Soy protein/tofu	12	12	7
Peanut butter	11	10	8
Protein bars/shakes/powders	6	2	5
Grains/bread/quinoa/rice	6	10	5
Dairy products (unspecified)	5	3	7
Vegetables/green leafy veg	5	5	3
Yogurt	3	3	3
Cottage cheese	1	2	2
Fruit (unspecified)	1	1	0
Supplements	1	0	0
Vitamins	1	3	1
Whey protein	1	2	0

Source: DMI 2011 Consumer Protein Tracker Update

Dairy protein has the potential to have a real impact on quality of life as people age; however, based on this seeming gap between what older adults know and what they do, education may be needed to help consumers connect the dots between getting increased levels of dietary protein and living the kind of life they want as they get older.

As with other consumer-relevant benefits, once the connection is made for them, people tend to respond: Messages that overtly connected dairy protein’s potential role in building and maintaining strong muscles to the end-benefit of maintaining mobility and independence were compelling to older consumers in quantitative message testing.

By helping older consumers see the linkage between dairy protein, physical strength and greater independence as a benefit of healthy aging, the dairy industry may have an opportunity tap into growth among this large and potentially valuable cohort of aging individuals.

A note on scientific support for consumer claims about healthy aging

The current learning in support of dairy’s potential advantages in maintaining strong skeletal muscle offers promise, but is still in its infancy. See [Protein Science and Innovation](#) section for a discussion of the current and emerging research around this topic.

Summary

- The population is aging, and preventive health care is a concern, both economically for the country as a whole and on a personal level for aging consumers.
- People lose muscle as they age, and chronic muscle loss is associated with a greater risk of disability.
- Older consumers associate protein with building muscle, but appear not to be seeking additional protein as part of their effort to stay strong. Even when they do look for protein, dairy is not a top-of-mind choice.
- Older consumers can easily make a connection between maintaining strong bones, muscles and joints and the deeper goal of physical and emotional independence.

- This connection suggests an opportunity to tap into growth among this large cohort of aging individuals. Messages that link dairy protein’s potential role in maintaining strong muscles to the end-benefit of staying active and independent are compelling to older consumers.
- The science in support of dairy’s potential advantages in maintaining strong skeletal muscle is still emerging, but offers promise.

Note: See the [Protein Nutrition and Health — Benefits, Messages and Claims](#) section for an in-depth discussion of consumer messages and claims as well as additional examples of potential messages and claims related to this key trend.

Also see the *Appendix* for a full summary of claims tested, including claims that score lower in terms of mass appeal, but nevertheless might be highly effective for specific consumer targets.

Protein scientific background and discussion of intake recommendations

This section provides a very general overview of what protein is and how it works, and summarizes the current recommendations for minimum daily requirements and accepted ranges for protein intake by age and gender. In addition, it includes a brief discussion of current research related to the potential benefit of higher protein intake for some consumer subgroups, timing of protein intake and protein quality.

Any claims and messages other than FDA-authorized nutrient content claims (e.g., structure/function claims) must be substantiated by competent and reliable evidence. Again, the responsibility to substantiate claims before they are in the marketplace lies with the manufacturer and, depending on the nature of the claim, substantiation often takes the form of scientific research conducted by a credible organization.

Overview and current intake recommendations for the general population

Proteins found in muscle, bone and other organs are involved in many metabolic processes and are constantly being broken down and replaced. Proteins are made up of amino acids, often referred to as “building blocks.” Amino acids are formed when the proteins in the foods we eat are digested, and are used to build and repair proteins throughout the body. Some amino acids also have unique functions; for example, leucine is a branched chain amino acid that acts as a nutrient signal to “turn-on” or initiate muscle protein synthesis.^{xxxvi} Whey protein is one of the best protein sources of leucine, which may explain why consuming whey protein after exercise so efficiently promotes muscle repair and recovery.

The Institute of Medicine provides recommendations for daily protein intakes as the RDA, the minimum amount needed to meet daily protein needs, and as an AMDR, which takes into account essential nutrient needs and chronic disease risk.^{xxxvii} For some segments of the population, protein intakes higher than the RDA and within the AMDR may be optimal for achieving individual goals.

Meeting minimum requirements

While the actual amount of protein needed each day depends on age, sex and level of physical activity, the amount needed by adults to meet minimum daily protein needs (RDA) is 0.8 g/kg body weight/d. Most people need at least 0.4 grams of protein for every pound of body weight to meet these basic protein requirements. This translates to the following amounts for children and adults (Table 8).

Table 8
Recommended Daily Allowance for Protein, Estimated in Grams
Recommended Dietary Allowance for Protein

Population group	Grams of protein needed daily	
	Males	Females
Children, ages 1 – 3 years	13	13
Children, ages 4 – 8 years	19	19
Children, ages 9 – 13 years	34	34
Teens, ages 14 – 18 years	52	46
Adults, ages 19 – 70+ years	56	46

Source: DMI 2008 Consumer Protein Tracker.

Recommended range for protein intakes

The Institute of Medicine also provides a recommendation for the percent of calories that should come from protein, carbohydrate and fat, the AMDR. For adults, the AMDR for protein is 10 to 35 percent of total calories, for fat is 20 to 35 percent of calories and for carbohydrate is 45 to 65 percent of calories. The AMDR for protein is different for children and adults, as shown in the following table (Table 9).

Table 9
AMDR for Protein, for Adults and Children

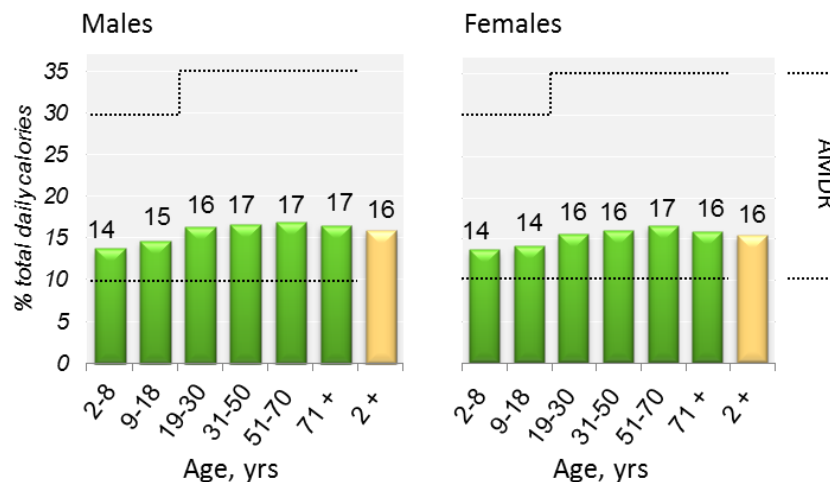
Acceptable Macronutrient Distribution Range for Protein	
Population Group	Percent of energy (calories)
Children, ages 1 – 3 years	5-20
Children, ages 4 – 18 years	10-30
Adults, ages 19 – 70+ years	10-35

Source: Dietary Reference Intakes, Recommended Intakes for Individuals. *National Academy of Sciences. Institute of Medicine. Food and Nutrition Board.* <http://www.iom.edu/Activities/Nutrition/SummaryDRIs/~media/Files/Activitypercent20Files/Nutrition/DRIs/Newpercent20Materi%20a5DRIpercent20Valuespercent20SummaryTablespercent2014.pdf>. Accessed 8/20/11.

Dairy foods (milk, cheese, yogurt) represent nearly one-fifth (18.4 percent) of the protein consumed in the U.S.^{xxxviii} Dairy foods and products made with dairy ingredients thus are already substantial contributors to protein intakes in the diet, but also can be an easy way to help people build higher-protein diets.

As illustrated below, adults are consuming an average of 16 to 17 percent of total daily calories as protein, which is at the low end of the recommended range for protein intakes (AMDR) (Figure 34).

