



# HIGH-QUALITY PROTEIN

- Natural source of high-quality protein to build lean muscle.
- The right carb-to-protein ratio scientifically shown to refuel and rebuild exhausted muscles.
- Vitamin A to support a healthy immune system and normal vision.
- Electrolytes including calcium, potassium, sodium and magnesium to help replenish what's lost in sweat.
- B vitamins for energy.
- Fluids to rehydrate.
- Calcium, vitamin D, phosphorus, protein and potassium to build and maintain strong bones and help reduce the risk for stress fractures.



## REBUILD YOUR MUSCLES

With 8 grams of high-quality protein in each 8 ounces, chocolate milk has protein athletes need to help rebuild muscles.

- Studies have found that subjects who drank regular or flavored milk after a rigorous workout experienced less exercise-induced muscle damage than those who drank typical sports drinks or water.<sup>1,2</sup>  
In one recent study, post-exercise muscle biopsies in eight moderately trained male runners showed enhanced skeletal muscle protein synthesis after drinking 16 ounces of fat-free chocolate milk compared to when they drank a carbohydrate-only sports beverage with the same amount of calories. This enhancement is a sign that muscles were better able to repair and rebuild.<sup>3</sup>
- In one study, healthy untrained volunteers were randomly assigned to receive a drink containing either different types of milk protein – casein, whey protein or placebo one-hour after performing a bout of resistance training. Consumption of both types of milk protein were found to bring about a similar positive net muscle protein balance, indicating that whole protein consumption can stimulate muscle protein synthesis after resistance exercise which over time could lead to increased muscle size and strength.<sup>4</sup>
- Researchers have also hypothesized that a combination of "slow" and "fast" proteins like casein and whey, both found in dairy milk, would be most effective for building muscle. Eight volunteers drank fluid milk or a soy protein beverage – equal in protein, carbohydrates, fat and calories – after a bout of weight lifting. The researchers found that while both protein beverages (soy or milk) resulted in a positive net muscle protein balance and more muscle protein synthesis, milk consumption after exercise resulted in a greater net muscle protein balance, and 34 percent more muscle protein synthesis compared to soy.<sup>5</sup>

# REFUEL YOUR BODY

- After a tough workout, chocolate milk helps restore muscles quickly to their peak potential and helps replenish what your body has lost – including fluids and critical nutrients lost in sweat.
- Chocolate milk is a natural choice when it comes to electrolytes, providing many of the same electrolytes that are added to commercial recovery drinks (calcium, potassium, sodium and magnesium) along with fluids to help you rehydrate. In fact, some research suggests milk may help you stay hydrated after exercise, more than some commercial sports drinks.
- Replacing muscle fuel (glycogen) after exercise is essential to an athlete's recovery. A recent study found that drinking 16 ounces of fat-free chocolate milk with its mix of carbohydrates and protein (compared to a carbohydrate-only drink with the same amount of calories) led to greater concentration of glycogen in muscles at 30 and 60 minutes post-exercise.<sup>1</sup>
- In a study of 13 male college soccer players, post-exercise consumption of lowfat chocolate milk was found to provide equal or possibly superior muscle recovery compared to a high-carbohydrate recovery beverage with the same amount of calories following a four-day period of intensified soccer training.<sup>2</sup>
- Drinking lowfat or fat-free milk after exercise could restore hydration better than other popular post-exercise beverages, according to one study. The study compared the rehydration effectiveness of four beverages: lowfat milk, lowfat milk with added sodium, water and a sports drink. After exercise in a warm climate, participants were given one of the four test beverages and the researchers measured hydration status. While all beverages restored hydration status equally, the researchers found that milk may be more effective than water or sports drinks at maintaining normal hydration status after exercise, likely due to milk's electrolyte content and energy density.<sup>3</sup>
- In a second study, the same researchers found that drinking fat-free milk after exercise-induced dehydration restored fluid balance better than a commercial sports drink. The researchers concluded that “milk can be an effective post-exercise rehydration drink, with subjects remaining in net positive fluid balance throughout the recovery period.”<sup>4</sup>  
Drinking milk after exercise can also help replace essential electrolytes that are lost in sweat. These essentials include potassium, sodium, magnesium and calcium. The loss of calcium is of particular concern since research suggests rigorous exercise may cause substantial calcium loss, which could increase the risk of stress fractures.<sup>5-7</sup>

