



# Milk – Nature's sports drink

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## Dairy and Health

- Dairy foods are the **richest source of calcium** in the Australian diet, providing around 60% of the calcium consumed.
- The Dietary Guidelines recommend milk, yogurt and cheese be included in our daily diet for **strong bones**
- **Three serves** of dairy every day provides most people with their average daily requirements for calcium.
- One serve of dairy is equal to:

1 glass (250ml) of milk  
1 tub (200g) of yogurt  
2 slices (40g) of cheese



But for many people, dairy is not relevant to their goals....



**AMERICAN COLLEGE  
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AMERICAN DIETETIC ASSOCIATION  
DIETITIANS OF CANADA

# Nutrition and Athletic Performance

JOINT POSITION STATEMENT

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## POSITION STATEMENT

*It is the position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine that physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition. These organizations recommend appropriate selection of food and fluids, timing of intake, and supplement choices for optimal health and exercise performance.*



***The goal of post-exercise nutrition is to provide adequate fluids, carbohydrates, electrolytes, energy, and protein.***

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*Med Sci Sport Exerc, 2009*

# Recovery Plan

Rehydrate		<ul style="list-style-type: none"><li>• Work out fluid deficit</li><li>• Replace 1500ml <b>fluid</b> for every 1kg weight lost</li></ul>
		<ul style="list-style-type: none"><li>• If sweat rate is high – include <b>electrolytes</b> (sodium &amp; potassium)</li></ul>
Refuel		<ul style="list-style-type: none"><li>• Consume snack within 30 minutes of workout to start refuelling muscles</li><li>• Snack should include at least 50g <b>carbohydrate</b></li></ul>
Repair		<ul style="list-style-type: none"><li>• Include 15-20g <b>protein</b> to repair and rebuild muscles</li></ul>

## *Rehydrate* with milk

- Milk has been shown to be as effective, if not *more effective* for rehydration than water or sports drinks

### Why?

- Milk naturally contains electrolytes and water to replace what is lost in sweat
- Milk empties from the stomach much more slowly, leading to a slower absorption into the blood stream



## Randomised Control Trial in Cyclists

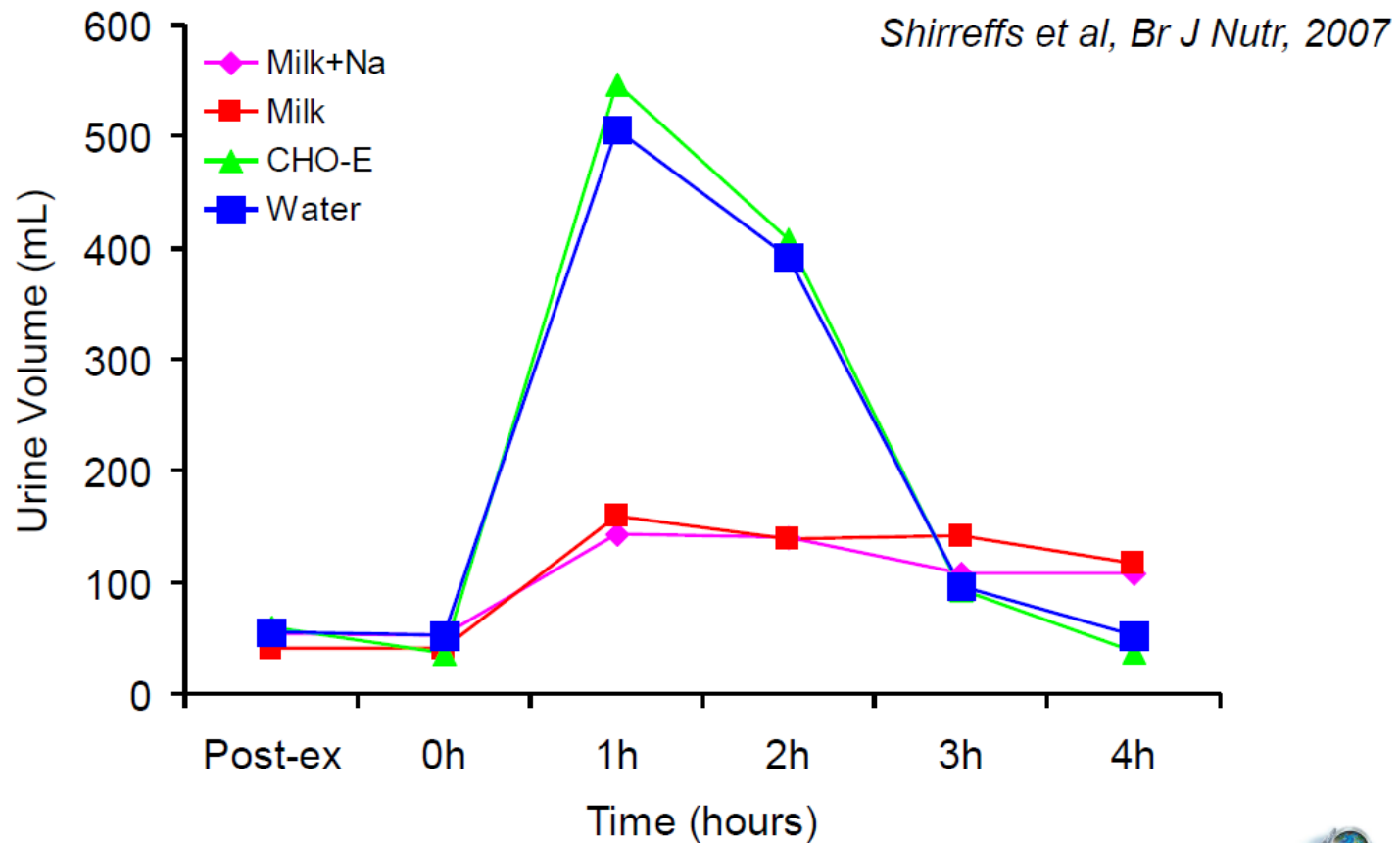
- In four trials cyclists undertook a series of cycling exercises until they had lost 1.8% body mass.
- To rehydrate they were given either
  - Low fat milk
  - Low-fat milk with added Na<sup>+</sup>
  - Sports drink
  - Water
- The volume of each drink consumed was 150% of the volume of fluid lost during the exercise