Figure 34
Protein Consumption Patterns for Males and Females as Percent of Total Daily Calories



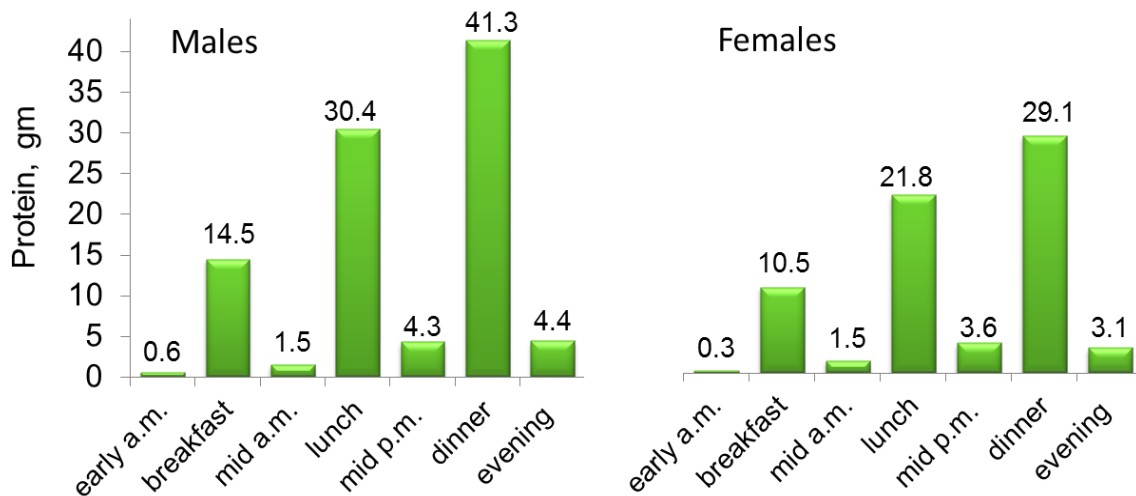
Source: Dairy Research Institute, NHANES (2003-2006). Ages 2 to 18 years. Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, [2003-2004; 2005-2006]. [<http://www.cdc.gov/nchs/nhanes.htm>]

Protein consumption through the day

As illustrated in the chart below, protein consumption in the U.S. is highest at dinner and lowest at breakfast and snacking occasions (Figure 35). A practical way for consumers to attain a higher-protein diet is to incorporate protein-containing foods at breakfast and when snacking.

Figure 35

Protein Consumption Patterns for Males and Females by Eating Occasion



Source: Dairy Research Institute, NHANES (2003-2006). Ages 2 to 18 years. Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, [2003-2004; 2005-2006]. [<http://www.cdc.gov/nchs/nhanes.htm>]

Protein quality

While many foods contain protein, the amount and quality of the protein varies. Animal-based proteins, including dairy foods and protein ingredients (e.g., whey protein), are high-quality, complete proteins because they supply the full range of essential amino acid “building blocks” the body needs. The proteins in most plant foods, including legumes (beans and peas), seeds, nuts, vegetables and grain products, are considered incomplete proteins because they lack some of the essential amino acids needed daily. Complementary proteins are those from two or more incomplete protein sources that together provide adequate amounts of all the essential amino acids.

Several methods of evaluating protein quality have been developed, including the Protein Digestibility Corrected Amino Acid Score (PDCAAS).^{xxxix} Though the methods of assessment vary, whey protein’s results identify it as a high-quality protein regardless of the measure used, as shown in the table below (Table 10).

For people who can benefit from increased protein intake, dairy foods and products made with dairy ingredients, such as whey protein, are convenient ways to help build diets higher in protein.

Table 10
Protein Quality Ratings Using Different Methods of Evaluation

Protein Quality Ratings				
Protein Type	PDCAAS ¹	Biological Value	Net Protein Utilization	Protein Efficiency Ratio
Whey Protein	1.00	104	92	3.2
Egg	1.00	100	94	3.9
Soy Protein	1.00	74	61	2.2
Beef	0.92	80	73	2.9
Wheat Gluten	0.25	64	92	0.8

Source: Hoffman J, Falvo M. Protein: Which is Best? *J Sports Sci Med*, 2004;3:118-130.

¹ For labeling purposes PDCAAS is the current required tool.

Summary

- Proteins are important components of the human body, and are constantly being broken down and replaced. Amino acids formed when we digest food are used to build and repair proteins throughout the body.
- While people are generally meeting minimum daily requirements for protein, for most people the proportion of their diet made up of protein is at the low end of the recommended acceptable range (AMDR).
- A growing body of scientific research indicates that some people may benefit from higher protein intakes: athletes and individuals who exercise regularly, people who are looking for ways to help manage their weight and older Americans.
- Protein from dairy is complete protein, containing all the amino acids the body needs, and offers a convenient way to add high-quality protein to the diet.

Protein nutrition and health — benefits, messages and claims

This section will briefly outline some general information about the nature of nutrient content claims (for which the FDA has established specific compliance requirements) and nutrition and health benefit messages, which usually take the form of structure/function claims that are not pre-authorized by the FDA, but rather must be supported with evidence provided by the manufacturer making the claim. It will also provide a number of sample claims relevant to the four key trends discussed previously, along with a listing of messages and claims that have generated strong appeal in consumer testing related to those trend areas.

We also will provide links to relevant regulatory resources and federal guidance on food labeling and advertising regulations available through the [Dairy Research Institute on USDairy.com](#). The Quick Reference Guide — Nutrition Claims for Dairy Products is a good place to start, as it provides a foundational understanding of nutrition claims, and labeling rules overseen by U.S. regulatory agencies and covers nutrition labeling claim basics, nutrient content and health claims and regulatory concepts and definitions for dairy. Additional resources, including regulatory guidance and scientific insights for nutrition-based messages and claims, are available to registered Innovation Center partners at USDairy.com.

As nutrition-conscious consumers increasingly recognize the nutrition and health benefits of protein, there are opportunities to leverage scientific research on its broad health benefits to promote the high-quality protein from dairy. Dairy protein may be of benefit for people who are trying to reduce their meat consumption, manage their weight, support their athletic participation or simply stay strong and active as they get older. Labeling and marketing claims through a variety of channels can help consumers recognize how dairy products and ingredients can help them achieve their personal goals.

Please note the following overview of health and nutrition benefits and claims for dairy products and ingredients is provided for informational purposes only.² The manufacturer is responsible for compliance with all applicable federal regulations, and for ensuring the truthfulness and validity of all labeling and advertising claims, based on industry standards set forth by the U.S. Food and Drug Administration (FDA), the Federal Trade Commission (FTC) and other governing agencies.

Current research on higher intake, timing of intake and quality of protein

² Information herein provided is for informational purposes only. The Dairy Research Institute expresses no opinion about the suitability of the information for use and suggests that any recipient obtain appropriate expert advice with regard to any statements or information herein contained. Although efforts are made to ensure that the information is complete and accurate, the Dairy Research Institute, its officers, employees and agents cannot and do not offer any representation or warranties, express or implied, as to the accuracy, completeness, currency or suitability of the information provided, whether based on warranty, contract, tort or any other legal theory and whether or not advised of the possibility of such damages. In no event shall the Dairy Research Institute or its affiliates be liable for any damages whatsoever arising out of the use, inability to use or the resulting use of information herein provided. All damages, including without limitation direct or indirect, special, incidental, consequential or punitive are hereby excluded to the fullest extent allowed by law. Any and all liability for the content or any omissions from this information, including any inaccuracies, errors or misstatements is expressly disclaimed.

Achieving optimum amounts of protein

A growing body of scientific research indicates that some people may benefit from higher protein intakes — athletes and individuals who exercise regularly, people who are looking for ways to help manage their weight and older Americans.

Sports and exercise nutrition

Experts agree that athletes and people who exercise regularly may benefit from protein intakes above the minimum requirements. According to a position paper issued in 2009 by the American College of Sports Medicine, the American Dietetic Association and Dietitians of Canada,^{xi} daily protein for endurance and strength-trained athletes should be between 1.2 and 1.7 g per kg body weight (0.5 and 0.8 grams per pound of body weight).

