

# Training Starts in the Kitchen

USA Sports Nutrition and Recipe Book





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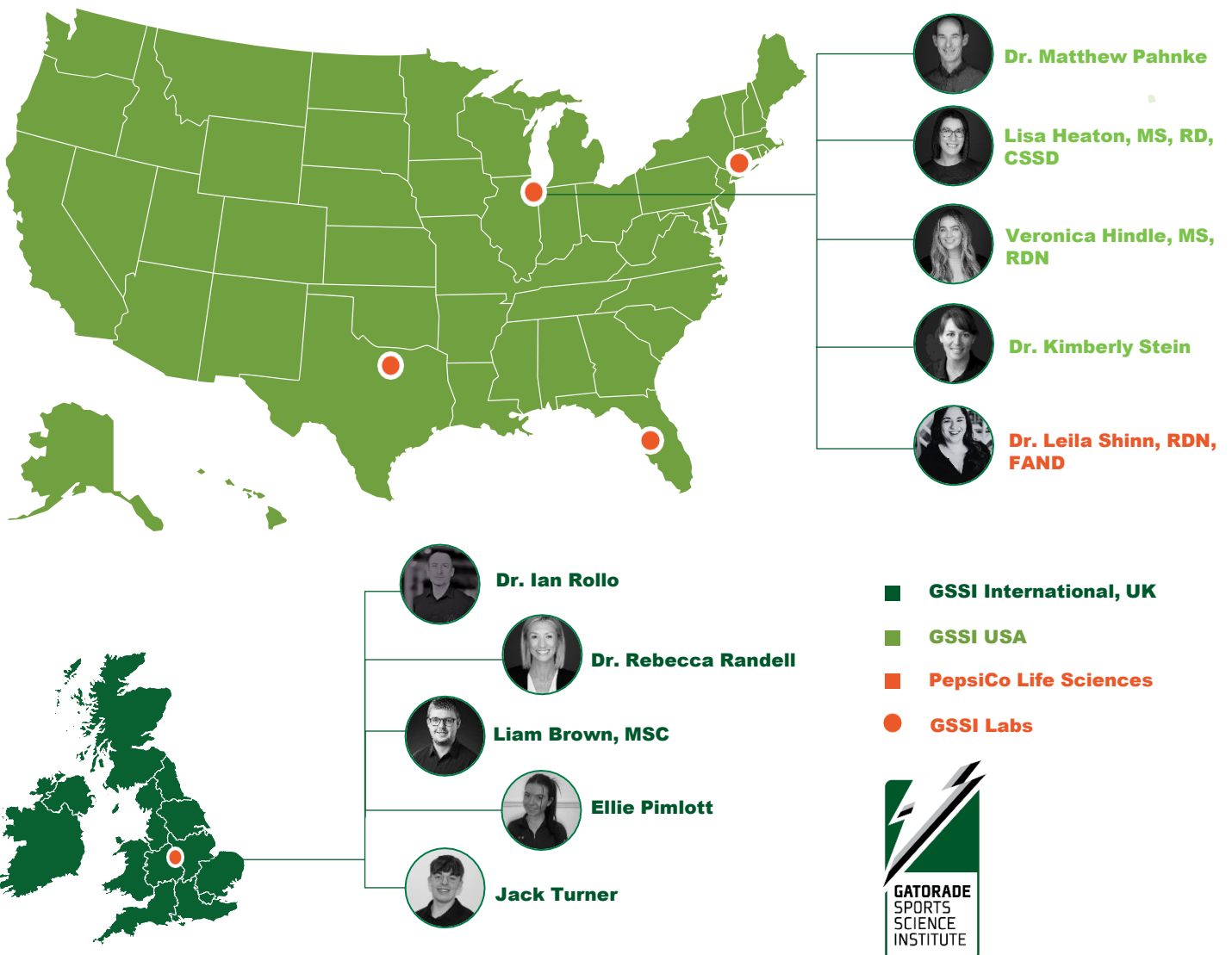
# Introduction to GSSI

Founded in 1985, the Gatorade Sports Science Institute (GSSI) strives to help athletes optimize their health and performance through research and education in hydration and nutrition science. GSSI scientists study the effects of nutrition on the human body before, during and after exercise. For over four decades, thousands of amateur and professional athletes have benefited from GSSI services. Hundreds of athletes have also participated in GSSI studies completed at GSSI facilities or university research partners around the world.

GSSI's headquarter lab is situated in New York, with mobile and satellite laboratories in Bradenton, Florida and Frisco, Texas, North America. GSSI also has a strong global presence. The GSSI international advisor team is more than 30 personnel strong, spanning predominantly the Asia Pacific (APAC) and Latin America (LATAM) regions. This network of advisors enables GSSI to support athletes, sports teams, influencers, and academics through athlete service and education initiatives worldwide.

This sport nutrition education and recipe book has been created using the regional knowledge and expertise of the North American GSSI scientists, in collaboration with the GSSI global team. There are two main aims of this book. Firstly, to act as an educational resource, providing information on the fundamentals of sports nutrition and hydration. Secondly, to provide nutritious recipes, specific to the palette and diverse cuisine of North America. These recipes are specifically designed to support athlete health, performance and recovery.

**Figure 1: Gatorade Sports Science Institute and PepsiCo Scientist Locations**



# Introduction to Sports Nutrition

Nutrients are compounds found in food which have a specific role, or purpose, in the human body. For example, nutrients provide energy for movement as well as the building blocks for growth and repair. Nutrients which are required daily in larger quantities are known as macronutrients and they include carbohydrate, protein, and fat. Nutrients which require daily intake in smaller amounts are called micronutrients, these are vitamins and minerals. Different foods contain different quantities of macro- and micronutrients.

Good nutrition practices apply to the whole population. However, nutrition plays a crucial role for athletes participating in sport and exercise because it is important for health, recovery, adaptation, physique management and performance. Chapters 1 - 4 provide information and recommendations relating to carbohydrate, protein, fat, and fluid intake for athletes. The micronutrient (vitamins and minerals) requirements for athletes are described in Chapter 5, and the importance of gut health is covered in Chapter 6. The second half of the book aims to translate the scientific recommendations into functional cuisine. The recipes are divided into 9 regions of North America and contain locally inspired pre-workout, post-workout, snack and beverage options.

Each recipe provides information on ingredients required, preparation instructions and nutritional content. The ambition is to inform and inspire athletes regardless of their sport to make appropriate functional 'food first' choices around the exercise occasion.



## CHAPTER 1


# Carbohydrate




Carbohydrates include all the sugars and fiber in an athlete’s diet. Fiber cannot be digested to provide energy but is important for general health. The other forms of carbohydrate are digested and absorbed to be stored or used to generate energy.

**1g carbohydrate = 4 kcal energy**

Carbohydrate is stored as glycogen in the muscles and the liver. During exercise, these glycogen stores are used up and may become depleted. As glycogen stores decrease, the body will begin to fatigue and feel tired, which can result in a reduction in performance. The body’s stores of glycogen can be manipulated by both diet and training. Increasing glycogen stores before exercise (by consuming carbohydrate containing foods) and providing carbohydrate during exercise can delay fatigue and improve exercise performance.

 **Liver glycogen**  
~80-100 g = ~320-400 kcal

 **Muscle glycogen**  
~350 g = 1,400-1,800 kcal

As exercise intensity shifts from low- to moderate- to high-intensity exercise, carbohydrate becomes an increasingly important fuel source for the muscles. Therefore, athletes who train or compete for one hour or longer, are recommended to ingest carbohydrate during exercise. The duration and intensity of exercise helps determine the quantity and type of carbohydrate to consume (Table 1). After exercise, it is important that athletes replenish depleted glycogen stores. Consuming a high carbohydrate diet during recovery from exercise can help restore the body’s store of glycogen and therefore support subsequent performance.

## Daily carbohydrate recommendations





**Daily carbohydrate recommendations for athletes are calculated based on:**



The range in suggested carbohydrate intake, highlighted in Table 1, allows for individual goals (i.e., performance or body mass loss) to be considered. These recommendations allow sufficient carbohydrate availability to support the working muscles, the central nervous system, and other important processes within the body. Table 1 provides an overview of daily carbohydrate recommendations for athletes. Table 2 shows how specific recommendations may differ throughout an athlete’s season.

Daily carbohydrate recommendations give athletes a guide to the total quantity of carbohydrate to eat throughout the whole day. However, it is also important for athletes to plan their carbohydrate intake pre-, during and post-training and competition.

**Table 1: Daily carbohydrate intake recommendations for athletes**

Activity type	Carbohydrate recommendations (g/kg body mass)
 <b>Low intensity or skill based activities</b>	<b>3-5</b>
 <b>Moderate exercise program</b> (e.g. 1 hour per day)	<b>5-7</b>
 <b>Endurance program</b> (e.g. 1-3 hours per day moderate-high intensity exercise)	<b>6-10</b>
 <b>Extreme exercise commitment</b> (e.g. over 4-5 hours per day moderate-high intensity exercise)	<b>8-12</b>

g/kg body mass = grams per kilogram of body mass

**Table 2: Carbohydrate recommendations across an athlete's season**

Phase of training	Goals	Suggested daily carbohydrate range (g/kg body mass)	
		Team sport athletes	Endurance athletes
Pre-season training	Increase aerobic and anaerobic fitness	<b>4-8</b>	<b>N/A</b>
	Increase/maximize strength, speed and power for performance and injury prevention		
	Increase lean mass/reduce fat mass		
In-season training	To maintain aerobic/anaerobic fitness	<b>3-8</b>	<b>5-8</b>
	To maintain strength, power and speed		
	To maintain lean body mass		
In season training (congested competition periods)	Restore muscle function as quickly as possible	<b>6-8</b>	<b>6-10</b>
	Promote glycogen resynthesis		
	Alleviate mental fatigue		
Off-season training	To minimize the loss of aerobic and anaerobic capacity	<b>less than 4</b>	<b>less than 4</b>
	To minimize decrements in strength, power and speed		
	To minimize decreases in lean mass and increases in fat mass		

g/kg body mass = grams per kilogram of body mass

## Pre-exercise carbohydrate intake



**1 to 4 hours before exercise it is recommended that athletes consume 1 to 4g of carbohydrate per kg of body mass**

For example, an athlete with a body mass of 70 kg performing a moderate intensity training session would need 140 g of carbohydrate 2 hours prior to training.

Foods high in fiber, fat and protein can slow digestion and absorption, which may increase the risk of gastrointestinal distress. Athletes should experiment by ingesting different types of high-carbohydrate foods prior to training, before eating them on the day of a competition. Therefore, not only does each individual nutritional strategy need to be based on the athlete's goal and demands of the sport, but also on individual preferences.

An example of a pre-exercise meal is Sunrise French Toast on [page 74](#).

Some athletes may want to ingest an additional source of carbohydrate in the hour prior to exercise. This may also be important for athletes who do not

consume carbohydrate during training/competition. A carbohydrate snack containing 25-30 g of carbohydrate is recommended during this time.

It is important to determine the type(s) of foods athletes can tolerate pre-exercise.

**Pre-exercise, it is recommended that meals are:**

- High in carbohydrate
- Low in fiber
- Low in fat
- Low in protein



### Fact

A ripe banana is an ideal snack to eat during the pre-exercise window, providing ~30g of easily digestible carbohydrate. Another great high energy snack which can be made at home are Jack's Sweet Potato Muffins found on [page 81](#).

## Carbohydrate intake during exercise

Carbohydrate intake during exercise to support performance differ depending on the duration of exercise to be completed (Table 3). For exercise lasting 1-2 hours, 30-60 grams of rapidly digested carbohydrate is recommended, per hour of exercise.

Carbohydrate intake recommendations increase in response to increasing exercise duration (Table 3). As carbohydrate intake increases beyond 60 g per hour a blend of carbohydrate sources should be consumed such as glucose/sucrose and fructose, typically in a ratio of 2:1, respectively.

This blend utilizes additional transport systems within the gut to support carbohydrate absorption and has been found to reduce gastrointestinal disturbances when larger amounts of carbohydrate are ingested.

If athletes are unfamiliar with ingesting carbohydrate during exercise, they should gradually increase the amount that they are consuming, and practice during training. This should be started ~4 weeks prior to competition. See Table 3 for a summary of carbohydrate recommendations during exercise.

**Table 3: Carbohydrate recommendations during exercise**

Duration of Activity	Carbohydrate Amount	Carbohydrate Type
Less than 30 minutes	Not needed	-
30-75 minutes	Small amounts	Rapidly oxidized carbohydrate (e.g. glucose, sucrose, maltodextrin)
1-2 hours	30-60 g/hour	
2-3 hours	60-90 g/hour	
More than 3 hours	Up to 120 g/hour	Multiple transportable carbohydrates (2:1 glucose:fructose)



### Fact

Sports drinks and gummy sweets are a great option during exercise because they are easily digested and absorbed.

## Post-exercise carbohydrate intake

It is important that athletes replenish depleted glycogen stores post-exercise. For athletes who have over 8 hours to recover, resuming daily carbohydrate intake should be sufficient to replenish glycogen stores (Table 1). However, if the athlete is training or competing again within 8 hours, ingesting approximately 1 g of carbohydrate per kg body mass per hour is recommended to be consumed for the first 4-6 hours post-exercise for rapid muscle glycogen

restoration. Following the first 4-6 hours, normal daily fueling strategies may then be resumed. Spaghetti Chili Stack on [page 65](#) provides a delicious post-exercise meal to help restore energy levels. Table 4 provides a summary of carbohydrate recommendations for athletes, with specific examples of carbohydrate rich foods shown in Figure 1.

**Table 4: Overview of carbohydrate recommendations for athletes**

Time	Carbohydrate recommendation	Example
3-4 hours pre-exercise	~2.5 g/kg body mass	Dr. Pahnke's Pancakes <a href="#">page 64</a>
1 hour pre-exercise	If desired, 25-30 g of easily digestible carbohydrate	Large banana (~30 g carbohydrate)
During exercise	Duration 1-2 h: 30-60 g/hour	Sports gels, sports drinks, gummies
	Duration 2-3 h: 60-90 g/hour Duration over 3 h: up to 120 g/hour 2:1 (glucose:fructose)	
Post-exercise (less than 8 hours to recover)	1-1.2 g/kg body mass for the first 4-6 hour, then resume daily fueling needs	Salmon & Mango Poke Bowl <a href="#">page 95</a>
Post-exercise (over 8 hours to recover)	Daily fueling plan adequate to restore muscle glycogen	Bean Oatmeal Burger <a href="#">page 70</a>

g/kg body mass = grams per kilogram of body mass

**Figure 1: Serving size and carbohydrate content of foods**



**Cereal**

**Serving size:** 2 cups  
**Grams of carbohydrate:** ~50 g



**Bagel**

**Serving size:** 1 bagel  
**Grams of carbohydrate:** ~53 g



**White Rice**

**Serving size:** 1 cup uncooked  
**Grams of carbohydrate:** ~50 g



**Oats**

**Serving size:** ½ cup  
**Grams of carbohydrate:** ~24 g



**Pasta**

**Serving size:** 1 cup uncooked  
**Grams of carbohydrate:** ~70 g



**Potatoes**

**Serving size:** 1 large baked  
**Grams of carbohydrate:** ~60 g



**Banana**

**Serving size:** 1 large banana  
**Grams of carbohydrate:** ~30 g



**Gatorade Thirst Quencher**

**Serving size:** 1 bottle (12 oz)  
**Grams of carbohydrate:** 22 g

# Calculating carbohydrate requirements

## Body mass

Calculations used to provide dietary recommendations are based on body mass measurements in kilograms (kg). If measuring body mass in pounds (lbs), please convert to kg using the following equation:

$$\text{Body mass (lbs)} \text{ _____ } / 2.2 = \text{ [ ] } \text{ kg}$$

## Daily carbohydrate recommendations

Daily carbohydrate intake varies depending on the type of sport, intensity, and duration, as well as the athlete's personal goals. The table below can be used to calculate recommended daily carbohydrate intake.

Activity type	Grams (g) of carbohydrate per day	
	Minimum value (g)	Maximum value (g)
Low intensity or skill based activities	_____ body mass (kg) * 3g = [ ]	_____ body mass (kg) * 5g = [ ]
Moderate exercise (e.g. 1 hour per day)	_____ body mass (kg) * 5g = [ ]	_____ body mass (kg) * 7g = [ ]
Endurance program (e.g. 1-3 hours per day moderate-high intensity exercise)	_____ body mass (kg) * 6g = [ ]	_____ body mass (kg) * 10g = [ ]
Extreme commitment (e.g. over 4-5 hours per day moderate-high intensity exercise)	_____ body mass (kg) * 8g = [ ]	_____ body mass (kg) * 12g = [ ]

Note: Daily carbohydrate recommendations are suggested as a range (minimum and maximum values). This range provides a guide for daily carbohydrate intake for a given activity level.

## Worked example

**For a 70 kg athlete:**

3-5 g/kg/body mass = **210-350 g**

5-7 g/kg/ body mass = **350-490 g**

6-10 g/kg/body mass = **420-700 g**

8-12 g/kg/body mass = **560- 840 g**

*If the athlete is completing moderate intensity exercise, to meet carbohydrate requirements for the day they may consume:*

- Big Apple Baked Crisp (~79g)*
- Golden Bagel Scramble (~98g)*
- 2 x Jack's Sweet Potato Muffins (~54g)*
- Sweet Heat BBQ Plate (~88g)*
- Ellie's Banana Bread Mug Cake (~70g)*

*Giving them a total of ~389g of carbohydrate (5.6g/kg/body mass).*



## Pre-exercise carbohydrate recommendations

Carbohydrate intake 2-3 h pre-exercise = \_\_\_\_\_ body mass (kg) \* 2.5 g =  g carbohydrate

### Carbohydrate intake 1 h pre-exercise = ~ 25-30 g

Each athlete has individual preferences and can tolerate different amounts of carbohydrate. Carbohydrate intake should be personalized to an athlete's individual needs.