# PROTEIN HELPS **BUILD** LEAN MUSCLE



- Milk and milk's high-quality protein has been shown to help athletes gain more lean muscle and lose fat when compared to drinking a carb-only beverage, as part of a regular workout and recovery routine.
- In a study of healthy, untrained men, those who consumed fat free milk after exercise gained more muscle and lost more body fat at the end of a 12-week training program than those who drank a soy protein beverage or a carb-only beverage. All three beverages had the same amount of calories.<sup>1</sup>
- Another similar study in women found that including fat free milk in a recovery routine during a 12 week training program, resulted in greater muscle mass, strength gains, fat loss, and even a potential protective effect on bone health, compared to a carb-only sports drink with the same calories. The researchers suggested that "milk is an effective drink to support favorable body composition changes in women with resistance training."<sup>2</sup>
- In another University of Texas at Austin study, 32 healthy but untrained cyclists who recovered with lowfat chocolate milk gained more muscle and lost more fat during training, with a 3 pound lean muscle advantage, compared to athletes who recovered with a carbohydrate drink.<sup>3</sup>



## PERFORM YOUR BEST

Some studies suggest drinking lowfat chocolate milk after a strenuous workout could help athletes boost power and even improve training times in their next bout of exercise later that same day, compared to when they drink a carbohydrate sports drink.

- Recovering with fat free chocolate milk after a hard workout helped recreational runners build more muscle, reduce debilitating muscle breakdown and run longer compared to when they recovered with a carbohydrate drink, according to a new study in the journal *Medicine & Science in Sports & Exercise*. When the runners drank fat free chocolate milk after a strenuous run, on average, they ran 23% longer and had a 38% increase in markers of muscle building compared to when they drank a carbohydrate-only sports beverage with the same amount of calories.<sup>1</sup>
- An Indiana University study found endurance-trained cyclists who drank lowfat chocolate milk after an intense period of cycling were able to work out longer and with more power during a second exercise period compared to when the same athletes drank a commercially available carbohydrate replacement drink, and just as long as when they consumed a traditional fluid replacement drink.<sup>2</sup>
- In another study, after an initial exercise and recovery, cyclists were able to cycle 51% longer during a second bout of exercise after drinking chocolate milk than after drinking a carbohydrate replacement drink with the same number of calories.<sup>3</sup>
- Researchers at the University of Texas at Austin found that following an exhausting ride, trained cyclists had significantly more power and rode faster, shaving about six minutes, on average, from their ride time when they recovered with lowfat chocolate milk compared to a carbohydrate sports drink or calorie-free beverage.<sup>4</sup>
- In a recent study, 32 healthy but untrained cyclists who recovered with lowfat chocolate milk had twice the improvement in VO<sub>2</sub>max—a measure of aerobic fitness and adaptation—after a 4.5 week cycling regimen—compared to athletes who grabbed a carbohydrate drink.<sup>5</sup>
- In a new study, researchers found that when six division one collegiate swimmers recovered with reduced fat chocolate milk after an exhaustive swim, they swam faster in time trials later that same day. On average, they shaved off 2.1 seconds per 200 yard swim, and 0.5 seconds per 75 yard sprint, compared to when they recovered with a traditional carbohydrate sports drink or calorie-free beverage.<sup>6</sup>

BUILD it. | got chocolate milk?



## TIPS FROM THE EXPERTS

BUILT WITH CHOCOLATE MILK teamed up with Nancy Clark, MS, RD, CSSD to share some tips for optimizing your post-workout nutrition.

- After exhaustive endurance exercise, your body needs time (24-48 hours) to adequately carbo-reload and replace your depleted glycogen stores. Be sure to take adequate rest days.
- Hydrate, hydrate, hydrate! Learn your sweat rate by weighing yourself with minimal clothing before and after one hour of sweaty exercise. One pound of sweat loss equals 16 ounces of fluid loss. At your next workout, you'll know how much you need to drink to prevent the loss of that fluid.
- Pre-exercise fuel will not only help you have a better workout but will also keep your recovery needs down. Within an hour and a half or two before you exercise, fuel up with 300-500 calories of carbs and proteins (as tolerated) such as oatmeal with lowfat milk, or toast with peanut butter and a banana. The closer you get to your workout, one hour or less, fuel up with a higher ratio of carbs than protein.
- If your training session will exceed 60 to 90 minutes, make sure to consume some fuel during the exercise to help maintain your energy! Popular mid-workout snacks include dried pineapple, fig cookies or jelly beans. Experiment during training to learn what works best with your body.
- After exercise, your body wants an adequate supply of protein to reduce muscle breakdown and stimulate growth, carbohydrates to refuel depleted muscle glycogen, and fluid and electrolytes to rehydrate the body and replenish what's lost in sweat. Plan ahead so you can eat well by having the right foods readily available at the right times. You cannot out-train a poor sports diet!
- How you refuel after strenuous exercise can make a difference in how well you can perform during your next workout. Lowfat chocolate milk offers the right balance of carbs and protein and has been scientifically shown to effectively refuel exhausted muscles.