Satiety and weight management

Diets higher in protein have been shown through scientific research to play a role in satiety, weight management and helping to maintain muscle during weight loss.^{xii} Consumers interested in increasing dietary protein for a satiety benefit or as part of their weight management plan may benefit from eating protein-containing foods such as meats, nuts, eggs and dairy foods. Including protein-fortified foods and beverages, such as shakes, bars, cereals, soups and puddings also can be a good way to incorporate protein throughout the day to reach their personal goals. As protein intakes at breakfast and snack times are the lowest, there are innovation opportunities for foods with higher protein from dairy foods and ingredients.

Healthy aging

After age 40, we can lose up to 1 percent of our muscle per year. Emerging research indicates that protein intakes higher than the RDA together with resistance exercise may help preserve muscle in older Americans. While this is an emerging area, there are opportunities to leverage scientific research on the general benefits of protein and promote the high-quality protein in dairy foods and ingredients. For example, dairy protein, including whey protein, contains all of the essential amino acids needed to help preserve muscles for healthy aging. For additional information, see the [Emerging Nutrition Research Related to Protein](#) section.

General guidelines for nutrient content claims about protein in foods and beverages

The nutritional content of a food or beverage can be one of the product's strongest selling points, and FDA-authorized *Nutrient Content Claims* can be used to inform consumers about the protein in foods and beverages. The FDA has established specific requirements for nutrient content claims that must be met in order to comply with food labeling regulations.

Brands can feature the protein content of their products on food labels, point-of-purchase materials and other communications. Some nutrient content claims that may be considered for dairy as a source of protein are described below.^{xiii}

Nutrient content claims

Milk, cheese, yogurt

- All forms of milk and most cheeses contain at least 5 grams of protein per reference amount,³ which qualifies for a “good source of protein” claim (variations: *contains, provides*).
- Many yogurts contain more than 10 grams of protein, which qualifies for an “excellent source of protein” claim (variations: *high in, rich in*).
- Factual statements about the amount of protein (e.g., 8 grams of protein) or the percent daily value (e.g., 15 percent Daily Value) also can be made.
- Comparative claims also are possible;⁴ e.g., *a serving of milk has as much protein as an egg*.

Products formulated with dairy foods and/or ingredients, such as whey protein

- Many products formulated with dairy foods and/or added protein qualify for “good source” or “excellent source” claims.

³ Reference amount customarily consumed as defined by FDA. 21 CFR 102.12/

⁴ Not preauthorized, thus manufacturer should have credible and reliable substantiation for the claim before going to market. All claims must be truthful and not misleading.

- Factual statements and comparative claims, as described above, also are possible.
- Products that contain at least 10 percent of the Daily Value more than other food may feature the following on their label: *Added protein, fortified with protein, protein enriched, plus protein, extra protein.*⁵

General guidelines for nutrient and health benefit messages for protein

Claims about the nutrition and health benefits of protein often fall into the regulatory category of structure/function claims — that is, claims about the role a nutrient plays in maintaining the normal structure or function of the body. It is important to note that, unlike for nutrient content claims, there are no FDA-authorized structure/function claims. Structure/function claims should be based on a scientifically supportable structural or functional role of the nutrient

All claims (including structure/function claims) must be truthful and not misleading, and must be substantiated by credible and reliable evidence. The responsibility to substantiate claims before they are in the marketplace lies with the manufacturer. Depending on the nature of the claim, substantiation may take the form of scientific research, consumer research and/or other types of evidence.

Some approaches to messaging to address key consumer trends

Following are discussions of some potential ways to approach messaging around the four key trends outlined in the previous section of this paper, with samples of messages and claims that are potential drivers of consumer interest related to each trend, and links to [relevant resources available through USDairy.com](#).

Potential claims related to emerging diets

Consumers today are exposed to a wide array of messages suggesting they should eat less meat and dairy, and consume more plant-based foods — and these messages can seem compelling. As discussed in the [Consumer Trends and Insights Related to Protein](#) section, some consumers are attracted by the idea that reducing consumption of animal products could somehow be a way to minimize their personal impact on the environment, and even more have the perception that a less meat-dependent diet would be more healthful. Decisions to cut consumption of meat and dairy products often are made without guidance on how to meet nutrient goals when these foods are eliminated or reduced.

Health experts agree that there is more to adapting one’s diet than simply substituting extra fruits and vegetables for the foods one is cutting back on. The most important thing when reducing or eliminating meat, eggs or dairy is that critical nutrients removed from the diet need to be obtained from other foods. “Watch-out” nutrients include protein, calcium, vitamin D, vitamin B12, zinc, iron, and sometimes iodine.^{xiii} Dairy is an important source of five of these seven nutrients: protein, calcium, vitamin D, vitamin B12, and zinc. Messages that highlight dairy’s value as a source of these critical nutrients may be especially appealing to consumers who have embraced less meat-centric diets and are looking to choose among alternative sources of protein.

As noted in the [Consumer Trends and Insights Related to Protein](#) section of this paper, one-fourth of consumers who are eating less meat are already consuming more dairy, and the majority is consuming at least the same amount.^{xiv} But other products like tofu, eggs and legumes come to mind more easily as sources of nonmeat protein. Because dairy already gets higher marks for taste than a lot of the competition, messages that heighten the saliency of dairy as a source of high-quality protein may help drive growth among this segment. Additional information can be found on the [Health and Wellness Consumer Trends: Protein and Local section of USDairy.com](#).

The [Dairy Research Institute](#) provides [regulatory resources](#) to help industry members. Regulatory and scientific insights for messaging and claims and links to regulatory guidance from FDA, FTC and others are available. Some sample messages from that resource⁶ include the following:

- Milk is a good source of protein. A diet higher in protein can help you feel fuller longer.

⁵See Quick Reference Guide — Nutrient Claims for Dairy Products for other labeling requirements for this claim.
<http://www.usdairy.com/DairyResearchInstitute/Pages/RegulatoryTools.aspx>

⁶Consultation with regulatory/legal experts is recommended before use of any sample messages or claims in labeling and marketing materials.

- Your body uses protein all day long. Try cheese, a good source of protein, to help get your protein throughout the day.
- Want to add protein to your diet? Yogurt is an ideal grab-and-go protein snack.

The Dairy Research Institute also has conducted [consumer message testing](#) across a wide range of claims. See the *Appendix* for additional information on consumer-tested messages and claims.

“Alternative protein” messages and claims that have scored well in consumer testing:

- Every serving of milk has as much protein as an egg.
- Don’t have protein on your plate? Milk with your meal is protein you can pour.
- Cheese is more than just calcium; it also provides protein your body needs to help stay healthy.
- Looking for a satisfying meatless meal? Add some low-fat cheese to help get protein your body needs. (Note: This claim scored below average among general population sample, but may be worth exploration among meat-reducers.)

Potential claims related to satiety and weight management

Diets higher in protein have been shown through scientific research to increase satiety, a feeling of fullness after or between meals.^{xiv} Dairy products, including those with added whey protein, can easily fit into a daily eating plan to help consumers achieve higher-protein diets and meet their personal weight management goals. The [Dairy Research Institute](#) provides [regulatory resources](#) to help industry members. Regulatory and scientific insights for messaging and claims and links to regulatory guidance from FDA, FTC and others are available. Some sample messages from that resource⁷ include the following:

[Satiety](#)

A large body of scientific research provides support for messages and claims based on diets higher in protein. Dairy products, many of which are a good source of protein, and foods with whey protein can help build diets higher in protein.

- Protein is more satiating than carbohydrates or fats.
- Diets higher in protein can help curb hunger.
- Whey protein, as part of a diet higher in protein, can help you feel fuller.

[Weight management](#)

Research has also shown that diets higher in protein can help in weight management and can fit into weight loss and weight management plans.

- Diets higher in protein can fit in your weight loss plan.
- Diets higher in protein, including whey protein-containing foods, can fit into your weight maintenance plan.

[Energy/calorie intake](#)

Snacks or meals with higher protein — generally greater than 40 grams of protein — may help to reduce calorie (energy) intake at the next meal.

- Meals or snacks with more than 40 grams of protein have been shown to decrease energy intake at the next meal.
- Consuming meals or snacks higher in protein may decrease intake at subsequent meals.