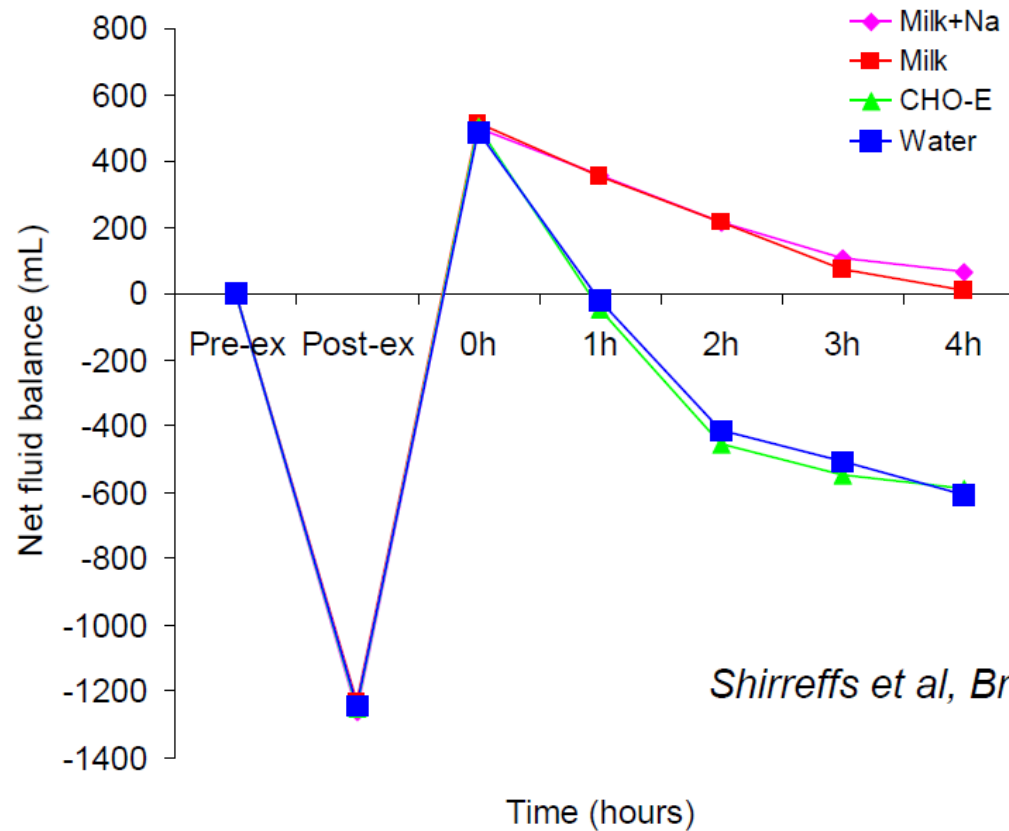
*Shirreffs SM et al 2007*



## Urine production post exercise



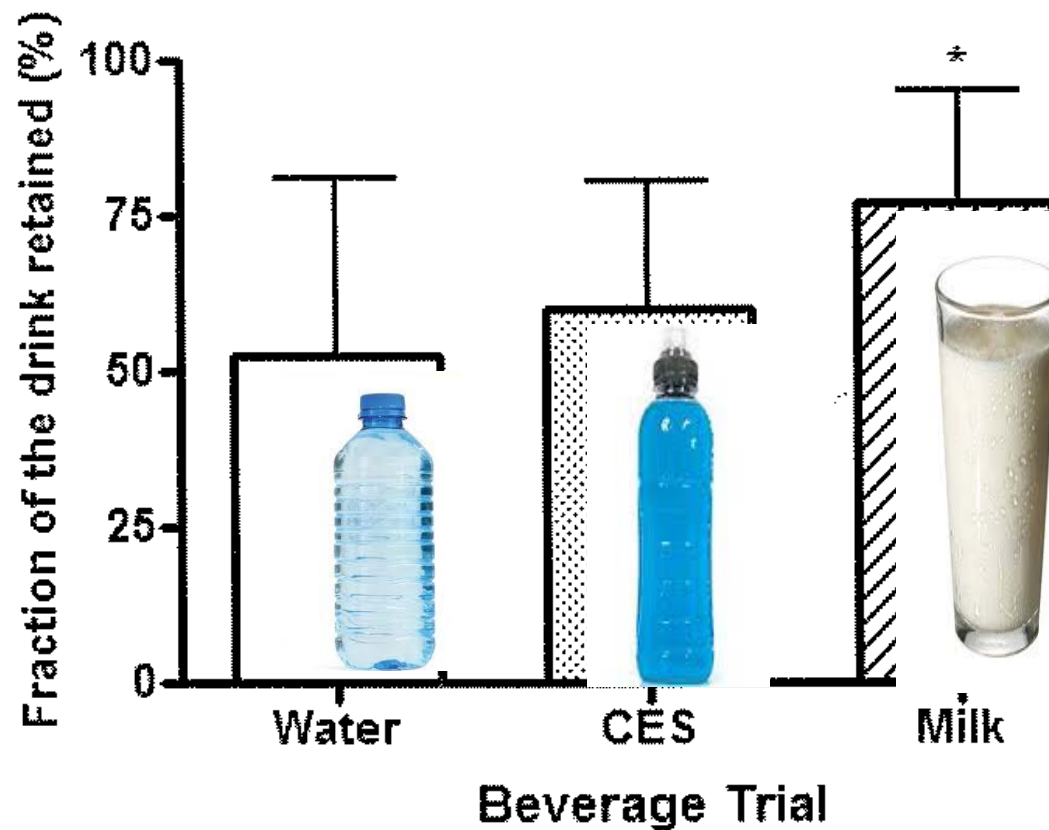
## Net Fluid Balance



*Shirreffs et al, Br J Nutr, 2007*

*The cyclists who drank milk were better hydrated by an average 600mL four hours after exercise.*

## Milk Better Than Water to Rehydrate Kids



*McMaster University (2011)*

## Milk- an economic sports drink?

Drink	Protein	Carbs	Approx Price
600ml Skim milk	21g	30g	60c - \$1.20
600ml Sports drink	0g	36g	\$2.50-\$4.00
250ml Tetrapack of pre-prepared energy drink	~10-15g	25-35g	\$2-\$3.50
600ml fruit juice	0g	70g	\$1.20-\$3.50

## *Refuel* with milk

- Replacing muscle fuel (glycogen) after exercise is essential to an athlete's recovery.