## During exercise carbohydrate recommendations

During exercise carbohydrate recommendations are provided as an absolute amount, therefore no calculations are required. The amount should be primarily based on the exercise duration but can be adapted depending on the athlete's goal. If the athlete is not familiar with consuming carbohydrate during exercise, it is advised to begin by ingesting small amounts and increasing slowly overtime towards the recommended intake. See Table 3 for carbohydrate recommendations during exercise.

## Post-exercise carbohydrate recommendations

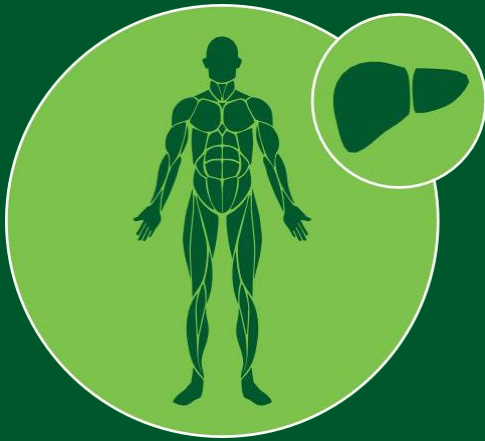
**Carbohydrate intake when recovery time is less than 8 hours:**

\_\_\_\_\_ body mass (kg) \* 1.0 g =  g carbohydrate  
TO

\_\_\_\_\_ body mass (kg) \* 1.2 g =  g carbohydrate

Consume for the first 4-6 hours after recovery.

**When an athlete has over 8 hours to recover from exercise, continuing a daily fueling plan will be adequate to restore muscle glycogen.**



Carbohydrate is the body's main energy source for continuous or intermittent moderate and high intensity exercise.

Carbohydrate is stored as glycogen in the muscles and liver. Athletes should aim to have sufficient glycogen stores before exercise to support performance and delay fatigue. The body's store of glycogen can be manipulated by both diet and training.

## Dietary sources of carbohydrate



Daily carbohydrate requirements depend upon:



The type of sport



The duration of exercise



The individual goals of the athlete



### 1-4 hours before

1-4 h pre-exercise, athletes should consume 1-4 g/kg body mass of carbohydrate.



### 60 min before

An easily digestible source of carbohydrate may be consumed, 25-30g is recommended.



### During exercise

Depends on the exercise duration and goal of the activity.



### Post-exercise

Less than 8 hours until next exercise bout: 1-1.2 g/kg body mass of carbohydrate for the first 4-6 hours of recovery.

More than 8 hours until next exercise bout: daily fueling plan.

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## Free Resources

[www.gssiweb.org/en/sports-science-exchange/All/carbohydrate](http://www.gssiweb.org/en/sports-science-exchange/All/carbohydrate)

<https://performancepartner.gatorade.com/resources/Nutrition/All/All/SortByRecent>

CHAPTER 2

# Protein

lbs



**P**roteins have many different roles in the human body. For athletic performance, protein is commonly associated with muscle and movement.

Proteins are composed of units called amino acids. In total there are 20 different amino acids. It is the sequence of amino acids that determines the structure and function of a protein. Eating dietary sources of protein supplies the body with amino acids. This provides the building blocks for growth and repair, helping an athlete adapt to the demands of training or competition. Importantly, dietary protein provides different quantities and types of amino acids, depending on the different foods the athlete eats.

Foods in the diet which contain all 9 essential amino acids are considered 'complete' dietary proteins. For athletes following vegan or vegetarian diets, protein sources can be combined to provide all essential amino acids.

**Did you know that all of the below are proteins within the human body?**



**Collagens**



**Antibodies**



**Hormones**



**Enzymes**

**Examples of complete dietary proteins**



**Dairy**



**Poultry**



**Fish**



**Soy**



**Red meat**

### Essential amino acids

Not produced by the body  
Important to consume within diet

### Non-essential amino acids

Produced by the body  
Not crucial to consume within diet



### Fact

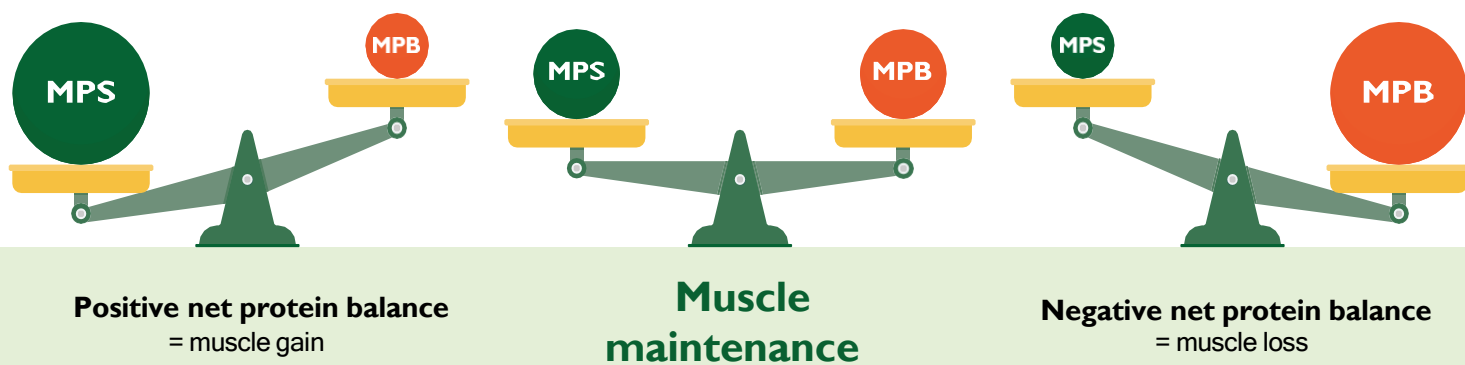
Leucine is an essential amino acid for triggering muscle protein synthesis i.e., building new muscle. Foods containing leucine include chicken, pork, tofu, eggs, milk and tuna. Find an example of a meal containing leucine in the Golden Bagel Scramble on [page 59](#).

## The process of building muscle

Human skeletal muscle is constantly being broken down and re-built into new structures. This process is known as protein turnover. When muscle protein synthesis is greater than muscle protein breakdown, net protein balance is positive, and muscular growth can occur. Exercise increases both muscle protein breakdown and muscle protein synthesis, therefore muscle protein turnover is high. The amino acids provided through dietary sources can be used in

muscle protein synthesis. The adaptations that occur within muscles will depend on the type of exercise performed, as well as the dietary nutrients available. For example, resistance training will increase the size of the muscle (fiber hypertrophy), but endurance training will increase the proteins needed to supply the muscles with energy (mitochondrial protein). Exercise and protein consumption are the two main determinants of muscle protein synthesis.

● Muscle protein synthesis ● Muscle protein breakdown



## Daily protein intake recommendations

Athletes require protein to support adaptation and muscular repair in response to exercise.

The recommended protein intake for athletes is between 1.2 – 2.0g of protein/kg of body mass/day

**This recommendation depends on:**

Athlete's individual goals

Exercise intensity

Exercise duration

Exercise type

Athletes may require higher protein intake during short periods of intensified/more frequent training, during recovery from an injury. More experienced athletes with a higher training status may require lower protein intake compared to less trained individuals.

**Table 1: Dietary protein sources**

Food source	Serving size	Approximate grams of protein
Chicken breast	4oz (medium sized)	31 g
Egg (hard boiled)	1 medium egg	6 g
Tofu	4 oz	18 g
Pork steak	4 oz (medium sized)	23 g
Salmon	4 oz	28 g
Red lentils	1 cup (cooked)	18 g
Peanut butter	1 tbsp	8 g
Greek yogurt	½ cup	13 g
Whole milk	1 cup	8 g
Whey protein isolate	1 scoop (30g)	25 g

## Timing of protein intake throughout the day

Athletes are advised to evenly distribute their consumption of protein throughout the day, approximately every 3 hours, in combination with appropriate quantities of other macro- and micronutrients. Athletes should ensure that each meal includes a protein source(s) (~20-30 g). See Table 1 for examples of dietary sources of protein.

- Signifies when protein (~20-30 g) should be consumed



## Protein intake before and during exercise

At present, there is no defined amount of protein recommended for athletes to consume before or during exercise. For athletes seeking to gain lean muscle mass through strength training, consuming a small amount of protein before and during training may be appropriate. Protein consumption should therefore be tailored to each athlete's individual goals. If athletes choose to ingest protein before or during exercise, they should consume an easily digestible, well tolerated protein source, to help prevent gastrointestinal distress.

## Post-exercise protein for recovery

Nutrition plays a crucial role in the muscle adaptation process. To fully maximize the training response post-exercise, it is advised to consume a source of protein. Following exercise, muscles are sensitized to incorporate the available amino acids which are used to build new muscle tissue. It is important to note that if new to a resistance training program, it may take approximately 8 weeks to see visible changes in muscle growth (hypertrophy). Becca's Berry Chia Pudding Parfait on [page 96](#) provides an excellent post-exercise protein snack.

**Athletes should consume ~20 g of protein post-exercise, or 0.25-0.3 g/kg of body mass.**

In most cases, larger servings of protein do not further enhance muscle protein synthesis. However, when participating in intense whole-body exercise, the protein serving post-exercise may be increased up to 30-40 g. See Dorito Flame Fold on [page 75](#).

containing protein and carbohydrate, perfect to help promote muscle protein synthesis and restore glycogen levels after training.

Consuming a high protein drink is a great option for post exercise because it also contains fluid to assist in the recovery of hydration status and may also contain carbohydrates which will help to restore energy stores. Find Dr. Shinn's Café Mocha Power Shake on [page 57](#).

There is currently no conclusive evidence on the exact time following exercise to consume protein to maximize muscle protein synthesis. Ingesting protein post exercise kick starts the recovery process and helps athletes achieve their daily protein target.



## Protein powder

Milk proteins (Whey and Casein) have been found to promote muscle protein synthesis. For vegan athletes, soy protein can be ingested as an alternative to whey, as soy also contains all essential amino acids. See Pecan Pie Protein Bars on [page 76](#) for a fun and delicious way to use protein powder.



**Whey Protein Isolate**  
20-25 g serving size suggestion  
~2.5 g leucine per serving



**Soy Protein Isolate**  
20-25 g serving size suggestion  
~2.0 g leucine per serving



**Casein Protein**  
20-25 g serving size suggestion  
~2.0 g leucine per serving

## Sleep

Sleep is often an overlooked occasion for recovery. Protein ingested before sleep is effectively digested and absorbed and used in muscle remodeling. Before sleep, ingesting 30-40 g of casein or whey protein is advised. Dr. Rollo's Recovery Casein Cocoa drink on [page 67](#) is a brilliant choice.



### Fact

The time it takes to see visible changes in muscle growth varies between athletes. Consuming protein after training will help to promote muscle growth over time.



# Calculating protein requirements

## Body mass

Calculations used to provide dietary recommendations are based on body mass measurements in kilograms (kg). If measuring body mass in pounds (lbs), please convert to kg using the following equation:

$$\text{Body mass (lbs)} \text{ \_\_\_\_\_\_ } / 2.2 = \text{ \_\_\_\_\_\_ } \text{ kg}$$

## Daily protein recommendations

Daily protein intake recommendations are based on a range and may vary depending on exercise type and the goals of the athlete. Daily protein intake should ideally be between the two below suggested values. A sports dietitian or nutritionist can give advice regarding an individual athlete's protein intake.

$$\text{ \_\_\_\_\_\_ } \text{ body mass (kg)} * 1.2 \text{ g} = \text{ \_\_\_\_\_\_ } \text{ g per day}$$

TO

$$\text{ \_\_\_\_\_\_ } \text{ body mass (kg)} * 2.0 \text{ g} = \text{ \_\_\_\_\_\_ } \text{ g per day}$$

## Worked example

### For a 70 kg athlete:

$$1.2 \text{ g} - 2.0 \text{ g/kg body mass/day} = \mathbf{84-140 \text{ g/day}}$$

For this athlete to meet their daily protein requirements they may consume:  
**Sunrise French Toast** (~29g)  
**Salmon Mango Poke Bowl** (~33g),  
**Spaghetti Chili Stack** (~44g)  
**Dr. Rollo's Recovery Casein Cocoa** (~25g).  
 Giving them a total of ~131g of protein (1.9g/kg/body mass).

g/kg body mass = grams per kilogram of body mass

## Post-exercise protein recommendations

Approximately 20 g of protein post-exercise is appropriate for most athletes. Alternatively, these two equations can be used to make sure that the protein ingestion falls between the suggested range:

$$\text{ \_\_\_\_\_\_ } \text{ body mass (kg)} * 0.25 \text{ g} = \text{ \_\_\_\_\_\_ } \text{ g protein}$$

TO

$$\text{ \_\_\_\_\_\_ } \text{ body mass (kg)} * 0.30 \text{ g} = \text{ \_\_\_\_\_\_ } \text{ g protein}$$

**Protein should continue to be consumed at regular intervals post-exercise in servings of 20-30 g.**

# PROTEIN

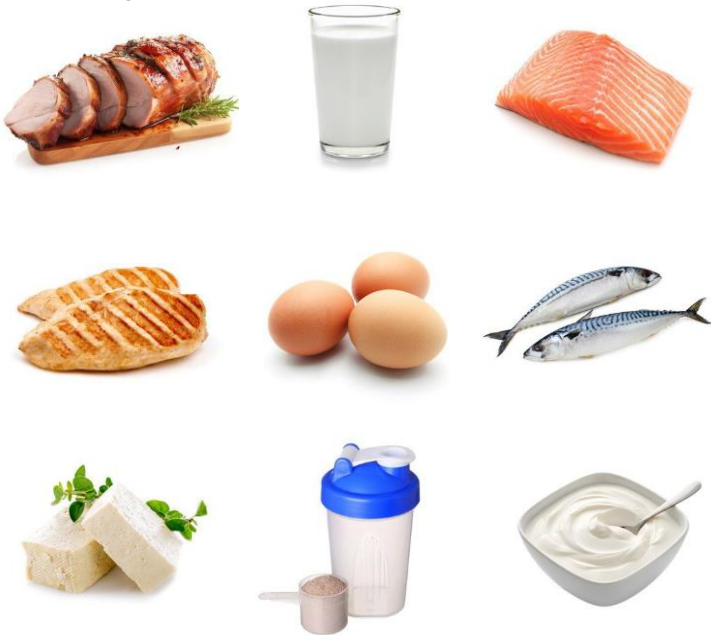
Dietary protein is important for the body's adaptation and recovery from exercise.

Daily protein intake  
**1.2-2.0**  
g/kg body mass/day

For a 70kg athlete  
**84-140g**

Daily protein requirements depend on the intensity and type of exercise, as well as individual goals.

## Dietary sources of protein



Consuming protein after exercise will help stimulate the muscle protein synthesis response. Athletes should consume 20 – 40g (~0.3g/kg of body mass) of protein post-exercise to maximize recovery and adaptation.

The amino acid leucine is important for triggering muscle protein synthesis.



Ingesting 30-40 g of casein or whey protein prior to sleep helps promote a positive overnight protein balance.



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## Free Resources

[www.gssiweb.org/en/sports-science-exchange/All/protein](http://www.gssiweb.org/en/sports-science-exchange/All/protein)

<https://performancepartner.gatorade.com/resources/Nutrition/All/All/SortByRecent>

## CHAPTER 3

# Fat



Fats are an essential macronutrient within an athlete's diet. Fat is the most energy dense macronutrient providing 9 kcal of energy per gram. Most fat sources contain saturated, monounsaturated, and polyunsaturated fatty acids, in differing amounts. Foods high in unsaturated fats are usually either fish or plant-based and/or liquid at room temperature. Unsaturated fats are considered to be healthier than foods high in saturated fat (which are typically solid at room temperature). See Figure 1 for some examples of saturated, monounsaturated and polyunsaturated fat sources. Excess consumption of foods high in saturated fats can raise low-density lipoprotein cholesterol (bad cholesterol), increasing the risk of negative health consequences. A high intake of fat in the diet can increase the risk of accumulating excess body fat, which may not be favorable for an athlete's performance.