[Body composition](#)

Other research has shown that diets higher in protein can help to preserve lean body mass during and after weight loss by increasing fat loss, decreasing muscle loss or a combination of both.

- Diets high in protein may help preserve lean body mass during weight loss and during weight maintenance.
- Diets high in protein may help improve body composition during weight loss by either increasing fat loss, decreasing muscle loss or a combination of both.

⁷Consultation with regulatory/legal experts is recommended before use of any sample messages or claims in labeling and marketing materials.

Dairy Research Institute also has conducted [consumer message testing](#) across a wide range of claims (see *Appendix* for additional information on consumer-tested claims).

Satiety-related messages and claims that have scored well in consumer testing:

- Milk is a good source of protein. A diet higher in protein can help you feel fuller longer.
- A diet higher in protein can help you feel fuller longer. Milk is a good source of protein.
- Help curb hunger with a diet higher in protein. Cheese is a good source of high-quality protein.

Potential claims related to sports and exercise nutrition

Dietary protein is critical to build and maintain muscle. For athletes and people who engage in strength building and endurance exercises, experts agree that consuming protein after exercise can help boost muscle recovery and growth.^{xlvi,xlvii} During times of high physical activity, energy and macronutrient needs, including adequate protein intake, must be met to build and repair lean muscle. For athletes looking for foods and beverages to help achieve higher protein intakes, a nutrient content claim (e.g., 20 grams of protein) together with a benefit claim may be considered.

Leading sports and nutrition organizations also recognize the importance of overall good nutrition for an active lifestyle. The American Dietetic Association, the American College of Sports Medicine and Dietitians of Canada (2009) in a joint position paper point out that physical activity, athletic performance and recovery from exercise are enhanced by optimal nutrition. The recommended daily protein intakes for endurance athletes are 1.2 to 1.4 g/kg and for resistance and strength-training athletes are 1.2 to 1.7 g/kg. Thus, a 140-pound endurance athlete would need about 77 to 90 g/day, and a 140-pound strength-training athlete would need about 77 to 109 g/day.

Marketing messages and claims about the benefits of dairy proteins and ingredients for sports and exercise nutrition are possible on a wide range of products. The Dairy Research Institute provides regulatory resources to help industry members with messaging and claims. Some sample messages from that resource include the following:

Nutrient rich messages for milk, cheese and yogurt

- The protein naturally found in milk helps to build strong muscles for your active lifestyle.
- Cheese is more than just calcium; it also provides protein your body needs to help stay healthy.
- Snackable nutrition: naturally contains protein and calcium.

Milk/favored milk and exercise recovery

- Milk: Nature's sports drink.
- As part of a daily training diet, milk provides high-quality protein to help reduce muscle breakdown and stimulate growth.

Whey protein and muscle benefits

Sample claims that may be applied to products formulated with whey and other dairy proteins, when applicable, are:

- Whey protein, a high-quality protein, can help build and maintain muscle.
- As part of your weight training program, whey protein helps promote muscle repair and recovery after exercise.
- Consuming whey protein in combination with resistance exercise can boost the rate at which the body makes lean muscle.

Dairy Research Institute also has conducted [consumer message testing](#) across a wide range of claims (see *Appendix* for additional information on consumer claims).

Exercise-related messages and claims that have scored well in consumer testing:

- Not all proteins are equal. Milk has high-quality protein your muscles need for recovery after exercise.

- The natural protein in milk helps your muscles recover after a tough workout.
- Looking to add protein to your diet? Cheese is an ideal portable snack.

Potential claims related to healthy aging

Emerging research suggests that protein intakes higher than the RDA, together with resistance exercise, may help preserve muscle in older Americans,^{xlviii,xlix} but the vast majority of nutrition research has been conducted in healthy, young or middle-age individuals. While considerably less attention has been given to the needs of the aging population, additional research still is needed to determine the extent of the benefits of a higher-protein diet on healthy aging. Claims that specifically tie protein intake to healthy aging therefore should be approached with caution, as they may be difficult to substantiate until more work is done.

In the meantime, however, while this is an emerging area, there are opportunities to leverage scientific research on the general benefits of protein and to promote the high-quality protein in dairy foods and ingredients. For example, dairy protein, including whey protein, contains all the essential amino acids needed to help preserve muscles for healthy aging. For additional information, see the [Protein Science and Innovation](#) section.

Dairy Research Institute also has conducted [consumer message testing](#) across a wide range of claims (see the *Appendix* for additional information on consumer-tested claims).

Healthy aging-related claims that have scored well in consumer testing (Source: USDEC Healthy Aging Message Test Report), but that have not yet been fully supported by the current science:

- Protein from dairy helps to build and maintain the muscles that support your skeletal system and keep you mobile as you age. (Strong appeal for both 45- to 55-year-olds and those aged 55 to 65.)
- Dairy protein is a complete source of the amino acids needed for healthy muscles and healthy aging. (Strong appeal for 45- to 55-year-olds.)
- Protein from dairy can help slow muscle loss as you age so you can stay more active, longer. (Strong appeal for 55- to 65-year-olds.)
- Dairy protein helps to build and maintain muscle so you can take care of yourself and remain more independent as you age. (Strong appeal for 55- to 65-year-olds.)

Note: The above are sample claims that have been consumer tested for appeal but may not yet be fully supported by the existing science.

Protein Science and Innovation

This section provides a look at two emerging directions for nutrition research related to protein being pursued by the Dairy Research Institute, followed by an overview of some of the opportunities and challenges of using dairy proteins in application, and a somewhat more in-depth discussion of the use of dairy proteins in specific product applications. It also briefly outlines some potential future opportunities for dairy protein innovation in the global market.

Emerging nutrition research related to protein

The Dairy Research Institute continues to develop the scientific support for the nutritional importance of consuming dairy and dairy proteins across the adult life span. Current protein research efforts include investigating the benefits of dairy vs. nondairy protein intake on outcomes such as body composition, metabolic health, bone health, and physical performance in young and old individuals. In addition to researching these benefits of dairy protein consumption, the Dairy Research Institute also is investigating the optimal timing of protein intake throughout the day.

Timing of protein intake (protein throughout the day)

Emerging research suggests that spreading protein consumption throughout the day might improve both satiety as well as the signals for making muscle.

Young adults can maximize the signal for muscle building when consuming at least 20 grams of a high-quality

protein, such as whey protein, following resistance exercise.ⁱ Research indicates that older individuals can reach similar rates of muscle protein synthesis if they consume adequate levels of protein in a meal, approximately 25 to 30 grams.ⁱⁱ

However, the current eating pattern in America may not be optimal to maximize the benefits from protein. Currently, Americans' eating pattern consists of a small protein intake at breakfast, slightly more protein at lunch and a much higher-protein dinner. Experts in the field suggest it would be more beneficial to spread the protein intake through the day in order to reach those optimal protein amounts (~20-30 g) at each meal.^{ii,iii}

The researchers hypothesize that by increasing protein at breakfast and lunch, daily rates of muscle protein synthesis will be higher because protein needs will be met at each meal three times a day instead of once or twice. Experts also suggest that satiety, feeling fuller longer, will improve, as calorie for calorie, protein is more satiating than carbohydrate or fat.ⁱⁱⁱ

Preliminary research supports the hypothesis as both muscle protein synthesis and satiety are improved by spreading protein ingestion evenly during three meals compared with the typical meal pattern.ⁱⁱⁱ Other researchers, including one funded by the Dairy Research Institute, also are currently exploring the benefits of evenly spreading protein consumption through the day.

Healthy Aging

The benefit of dietary protein for healthy aging is another emerging area of nutrition research. As we age, an estimated 30 percent of people older than 60 and 50 percent of those over 80 may experience a loss of muscle mass, function and strength,^{liv} which may lead to an increased risk of falling and injury. It has been reported that after the age of 40, we lose up to 1 percent of our muscle mass each year.^{lv}

As the oldest baby boomers have now reached 65 years of age, not only will the older population swell in size, but their desired activity level appears to be quite high.^{lvi} Due to this group's size, the Census Bureau estimates that by 2025 the elderly population in the United States is expected to be about 80 percent larger than in 2000.^{lvii} But the vast majority of nutrition research has been conducted in healthy, young or middle age individuals, while considerably less attention has been given to the needs of the aging population.