- **Flavoured milk and yogurt** contain the right mix of carbohydrates and protein to refuel muscles after a tough workout.
- It helps restore muscle glycogen quickly for the next bout of exercise

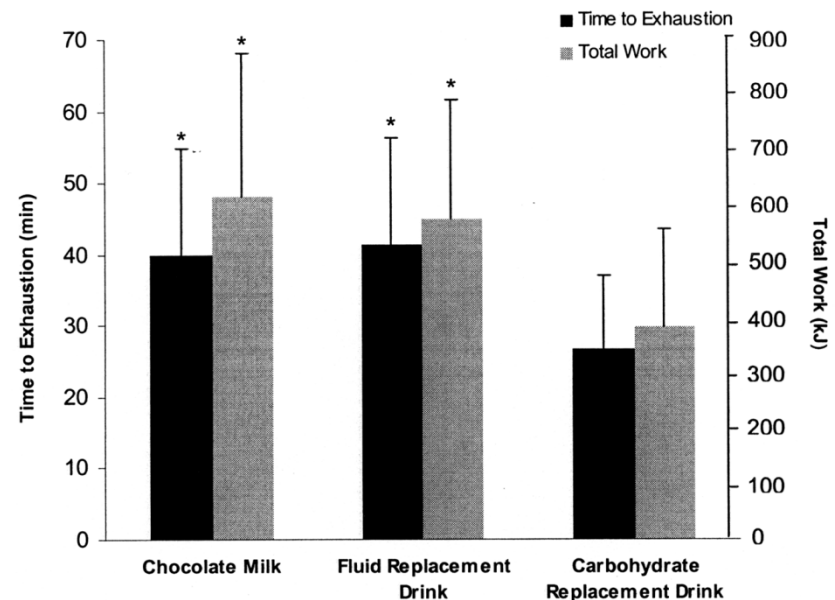


## Randomised control trial cyclists

- 9 trained cyclists performed an interval workout followed by 4 hours of recovery, and then an endurance trial to exhaustion
- On each of the 3 days, the subjects received a different drink after the interval workout:
  - **Fluid replacement drink** (a sports drink)
  - Specially designed post-exercise **carbohydrate replacement drink** (70g of carbs, 18g of protein, and 1.5g of fat)
  - **Chocolate milk** (70g carbs, 18g protein, and 5.0g of fat)