Fat is important for health and optimal functioning of the human body. For example, fats:



Provide energy for contracting muscles, especially during long-duration and low-intensity exercise



Aid the absorption of fat-soluble vitamins



Protect vital organs



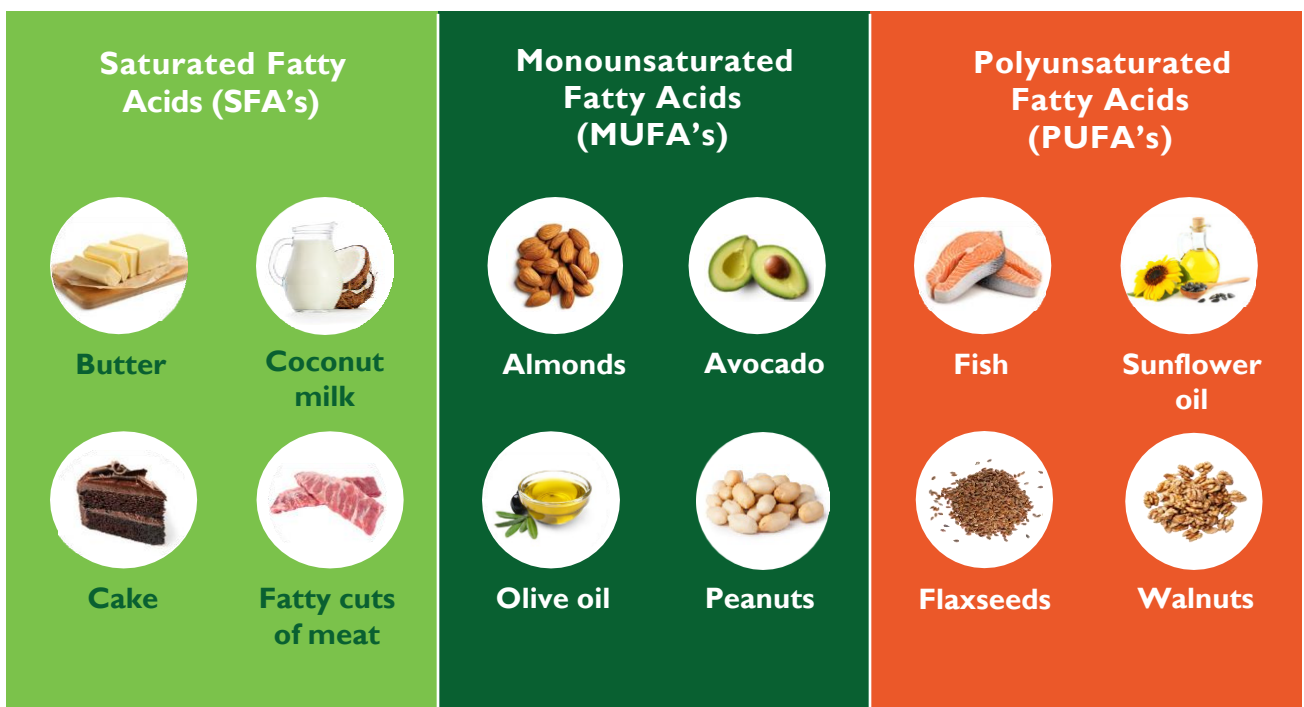
Contribute to the structure of cell membranes



Fact

The World Health Organization suggests that daily fat intake should not exceed 30 – 35% of total energy intake.

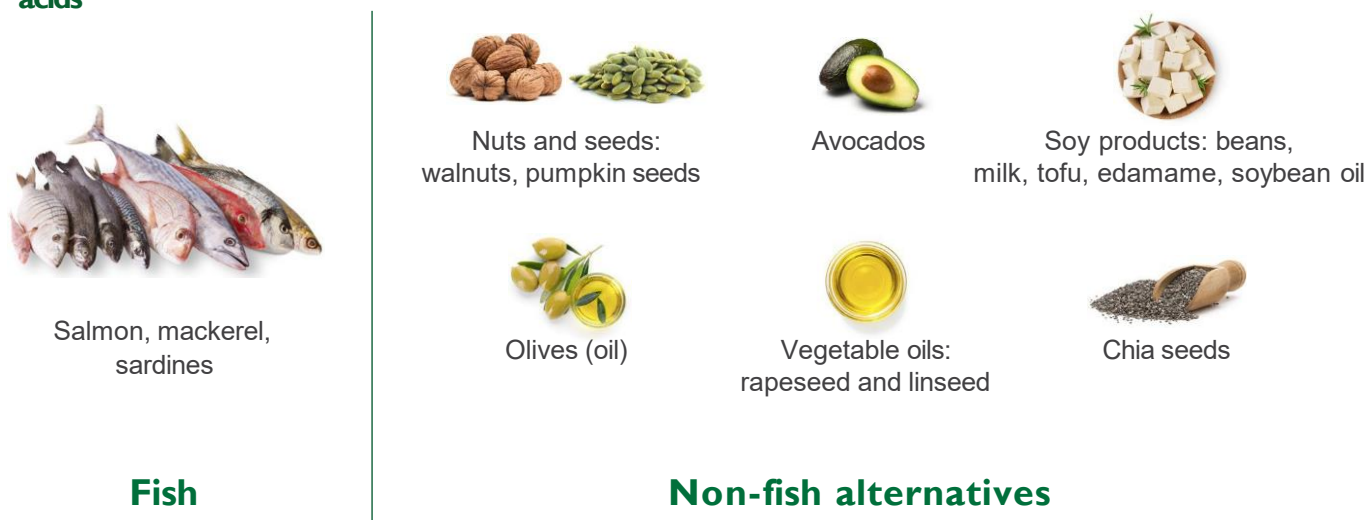
Figure 1: Saturated, monounsaturated, and polyunsaturated dietary fat sources



## Omega-3 fatty acids

Omega-3 fatty acids are a type of polyunsaturated fatty acid. They are classified as essential because they cannot be made by the human body and must therefore be consumed in the diet. Examples of dietary sources of omega-3 fatty acids can be seen in Figure 2. Omega-3 fatty acids can also be taken as a supplement in the form of fish oil, krill oil, or algae oil. Algae oil is a plant-based omega-3 fatty acid supplement which may appeal to vegetarian and vegan athletes.

**Figure 2: Sources of omega-3 fatty acids**



Certain types of exercise (i.e., eccentric exercise or stop and go exercise) can result in muscle damage, which initiates an inflammatory response in the body. While some inflammation is necessary for muscle adaptation, too much may reduce the ability of the muscle to recover.



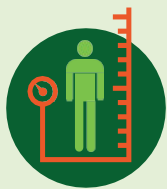
Omega-3 fatty acid ingestion may have anti-inflammatory effects and may also help to mitigate muscle soreness. Reducing muscle soreness is of importance for athletes undergoing periods of heavy training, competing in multiple events over several days, and/or during periods of fixture congestion.



Additionally, consumption of omega-3 fatty acids may help in maintaining muscle mass during periods of limb immobilization. This may be of particular interest for athletes who are rehabilitating from an injury. Furthermore, incorporating omega-3 fatty acids into the diet has been reported to reduce the effects of mild head trauma, which is important for athletes who partake in sports such as American football. Please see [Salmon & Mango Poke Bowl](#) on [page 95](#) for a meal containing omega 3 fatty acids.



However, more research is needed in all of the aforementioned areas. The optimal dose of omega-3 fatty acid ingestion to evoke these beneficial effects is still largely unknown, although the majority of studies administer a dose of 5 grams per day. This dose is beyond that which can be achieved through dietary intake. Therefore, if dietary supplements are to be used, this should be done under the supervision of a qualified professional e.g., a sports nutritionist.



## Fact

Most of the fat within the body is stored as adipose tissue. Fat is also stored in the muscle as intramuscular triglycerides. The human body can store ~100,000 kcal worth of fat. To put this into context, for a person weighing 80 kg with 15% body fat, ~12 kg will be stored as adipose tissue.



## What is $\dot{V}O_2\text{max}$ ?

$\dot{V}O_2\text{max}$  is the maximum amount of oxygen an athlete can use during exercise at maximal effort, otherwise referred to as 'maximal oxygen uptake'.

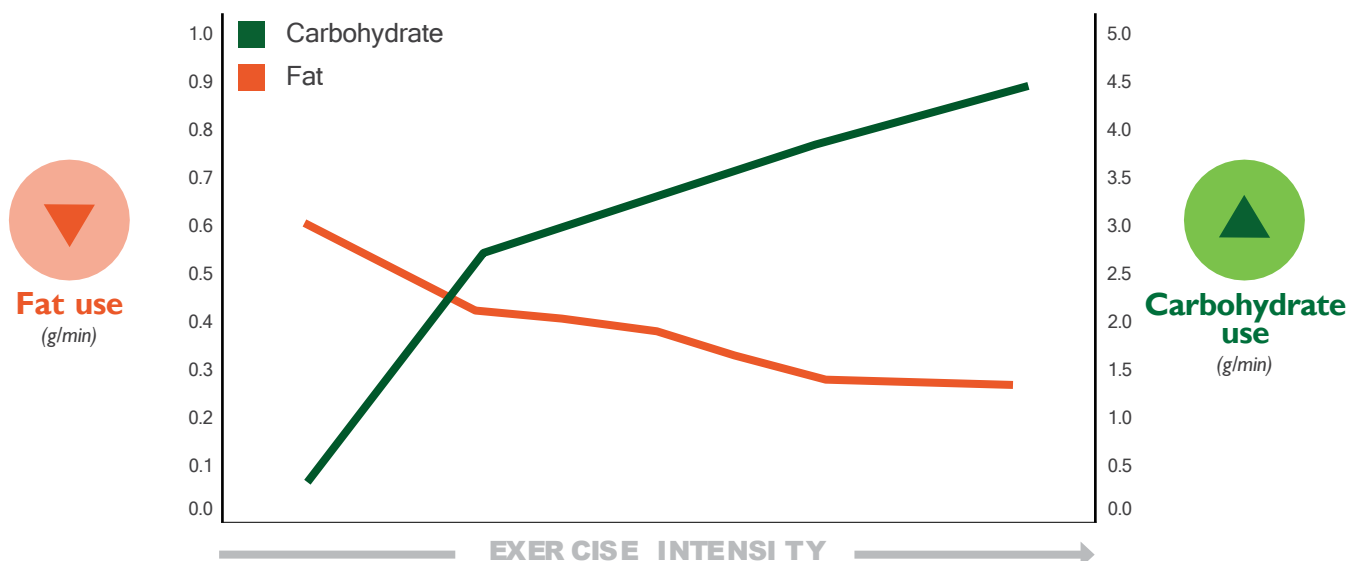
## Fat utilization during exercise

During exercise, a mixture of both carbohydrate and fat provide fuel for muscle contraction. During low-intensity aerobic exercise (less than ~40%  $\dot{V}O_2\text{max}$ ), fat is the predominant energy source. During moderate-intensity aerobic exercise (~40-65%  $\dot{V}O_2\text{max}$ ), fat provides ~50% of the required energy. As exercise intensity increases, carbohydrate becomes the predominant energy source (see Figure 4).

**Figure 3: Typical  $\dot{V}O_2\text{max}$  values for male and female, elite and recreational athletes**

	<b>18-25</b>	Age
	<b>42-46</b>	Average (recreational athlete)
	<b>&gt;60</b>	Excellent (endurance athlete)
	<b>18-25</b>	Age
	<b>35-46</b>	Average (recreational athlete)
	<b>&gt;56</b>	Excellent (endurance athlete)

**Figure 4: Fuel utilization**



Fat provides a large store of energy within the body. Therefore, consuming dietary fats during exercise is not necessary. In fact, there is no evidence to suggest that feeding fat during exercise will enhance performance. Fat intake is often not recommended before or during exercise, as it can reduce the rate of digestion. Therefore, athletes are advised to avoid foods high in fat before exercise to reduce the risk of gastrointestinal discomfort, which can negatively impact performance.

# FAT

The main functions of fat are to:



Provide energy for contracting muscles, especially during long-duration and low-intensity exercise



Aid the absorption of fat-soluble vitamins



Protect vital organs



Contribute to the structure of cell membranes



Fat is stored in the body as adipose tissue and as intramuscular triglycerides within the muscles.



Fats are the main fuel used during low to moderate intensity exercise.

Daily fat intake should not exceed 30-35% of total energy intake, with no more than 10% coming from saturated fats.

Examples of saturated, monounsaturated, and polyunsaturated fat sources:

## Saturated Fatty Acids (SFA's)



Butter



Coconut milk



Cake



Fatty cuts of meat

## Monounsaturated Fatty Acids (MUFA's)



Almonds



Avocado



Olive oil



Peanuts

## Polyunsaturated Fatty Acids (PUFA's)



Fatty Fish



Sunflower oil



Flaxseeds



Walnuts

Omega-3 fatty acid ingestion may:



Help to reduce inflammation



Accelerate recovery after training and competition



Help with minor head trauma



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## Free Resources

[www.gssiweb.org/en/sports-science-exchange/All](http://www.gssiweb.org/en/sports-science-exchange/All)

<https://performancepartner.gatorade.com/resources/Nutrition/All/All/SortByRecent>

CHAPTER 4

# Fluid



**W**ater is critical for many processes within the human body, such as:



Removing waste products



Regulating blood volume and blood pressure



Transporting oxygen and nutrients to the brain and working muscles

**Water is important for regulating body temperature during exercise.**

When body temperature starts to rise, sweat glands on the skin secrete sweat. The evaporation of the sweat from the skin's surface is the primary mechanism which cools the body.



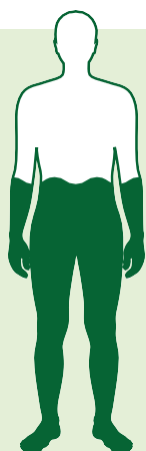
During exercise, the balance between water loss (from sweat and urine) and water intake (from foods and beverages) will determine the hydration status of an individual. When water loss exceeds intake, dehydration occurs; some level of dehydration is common during exercise. However, if the volume of fluid consumed is inadequate or completely avoided, dehydration can reach levels which can impact athletic performance and, in more extreme cases, athlete health.

**When body water losses are greater than or equal to 2% of an athlete's pre-exercise body mass, exercise performance may be impaired, especially when exercising in the heat.**

Dehydration negatively affects athletic performance by increasing the strain on the cardiovascular system and decreasing sweat rate, subsequently reducing the removal of heat from the body, and increasing body temperature. These physiological effects of dehydration may increase the perceived effort of exercise, and therefore adversely affect performance. Furthermore, dehydration has a detrimental effect on cognitive performance and technical skill, especially when combined with heat stress. Therefore, all athletes, regardless of their sport/event are advised to maintain an adequate level of hydration to perform at their best.

**Athletes should be able to recognise the signs of dehydration:**

Thirst	Headache	Dark/low volume urine	Extreme thirst	Lightheaded	Nausea	Mental & physical fatigue



**60%**

**Fact**

Approximately 60% of body mass is water

## Pre-exercise hydration

Athletes are recommended to start exercise in a hydrated state (i.e., euhydrated).

**It is recommended that athletes should drink 5-7 mL of fluid per kg of their body mass ~4 hours prior to the start of exercise.**

For example, an individual with a body mass of 70 kg may drink 350-490 mL of fluid 4 hours prior to exercise. If urine remains low in volume/dark in color, a further 3-5 mL of fluid per kg of body mass should be consumed in the 2 hours prior to exercise.

Assessing urine color and volume before exercise, and throughout the day, is a simple way for athletes to review their hydration status. If urine is pale yellow, and high in volume, this is an indicator that the athlete is likely hydrated. If urine is darker in color, and of low volume, additional fluids are recommended (see Figure 1). It is recommended that athletes also monitor perception of thirst (see Figure 2) and daily body mass, in addition to urine color and volume, to provide a better estimation of hydration status. See [GSSI's SSE #97](#) for more information.

**Figure 1: Urine color chart**



**Figure 2: Perception of thirst**



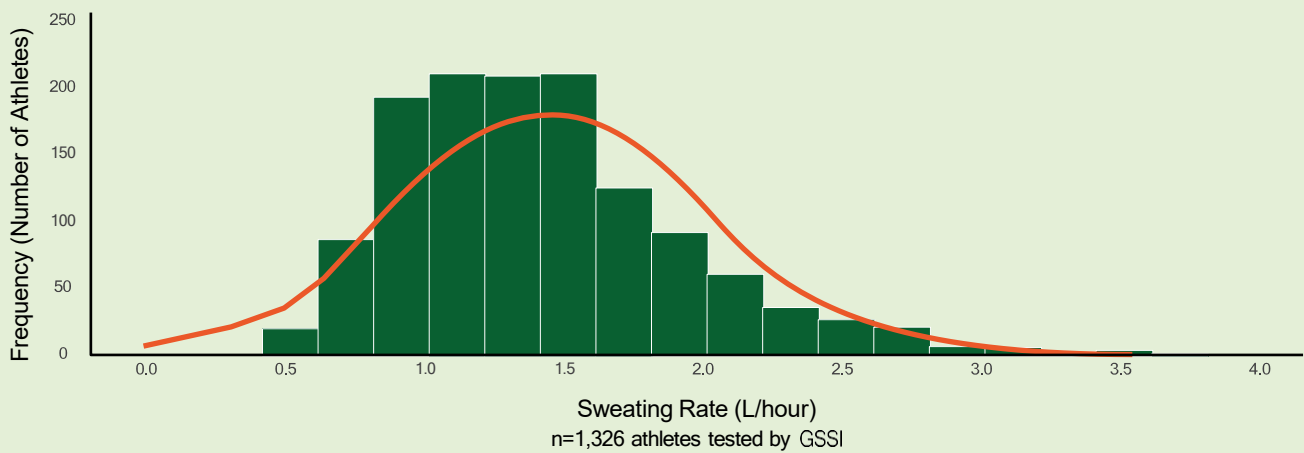
## During exercise hydration

The level of dehydration can be limited during exercise by recommending fluid intake based on the amount of sweat an athlete loses, especially during exercise lasting more than one hour, or exercise performed in the heat. An individual's sweat rate is the amount of fluid they lose (via sweat) per hour during exercise. Sweat rates vary between athletes, typically ranging from ~1.0 to 2.0 liters per hour, however they can exceed 3.0 liters per hour in extreme cases (see Figure 4). Different factors can affect athletes' sweat rates (see Figure 3).

**Figure 3: Factors that affect sweat rates**


- Exercise intensity and duration**
- Body mass**
- Temperature**
- Cycling and equipment**
- Training and heat acclimation status**

**Figure 4: Athlete sweat rates**



To determine an athlete’s individual sweat rate, a sweat test can be performed. The fluid worksheet on pages 32-33 explains the steps to follow to carry out a sweat test, as well as how to calculate fluid recommendations. It is recommended that sweat tests are repeated in different environmental conditions (hot and cold weather), and during different exercise intensities (low and high intensity), to understand and individual athlete’s sweat profile. For exercise durations lasting less than 1-hour, low intensity exercise, and/or situations where less than 2% dehydration is expected, an athlete’s hydration plan should be to drink to thirst. Please see GSSI’s SSE #182 for more information.