As previously mentioned, older individuals may not derive the same benefits from a similar level of protein intake compared with younger adults. This is possibly due to a decrease in muscle sensitivity as we age.^{lviii,lix} Thus, for the same benefit, older adults may need to consume more protein than young adults. This hypothesis is supported by emerging research, which indicates that older individuals may need to eat more than the Recommended Daily Allowance for protein to attain optimal benefits.^{lv,lix}

Benefits of higher-protein diets in older adults have been suggested in a large cross-sectional study of community-dwelling older adults. Researchers found that those with higher protein intakes lost about 40 percent less lean mass than those consuming up to the RDA for protein.^{lxi} Similarly, in a five-year investigation of 862 elderly women, researchers found that whole body and appendicular lean mass, as well as upper arm muscle area was approximately 5 to 6 percent higher in women consuming a higher- (>87 g/day) compared with a lower- (<66 g/day) protein diet.^{lxii}

While the emerging research is promising, additional longitudinal research is still needed to determine the extent of the benefits of a higher-protein diet on healthy aging.

Protein from dairy, such as whey, is a high-quality, complete protein containing all of the amino acids and it has been shown to help build and maintain muscles. This means it may also provide benefits to an aging population. The Dairy Research Institute is currently funding several clinical trials to identify and understand the beneficial effects of a higher-protein diet, achieved via dairy protein consumption, on healthy aging.

Opportunities and challenges of using dairy in food applications

Overview of protein ingredients

Dairy proteins are versatile, multifunctional proteins, which is evident by their wide use in a variety of foods and beverages.

Dairy proteins include a long list of ingredients derived from both milk and whey:

- Dairy protein ingredients manufactured from milk include nonfat dry milk (NFDM), milk protein concentrate (MPC), milk protein isolate (MPI), micellar casein, sodium and calcium caseinates, rennet casein, acid casein and native whey (serum proteins). Rennet and acid casein are primarily used in process cheese and have very poor water solubility, so for the majority of food applications, they are not the protein of choice.
- Dairy protein ingredients manufactured from whey include whey protein concentrate (WPC), whey protein isolate (WPI), and individual whey proteins such as glycomacropeptide, alpha-lactalbumin, beta-lactoglobulin, lactoferrin and lactoperoxidase.^{lxiii}

Both milk and whey protein ingredients can undergo modifications such as protein hydrolysis to further enhance their functional and nutritional properties.

Dairy proteins consist of two different types of proteins; caseins and whey proteins. The casein proteins consist of four different types α , β , κ and γ casein. The whey proteins include α -lactalbumin, β -lactoglobulin, bovine serum albumin, immunoglobulins, glycomacropeptide, lactoferrin and lactoperoxidase.^{lxiv}

The protein in milk consists of roughly 80 percent casein and 20 percent whey protein.

- Milk protein ingredients such as NFDM, MPC and MPI will contain varying levels of total protein, but for most, that 80:20 ratio of casein to whey protein is still maintained. NFDM contains 35 percent total protein while MPC can contain 42 to 89 percent protein and MPI contains a minimum of 90 percent protein.
- Whey protein ingredients, such as WPC and WPI, consist only of whey proteins at varying levels. The protein content of WPC ranges from 34 to 89 percent while WPI has a minimum of 90 percent protein.

Caseins and whey proteins are very different structurally, so they also function differently in food applications. Understanding their functional differences helps in the selection of the dairy protein ingredient that fits best with the processing and formulation of a food application.

- Caseins are larger than whey proteins and have a random coil structure. They are very heat stable, which makes them ideal for ultra high temperature (UHT) and retort processed beverages. Caseins also have good water solubility and water-binding properties above pH 6. They are good at fat emulsification and will form gels under acid conditions such as in yogurt or cheese manufacture.
- Whey proteins are smaller and have an ordered, globular structure. Whey proteins are heat sensitive and will denature (unfold) with heat starting at temperatures above 140°F (60°C). Whey proteins are known for their good solubility over a wide pH range, from 2 to 10.

Dairy proteins in specific product applications

Dairy protein ingredients like NFDM, WPC and MPC began their use in food as multifunctional ingredients to provide benefits such as water binding, gelling, foaming and emulsification. As the processes to make higher-protein ingredients were more widely adopted and food trends began to favor more protein-enhanced foods, dairy proteins gained importance as part of these new products.

Dairy proteins are now widely used in protein-enhanced foods of all types, but especially in beverages and nutrition bars. It is common to find both milk and whey protein ingredients used alone or in combination with other proteins in these two key applications. Both application areas have unique processing parameters and functional needs from the protein ingredients, which we will explore in more detail below.

High-acid beverages

Beverages are a diverse category that covers a wide pH range, a wide range of temperature processing, and a wide variety of textures and flavors. Beverages typically range in pH from 3 to 7, or from what is typically called high acid to low acid. The pH typically dictates the type of heat processing that is used to obtain a shelf stable product.

Some protein-enhanced beverages are refrigerated. These tend to go through a typical milk pasteurization process, which yields a relatively short shelf life — similar to milk or slightly longer. But the majority of protein-enhanced drinks are made using a hot fill, UHT or retort process to give them shelf stability for one to two years without refrigeration.^{lxv}

The drinks using hot fill conditions are generally in the pH range of 2.8 to 4.5, and it is in this range that whey protein ingredients will perform best. Typical drinks in this category are clear sports drinks, juice-and-protein drinks, smoothies and protein-enhanced waters. It is possible to obtain an end product with up to 2 grams of protein per ounce (or about 7 percent protein), with good heat stability using a whey protein isolate in a high-acid beverage (pH less than 3.5) or a hydrolyzed whey protein ingredient in a beverage with pH from 3.5 to 4.5. It is important to note that whey protein isolates or native whey protein concentrates or isolates are the only dairy protein ingredients that will provide the clarity and heat stability desirable in a clear sports drink or protein-enhanced water.

The most critical step to ensure good heat stability when using a dairy protein ingredient in a beverage application is to hydrate the ingredient prior to heat processing. Whey protein ingredients should be mixed in well with a high-speed mixer and then allowed to hydrate for 30 minutes in water that's no warmer than 140°F. Ambient-temperature water therefore works well for hydrating whey proteins. If in the final product there is settling of protein in the drink container, a chalky mouth-feel in the beverage and/or a lack of clarity in a clear drink, this is evidence of possibly inadequate hydration time.

Low-acid beverages

Drinks that are made in the pH range from 5.5 to 7.0 include coffee drinks, meal replacement drinks and sport shakes. These products tend to have protein levels similar to those in high-acid beverages, but to obtain shelf stability they generally require UHT or retort processing, both of which are higher-temperature processes than the hot fill process often used for high-acid drinks.

Casein-based ingredients such as MPC, MPI, caseinates and micellar casein have better heat stability than whey proteins at these higher pH levels and hotter temperatures. For this reason, it is common to see milk protein ingredients (used either alone or in combination with whey protein ingredients) in protein-enhanced beverages in the neutral pH range (6 to 7).

Hydration of milk protein ingredients such as MPC prior to heat processing is just as important as it is for whey proteins. It is recommended to use water or milk from 90 to 140°F for at least 30 minutes, as drinks in the neutral pH range can suffer from the same stability issues as the high-acid drinks without sufficient hydration of the milk protein ingredients.

Nutrition bars

Protein-enhanced nutrition bars, valued by consumers for their compactness, portability and convenience, are an application in which dairy proteins are ubiquitous.

Unlike protein-enhanced beverages, protein bars are often cold extruded, which means they don't go through a heat process in manufacture. Instead, the shelf life of these bars is primarily achieved through the use of ingredients that help control water activity, as well as packaging with low permeability to water and air.