## Results

- Chocolate milk or the carbohydrate replacement drink resulted in 50% increase in endurance performance in the test to exhaustion.
- Chocolate milk with its mix of carbohydrates and protein (compared to a carbohydrate-only sports drink) led to greater concentration of glycogen in muscles at 30 and 60 minutes post exercise



## *Repair* with milk

- Intense exercise leads to muscle tissue breakdown
- Milk, cheese and yogurt contains **high-quality proteins** to help repair and rebuild muscles after strenuous exercise.
- Intake of 15-25g high quality protein (2 glasses of milk) in the first hour after exercise can help promote faster muscle repair



*Studies have found subjects who drank regular or flavoured milk after a strenuous muscle workout experienced less muscle damage than those who drank water or typical sports drinks*





## Dairy foods providing approximately 10g of protein

Dairy Food	Serving Size
Milk	250ml (a large glass)
Flavoured Milk	250ml (a large glass)
Evaporated milk	125ml
Flavoured yoghurt	250ml
Ricotta cheese	100g
Cheddar cheese	40g – 2 slices
Vanilla custard	250ml

# Body Composition

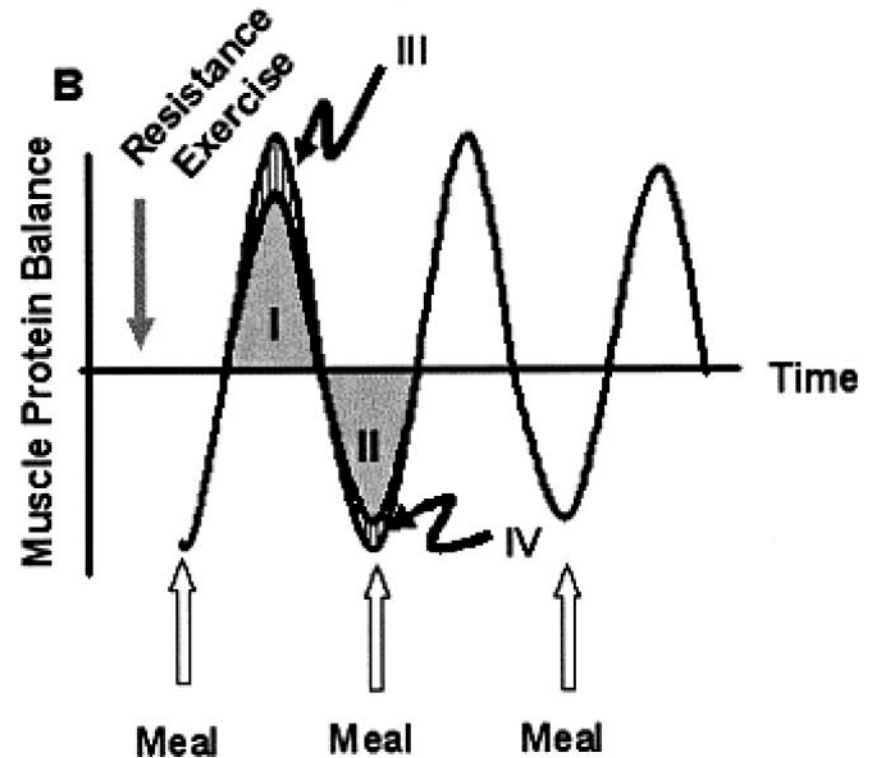
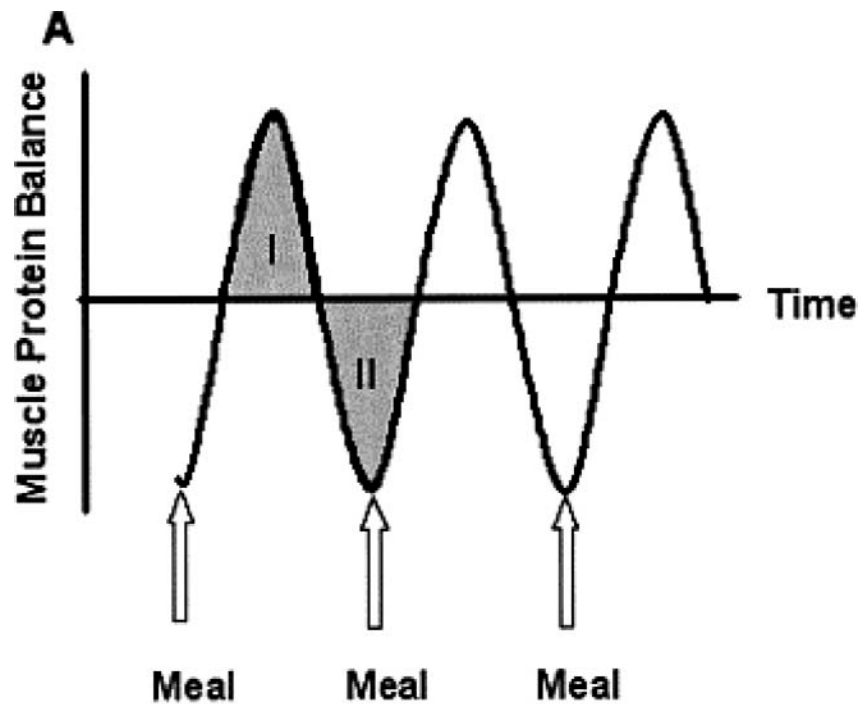


## How to grow muscles

- Muscle tissue is made up of protein (amino acids)
- Whether or not someone gains or loses muscle mass is a reflection of the balance between protein synthesis & breakdown
- If synthesis exceeds breakdown, muscle mass will increase.
- If breakdown exceeds synthesis, muscle mass will decrease.