Electrolytes are also lost in sweat. Sodium and chloride are the most abundant electrolytes in sweat however, potassium, magnesium and others are also present. The total amount of sodium lost via sweat during exercise depends on the sodium concentration of the sweat, the sweat rate of the athlete, and the duration of exercise. There are large variations in sweat sodium concentrations between individuals.



Sodium and other electrolytes are often included in sports drinks not only to replace what is lost through sweat, but also to promote drinking and fluid retention to support hydration. See [GSSI's SSE #244](#) for more information.

## Post-exercise hydration

Replacing water and electrolytes in the recovery period after exercise is important, with the aim being to completely replace fluid losses prior to the start of the next exercise bout. Consuming an electrolyte containing beverage, or including sodium in snacks/meals, will aid fluid retention. Post-exercise, athletes should aim to consume fluid in a volume equivalent to 120-150% of body mass losses during exercise. (i.e., drink 1.2-1.5 liters of fluid for each 1 kg of body mass loss during exercise). If dehydration is severe (if over 5% of body mass is lost), or if there is less than 24 hours before the next exercise bout, then athletes should aim for the upper end of the recommendation (i.e., 1.5 liters of fluid for each 1 kg of body mass loss).

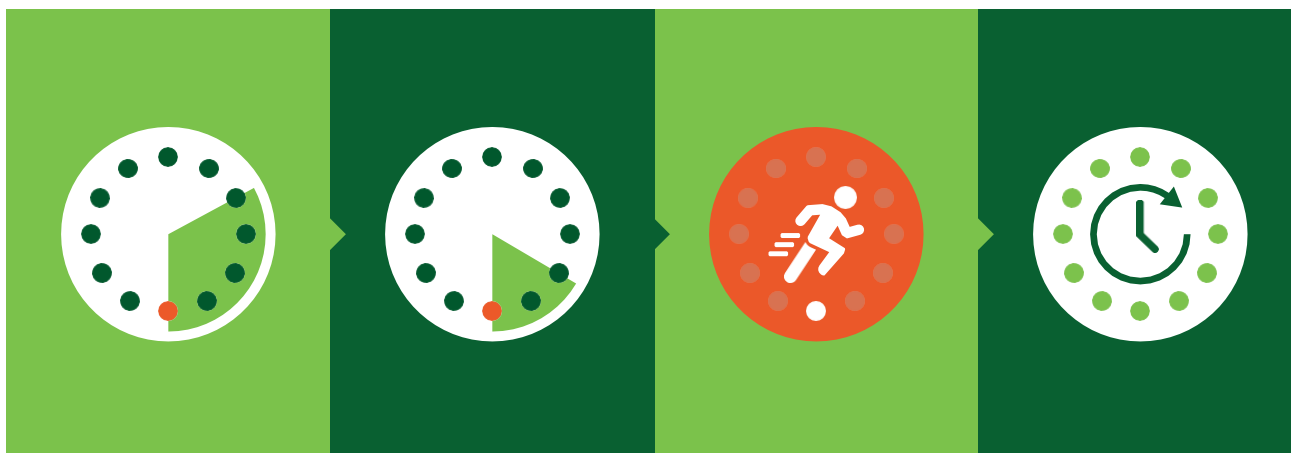
If an athlete remains adequately hydrated during exercise, it is recommended that they sip on fluids throughout the day, post-exercise, to maintain hydration status.

See Cherry Lime Reboot on [page 87](#) for a post-exercise rehydrating drink.

## Summary

Drinking fluids is important for an athlete's health and performance. Adhering to hydration guidelines pre-, during, and post-exercise will help to: (1) prevent significant dehydration during exercise and, (2) maintain an adequate daily hydration status. Figure 5 provides a summary of pre-, during and post-exercise fluid recommendations.

**Figure 5: Fluid recommendations**



**4 hours before**

**Drink 5 – 7 mL of fluid per kg of body mass**

**2 hours before**

**Drink 3 – 5 mL of fluid per kg of body mass (if urine is dark/low in volume)**

**During exercise**

**Individual hydration plan based on the athlete's sweat rate**

**Post-exercise**

**Drink 120 – 150% of body mass lost during exercise**



# Fluid worksheet

## Body mass

Calculations used to provide fluid recommendations are based on body mass measurements in kilograms (kg). If measuring body mass in pounds (lbs), please convert to kg using the following equation:

$$\text{Body mass (lbs)} \quad \underline{\hspace{2cm}} \quad / 2.2 = \boxed{\hspace{2cm}} \text{ kg}$$

## Pre-exercise fluid recommendations

4 hours prior to exercise:

$$\underline{\hspace{2cm}} \text{ body mass (kg)} * 5 \text{ mL} = \boxed{\hspace{2cm}} \text{ mL}$$

TO

$$\underline{\hspace{2cm}} \text{ body mass (kg)} * 7 \text{ mL} = \boxed{\hspace{2cm}} \text{ mL}$$

2 hours prior to exercise (if needed i.e., if urine is low in volume/dark in color):

$$\underline{\hspace{2cm}} \text{ body mass (kg)} * 3 \text{ mL} = \boxed{\hspace{2cm}} \text{ mL}$$

TO

$$\underline{\hspace{2cm}} \text{ body mass (kg)} * 5 \text{ mL} = \boxed{\hspace{2cm}} \text{ mL}$$

To convert mL to fluid oz:  $\underline{\hspace{2cm}} \text{ mL} * 0.03 = \underline{\hspace{2cm}} \text{ fluid oz}$

## Worked example

**For a 70 kg athlete:**

4 hours prior to exercise:  
~350 – 500 mL of fluid

2 hours prior to exercise (if needed):  
~200 – 350 mL of fluid

## During exercise fluid recommendations

To calculate an athlete's sweat rate, follow all steps below. Understanding an athlete's sweat rate will inform fluid intake recommendations during exercise. The aim is for the athlete to consume enough fluid to limit dehydration to less than 2% of the athlete's pre-exercise body mass, whilst ensuring the athlete does not accumulate body mass during exercise through excess drinking.

$$\begin{array}{ccc}
 \text{Pre-exercise body mass} & - & \text{Post-exercise body mass} & + & \text{Fluid intake} \\
 \underline{\hspace{2cm}} \text{ kg} & & \underline{\hspace{2cm}} \text{ kg} & & \underline{\hspace{2cm}} \text{ L} \\
 \\ 
 = & & \underline{\hspace{2cm}} \text{ Sweat loss} & & \text{(1 kg lost = 1 L fluid)}
 \end{array}$$

**Step 1: Exercise time**

           hours

**Step 2: Sweat rate**

Sweat loss            (L) / Exercise time            hours =  L/hour

**Fluid recommendations worked example**

An endurance runner ran for **2 hours**. Their sweat rate was **0.5 L/hour**.



Pre-exercise body mass <b>70 kg</b>	Post-exercise body mass <b>69 kg</b>	Fluid intake <b>0 L</b>
--	---	----------------------------

**Total sweat loss = 1.0 L** (1 kg = 1 L fluid lost)

**Sweat rate = 0.5 L/hour**

**Target fluid consumption: ~300 mL/hour**

Note: This recommendation will result in approximately 1.0% dehydration during an exercise session of similar duration, completed in similar environmental conditions.

**Post-exercise fluid recommendations**

Body mass loss = Pre-exercise body mass            kg - Post-exercise body mass            kg =  kg

**Fluid needs:**

           kg body mass lost \* 1.2 =  L

TO

           kg body mass lost \* 1.5 =  L

# FLUID



During exercise, body temperature increases and sweating occurs to dissipate heat from the body. Body water and electrolytes are lost during sweating, which can lead to dehydration. Therefore, beginning exercise in a hydrated state and maintaining adequate hydration levels during exercise is important for an athlete's health and performance.



## 4 Hours Before

Drink 5-7 mL of fluid per kg of body mass



## 2 Hours Before

Drink 3-5 mL of fluid per kg of body mass (if urine is dark/low in volume)



## During Exercise

Individual hydration plan based on athlete's sweat rate



## Post-Exercise

Drink 120-150% of body mass lost during exercise

### Factors that affect sweat rate:



Exercise intensity and duration



Body mass



Temperature



Clothing and equipment



Training and heat acclimation status



Ingesting electrolytes can help to replace what is lost in sweat, promote drinking and increase fluid retention.



Electrolytes are often included in sports drinks but can also be provided in the form of dissolvable sachets or gels and are also found within some foods.

Fluid and electrolyte losses should be replenished post-exercise to support complete rehydration.

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## Free Resources

[www.gssiweb.org/en/sports-science-exchange/All/hydration-thermoregulation](http://www.gssiweb.org/en/sports-science-exchange/All/hydration-thermoregulation)

<https://performancepartner.gatorade.com/resources/Hydration/All/All/SortByRecent>

lbs

CHAPTER 5

# Micronutrients



**V**itamins, minerals and trace minerals are known as micronutrients. The body requires much smaller quantities of micronutrients in comparison to macronutrients. Micronutrients are essential for many bodily processes which help to maintain health and performance.

The main functions of vitamins are to aid growth and development, and they are also essential for many metabolic reactions. Although some vitamins are involved in energy pathways, they are not direct providers of energy. The body is unable to produce large amounts of vitamins, with the exception of vitamin D (which can be synthesized from sunlight and dietary sources). Therefore, vitamins should be obtained from the diet. Health and/or performance may be impacted if insufficient amounts of vitamins are consumed for long periods of time (i.e., deficiencies). Figure 1 lists the 13 known vitamins, the role they play in the body, and food sources high in each specific vitamin.

Adequate intake of minerals and trace minerals are also important for the health and performance of athletes. For example, calcium and phosphorus are essential for bone health, and zinc and iron play an essential role in immunity (Figure 2).



### Fact

**Vitamin D can be synthesized by the skin from sunlight. It can also be obtained through dietary sources such as oily fish and egg yolks.**



**Vitamin C is important for bones, skin and muscle growth. Dietary sources of vitamin C include citrus fruits such as oranges as well as peppers and broccoli.**

## Eat the rainbow!

Athletes are encouraged to eat fruits and vegetables of different colors to meet vitamin and mineral requirements.



**Figure 1: The main function of vitamins and common dietary sources**



### Vitamin A

**Helps with vision and fighting infection**

Seafood, orange and green vegetables (e.g., carrot and spinach)



### Vitamin C

**Important for immune system, bones, skin and muscle growth**

Many fruit and vegetables including citrus fruit, peppers, strawberries and broccoli



### Vitamin D\*

**Maintains bone strength and important for the nervous system**

Fish (e.g., salmon and mackerel), and egg yolk



### Vitamin E

**An antioxidant important in protecting against cell damage**

Sunflower seeds, nuts, vegetable oil, broccoli



### Vitamin K

**Helps the blood to clot**

Green leafy vegetables (e.g., kale and broccoli)



### Vitamin B<sub>1</sub> (thiamine)

**Important for helping the body convert macronutrients (carbohydrate, fat, protein) into energy**

Legumes (e.g., lentils, seeds and wholegrains)



### Vitamin B<sub>2</sub> (riboflavin)

**Helps maintain the body's energy supply by breaking down macronutrients**

Bread and eggs



### Vitamin B<sub>3</sub> (niacin)

**Important for metabolism**

Lean meat (e.g., tuna, turkey, salmon) and mushrooms



### Vitamin B<sub>5</sub> (pantothenic acid)

**Synthesizes coenzyme A which is important for metabolic reactions**

Beef, poultry, mushrooms, milk



### Vitamin B<sub>6</sub> (pyridoxine)

**Important for enzyme reactions within the body, particularly those related to protein metabolism**

Chickpeas, tuna, salmon, chicken



### Vitamin B<sub>7</sub> (biotin)

**Helps metabolize macronutrients and important for hair and skin health**

Red meat, eggs, nuts



### Vitamin B<sub>9</sub> (folate)

**Used in red blood cell production**

Rice, vegetables (e.g. spinach, asparagus, lettuce) and fruit/fruit juice (e.g., oranges and orange juice)



### Vitamin B<sub>12</sub> (cobalamin)

**Important for brain functioning, the nervous system and red blood cell production**

Boiled eggs and milk

**Figure 2: The main function of minerals and common dietary sources**



### Calcium

**For muscle contraction, healthy bones and teeth**

Milk, yogurt, tofu



### Phosphorus

**Important for maintaining bone and teeth health**

Meat, fish and processed food



### Magnesium

**Helps form protein and important for immune functioning**

Nuts, seeds, green vegetables



### Sodium

**Essential for fluid balance, muscle contraction and the nervous system**

Table salt



### Chloride

**Helps with fluid balance**

Table salt



### Potassium

**Maintains fluid balance, important for muscle contraction and the nervous system**

Meat, milk, fresh fruit



### Iron

**Helps store and utilize oxygen**

Red meat, nuts, beans



### Zinc

**Important for optimal immune functioning**

Lean meat, shellfish, legumes, nuts and seeds

## Guidance

Vitamin D, calcium, and iron are micronutrients which are especially important for athletes. See below for guidance on how athletes can maintain sufficient levels of these micronutrients.

### Vitamin D

It is extremely difficult to obtain vitamin D in sufficient quantities from foods. Therefore, other methods are required to ensure vitamin D levels are optimal. This can be achieved by:



**Regular, sensible sun exposure (5 – 30 minutes of exposure to arms, legs, and back, several times per week)**



**Daily vitamin D supplementation (1000 – 2000 IU per day), especially during winter months when sunlight is reduced**



**A combination of dietary intake, sensible sun exposure and supplementation**



### Warning

**Excessive consumption of vitamin D (>4000 IU per day) increases the risk of vitamin D toxicity**



## Calcium

Regular exercise increases calcium requirements. Therefore, to optimize bone health, the recommended calcium intake for athletes is 1000-1500 mg per day. This can be achieved by consuming calcium rich foods (see below), with supplementation used if deemed necessary. See page 111 for a drink high in calcium.



### Whole or skimmed cow's milk

Serving size: 300 mL  
Calcium: 360 mg



### Calcium enriched soy milk

Serving size: 300 mL  
Calcium: 360 mg



### Kale (boiled)

Serving size: 100 g  
Calcium: 150 mg



### Orange

Serving size: 1 medium size  
Calcium: 40 mg



### Hard cheese

Serving size: 30 g  
Calcium: 220 mg



### Soya bean tofu

Serving size: 100 g  
Calcium: 350-400 mg



### Sardines in oil (canned)

Serving size: 60 g  
Calcium: 240 mg



### Wholegrain bread

Serving size: 2 slices  
Calcium: 100 mg



### Plain yogurt

Serving size: 120 g  
Calcium: 200 mg

## Iron

The recommended daily iron intake differs between men and women:



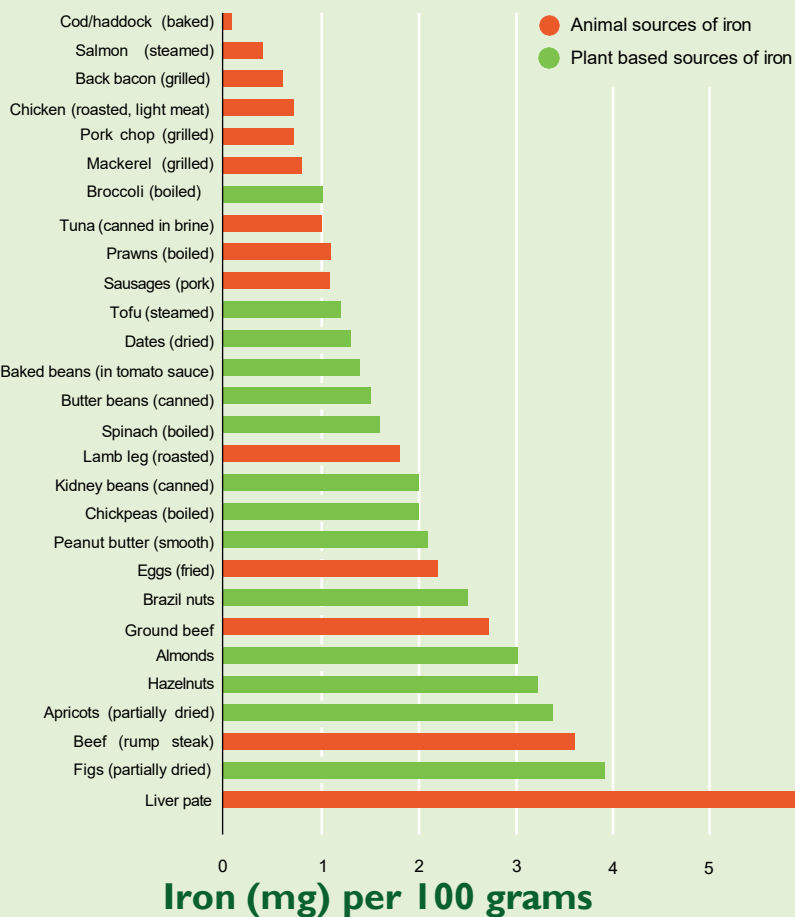
**Men**  
8 mg of iron per day



**Women**  
18 mg of iron per day

There are many animal and plant-based dietary sources of iron, as shown in the graph. Consuming plant-based iron sources with vitamin C can enhance iron absorption. Athletes who do not maintain adequate iron status may require further supplementation at higher doses, however this must be guided by a qualified professional.

An iron rich recipe is the Spaghetti Chili Stack found on [page 65](#).