A typical protein-enhanced bar has a shelf life of one year, so maintaining the texture of the bar throughout shelf life can be a challenge, as the bars often become harder and chewier over time. Using a combination of proteins that behave differently as they age is one way to minimize that undesirable change.

For this reason, milk protein and whey protein ingredients are commonly used in combination in bars, and they're also often combined with other proteins like soy. Formulators have developed some all-whey protein bars, but these are the exception.

As mentioned above, modifications like protein hydrolysis can enhance the functional and nutritional properties of dairy proteins, and hydrolyzed whey protein^{lxvi} has proved a useful ingredient in this application. Dairy proteins tend to bind water over time, which contributes to the harder texture of nutrition bars as they age. But using a low level of hydrolyzed whey protein (1 to 2 percent addition) can help decrease water binding and minimize the increase in bar hardness.

Other opportunities for dairy ingredient applications

Dairy proteins can be used to enhance the nutritional value of a wide variety of foods, including cereals, yogurts, salty snacks, frozen desserts, baked products and more.

For consumers who could benefit from increased protein intake, but who are not attracted by “specialty” products such as protein shakes and nutrition bars, protein enhancement of more familiar foods could be a real plus. We've already begun to see growth in this arena, and there is undoubtedly room for more.

That having been said, it also should be noted that using dairy ingredients may offer advantages to manufacturers that extend beyond just protein enhancement per se.

As consumers become increasingly suspicious of “chemical-sounding” ingredients on their food labels, ingredient names like “mono- and diglycerides,” “xanthan gum” and even “caseinate” may dampen the appeal of products that contain them. Dairy proteins often can replace one or more of these ingredients, providing good product functionality such as emulsification or water-binding properties and ingredient names that include words such as “milk” and “whey” instead of off-putting strings of unfamiliar syllables.

Food companies that are listening closely and working to respond to their consumers' interests may find increasing value in familiar-sounding, functional, nutritious dairy protein ingredients

Global innovation for growth

As the world market for protein expands, so do global growth opportunities for dairy proteins, both in developing countries and mature markets. Ingredient and product innovation will be key to driving that growth.

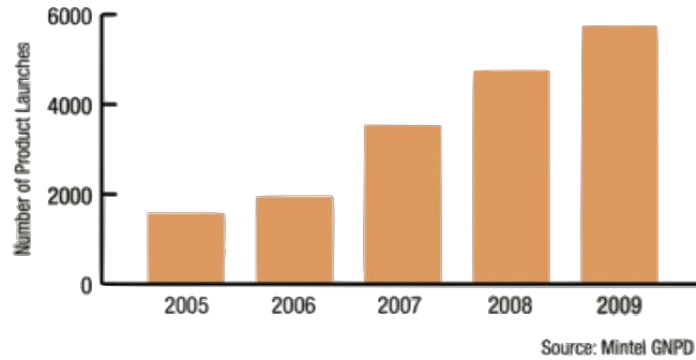
In developing countries, reliable sources of protein can help improve the basic nutritional quality of the food available. Dairy proteins in these markets often are used for applications like infant formula, canned milk and baked goods. Especially in geographies where existing infrastructures may not support widespread refrigeration, dairy proteins including whey and dry milk powders can provide high-quality nutrition to people who might otherwise not easily get it. As noted in [The Opportunity for Protein](#) section, protein consumption goes up as economies develop, providing an inherent opportunity for growth in U.S. exports of dairy protein products and ingredients.

Established markets also represent opportunity for growth for dairy protein ingredients, as even well-fed consumers seek protein to improve health, wellness and performance. In response to demand for foods that can deliver specific health benefits, the functional food segment of health and wellness foods has been steadily increasing, and whey protein has become a choice ingredient for those products.^{lxvii} According to Mintel International, functional food and beverage product introductions worldwide more than tripled across a five-year span (Figure 36).

Figure 36

Trend in Worldwide Product Launches of Functional Foods and Beverages

FUNCTIONAL FOOD & BEVERAGE INTRODUCTIONS WORLDWIDE



©Bain & Company, Dairy Globalization – Threats, Opportunities and Implications, 2009. Research conducted in association with the Innovation Center for U.S. Dairy's Globalization Task Force.

Emerging technologies for producing concentrated dairy proteins will become increasingly important as global demand expands, as a variety of product applications will be needed to appeal to people with sometimes greatly varied taste preferences. To provide just one example, new processes for extracting whey protein directly from milk create an end product with several advantages over whey that has undergone the cheese-making process. With fewer variables involved, fewer heat pasteurization steps and extremely low fat, even at high-protein concentrations, whey proteins fractionated directly from milk are more consistent, stable, soluble and bland, and offer functionality such as high foaming capability, greater clarity and strong gelation.

This and other emerging technologies will give food and beverage manufacturers more flexibility for creating protein-enhanced products across a broad array of applications and flavor profiles, to better meet differing nutritional needs and consumer preferences around the world. More information about global innovation opportunities for dairy protein is available from the [Innovation Center for U.S. Dairy](#).

Summary

- Emerging research suggests that spreading protein consumption throughout the day might improve satiety and the signals for making muscle.
- Researchers also hypothesize that older individuals may not derive the same benefits from a similar level of protein intake compared with younger adults. This is supported by emerging research, which indicates that older individuals may need to eat more than the Recommended Daily Allowance for protein to attain optimal benefits
- Protein from dairy, such as whey, is a high-quality, complete protein containing all of the amino acids, and it has been shown to help build and maintain muscles.
- Dairy proteins can be successfully used in a multitude of applications, and innovative new processes are enabling even broader uses.
- Dairy proteins can be used to address consumer needs in both developing and mature markets, whether to improve basic nutrition or to offer specific functional health benefits.
- Emerging technologies for dairy will give food and beverage manufacturers more flexibility for creating protein-enhanced products across a broad array of applications and flavor profiles, to better meet differing nutritional needs and consumer preferences around the world.

Conclusion

There is real opportunity, both globally and domestically, for dairy proteins to grow their presence as a source of high-quality protein. Inherent growth in developing markets presents significant opportunities for dairy exporters, and even in mature markets, several broad-reaching trends create possibilities for growth of dairy ingredients and products.

Dairy has tremendous nutrition credentials and has a taste advantage over many alternative protein sources, but consumers don't readily think of it when they're looking for sources of high-quality protein. If dairy can become more widely recognized for its protein contribution this should spur growth, but marketing and product innovations will be needed to realize that potential.

Communication to key consumer cohorts will be critical: People changing the way they eat to be less meat-dependent, people struggling to manage their weight without feeling hungry, athletes and exercisers of both genders, and the aging American population all may benefit from increasing their intake of dairy protein, but the dairy industry will need to show them how.

Appendix

Dairy and Protein: Consumer-tested messages^{lxviii, lxix, lxx}

Fifty-four percent of consumers are interested in getting more protein in their diets; however, they are largely unaware that dairy foods are a protein source. Dairy's inherent high-quality protein is an equity that is not being widely communicated to the consumer. There is an opportunity for the dairy industry to help better educate and market dairy foods as a high-quality source of protein that provides health and wellness benefits.

To provide a starting point for branded message development, dairy protein messages were created and tested to determine which sentiments generate the highest level of consumer interest for dairy protein in multiple benefit areas across multiple dairy categories: milk, chocolate milk, cheese, yogurt, whey protein, cottage cheese and Greek yogurt. Industrywide adoption and amplification of these messages would serve to build and reinforce consumers' awareness and belief in dairy as a protein source. Each protein message was given a final score based upon the feedback of the general population (18 years old +) respondents tested.

