CHOCOLATE MILK SCIENCE BACKGROUNDER

What's in Chocolate Milk?
Lowfat chocolate milk has 9 essential nutrients that an athlete needs, including some not typically found in recovery drinks.

Chocolate milk's liquid assets:

- A **natural source of high-quality protein** to build lean muscle.
- The **right carbs-protein ratio** scientifically shown to **refuel and rebuild exhausted muscles**.
- **Electrolytes** including **calcium, potassium**, sodium and **magnesium**.
- **Fluids** to rehydrate**.**
- **B Vitamins** for energy
- **Calcium, vitamin D, phosphorus, protein** and **potassium** to build and maintain strong bones and reduce the risk for stress factors.
- **Vitamin A** to support a **healthy immune system** and **normal vision**.

PERFORM

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.[1]

- 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.[2]

- 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.[3]

- Researchers at the University of Texas at Austin found that following an exhausting ride, trained cyclists had significantly **more power** and **rode faster during their second ride later in the day**, shaving about six minutes, on average, from their time **when they recovered with lowfat chocolate milk** compared to a carbohydrate sports drink or calorie-free beverage.[4]

- In a recent study, 32 healthy but untrained cyclists who recovered with lowfat chocolate milk had **twice the improvement in VO2max**—a measure of aerobic fitness and adaptation—after a 4.5 week cycling regimen—compared to athletes who grabbed a carbohydrate drink.[5]

- 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.[6]

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REFUEL

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.[1]

- 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.[2]

- **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.[3-5]

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REBUILD

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.[1,2]

- 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.[3]

- 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.[4]

- 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**.[5]

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REHYDRATE AND REPLENISH

Refueling with chocolate milk after exercise helps replenish what your body has lost – including fluids and critical nutrients lost in sweat. Chocolate milk is a "natural" when it comes to electrolytes, providing some 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.

- Drinking lowfat or fat-free milk after exercise could maintain 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. They found that milk may be more effective than water or sports drinks at restoring and maintaining normal hydration status after exercise, likely due to milk's electrolyte content and energy density.[1]

- In a second study, the same researchers found that drinking fat-free milk after exercise-induced dehydration restored fluid balance as well as, if not 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." [2]

- 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.[3-5]

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