# MICRONUTRIENTS

**Micronutrients include vitamins, minerals and trace minerals, all of which are important for health and performance**

**Different foods provide different quantities of vitamins and minerals**

**For most athletes, vitamin and mineral requirements will be met by eating sufficient quantities of a variety of different foods**

**Eat the rainbow!**



## Vitamin D

### Recommendation

**Sensible sun exposure (5 – 30 minutes, several times per week)**

**Supplementation (1000 – 2000 IU per day), especially during winter months**

**Combination of dietary intake, sensible sun exposure and supplementation**



## Calcium

### Recommendation

**1000 – 1500 mg per day**

**Achieved by consuming calcium rich foods**

**Supplementation can be used if deemed necessary**



## Iron

### Recommendation

**For men: 8mg of iron per day**

**For women: 18mg of iron per day**

**Achieved by consuming iron rich foods**

**Supplementation can be used if deemed necessary**



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## Free Resources

[www.gssiweb.org/en/sports-science-exchange/All](http://www.gssiweb.org/en/sports-science-exchange/All)

<https://performancepartner.gatorade.com/resources/Nutrition/All/All/SortByRecent>

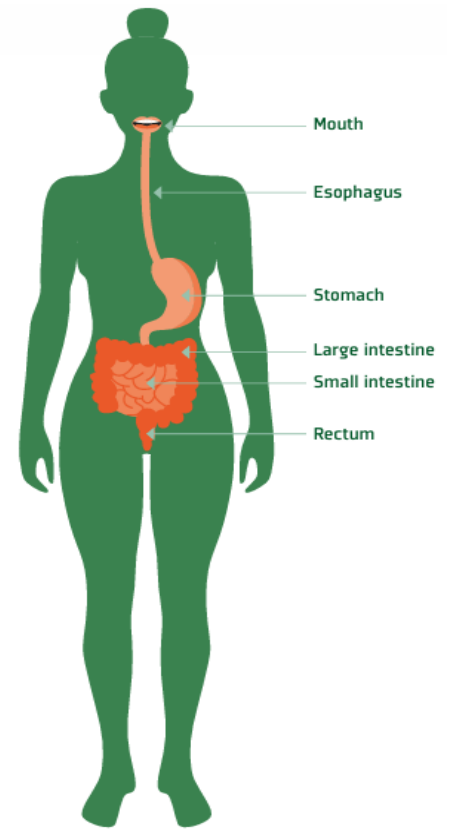
CHAPTER 6

# Gut Health



The gastrointestinal (GI) tract is one of the most important components of the human body. Ultimately, the GI tract functions to turn ingested foods into substrates that the body can use for energy, growth and vital functions. The GI tract is made up of many organs (Figure 1), commonly known as the ‘gut’. The gut is more than just a digestive organ. It plays a key role in immunity, cognition as well as hormone and neurotransmitter production.

**Gut function is coordinated by some 400 to 600 million neurons of the Enteric Nervous System. This vast network of neurons helps transmit signals from the gut to the wider functions of the body.**



**Figure 1: The gastrointestinal tract**

## Gut Discomfort During Exercise

GI issues experienced by athletes can be classified as ‘upper’ and ‘lower’ GI symptoms (Table 1). Individuals may be more or less sensitive to GI disturbances during exercise. Nonetheless, it is reported that 30 - 90% of athletes suffer from GI symptoms. The mechanisms responsible for GI symptoms are listed in Figure 2.

Upper Abdominal Symptoms	Lower Abdominal Symptoms
Reflux / Heartburn	Intestinal / Lower Abdominal Cramps
Belching	Side Ache / Stitch
Bloating	Flatulence
Stomach Pain / Cramps	Urge to Defecate
Vomiting	Diarrhea



**Figure 2: Mechanisms of GI symptoms during exercise**

~75%

Approximately 70-80% of immune cells live in the gut!

*The information provided in this section is for general educational purposes only and should not be construed as medical or health advice. It does not replace consultation with a qualified healthcare professional. Nutrition and gut health needs vary by individual, and readers should seek guidance from a licensed healthcare provider or registered sports dietitian before implementing any dietary or supplementation strategies.*

To reduce the risk of experiencing GI issues during exercise athletes are advised to:



## The Gut Microbiome

Gut microbiota refers to the individual microorganisms living within the gut. Whereas the gut microbiome refers to microbiota, its genetic material and the surrounding environment. Exercise and diet are among the most modifiable lifestyle factors influencing the gut microbiome. Athletes often demonstrate greater microbial diversity compared to sedentary individuals. A reduced diversity of gut microbes has been associated with a variety of GI disorders. Therefore, striving for a diverse and stable microbiome appears favorable for both health and performance.

A healthy gut is defined as 'free from diagnosed diseases and operates without discomfort or dysfunction'. Exercise appears to improve the metabolic activity of gut bacteria. The associated increase in short chain fatty acids (SCFA's) produced by gut microbiota seem crucial in maintaining gut barrier integrity, reducing inflammation and supporting immune function.

Fiber is perhaps the most beneficial compound for our gut microbiota. Fiber is a form carbohydrate that humans are unable to digest. However, our gut microbes are equipped with the tools to use it for energy. Benefits of fiber depend on the source and can include, increased SCFA production, growth of beneficial bacteria and improved gut motility. Current guidelines recommend a daily intake of 28g for females and 34g for males, or 12g per 1,000 calories consumed. As of 2020 more than 90% of males and 97% of females in America do not meet recommended intake. For athletes, consuming adequate dietary fiber is essential to support a diverse and stable gut microbiome. Furthermore, it can assist in preserving microbial diversity which may be compromised through higher protein intakes.

**Figure 3: Factors affecting the gut microbiome**



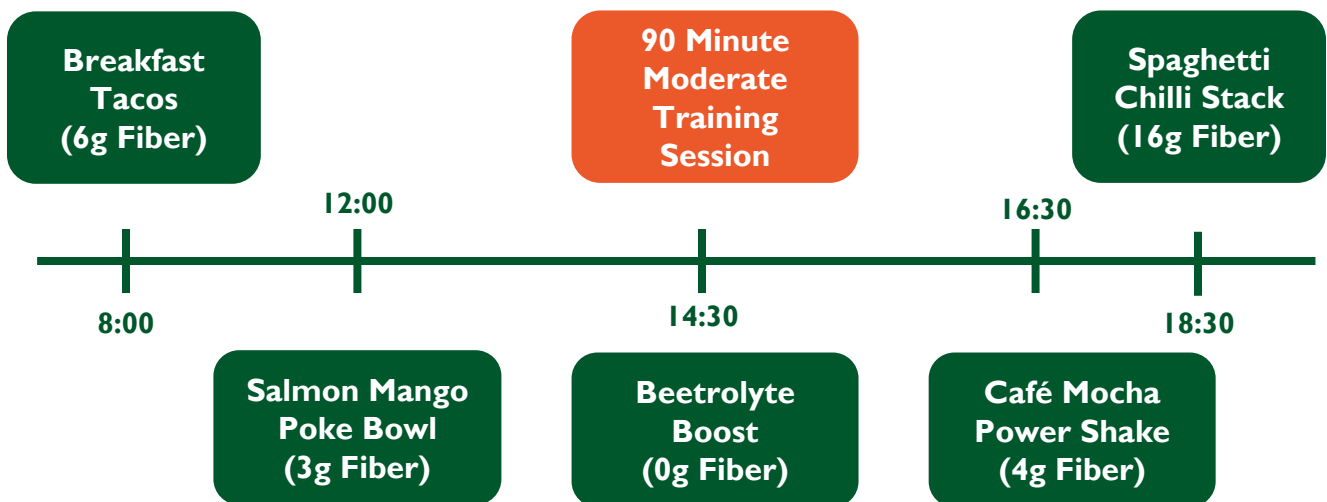
**Higher levels of SCFA's have been linked to improved physical performance and recovery.**

**Table 2.** Fiber types classified by phytochemical structure and function.

Fiber Type	Description	Dietary Examples
Soluble Fiber	Dissolves in water, slows digestion & absorption	Oats, legumes, apples
Insoluble Fiber	Does not dissolve in water, adds bulk to stool and speeds up intestinal transit	Whole grains, green beans, cauliflower, nuts & seeds
Fermentable Fiber / Microbiota-Accessible Carbohydrates (MACs)	Fermented by gut microbiota to produce SCFAs	Specific to individual microbiota but may include oats, resistant starch, onions
Non-Fermentable Fiber	Poorly or not fermented, mainly contributes to stool bulk	Certain vegetables, wholegrains

However, consuming high fiber foods may not always be optimal for performance. High fiber intake close to exercise will decrease gastric emptying and increase risk of GI symptoms thus, a periodized approach should be adopted (Figure 4). This is particularly important during periods of high energy demands due to appetite suppressing effects. Sufficient fluid consumption is also crucial to speed fiber transit and reduce risk of constipation.

**Figure 4:** Example of how to periodize fiber intake with recipes in this book



## Prebiotics, Probiotics & Fermented Foods

Athletes should prioritise a food first approach, focusing on a balanced and diverse diet to support gut health. Prebiotics are the food for our gut microbes and can modulate the gut microbiome. This has the potential to provide downstream health benefits, including helping reduce inflammation and minimize GI symptoms. It is important to note that not all prebiotics are fibers, and not all sources of fiber are prebiotics. See Figure 5 below for possible examples of prebiotics.

**FACT**  
 The human microbiome is highly adaptable, changing within 24 hours of dietary intervention. See [GSSI's SSE #178](#) article for more information.

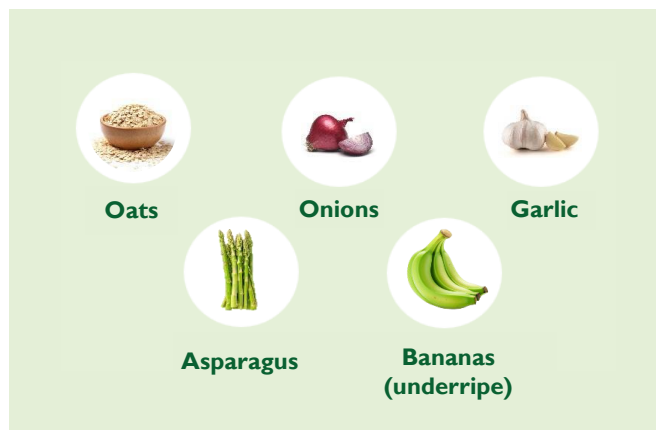
Probiotics are the live microbes themselves, which can provide various health and performance benefits when consumed in adequate amounts. Mechanisms of action include improving muscle recovery, boosting nutrient absorption and supporting immune function. While probiotics must have demonstrated health benefit conferred by well-defined and characterized live microbes, fermented foods are simply formulated through desired microbial growth and enzymatic conversions of food components.

**Figure 6: Dietary sources of fermented foods which may also contain probiotics**



For a drink containing kefir see the PB & J Power Up on [page 92](#).

**Figure 5: Potential dietary sources of prebiotics**



Some fermentable items may contain probiotic strains at adequate doses which can confer the associated health benefits. However, strains without scientific evidence may be used in the fermentation process and due to processing methods, live microbes may not even be present in the final product. Therefore, when incorporating fermented foods into your diet for probiotic-specific benefits, it is recommended to choose products that specify the strain and dose contained. However, fermented foods regardless of probiotic standing can be a part of a healthy diet and research is continuing to examine the benefits of these foods. See Figure 6 for sources of fermented foods which may contain probiotics.



# GUT HEALTH

## Gut Microbiota

Individual microorganisms living in the gut

## Gut Microbiome

The microbiota, its genetic material and the surrounding environment

30 – 90% of athletes suffer from gastrointestinal (GI) symptoms

A diverse and stable gut microbiome supports:



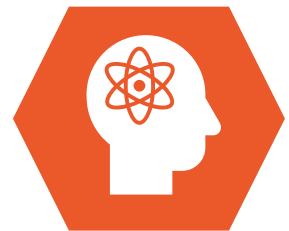
**Nutrient  
Absorption**



**Energy**



**Immune  
Function**



**Cognitive  
Wellbeing**

## Top tips to minimize GI symptoms in athletes



Limit high fiber and high fat foods close to exercise as these nutrients can decrease gastric emptying



Maintain good hydration status, as dehydration can exacerbate GI symptoms



Ensure carbohydrate ingested during exercise is fast digesting and well tolerated



Athletes should seek guidance from a registered sports dietitian to create a fueling plan that works best for them

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## Free Resources

[www.gssiweb.org/en/sports-science-exchange/All](http://www.gssiweb.org/en/sports-science-exchange/All)

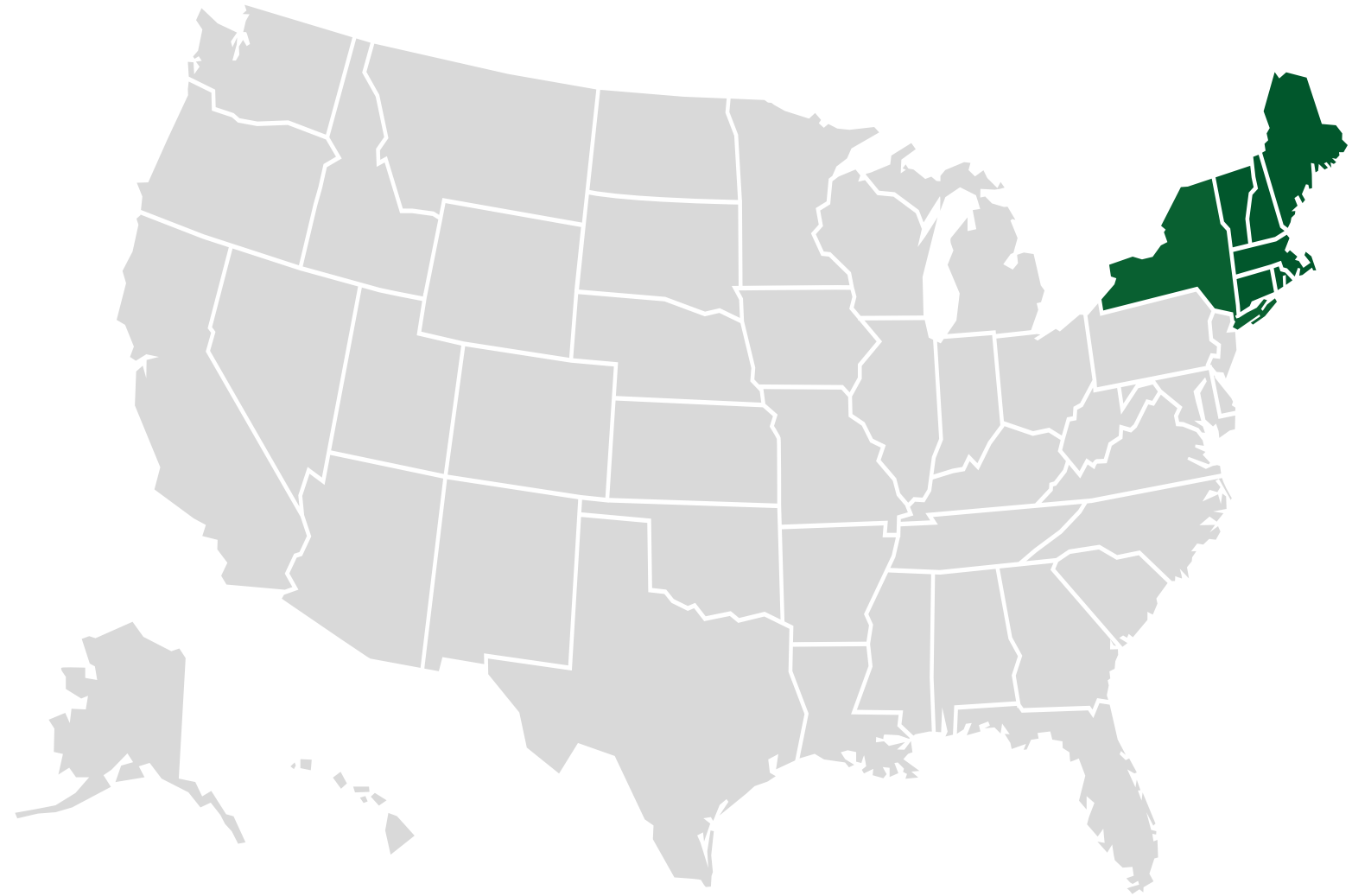
<https://performancepartner.gatorade.com/resources/Nutrition/All/All/SortByRecent>



We have done our best to highlight recipes containing potential allergens with this symbol. Please double check the product packaging and ingredient list to ensure they are safe for your consumption.



The following images have been produced using AI.



**Big Apple  
Baked Crisp**



**Tuna Twist**



**Berry Açaí  
Bowl**



**Dr. Shinn's  
Café Mocha  
Power Shake**

# Big Apple Baked Crisp

**Number of portions:** 4

**Estimated make time:** 45 minutes

**Difficulty rating:** Easy

Contains gluten & dairy



## Ingredients

### Filling

- 4 medium apples, thinly sliced & peeled
- ¼ cup firmly packed brown sugar
- 2 tbsp all-purpose flour
- ½ tsp cinnamon
- 1 small orange, freshly squeezed

### Topping

- ½ cup quaker oats
- ¼ cup firmly packed brown sugar
- 3 tbsp unsalted butter
- 1 tbsp all-purpose flour

### Additional Topping

- ½ cup nonfat Greek yogurt for each serving

## Recipe

1. Preheat oven to 350 F and spray baking dish with non-stick cooking spray.
2. Combine all filling ingredients in a large bowl and spoon into baking dish.
3. Combine all topping ingredients in a medium bowl.
4. Sprinkle the topping evenly over the filling.
5. Bake for 30-35 minutes until apples are tender.
6. Serve and apply yogurt for a protein boost.