The information contained presents the results of the tested protein messages. For additional information and other resources related to the dairy and protein opportunity, please visit:

- [Innovation Center for U.S. Dairy Emerging Diets Presentation](#)
- [Innovation Center for U.S. Dairy Emerging Diets: Protein Dairy Opportunity Alert](#)
- [U.S. Dairy Export Council \(USDEC\)](#)
- [Understanding satiety](#)
- [Navigating protein and satiety messages](#)

Research methodology

- A total of 32 messages were created by the Innovation Center for U.S. Dairy Health and Wellness Committee. The messages tested included the following benefit areas:
 - General protein (14)
 - Lean muscle (3)
 - Recovery (4)
 - Alternate protein sources (2)
 - Satiety (7)
 - Weight management (2)
- Seven dairy product categories were tested: milk, chocolate milk, cheese, cottage cheese, yogurt, Greek yogurt and whey protein.
- The sample consisted of 500 consumers representative of the general population, adults 18 and older, living in the United States, purchased dairy products in the past 30 days, not allergic to dairy products, open to consuming dairy products and passed screening criteria for being health conscious.
- Each message was tested and scored based on seven criteria:
 - Composite Score Index (a relative measure calculated from a message's purchase interest and rating in the forced choice exercise)
 - Purchase Interest
 - Max Diff Choice Exercise
 - Impact on Purchase Frequency (more, less, about the same)
 - Believability
 - Perceived Taste
 - Uniqueness
- All research was conducted by Knowledge Networks via an online survey using Knowledge Networks' KnowledgePanel[®]. The research methodology provides an absolute measure of consumer interest in each of the messages and uses a maximum difference forced-choice exercise to measure the relative interest of each message compared with the others.

Top-scoring Messages

The following consumer-tested messages scored best, with composite scores above 100 and statistically above average for believability:

Topic	Message Delivered — Top-scoring Messages in Order of Highest Rank (≥100)	Composite Score	Regulatory & Scientific Insights (click link)
Satiety	Milk is a good source of protein. A diet higher in protein can help you feel fuller longer.	168	Regulatory resources for messaging Quick Reference Guide : A practical guide about nutrition claims and regulations Reference Guides & Scientific Backrounders* : Regulatory guidance and scientific insights for nutrition-based messages
Satiety	A diet higher in protein can help you feel fuller longer. Milk is a good source of protein.	152	
Exercise Recovery	Not all proteins are equal. Milk has high-quality protein your muscles need for recovery after exercise.	118	
General Protein	Every serving of milk has as much protein as an egg.	113	
Alternate Protein Source	Don't have protein on your plate? Milk with your meal is protein you can pour.	112	
Exercise Recovery	The natural protein in milk helps your muscles recover after a tough workout.	110	
General Protein	Cheese is more than just calcium; it also provides protein your body needs to help stay healthy.	190	
General Protein	Looking to add protein to your diet? Cheese is an ideal portable snack.	165	
Satiety	Help curb hunger with a diet higher in protein. Cheese is a good source of high-quality protein.	163	
General Protein	Your body uses protein all day long. Try cheese, a good source of protein, to help get your protein throughout the day.	154	
General Protein	Cheese is snackable protein.	148	
General Protein	Need an easy way to add protein to your child's diet? String cheese makes a quick and delicious snack.	133	
General Protein	Looking for an easy way to add protein to your child's diet? Yogurt makes a great snack that helps keep them satisfied.	106	
General Protein	Want to add protein to your diet? Yogurt is an ideal grab-and-go protein snack.	103	

Insights gained from top-scoring messages

- It appears that immediate opportunities exist with the messages that focus on general protein and satiety, as these message areas had the highest composite scores.
- Message areas that merit additional consideration due to high scoring status among consumers include:
 - Dairy as an alternate protein source
 - Dairy protein for exercise recovery
 - Messages emphasizing cheese as a source of protein (not just calcium)

Please contact us [here](#) for more information.

Inferred Messages

Though these messages were not tested for the dairy products listed above, they were inferred from top-scoring messages for other dairy products that have a similar nutritional profile for protein content. One can infer that these messages also will resonate with consumers.

Dairy Category Tested	Topic	Messages Were Not Tested For These Products, But Inferred From Top-scoring Messages	Regulatory & Scientific Insights (click link)
Milk	General Protein	Milk is more than just calcium; it also provides protein your body needs to help stay healthy.	Regulatory resources for messaging Quick Reference Guide : A practical guide about nutrition claims and regulations Reference Guides & Scientific Backgrounders* : Regulatory guidance and scientific insights for nutrition-based messages
	Satiety	Help curb hunger with a diet higher in protein. Milk is a good source of high-quality protein.	
	General Protein	Your body uses protein all day long. Try milk, a good source of protein, to help get your protein throughout the day.	
Cheese	Satiety	Cheese is a good source of protein. A diet higher in protein can help you feel fuller longer.	
	Satiety	A diet higher in protein can help you feel fuller longer. Cheese is a good source of protein.	
	Exercise Recovery	Not all proteins are equal. Cheese has high-quality protein your muscles need for recovery after exercise.	
	General Protein	Every serving of cheese has as much protein as an egg.	
	General Protein	Don't have protein on your plate? Cheese is protein you can add.	
	General Protein	Looking for an easy way to add protein to your child's diet? Cheese makes a great snack that helps keep them satisfied.	
	General Protein	Want to add protein to your diet? String cheese (cheese) is an ideal grab-and-go snack.	
Yogurt/ Greek yogurt	Satiety	Yogurt is a good source of protein. A diet higher in protein can help you feel fuller longer.	
	Satiety	A diet higher in protein can help you feel fuller longer. Yogurt is a good source of protein.	
	Exercise Recovery	Not all proteins are equal. Yogurt has high-quality protein your muscles need for recovery after exercise.	
	General Protein	Every serving of yogurt has as much protein as an egg.	
	Exercise Recovery	The natural protein in yogurt helps your muscles recover after a tough workout.	
	General Protein	Yogurt is more than just calcium; it also provides protein your body needs to help stay healthy.	
	General Protein	Looking to add protein to your diet? Yogurt is an ideal portable snack.	
	Satiety	Help curb hunger with a diet higher in protein. Yogurt is a good source of high-quality protein.	
	General Protein	Your body uses protein all day long. Try yogurt, a good source of protein, to help get your protein throughout the day.	
	General Protein	Yogurt is snackable protein.	
	General Protein	Need an easy way to add protein to your child's diet? Yogurt makes a quick and delicious snack.	

Please contact us [here](#) for more information.

Messages Scoring <100

Dairy Category	Topic	Additional Tested Messages	Composite	Regulatory & Scientific Insights (click link)
Yogurt	General Protein	Your body uses protein all day long. Try protein-rich yogurt to help get your protein throughout the day.	99	Regulatory resources for messaging Quick Reference Guide : A practical guide about nutrition claims and regulations Reference Guides & Scientific Backgrounders* : Regulatory guidance and scientific insights for nutrition-based messages
	General Protein	Start your child's day with the high-quality protein found in yogurt.	67	
Chocolate Milk	Lean Muscle	Looking to build lean muscle? The protein in chocolate milk provides the amino acid building blocks your body needs to develop lean muscle.	96	
	Exercise Recovery	After vigorous exercise, the powerful combination of carbs and proteins found in a serving of chocolate milk can help healthy muscle recovery.	95	
	General Protein	Giving your kids chocolate milk rather than other less nutritious beverage choices is an easy way to help them get the protein their growing bodies need.	95	
	General Protein	Looking for a healthy snack that will curb hunger? Fat-free chocolate milk has 8 grams of protein that really satisfies.	91	
	General Protein	To help fuel after-school activities, try chocolate milk. It has 9 essential nutrients, including protein for active kids.	79	
Cottage Cheese	Satiety	Diets higher in protein can help curb hunger between meals. Cottage cheese is an excellent source of protein.	91	
	Weight Management	On a diet? To help your body preserve lean muscle, try a higher-protein diet with cottage cheese.	59	
Cheese	General Protein	To help fuel after-school activities, try cheese. It has essential nutrients and high-quality, complete protein for growing bodies.	88	
	Alternate Protein Source	Looking for a satisfying meatless meal? Add some low-fat cheese to help get protein your body needs.	81	
*Whey Protein	Exercise Recovery	Muscle breaks down when you exercise. Whey protein, a protein from milk, can help you rebuild muscle.	50	
	Weight Management	Including whey protein as part of a higher-protein, reduced-calorie diet can improve the quality of your weight loss by helping maintain lean muscle.	46	
	Satiety	Calorie for calorie, whey protein, a high-quality dairy protein, can help you feel fuller longer than carbs or fat.	43	
	Lean Muscle	Whey protein is a complete source of the amino acids needed to build lean muscle.	37	
	General Protein	Need a great snack for the kids? Give them energy from a snack bar made with whey protein.	37	

Inferences from low-scoring messages

The relative appeal of these messages was lower with respondents who were tested (general population audience). All scored below 100, classifying them as “average” to “low” scoring messages. The lower scores may be a result of lower awareness and/or usage of these products among consumers in the marketplace. In cases such as this, it may be wise to “anchor” messages with familiar products (e.g., cheese and milk) and then extend to other dairy products with lower consumption rates, such as Greek yogurt, cottage cheese and whey. Additionally, some messages simply did not resonate as well as others.