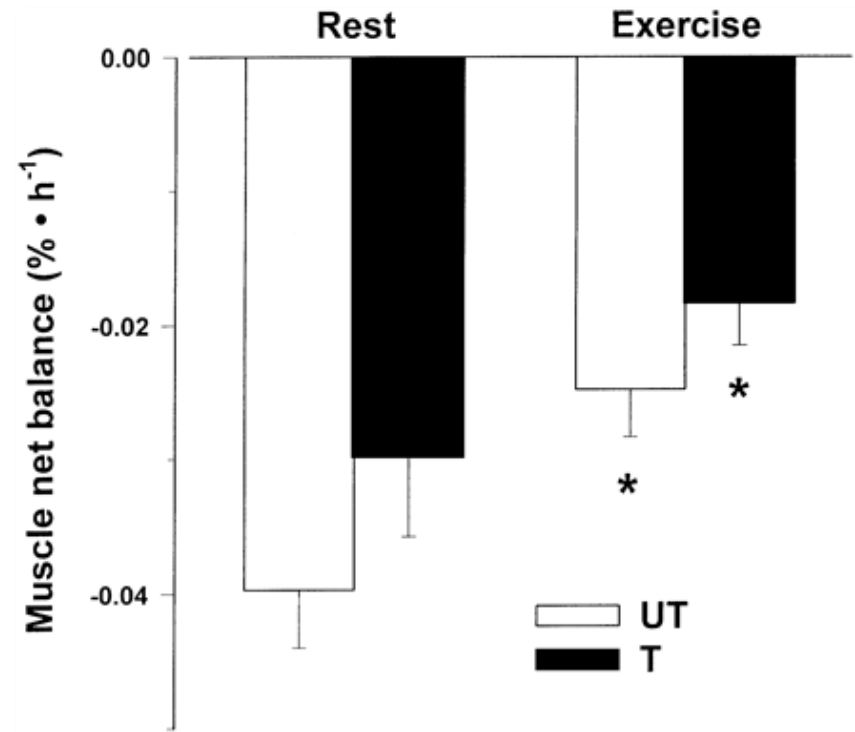


## Protein balance



## Protein balance

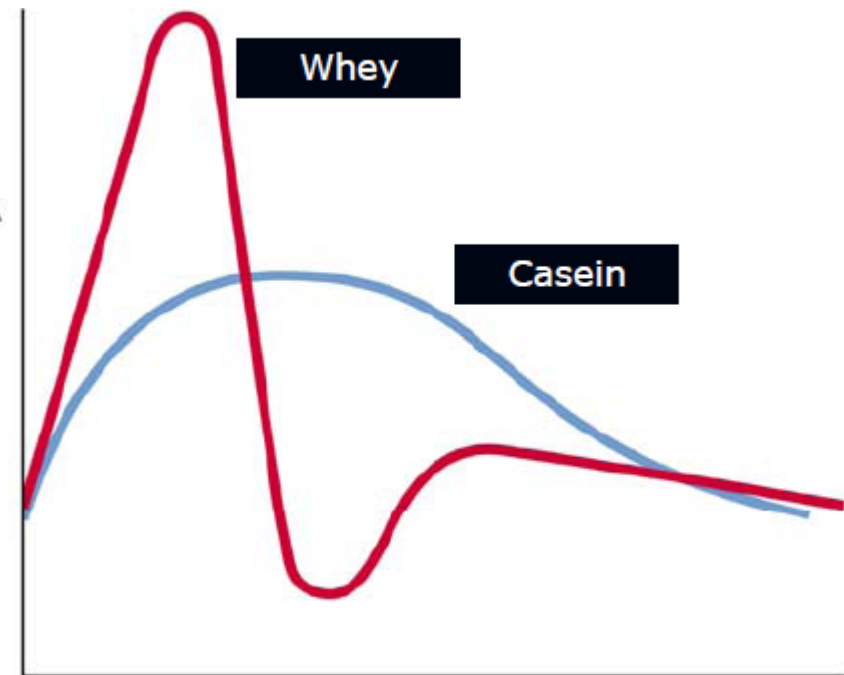
- Without nutrition, net protein balance is negative
- Gains in muscle mass don't just happen in response to resistance training
- It's the combination of an effective overall training program & meal plan that allows optimal adaptation to the training stimulus



*Phillips SM. et al. (1999)*

## *Build muscle* with milk

- Milk contains high quality proteins:
  - **Casein** is a slow-to-digest and slow-release protein which has been shown to reduce muscle breakdown.
  - **Whey** is a fast acting and quick absorbing protein. Whey has a high concentration of the branched chain amino acid – leucine.
  - *Leucine* has been shown to specifically stimulate the building of new muscle tissue.