## Nutrition Information Per Serving:

**510**  
Calories (kcal)

**27**  
Protein (g)

**79**  
Carbohydrate (g)

**11**  
Fat (g)

**4**  
Fiber (g)

## Tuna Twist



**Number of portions:** 1



**Estimated make time:** 10 minutes



**Difficulty rating:** Easy



Contains gluten, fish & eggs



### Ingredients

- 2 medium wholegrain wraps
- ½ can tuna (drained)
- 1 cup iceberg lettuce
- ½ cup sweetcorn (drained)
- ½ cup red bell pepper
- 1 tbsp reduced fat mayonnaise
- 1 tbsp sriracha chili sauce

### Recipe

1. In a small bowl mix the mayonnaise and sriracha sauce.
2. Add the tuna to the sauce and combine until covered.
3. Distribute evenly onto the two wraps.
4. Add lettuce, sweetcorn and pepper.
5. Serve cold or toasted if desired.

### ATHLETE ADVICE

A tin of tuna contains approximately 25g of protein. This makes it a great protein choice which is quick and convenient to prepare!

#### Nutrition Information Per Serving:

<b>675</b>	<b>35</b>	<b>88</b>	<b>17</b>	<b>14</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Berry Açai Bowl

**Number of portions:** 1

**Estimated make time:** 10 minutes

**Difficulty rating:** Easy

Contains gluten & dairy



## Ingredients

### Base

- ½ cup frozen blueberries
- ½ cup frozen strawberries
- ½ cup nonfat Greek yogurt
- 2 tbsp reduced fat milk

### Toppings

- ½ cup quaker oat granola of choice
- 1 tbsp peanut butter
- 1 strawberry, sliced
- 1 palm of blueberries

## Recipe

1. Blend the blueberries, strawberries, yogurt and milk until smooth and thick
2. Spoon mixture into a bowl
3. Add remaining toppings and serve

### Nutrition Information Per Serving:

**510**  
Calories (kcal)

**27**  
Protein (g)

**79**  
Carbohydrate (g)

**11**  
Fat (g)

**4**  
Fiber (g)

## Dr. Shinn's Café Mocha Power Shake



**Number of portions:** 1



**Estimated make time:** 5 minutes



**Difficulty rating:** Easy



Contains gluten



### Ingredients

- 1 carton of Evolve plant-based protein RTD
- 1 large banana
- ¼ cup oats
- 2 to 3 ice cubes

### Recipe

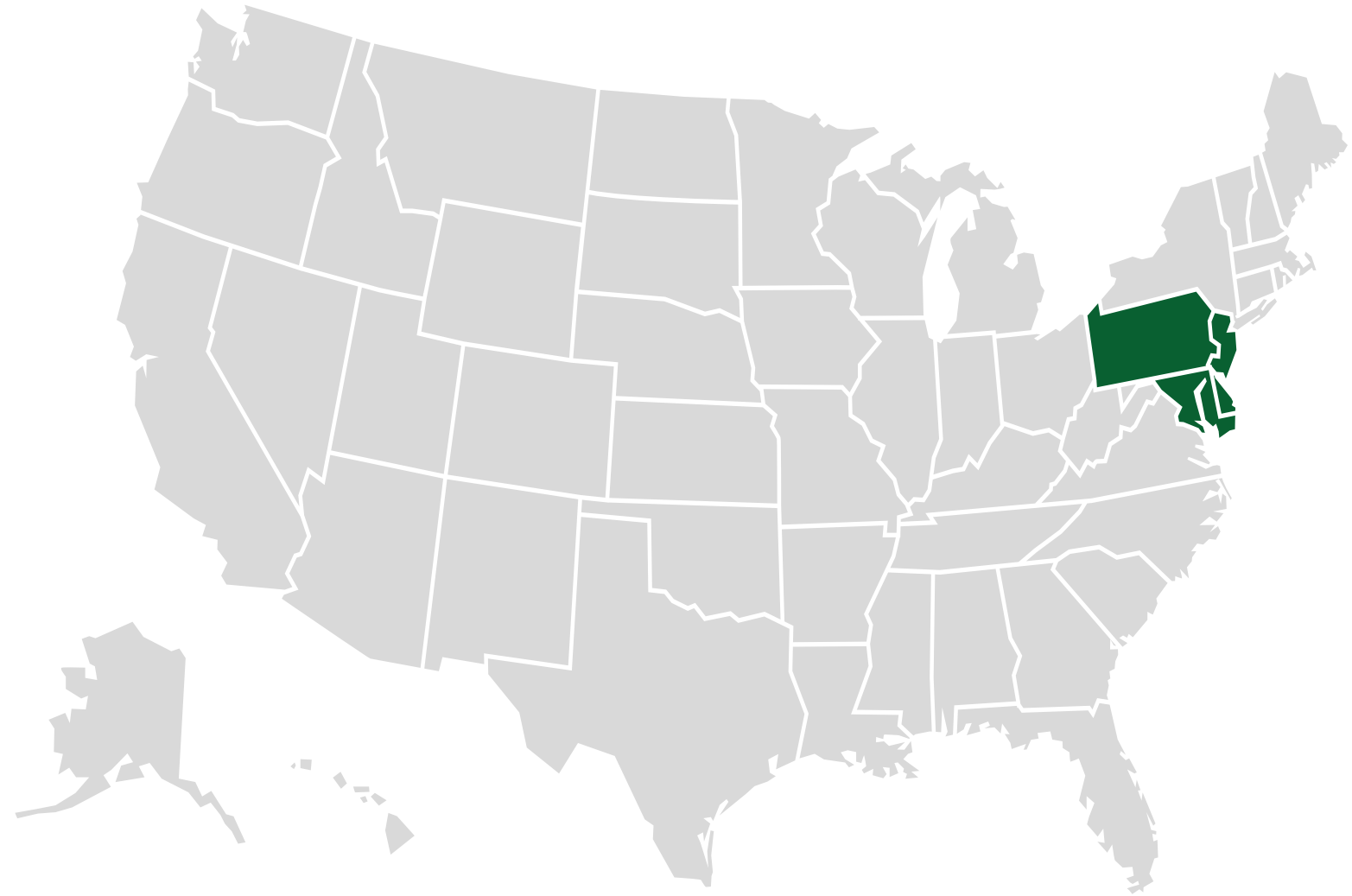
1. Add all ingredients to a blender and mix.

### ATHLETE ADVICE

Consuming liquid sources of carbohydrate and protein post-exercise provides a convenient way to recover and rehydrate for those who have a low appetite after exercise.

#### Nutrition Information Per Serving:

<b>300</b>	<b>24</b>	<b>54</b>	<b>4</b>	<b>13</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)



**Golden Bagel Scramble**



**Crab Shack Special**



**Pizza Bites**



**Green Machine Smoothie**

## Golden Bagel Scramble

 **Number of portions:** 1

 **Estimated make time:** 30 minutes

 **Difficulty rating:** Moderate

 Contains gluten, eggs & soy



### Ingredients

- 3 medium eggs
- 1 plain medium bagel
- 1 small sweet potato, peeled
- 1 cup spinach
- ½ cup red bell pepper
- 1 tsp olive oil
- ½ turmeric
- ¼ tsp black pepper

### Recipe

1. Add olive oil to pan over medium heat.
2. Dice sweet potato and sauté until golden and fork tender.
3. Toss in the red pepper and spinach to soften. Meanwhile in a bowl whisk the eggs, turmeric and black pepper.
4. Scramble the eggs with the vegetables.
5. Cut a bagel in half and place both pieces in the toaster.

### ATHLETE ADVICE

Whole eggs have been shown to stimulate a greater muscle protein synthesis response compared to just egg whites. This is possibly due to the other nutrients contained within the egg yolk known as the food matrix. For more information read [SSE Article #194](#).

#### Nutrition Information Per Serving:

<b>640</b>	<b>30</b>	<b>98</b>	<b>29</b>	<b>10</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Crab Shack Special

**Number of portions:** 2

**Estimated make time:** 45 minutes

**Difficulty rating:** Moderate

Contains gluten, fish & dairy



## Ingredients

### Crab Cakes

- ¾ cup quaker oats
- 8 oz crab meat
- ¼ cup non-fat milk
- 1 egg, beaten
- 1 tbsp white onion, finely chopped
- Nonstick cooking spray

### Corn Salad

- 1 cup drained sweetcorn
- ¾ cup quinoa, raw
- ¼ red onion, diced
- ½ cup cucumber, diced
- ½ cup cherry tomatoes, diced
- 1 tbsp olive oil
- 1 tbsp lime juice
- 1 tbsp basil
- ¼ tsp black pepper

## Recipe

Make and cook the crab cakes whilst cooking the quinoa to save time.

### Crab Cakes

1. In a medium bowl combine the crab cake ingredients. Mix well and leave to stand for 5 minutes.
2. Shape into 6 oval patties.
3. Lightly spray a large non-stick pan with cooking spray.
4. Cook crab cakes over medium heat for 3-4 minutes on each side until golden brown and heated through.

### Corn Salad

1. Cook quinoa according to package instructions, then fluff and let cool.
2. In a bowl combine the corn, quinoa, onion, cucumber and tomato.
3. In a separate bowl whisk together the olive oil, lime juice, basil and black pepper.
4. Pour this dressing over the salad and toss gently.

5. Serve 3 crab cakes per serving alongside 1 serving of corn salad

## Nutrition Information Per Serving:

**610**  
Calories (kcal)

**40**  
Protein (g)

**84**  
Carbohydrate (g)

**17**  
Fat (g)

**11**  
Fiber (g)

## Pizza Bites

**Number of portions:** 3 (4 bites per serving)

**Estimated make time:** 40 minutes

**Difficulty rating:** Moderate

Contains eggs, gluten & dairy



### Ingredients

**Pizza Dough (or 2 English muffins per serve)**

- ¾ cup blended reduced fat cottage cheese
- ½ cup egg whites (or 4 large egg whites)
- 1 cup whole wheat flour
- ½ tsp baking powder
- ½ tsp salt
- ½ tsp oregano

**Toppings**

- ½ cup crumbled feta cheese
- ½ cup chopped spinach
- ½ cup diced tomatoes

### Recipe

1. Line baking tray with parchment paper and preheat oven or air fryer.
2. Blend cottage cheese and egg whites until smooth.
3. In a bowl mix the flour, baking powder, salt and oregano.
4. Gradually stir in the blended cottage cheese and egg whites to form a soft dough, knead briefly until smooth.
5. Roll into 12 balls and flatten slightly to shape a small cup.
6. Evenly top each ball with tomato, spinach and feta.
7. Bake for 15-20 minutes until golden.
8. Cool slightly to serve or chill and store for on-the-go fuel.

### ATHLETE ADVICE

A great snack to support your energy and protein needs when you don't have time for a complete meal.

#### Nutrition Information Per Serving:

<b>260</b>	<b>20</b>	<b>38</b>	<b>6</b>	<b>5</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Green Machine Smoothie



**Number of portions:** 1



**Estimated make time:** 5 minutes



**Difficulty rating:** Easy



## Ingredients

- 1 ½ cup apple juice from concentrate
- 1 small banana
- 1 cup kale
- 1 medium kiwi, peeled
- ½ cup avocado
- 1 thumb ginger (optional)

## Recipe

1. Add all ingredients to a blender and mix.

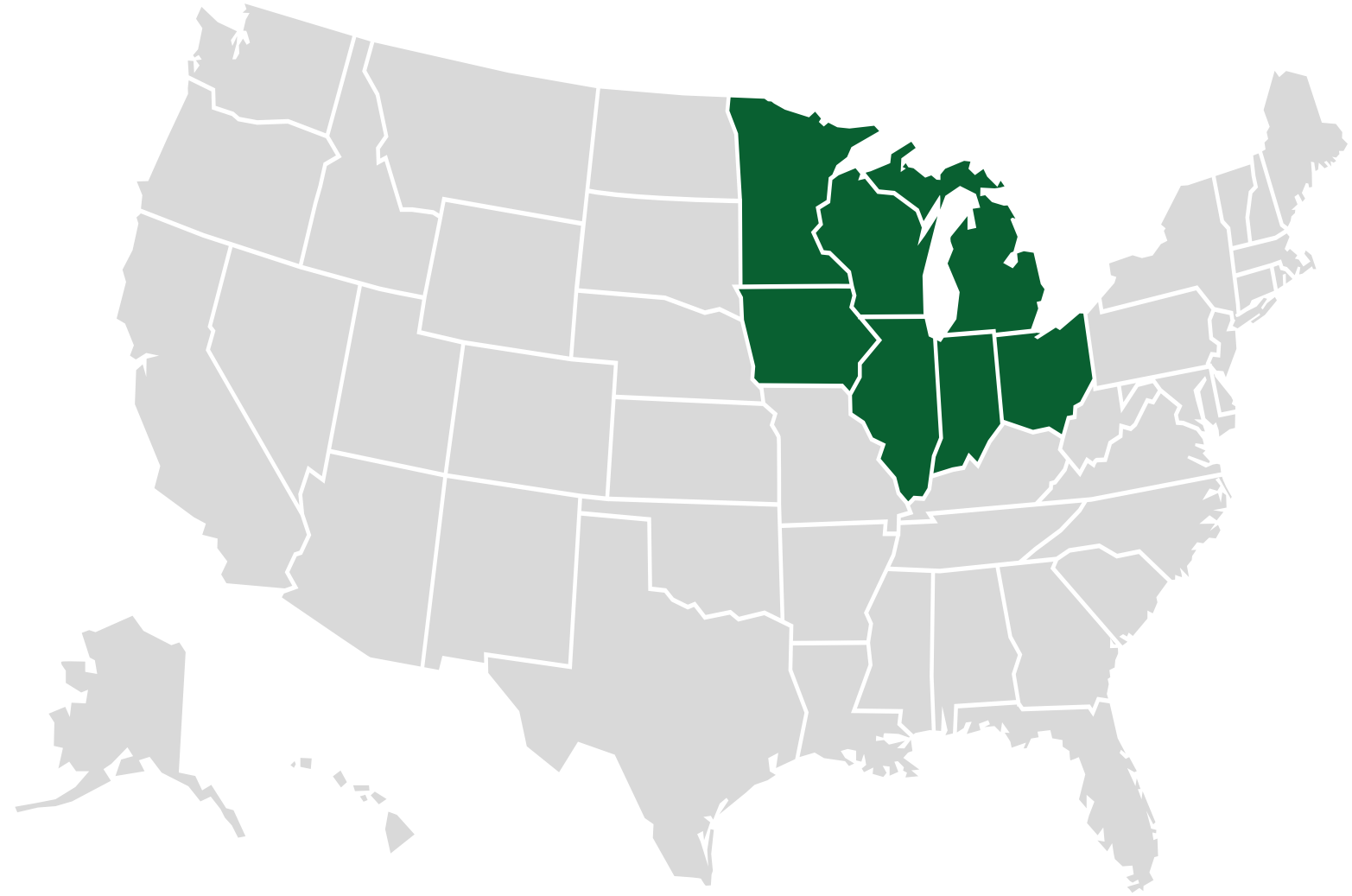
## ATHLETE ADVICE

Add 1 serving of Muscle Milk 100% whey to provide 32g of high-quality protein to support muscle recovery.

### Nutrition Information Per Serving:

<b>330</b>	<b>5</b>	<b>53</b>	<b>14</b>	<b>7</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Upper Midwest



**Dr. Pahnke's  
Pancakes**



**Spaghetti  
Chilli Stack**







**Quick  
Quaker  
Crunch**



**Dr. Rollo's  
Recovery  
Casein Cocoa**

## Dr. Pahnke's Pancakes

-  **Number of portions:** 1
-  **Estimated make time:** 45 minutes (+ 8 hours refrigerating)
-  **Difficulty rating:** Easy
-  Contains eggs, gluten & dairy



### Ingredients

- 1 ½ cup quaker steel cut oats
- 1 cup buckwheat groats
- 3 cups buttermilk (2 ½ cups reduced fat milk + ½ tbsps white vinegar)
- 3 large eggs
- 1 tbsp unsalted butter, melted
- 2 tsp baking soda
- ½ tsp vanilla essence
- ½ tsp salt
- 1 ½ cup blueberries
- 4 cups kefir to serve on the side (1 per person)

### Recipe

1. Combine the steel cut oats, buckwheat groats and buttermilk together in a bowl. Cover and refrigerate for 8 hours (ideal to do just before bed).
2. After soaking stir and blend until smooth.
3. In a separate bowl combine the eggs, melted butter, baking soda, vanilla essence and salt and mix thoroughly with whisk or blender.
4. Combine this mixture with the oats, groats and buttermilk. Then add blueberries in, mix well and let sit for 5 minutes.
5. Stir pancakes again before cooking in a non-stick cooking pan on medium heat. Adjusting the temperature of the pan will alter the texture of pancakes - experiment to find out what you like best.

### ATHLETE ADVICE

If you need to boost carbohydrate content pre-exercise, top the pancakes with additional maple syrup.