Among a general population audience, knowledge and awareness of whey protein is relatively low. However, whey protein is well-known by other specific audiences, such as athletes and exercise enthusiasts. For more information and research about whey protein and specific audiences, visit [U.S. Dairy Export Council](#):

- [Understanding satiety](#)
- [Navigating protein and satiety messages](#)

Please contact us [here](#) for more information.

All Data

Dairy Category Tested	Topic	Dairy and Protein Messages	Composite Score
Cheese	Alternate Protein Source	Looking for a satisfying meatless meal? Add some low-fat cheese to help get protein your body needs.	81
Milk	Alternate Protein Source	Don't have protein on your plate? Milk with your meal is protein you can pour.	112
Whey Protein	Exercise Recovery	Muscle breaks down when you exercise. Whey protein, a protein from milk, can help you rebuild muscle.	50
Chocolate Milk	Exercise Recovery	After vigorous exercise, the powerful combination of carbs and proteins found in a serving of chocolate milk can help healthy muscle recovery.	95
Milk	Exercise Recovery	The natural protein in milk helps your muscles recover after a tough workout.	110
Milk	Exercise Recovery	Not all proteins are equal. Milk has high-quality protein your muscles need for recovery after exercise.	118
Cheese	Exercise Recovery	Not all proteins are equal. Cheese has high-quality protein your muscles need for recovery after exercise.	inferred
Yogurt/Greek Yogurt	Exercise Recovery	Not all proteins are equal. Yogurt has high-quality protein your muscles need for recovery after exercise.	inferred
Yogurt/Greek Yogurt	Exercise Recovery	The natural protein in yogurt helps your muscles recover after a tough workout.	inferred
Whey Protein	General Protein	Need a great snack for the kids? Give them energy from a snack bar made with whey protein.	37
Cottage Cheese	General Protein	Get ready to go by starting your day with the protein in low-fat cottage cheese.	57
Yogurt	General Protein	Start your child's day with the high-quality protein found in yogurt.	67
Chocolate Milk	General Protein	To help fuel after-school activities, try chocolate milk. It has 9 essential nutrients, including protein for active kids.	79
Cheese	General Protein	To help fuel after-school activities, try cheese. It has essential nutrients and high-quality, complete protein for growing bodies.	88
Chocolate Milk	General Protein	Looking for a healthy snack that will curb hunger? Fat-free chocolate milk has 8 grams of protein that really satisfies.	91
Chocolate Milk	General Protein	Giving your kids chocolate milk rather than other less nutritious beverage choices is an easy way to help them get the protein their growing bodies need.	95
Yogurt	General Protein	Your body uses protein all day long. Try protein-rich yogurt to help get your protein throughout the day.	99
Yogurt	General Protein	Want to add protein to your diet? Yogurt is an ideal grab-and-go protein snack.	103
Yogurt	General Protein	Looking for an easy way to add protein to your child's diet? Yogurt makes a great snack that helps keep them satisfied.	106
Milk	General Protein	Every serving of milk has as much protein as an egg.	113
Cheese	General Protein	Cheese is snackable protein.	148
Cheese	General Protein	Your body uses protein all day long. Try cheese, a good source of protein, to help get your protein throughout the day.	154
Cheese	General Protein	Looking to add protein to your diet? Cheese is an ideal portable snack.	165
Cheese	General Protein	Cheese is more than just calcium; it also provides protein your body needs to help stay healthy.	190
Cheese	General Protein	Every serving of cheese has as much protein as an egg.	inferred
Cheese	General Protein	Don't have protein on your plate? Cheese is protein you can add.	inferred
Cheese	General Protein	Looking for an easy way to add protein to your child's diet? Cheese makes a great snack that helps keep them satisfied.	inferred
Cheese	General Protein	Want to add protein to your diet? String cheese (cheese) is an ideal grab-and-go snack.	inferred

Dairy Category Tested	Topic	Dairy and Protein Messages	Composite Score
Milk	General Protein	Milk is more than just calcium; it also provides protein your body needs to help stay healthy.	inferred
Milk	General Protein	Your body uses protein all day long. Try milk, a good source of protein, to help get your protein throughout the day.	inferred
Yogurt/Greek Yogurt	General Protein	Every serving of yogurt has as much protein as an egg.	inferred
Yogurt/Greek Yogurt	General Protein	Yogurt is more than just calcium; it also provides protein your body needs to help stay healthy.	inferred
Yogurt/Greek Yogurt	General Protein	Looking to add protein to your diet? Yogurt is an ideal portable snack.	inferred
Yogurt/Greek Yogurt	General Protein	Your body uses protein all day long. Try yogurt, a good source of protein, to help get your protein throughout the day.	inferred
Yogurt/Greek Yogurt	General Protein	Yogurt is snackable protein.	inferred
Yogurt/Greek Yogurt	General Protein	Need an easy way to add protein to your child's diet? Yogurt makes a quick and delicious snack.	inferred
Cheese	General Protein	Need an easy way to add protein to your child's diet? String cheese makes a quick and delicious snack.	133
Whey Protein	Lean Muscle	Whey protein is a complete source of the amino acids needed to build lean muscle.	37
Chocolate Milk	Lean Muscle	Looking to build lean muscle? The protein in chocolate milk provides the amino acid building blocks your body needs to develop lean muscle.	96
Whey Protein	Satiety	Calorie for calorie, whey protein, a high-quality dairy protein, can help you feel fuller longer than carbs or fat.	43
Cottage Cheese	Satiety	Diets higher in protein can help curb hunger between meals. Cottage cheese is an excellent source of protein.	91
Milk	Satiety	A diet higher in protein can help you feel fuller longer. Milk is a good source of protein.	152
Cheese	Satiety	Help curb hunger with a diet higher in protein. Cheese is a good source of high-quality protein.	163
Milk	Satiety	Milk is a good source of protein. A diet higher in protein can help you feel fuller longer.	168
Cheese	Satiety	Cheese is a good source of protein. A diet higher in protein can help you feel fuller longer.	inferred
Cheese	Satiety	A diet higher in protein can help you feel fuller longer. Cheese is a good source of protein.	inferred
Milk	Satiety	Help curb hunger with a diet higher in protein. Milk is a good source of high quality protein.	inferred
Yogurt/Greek Yogurt	Satiety	Yogurt is a good source of protein. A diet higher in protein can help you feel fuller longer.	inferred
Yogurt/Greek Yogurt	Satiety	A diet higher in protein can help you feel fuller longer. Yogurt is a good source of protein.	inferred
Yogurt/Greek Yogurt	Satiety	Help curb hunger with a diet higher in protein. Yogurt is a good source of high-quality protein.	inferred
Whey Protein	Weight Management	Including whey protein as part of a higher-protein, reduced-calorie diet can improve the quality of your weight loss by helping maintain lean muscle.	46
Cottage Cheese	Weight Management	On a diet? To help your body preserve lean muscle, try a higher-protein diet with cottage cheese.	59

***Reference Guides and Scientific Backgrounders**

- Nutrient Rich Messages: Milk, Cheese and Yogurt
- Dietary Protein: Satiety, Weight Management, Energy/Calorie Intake, Body Composition
- Milk/Flavored Milk for Post-exercise Nutrition
- Whey Protein and Muscle Benefits

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