A Sporting Choice

Milk and whey for sports nutrition and beyond.

BY KELLY KESTER AND MATTHEW PAHNKE, PHD

How about a tall glass of chocolate milk after an intense workout? Or perhaps a protein-rich snack? Athletes increasingly are looking to dairy products to support their active lifestyles. Both milk and whey protein, a high-quality protein naturally found in dairy, complement a healthy training diet and enhance an exercise-specific nutrition plan. With health and sports organizations highlighting nutrition as a crucial component of reaching peak exercise performance levels, milk and whey provide the nutrient profile to help meet daily as well as post-exercise nutrition recommendations.

Fueling Up to Enhance Physical Performance

With physical fitness in mind, the American College of Sports Medicine and the American Heart Association recommend moderate-to-vigorous aerobic activities, such as brisk walking, bicycling, running, and swimming, in addition to a regular strength-training program (see Table 1 on page 46). Despite publicly held knowledge on the importance of physical activity, only 16% of Americans 15 years and older currently achieve the recommended levels of activity, according to the Bureau of Labor Statistics. Interestingly, 60% of those who meet the recommendation exercise for an hour or longer on an average day. While nutrition is important to maintaining optimal health for all individuals, meeting specific dietary needs is important for these active individuals to support their active lifestyle.

Organizations such as the American College of Sports Medicine and the International Olympic Committee have publicly supported the importance of smart food and beverage choices for overall health during training and as part of a post-workout nutrition program. In their joint position statement, Nutrition and Athletic Performance, the American College of Sports Medicine, the American Dietetic Association, and Dietitians of Canada state that physical activity, athletic performance, and recovery from exercise can be enhanced by proper nutrition. Consuming daily recommendations for energy and macronutrients—in particular carbohydrates and protein—are necessary for maintaining body weight, replenishing glycogen stores, and building and repairing tissues. These foods are especially important during periods of high physical activity. Choosing a post-exercise snack or beverage that contains carbohydrates to help refuel muscles, high-quality protein to help reduce muscle breakdown and stimulate muscle growth, and fluid and electrolytes for rehydration can further enhance physical performance by improving exercise recovery (see Table 2 on page 47).

Milk: Nature's Sports Drink

Milk, a wholesome, nutrient-rich beverage, delivers these key dietary components recommended by health and fitness organizations for exercise recovery and provides nine essential nutrients for overall health. "Milk: the new sports drink? A Review," published in the *International Society for Sports Nutrition,* concluded that milk is an effective post-exercise nutrition beverage. For those participating in prolonged endurance activities, milk is an excellent rehydration beverage, as it naturally contains fluid and electrolytes that are lost in sweat during exercise. Although there are many rehydration beverage choices available, emerging research from the *British Journal of Nutrition* and the *European Journal of Applied Physiology* suggests that milk may be even more effective than water or traditional sports drinks at maintaining hydration after exercise. Furthermore, consuming chocolate milk, rather than white milk, may be the optimum choice to refuel muscles following prolonged or intense exercise due

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to the slightly higher carbohydrate content.

Additional research published in the *American Journal of Clinical Nutrition* found that consuming milk immediately after a resistance-training session increased muscle protein synthesis to a greater extent than a soy beverage. When consumed regularly during a 12-week resistance-training program, milk resulted in greater increases in muscle mass compared with both a soy and a carbohydrate beverage.

In addition to improving post-exercise recovery, a glass of milk, either white or chocolate, after a workout is a great way for athletes and active individuals to come closer to achieving the three daily servings of dairy recommended by the 2010 Dietary Guidelines for Americans. Because many adults consume only about half of the recommended three servings of dairy, milk as a post-exercise beverage can help achieve recommended intakes of key nutrients for overall health while also enhancing post-exercise recovery.

A Different "Whey" to Refuel

Not only can whole dairy products such as milk be a valuable part of a training diet, but dairy proteins can also play an important role. Many foods contain protein, but the amount, type, and quality of proteins vary. High-quality proteins, such as those in milk, cheese, and yogurt, supply the complete range of essential amino acids the body needs to build and maintain muscle. Whey protein is a fraction of dairy proteins found in milk and other dairy products and has a very high biological value compared with other protein sources. Whey protein is easily absorbed and utilized by the body, making whey an ideal protein to consume after exercise to promote muscle repair and recovery.

Whey protein is one of the best sources of the branched chain amino acid leucine, which has been found to uniquely act as a nutrient signal to "turn on" or initiate muscle protein synthesis.[1] When combined with strength training, research has shown that whey protein can help boost the rate at which the body makes lean muscle. This response is maximized when at least 20 g of high-quality protein, such as whey, is consumed after exercise.[2] Researchers at McMaster University showed that when young men consumed whey protein following a single bout of resistance exercise, muscle protein synthesis increased to a greater extent compared with other protein sources. For athletes and active individuals seeking optimal benefits from a workout, choosing high-quality protein, such as whey protein, can make a difference in post-exercise recovery. In addition to its nutritional benefits, whey protein is a versatile product that easily fits an active lifestyle.

Innovative Opportunities for Dairy

Scientific research continues to recognize dairy foods and dairy ingredients, such as milk and whey protein, for their value to a healthy

Physical Activity Recommendations

Type of Exercise	Recommendation
Moderate Aerobic Activity	30 minutes, 5 days/week
Vigorous Aerobic Activity	20 minutes, 3 days/week
Strength-Training Activity	8 to 10 exercises, 8 to 12 repetitions, 2 days/week

Table 1. SOURCE: AMERICAN COLLEGE OF SPORTS MEDICINE AND AMERICAN HEART ASSOCIATION

Sports Nutrition Recommendations	
Protein	Daily: 1.2 to 1.7 g per kg body weight per day for endurance- and strength-training athletes
	Post-exercise: consuming after exercise will provide amino acids for building/repairing muscle tissue
Carbohydrate	Daily: 6 to 10 g per kg body weight per day
	Post-exercise: 1.0 to 1.5 g per kg body weight during first 30 min and every 2 hr for 4 to 6 hr
Electrolytes	Consuming food/drink with sodium helps speed rehydration and stimulates thirst after exercise
Fluids	16 to 24 fl oz for each pound of body weight lost during exercise to restore fluid balance

Table 2. SOURCE: AMERICAN COLLEGE OF SPORTS MEDICINE, AMERICAN DIETETIC ASSOCIATION, AND DIETITIANS OF CANADA

diet and post-exercise recovery. Interest in dairy provides opportunities for the food and beverage industry to reach consumers who are looking for ways to enhance the benefits of a physically active lifestyle. While milk may be more familiar to consumers, adding whey protein powder is a convenient way to increase the protein in a smoothie and can be paired with milk for a dairy-powered snack. Manufacturers also can add whey protein to products such as nutrition bars, yogurt, and oatmeal to give them a high-quality protein boost and help individuals reach their dietary nutrition goals.

With consumers looking for ways to enhance their active lifestyle, there is a tremendous opportunity for innovation within the food and beverage industry to leverage milk's nutrient package and whey as a functional ingredient. Resources, including updates on the latest research, are available at www.USDairy.com and www.Innovate-WithDairy.com.

References:

1. Anthony JC, et al., "Leucine stimulates translation initiation in skeletal muscle of postabsorptive rats via a rapamycin-sensitive pathway," J Nutr. 2000;130(10):2413-2419.
2. Moore DR, et al., "Ingested protein dose response of muscle and albumin protein synthesis after resistance exercise in young men," Am J Clin Nutr. 2009;89:161-168.

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