#### Nutrition Information Per Serving:

<b>603</b>	<b>34</b>	<b>73</b>	<b>18</b>	<b>7</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Spaghetti Chilli Stack

**Number of portions:** 2

**Estimated make time:** 35 minutes

**Difficulty rating:** Moderate

Contains gluten



### Ingredients

- 16 oz (4 cups) cooked whole wheat spaghetti
- 6 ounces of extra lean ground beef
- ½ cup red kidney beans, drained
- ½ cup low fat cheddar cheese
- 1 small red onion, diced
- 1 medium garlic clove, finely diced
- 1 tsp olive oil
- ½ can chopped tomatoes
- ½ tbsp tomato puree
- ½ tsp chili powder
- ½ tsp cumin

### Recipe

1. Add oil to a pan on a medium heat.
2. Sauté the onion and garlic until soft.
3. Add the beef, stir occasionally until brown.
4. Stir in the spices, chopped tomatoes and tomato puree/
5. Meanwhile, cook the spaghetti according to package instructions. Once done drain and distribute evenly on 2 plates.
6. Serve the chilli mixture on top of the spaghetti and add the toppings of kidney beans and cheese

### Nutrition Information Per Serving:

**590**  
Calories (kcal)

**44**  
Protein (g)

**82**  
Carbohydrate (g)

**14**  
Fat (g)

**16**  
Fiber (g)

# Quick Quaker Crunch

**Number of portions:** 1

**Estimated make time:** 10 minutes

**Difficulty rating:** Easy

Contains soya, dairy & nuts



## Ingredients

- 3 quaker rice cakes of choice
- ½ cup reduced fat cottage cheese
- 1 small apple, sliced
- 1 tbsp peanut butter

## Recipe

1. Spread the peanut butter and then cottage cheese onto the rice cakes.
2. Top the rice cakes with thin slices of apple and serve.

## ATHLETE ADVICE

The high protein content along with quick digesting carbohydrates makes this snack ideal to consume post-workout to help kickstart recover.

### Nutrition Information Per Serving:

<b>360</b>	<b>19</b>	<b>46</b>	<b>14</b>	<b>5</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Dr. Rollo's Recovery Casein Cocoa



**Number of portions:** 1



**Estimated make time:** 15 minutes



**Difficulty rating:** Easy



Contains dairy



## Ingredients

- 1 cup of full fat milk
- ¾ cup plain non-fat Greek yogurt
- ½ ripe banana
- 1 tbsp chia seeds
- 1 tbsp cocoa powder
- 1 tbsp honey
- ½ tsp cinnamon

## Recipe

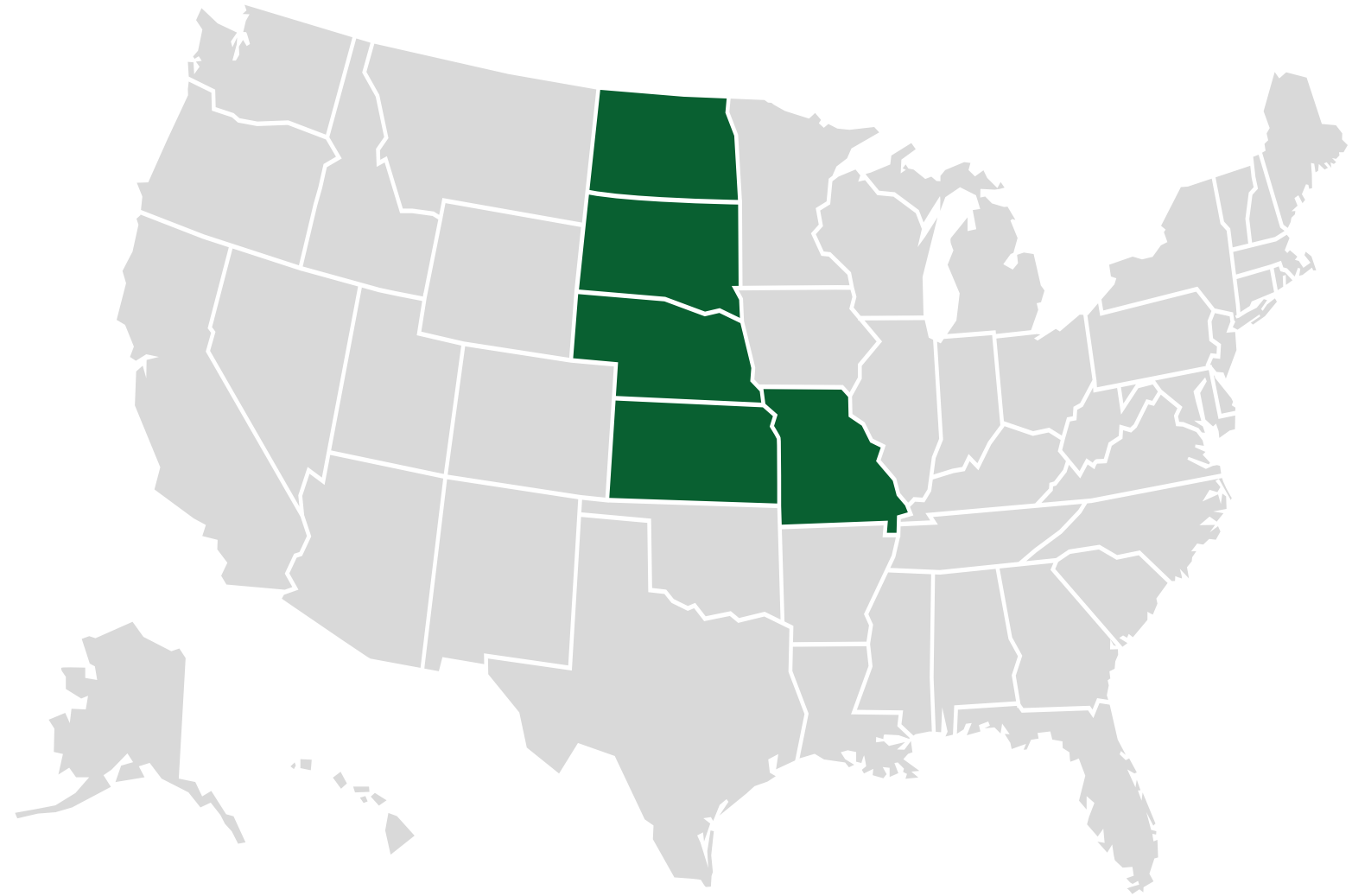
1. In a bowl, mash the banana with a fork.
2. In a small saucepan, warm the milk, mashed banana, honey, cocoa, cinnamon and chia seeds over a low-medium heat. Stir gently and do not boil.
3. Once warm, remove from heat and whisk in the Greek yogurt.
4. Pour into your favourite mug and enjoy!

## ATHLETE ADVICE

Casein (found in dairy products) is a slower releasing protein source making it ideal to consume pre-sleep to keep rates of muscle protein synthesis elevated overnight.

### Nutrition Information Per Serving:

<b>410</b>	<b>25</b>	<b>59</b>	<b>14</b>	<b>14</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)



**Cherry  
Vanilla  
Overnight  
Oats**



**Bean  
Oatmeal  
Burger Stack**



**Pepper  
Pockets**



**Beetrolyte  
Boost**

# Cherry Vanilla Overnight Oats



**Number of portions:** 1



**Estimated make time:** 15 minutes (+ 8 hours refrigerating)



**Difficulty rating:** Easy



Contains dairy, nuts & gluten



## Ingredients

- ¾ cup quaker oats
- ¾ cup reduced fat milk
- ½ cup plain non-fat Greek yogurt
- ½ cup frozen cherries, pitted
- ¼ cup almonds, chopped
- 1 tbsp honey
- ½ tsp vanilla extract
- 1 tsp cinnamon

## Recipe

1. Mix the milk, yogurt, honey, vanilla extract and cinnamon in a container of choice.
2. Then gradually stir in the oats, almonds, cherries and mix thoroughly.
3. Cover and place it in the refrigerator for at least 8 hours and consume the following day.

## ATHLETE ADVICE

Overnight oats are a brilliant choice for busy mornings. Make the night before, refrigerate overnight then simply grab and go!

### Nutrition Information Per Serving:

<b>640</b>	<b>32</b>	<b>92</b>	<b>20</b>	<b>10</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Bean Oatmeal Burger Stack

**Number of portions:** 2

**Estimated make time:** 30 minutes

**Difficulty rating:** Medium

Contains gluten, soy & eggs



## Food Processor needed

## Ingredients

- 2 burger buns
- 2 cups quaker oats (divided)
- 2 egg whites
- 1 can black beans, drained
- 1 cup eggplant, peeled and diced
- 1 cup mushrooms, diced
- 1 garlic clove, minced
- 1 beef tomato, sliced
- 1 cup iceberg lettuce
- ½ red onion, diced
- 1 tbsp olive oil (divided)
- ½ cup chopped parsley
- ½ tsp black pepper

## Recipe

1. Heat ½ tbsp olive oil in a pan on medium heat and egg the eggplant, mushrooms, onion, garlic and black pepper.
2. Stir frequently and cook until eggplant is tender, reduce to medium low heat if ingredients brown too quickly. Once cooked, let cool slightly.
3. Place 1 ½ cups of oats and the beans into a food processor and pulse to combine.
4. Add eggplant mixture, then gradually add egg whites until a moist but firm texture is attained.
5. Stir in the remaining ½ cup oats and let stand for 5 to 10 minutes.
6. Shape mixture evenly into 4 patties.
7. Heat the remaining ½ tbsp of oil in a pan over medium heat and cook each patty for 3 to 5 minutes per side until brown.
8. Serve 2 patties in 1 bun per person and complete with lettuce and sliced tomato.

## Nutrition Information Per Serving:

**600**  
Calories (kcal)

**28**  
Protein (g)

**112**  
Carbohydrate (g)

**13**  
Fat (g)

**20**  
Fiber (g)

# Pepper Pockets

 **Number of portions:** 2

 **Estimated make time:** 55 minutes

 **Difficulty rating:** Easy

 Check seasonings



## Ingredients

- 2 medium red bell peppers
- ½ cup cooked brown lentils
- ½ cup sweetcorn, drained
- ½ medium red onion, finely chopped
- 1 garlic clove, minced
- 2 tbsp nutritional yeast
- 1 tbsp tomato puree
- ½ tbsp olive oil
- ½ tsp cumin
- ½ tsp paprika

## Recipe

1. Preheat oven to 375 F.
2. Heat olive oil in a pan over medium heat, add onion and garlic and sauté until soft.
3. Store in tomato paste, paprika, cumin, salt and pepper.
4. Mix in the cooked lentils and corn.
5. Meanwhile slice the top of the peppers and spoon out the inside.
6. Spoon the mixture of tomato, lentils and corn into each pepper.
7. Cover peppers loosely with foil and bake for ~20 minutes, then remove foil and bake for another ~10 minutes.
8. Sprinkle nutritional yeast on top to serve.

## Nutrition Information Per Serving:

**220**  
Calories (kcal)

**14**  
Protein (g)

**42**  
Carbohydrate (g)

**6**  
Fat (g)

**13**  
Fiber (g)

# Beetrolyte Boost



**Number of portions:** 1



**Estimated make time:** 5 minutes



**Difficulty rating:** Easy



## Ingredients

½ cup beetroot juice or 2 tsp of beetroot powder  
12 oz of Gatorade thirst quencher, orange

## Recipe

1. Combine the Gatorade and beetroot juice / powder and shake well.
2. Add 2 - 4 oz of plain water to reduce sweetness if desired.

### Nutrition Information Per Serving:

120  
Calories (kcal)

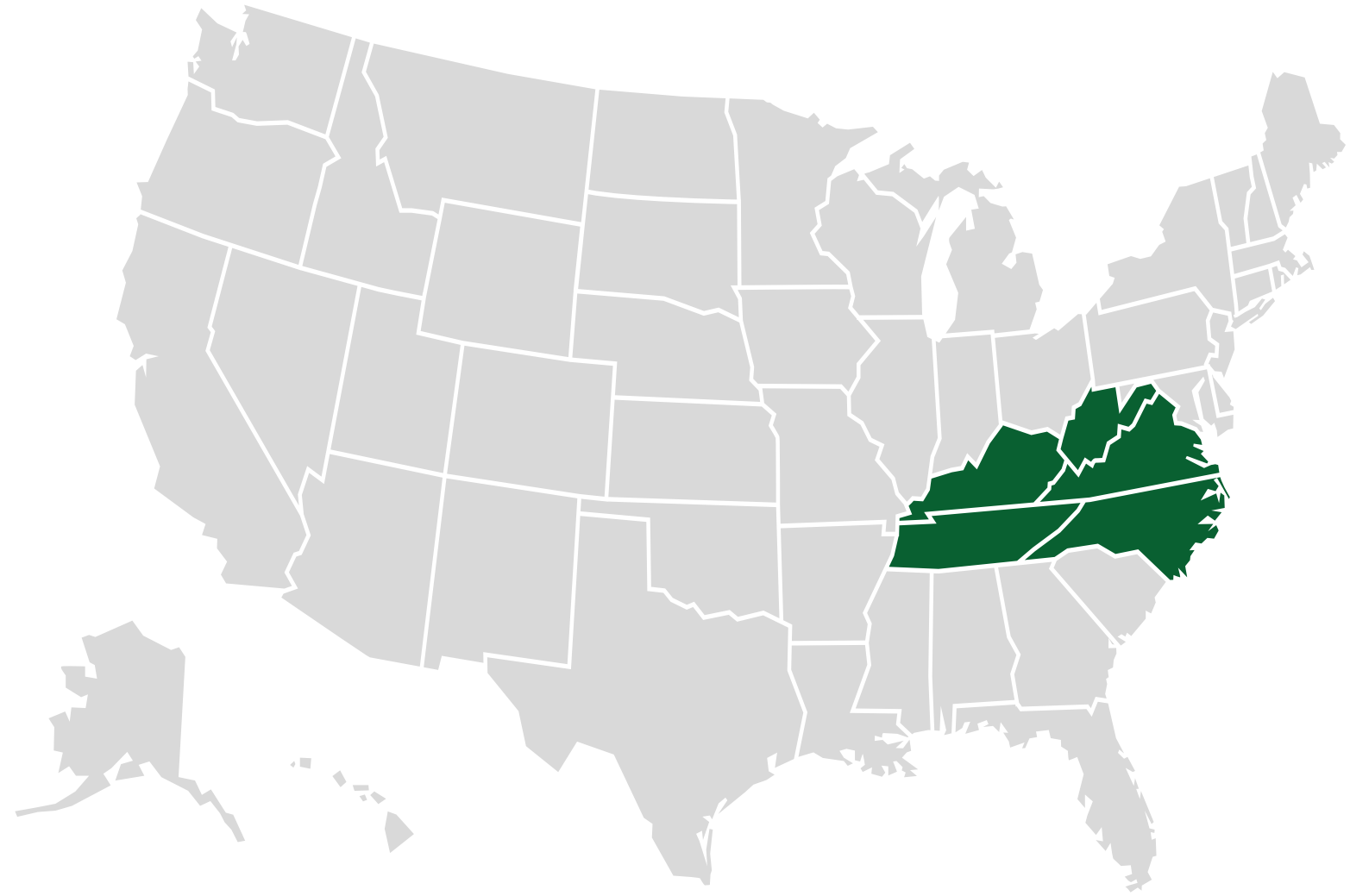
1  
Protein (g)

30  
Carbohydrate (g)

0  
Fat (g)

0  
Fiber (g)

# Upper South



**Sunrise  
French Toast**



**Dorito Flame  
Fold**



**Pecan Pie  
Protein Bars**



**Sweet  
Gatorade Tea**

# Sunrise French Toast



**Number of portions:** 2



**Estimated make time:** 30 minutes



**Difficulty rating:** Moderate



Contains gluten & eggs



## Ingredients

- 6 slices of white bread
- 4 turkey bacon rashers
- 3 tbsp honey or maple syrup (divided)
- 2 eggs
- 2 medium ripe peaches, peeled and sliced
- 1 tsp olive oil
- 1 tsp cinnamon (divided)
- ½ cup unsweetened almond milk
- ½ tsp vanilla extract

## Recipe

1. Preheat oven or air fryer to 400 F
2. Sauté the peach slices in olive oil over a medium heat, add half the cinnamon and cook until caramelized. Then remove.
3. Whisk the eggs, milk, 1 tbsp honey / maple syrup, vanilla extract and remaining cinnamon in a bowl.
4. Add turkey rashers to a baking sheet and cook each side in the oven or air fryer until desired crispness is reached.
5. Meanwhile dip the bread slices into the batter and soak both sides, then cook in a non-stick pan over medium heat until golden brown.
6. Serve 3 slices each, top with crispy bacon, warm golden peaches and another 1 tbsp of honey / maple syrup per serving.

### Nutrition Information Per Serving:

**530**  
Calories (kcal)

**29**  
Protein (g)

**88**  
Carbohydrate (g)

**10**  
Fat (g)

**7**  
Fiber (g)

# Dorito Flame Fold

**Number of portions:** 2

**Estimated make time:** 15 minutes

**Difficulty rating:** Moderate

Contains gluten, soy & dairy



## Ingredients

- 4 wholegrain tortilla wraps
- 6 ounces cooked shredded chicken breast
- 1 grab bag of Doritos cool ranch or chili heatwave
- 1 avocado
- ½ cup reduced fat cheddar cheese
- ½ cup diced tomatoes

## Recipe

1. Take each wrap and make a single cut from the centre to the edge
2. Then evenly distribute the ingredients across each of the 4 tortillas with each quadrant containing:  
(1) Chicken (2) Tomato & Avocado (3) Lightly Crushed Doritos (4) Cheese
3. Carefully fold up each quadrant of the tortilla
4. If desired grill, air fry or pan fry on a medium heat until golden and crispy on both sides. Serve 2 wraps per person.