## Study: Soy v Milk

### **Aim:**

To compare and find if there is a difference on muscle protein turnover between using milk or soy as a recovery drink

### **Subjects:**

8 healthy men who regularly participated in resistance training.

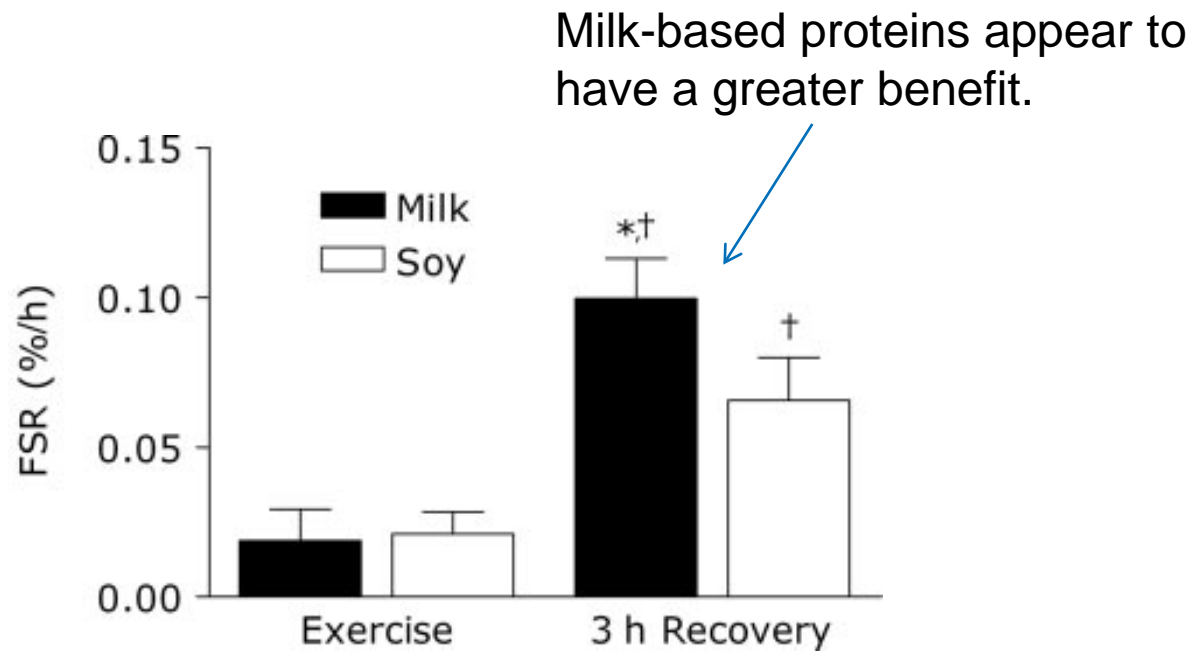
### **Method:**

The subjects performed 2 rounds of a standardized leg workout with a single leg with each exercise reaching failure in final set

Immediately after the workout, participants were provided with one of the recovery drinks:

- 500ml Non fat milk drink
- 500ml Soy drink equivalent with matched energy, carbohydrate & protein

## Results



Resistance training itself is a trigger for increased muscle synthesis

Milk and soy based protein promote muscle synthesis when consumed after resistance training



## Study: Milk and muscle gains in men

### Aim:

To compare and find if there is a difference on muscle gains between using milk, soy or a carbohydrate only drink after resistance exercise.

### Participants:

56 healthy men

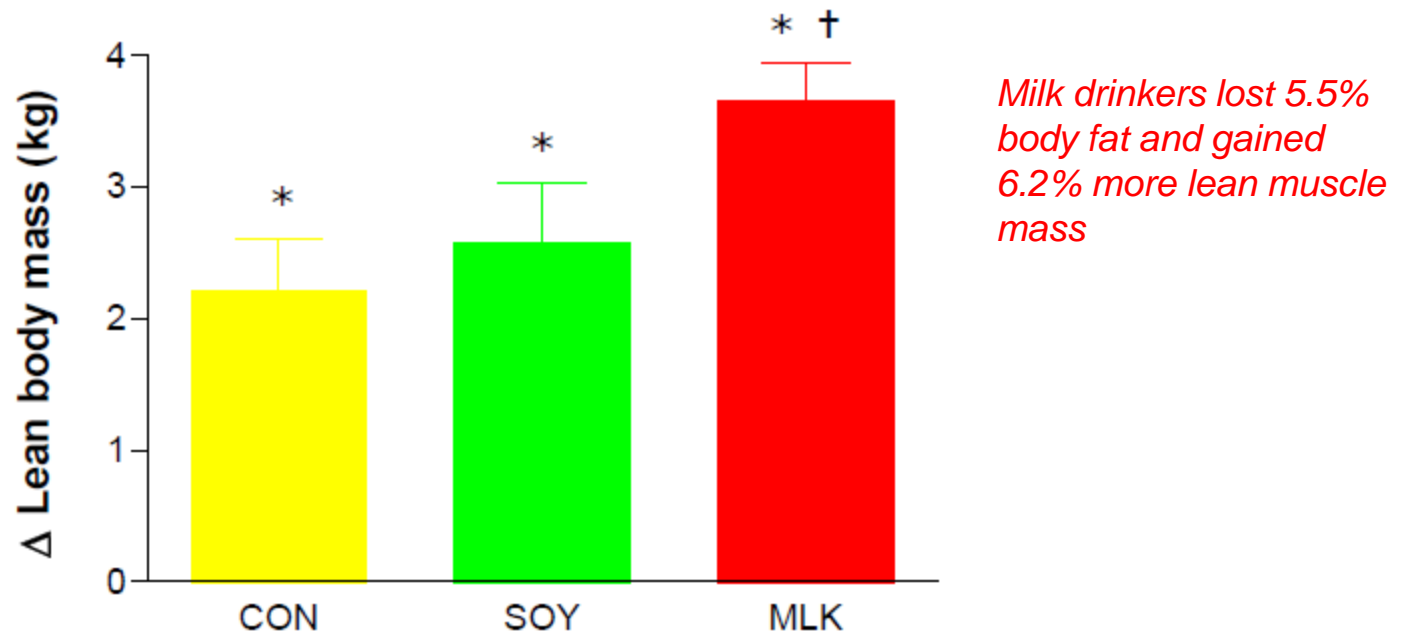
### Method:

Participants were randomly assigned to one of 3 recovery drinks:

- 500mL fat free milk
- 500ml fat-free soy drink (equivalent energy, carbohydrate and protein)
- 500ml maltodextrin-based solution (equivalent energy but all from carbohydrate)

All groups participated in a 12 week training program and drank recovery drinks immediately after exercise and again one hour post-exercise.

12 weeks of resistance training with milk consumption promotes greater lean mass gains and fat mass losses in young men



## Study: Milk and muscle gains in women

### **Aim :**

To find out if milk provided advantage over a sports drink with regard to increased muscle gain and decreased body fat.

### **Participants:**

20 healthy women, variety of weight and age

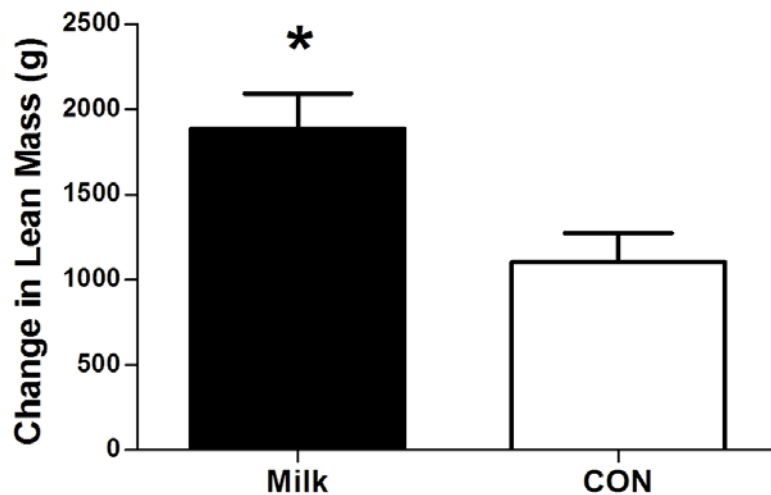
### **Method:**

Participants were randomly assigned to one of 2 recovery beverages:

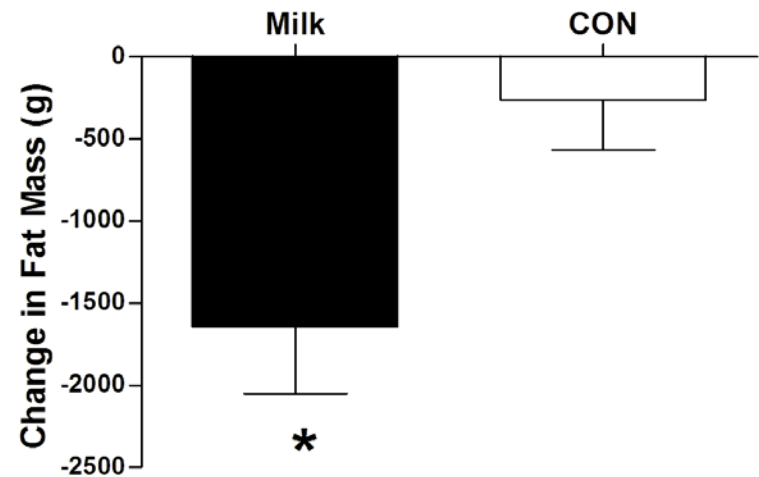
- 500ml vanilla fat free white milk (18g protein, 24g carbohydrate)
- 500ml control drink with equivalent energy but carbohydrate only.

All participants were put through a 12 week intensive resistance training and consumed their randomly assigned recovery drink immediately after as well as one hour following exercise.

## Results



After 12 weeks, both groups gained significant lean muscle mass with milk group (1.9kg) significantly more than control (1.1kg).



After 12 weeks milk group had a significant decrease in fat mass (-1.6 +/- 0.4 kg)

# Practical Dairy Strategies



# Sample athlete meal plan

## Morning pre-training snack

- Banana

## Breakfast

- Bowl of cereal with **200mls milk**
- 2 slices toast with jam

## Snack

- Piece fruit
- Muesli bar

## Lunch

- 2 X ham, cheese and salad rolls
- **Tub of yoghurt**

## Afternoon pre-training snack

- Cheese and biscuits

## Post – training recovery snack

- **UHT flavoured milk**

## Dinner

- Bowl of pasta with meat sauce and veggies

## Supper

- **250ml glass of milk** with milo

## Practical dairy tips and ideas

- Flavoured milks and smoothies are a great tasting alternative for those who don't like the taste of milk
- Long life milk products are portable and have long shelf lives. This makes them great for recovery snacks and at meets where refrigeration is not available.
- Cheese has a high salt content, and is great when added to a recovery snack to help replace lost electrolytes and retain fluid.
- For those with diagnosed lactose intolerance, lactose free dairy products are available for those with lactose intolerance.



## Practical dairy food ideas for *recovery*

Good recovery snacks provide carbohydrate and protein, and are quick and easy to prepare.

- Tub of yoghurt and fruit
- Cheese sandwich with glass of milk
- Low fat fruit smoothie
- Low fat flavoured milk
- For something different try freezing a frozen flavoured milk carton
- Drinking yoghurt





## Practical dairy food ideas for *fuelling*

Dairy foods also make great fuelling snacks before training or competition:

- Ham and cheese sandwich
- Piece of fruit with a glass of milk
- Savoury muffins with grilled tomato and shredded mozzarella and some Italian herbs
- For a calcium boost, top fresh fruit or cereal and milk, with fruit flavoured yogurt.
- Ricotta, honey and banana on toast





**Milk the moment.**

"As an athlete, dairy is what I wake up to, and what I go to bed with."  
David Crawshay. Olympian. Milk Drinker.

AUSTRALIAN DAIRY FARMERS ASSOCIATION

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POWERED BY **MILK**

*"As an athlete, dairy is what I wake up to, and what I go to bed with."*

***David Crawshay. Olympic rower.  
Milk Drinker.***



**Milk the moment.**

"Milk gives me the protein I need for muscle repair and helps me maintain a lean body mass. It's my natural choice."  
Jessica Rothwell. Elite athlete.  
Milk Drinker.

  
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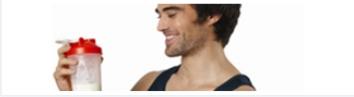




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<p>Home &gt; Health &amp; nutrition &gt; Dairy &amp; your health &gt; Sportshub</p>							
<p><b>Dairy &amp; your health</b></p> <p>3 serves</p> <p>Allergy</p> <p>Asthma</p> <p>Bones and Osteoporosis</p> <p><b>&gt; Sportshub</b></p> <p>Milk and rehydration</p> <p>Dairy and exercise recovery</p> <p>Dairy and body composition</p> <p>Testimonials</p> <p>Tips and resources</p> <p>Campaigns and partnerships</p> <p>Dairy Myths</p> <p>Dental Health</p> <p>Diabetes</p> <p>Fitness &amp; recovery</p> <p>Healthy Weight</p> <p>Heart health</p> <p>Lactose Intolerance</p> <p>Nutrients in dairy</p> <p>Dairy &amp; your lifestyle</p> <p>Resources &amp; tools</p> <p>Media &amp; campaigns</p> <p>Health professionals</p>							
<p><b>Sportshub</b></p> <p>Whether you're a serious athlete or you are exercising for your general health and fitness, nutrition is fundamental to your performance. A growing body of evidence is showing that milk is one of the best liquids for rehydration and recovery after exercise. Milk and dairy foods unique combination of whey and casein proteins, which play an important role in muscle growth as well as recovery from exercise, is another plus for athletes.</p>							
<div> <div>  <p><b>Milk and rehydration</b></p> <p>Milk helps you rehydrate fast by replacing fluid and electrolytes lost in sweat.</p> <p><a href="#">&gt; Learn more</a></p> </div> <div>  <p><b>Dairy and exercise recovery</b></p> <p>Drinking milk within 30 minutes of your workout provides nutrients for recovery and muscle repair.</p> <p><a href="#">&gt; Learn more</a></p> </div> </div>							
<div> <div>  <p><b>Dairy and body composition</b></p> <p>Whether you want to build muscle or burn fat, your diet is just as important as your workout.</p> <p><a href="#">&gt; Learn more</a></p> </div> <div>  <p><b>Milk the moment</b></p> <p>See what experts and elite athletes have to say about dairy, exercise and performance.</p> <p><a href="#">&gt; Learn more</a></p> </div> </div>							
<div> <div>  <p><b>Tips and resources</b></p> <p>Check out our tips for maximizing your exercise with milk and dairy foods.</p> </div> <div>  <p><b>Campaigns and partnerships</b></p> </div> </div>							
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# Questions?