### Nutrition Information Per Serving:

**770**  
Calories (kcal)

**51**  
Protein (g)

**88**  
Carbohydrate (g)

**31**  
Fat (g)

**17**  
Fiber (g)

# Pecan Pie Protein Bars

**Number of portions:** 4

**Estimated make time:** 10 minutes (+ 1 hour chill time)

**Difficulty rating:** Easy

Contains gluten, nuts & dairy



## Ingredients

- 2 scoops muscle milk 100% whey vanilla flavor
- 2 tbsp maple syrup
- 2 tbsp almond butter (or nut butter of choice)
- ¾ cup oats
- ¼ cup chopped pecans
- ¼ cup of water
- ½ tsp cinnamon

## Recipe

1. Mix the protein powder and oats together in a bowl.
2. Stir in the maple syrup, almond butter and water.
3. Fold in the chopped pecans.
4. Press into a parchment lined loaf tin and chill for 1 hour.
5. Remove from refrigerator and slice into 4 bars.
6. Keep chilled until consumed.

## ATHLETE ADVICE

Homemade protein bars are a good way to assist you with meeting your daily protein target when you may not have time or access to a complete meal.

### Nutrition Information Per Serving:

<b>265</b>	<b>18</b>	<b>18</b>	<b>13</b>	<b>3</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Sweet Gatorade Tea



**Number of portions:** 1



**Estimated make time:** 10 minutes



**Difficulty rating:** Easy



### Ingredients

- 1 tea bag of green tea
- 12 oz Gatorade thirst quencher lemon & lime
- 1 tbsp honey
- 1 cup of water
- Ice cubes

### Recipe

1. Boil 1 cup of water and infuse tea bag for ~5 minutes, then let cool.
2. Combine the cooled tea, Gatorade and honey.
3. Stir well and add ice to chill.

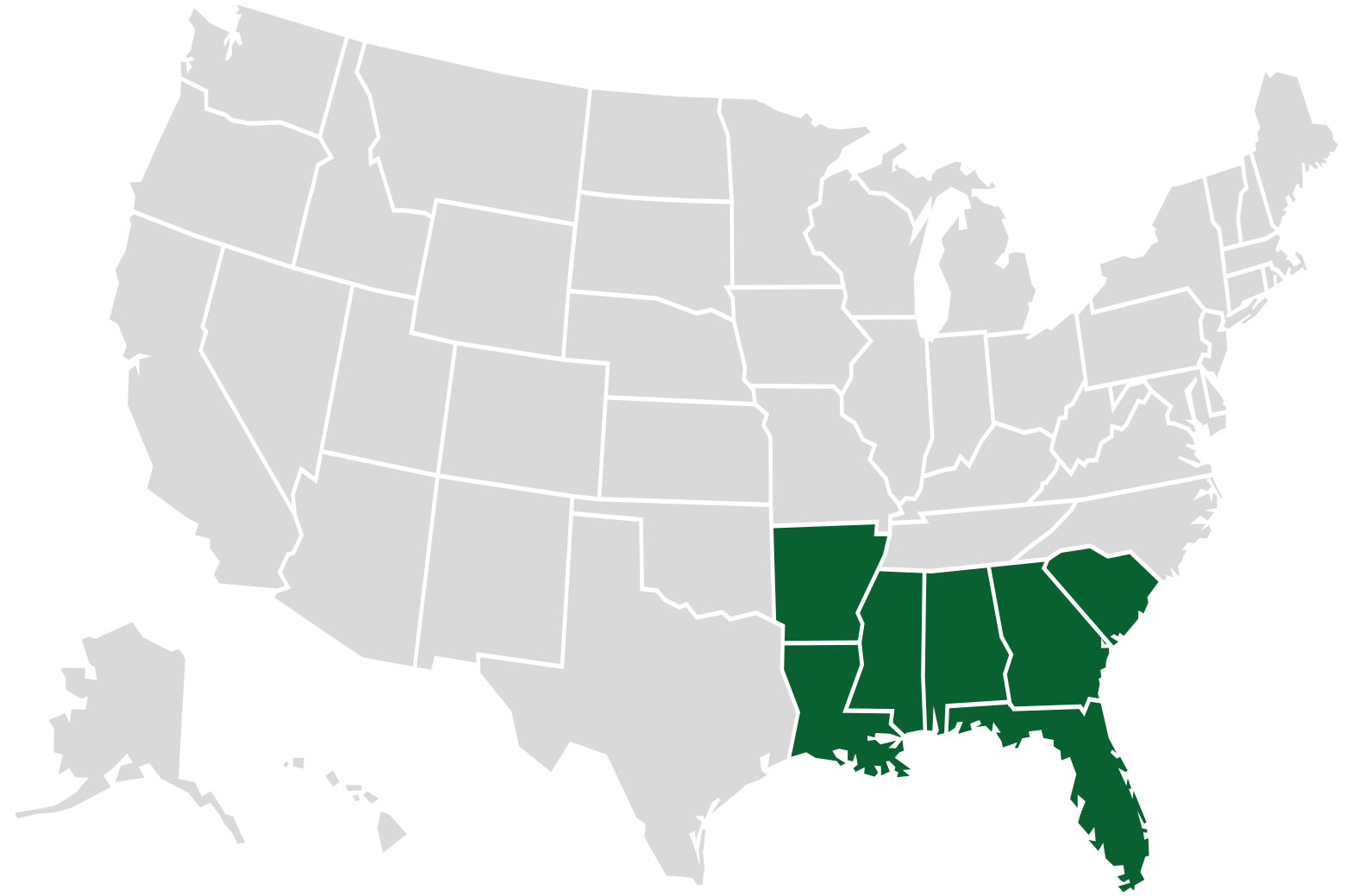
### ATHLETE ADVICE

The fast-digesting carbohydrates in this drink makes it optimal to consume pre-exercise to fuel and hydrate you for an intense training session.

#### Nutrition Information Per Serving:

150	37	0	0	0
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# South



**Grilled  
Chicken &  
Waffles**



**Grits & Gains**



**Jack's Sweet  
Potato  
Muffins**



**Ellie's Banana  
Bread Mug  
Cake**

# Grilled Chicken & Waffles

- Number of portions:** 2
- Estimated make time:** 45 minutes
- Difficulty rating:** Moderate



## Equipment needed: Waffle Iron

### Ingredients

- 6 oz chicken breast
- 4 tbsp maple syrup
- 1 cup all purpose flour
- 1 cup of blueberries
- 1 egg
- 1 tsp baking powder
- ¾ cup reduced fat milk
- ½ tsp unsalted butter, melted
- ½ tsp paprika
- ½ tsp garlic powder
- ½ tsp black pepper
- ½ tsp ground cinnamon

### Recipe

1. Season chicken with paprika, garlic powder, black pepper and rub well.
2. Grill over medium heat either side until cooked throughout, then let rest.
3. Mix flour, milk, egg, baking powder and cinnamon until smooth to form waffle mixture.
4. Grease waffle iron with unsalted butter.
5. Add mixture to the waffle iron and cook, until all mixture is used.
6. Slice the chicken into strips and layer on top of waffles.
7. Serve with berries and 2 tbsp of maple syrup per serving.

## ATHLETE ADVICE

Chicken is a great complete protein source. Just 3 oz will contain ~1.6g of leucine which contributes to optimal rates of muscle protein synthesis.

### Nutrition Information Per Serving:

<b>590</b>	<b>43</b>	<b>88</b>	<b>12</b>	<b>10</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Grits & Gains

**Number of portions:** 2

**Estimated make time:** 40 minutes

**Difficulty rating:** Easy

Contains gluten, fish & dairy



### Ingredients

- 6 packets (6 oz) of quaker instant grits
- 6 oz raw shrimp peeled and deveined
- 2 cups whole milk
- 2 cups sweetcorn, drained
- ½ cup (2 oz) reduced fat cheddar cheese
- ½ tsp black pepper
- ½ tsp oregano
- ½ tsp onion powder
- ½ tsp chili powder
- ½ tsp ground cumin

### Recipe

1. Heat oven to 400 F.
2. Mix the seasonings and coat shrimp on both sides.
3. Bake shrimp on both sides until opaque and cooked through.
4. In a pan heat the milk on a medium-high heat and slowly stir grits in.
5. Reduce to a medium-low heat and cover until thickened.
6. Add cheese and stir until it melts in.
7. Serve grits in 2 bowls, top both evenly with shrimp and serve with 1 cup of corn per person on the side.

### ATHLETE ADVICE

This meal an excellent source of protein and calcium which can support muscle protein synthesis and bone health.

#### Nutrition Information Per Serving:

<b>620</b>	<b>39</b>	<b>81</b>	<b>19</b>	<b>7</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Jack's Sweet Potato Muffins

**Number of portions:** 9

**Estimated make time:** 30 minutes

**Difficulty rating:** Moderate

Contains gluten & eggs



### Ingredients

- 8 oz sweet potato (baked, peeled and mashed)
- 4 tbsp maple syrup / honey
- 2 medium eggs
- 1 cup all-purpose flour
- ½ cup milk chocolate chips
- ½ tsp cinnamon
- ½ tsp baking powder

### Recipe

1. Bake sweet potato, then let cool.
2. Preheat oven to 350 F and line or lightly grease muffin tin.
3. Peel and mash the sweet potato in a large bowl.
4. Then whisk in the syrup and eggs with the sweet potato.
5. In a separate bowl, mix the flour, baking soda and cinnamon.
6. Combine wet and dry ingredients, then fold in the chocolate chips.
7. Scoop batter evenly into muffin cups and bake for ~20 minutes or until toothpick comes out clean.

### ATHLETE ADVICE

The fast digesting and low fiber carbohydrate content in this snack makes it a great choice for athletes to consume pre-exercise.

#### Nutrition Information Per Serving:

165	4	27	2	2
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Ellie's Banana Bread Mug Cake

- Number of portions:** 1
- Estimated make time:** 10 minutes
- Difficulty rating:** Easy
- Contains gluten, eggs & dairy



### Ingredients

- 1 ripe medium banana
- 1 egg
- 2 tbsp non-fat Greek yogurt
- 2 tbsp flour
- 1 tbsp reduced fat milk
- 1 tsp honey
- ½ tsp cinnamon
- ½ tsp baking powder

### Recipe

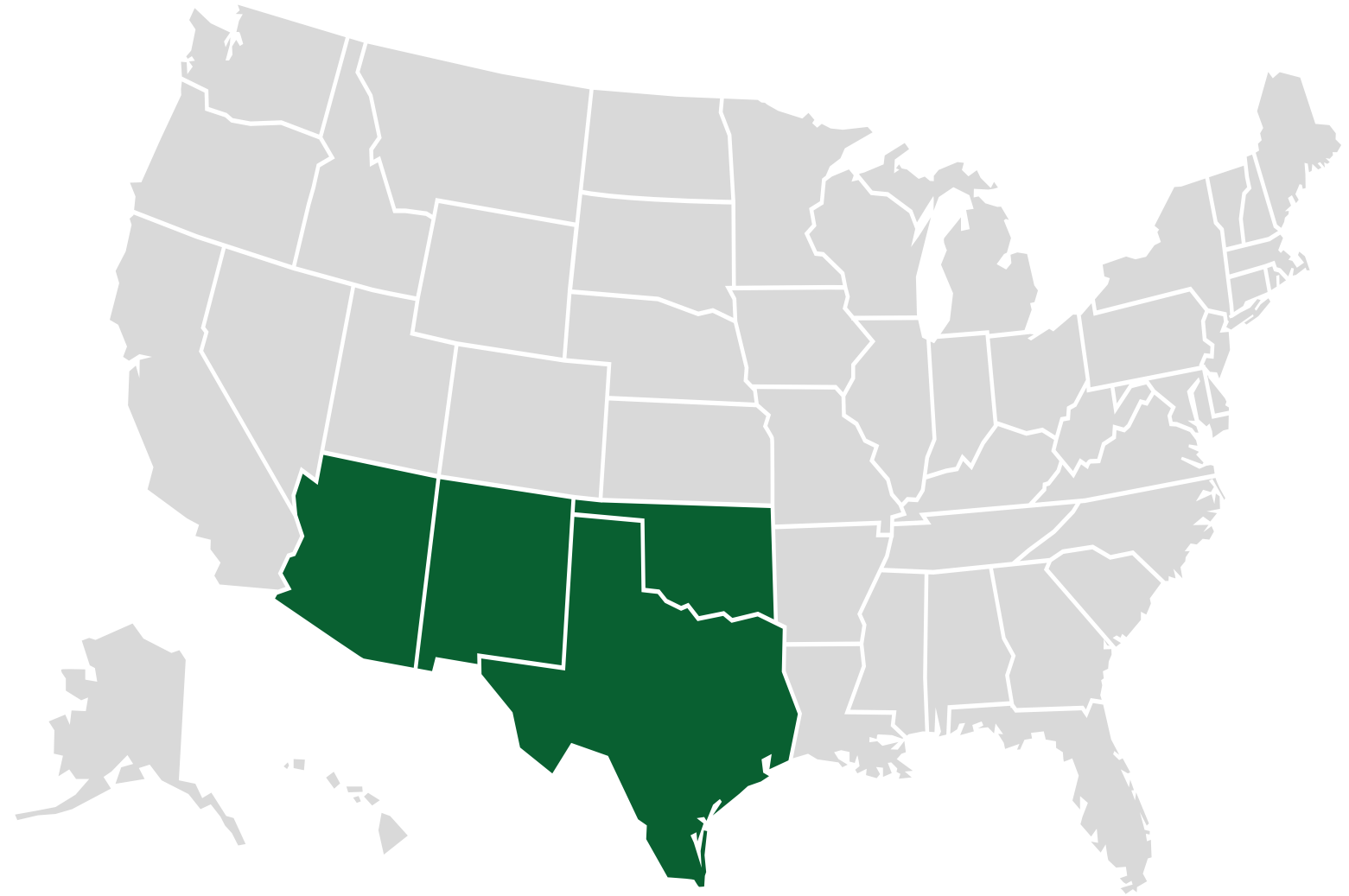
1. In a microwave-safe mug, mash the banana.
2. Mix in the egg, milk and honey.
3. Then stir in the flour, baking powder and cinnamon
4. Microwave on medium power for 30 seconds, stir, then microwave for a remaining 60 - 90 seconds.
5. Cool slightly and top with yogurt.

### ATHLETE ADVICE

This sweet treat is a great choice post-exercise providing carbohydrate and protein to help kickstart the recovery process.

#### Nutrition Information Per Serving:

<b>410</b>	<b>23</b>	<b>70</b>	<b>7</b>	<b>6</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)



**Breakfast  
Tacos**



**Sweet Heat  
BBQ Plate**







**Pretzel &  
Carrot  
Crunch**



**Cherry Lime  
Reboot**

## Breakfast Tacos

-  **Number of portions:** 2
-  **Estimated make time:** 30 minutes
-  **Difficulty rating:** Moderate
-  Contains eggs, check taco shells for gluten & soya



### Ingredients

- 6 average baked taco shells
- 4 eggs
- 1 cup cooked white rice
- ½ cup black beans, drained
- 6 tbsp Tostitos medium salsa
- 1 tsp olive oil
- ½ medium red onion
- ½ red bell pepper

### Recipe

1. Add oil to a pan on a medium heat.
2. Sauté onion and pepper until soft.
3. Stir in the black beans and rice to heat through.
4. Whisk the eggs in a bowl, then pour into the pan and gently scramble with the other ingredients until just set.
5. Spoon the mixture evenly into each of the 6 tacos and top with salsa. Serve 3 tacos per person.

### Nutrition Information Per Serving:

<b>550</b>	<b>23</b>	<b>74</b>	<b>20</b>	<b>6</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Sweet Heat BBQ Plate

-  **Number of portions:** 2
-  **Estimated make time:** 40 minutes
-  **Difficulty rating:** Moderate
-  Check labels of seasonings



### Ingredients

- 2 lean medium pork tenderloin steaks
- 2 cups brown rice, cooked
- 1 cup chopped cucumber
- 1 cup chopped tomatoes
- ½ medium red onion, chopped
- 1 tbsp olive oil

#### Homemade BBQ Sauce

- 1 tbsp tomato puree
- 1 tbsp honey
- 1 tsp olive oil
- 1 tsp smoked paprika
- 1 tsp garlic powder
- ½ tsp onion powder
- ½ tsp ground cumin
- ½ tsp black pepper

### Recipe

1. Preheat grill to 400 F and cook rice according to package instructions.
2. Whisk all ingredients for the BBQ sauce together in a bowl until smooth.
3. Cover each side of the pork steak in the sauce.
4. Grill the pork for the ~5 minutes per side until cooked throughout and tender.
5. Meanwhile, combine the cooked rice, cucumber, tomatoes and onions. Add the lime juice and olive oil and toss well.
6. Serve alongside the cooked BBQ pork.

### Nutrition Information Per Serving:

<b>590</b>	<b>34</b>	<b>88</b>	<b>14</b>	<b>6</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Pretzel & Carrot Crunch

-  **Number of portions:** 4
-  **Estimated make time:** 30 minutes
-  **Difficulty rating:** Moderate
-  Contains gluten, dairy, sesame & eggs



### Ingredients

- 3 cups of water
- 1 ½ cup self-raising flour
- 1 cup non-fat Greek yogurt
- 1 egg
- ¼ tsp salt
- ¼ tsp baking soda

#### To Serve Per Pretzel

- 1 medium raw carrot sliced into batons
- 1 serving of Sabra roasted red pepper hummus




### Recipe

1. Preheat oven to 425 F and line baking tray with greaseproof paper.
2. Mix the yogurt and flour until a soft dough forms, knead briefly until smooth.
3. Divide into 4 pieces, gently roll each out into a tapered cylinder and twist into the double knotted pretzel shape.
4. Mix the water and baking soda to a gentle boil and carefully brush a small coat onto each pretzel.
5. Lightly sprinkle the salt evenly across each pretzel and bake for 15-18 minutes until deep golden brown.
6. Serve 1 pretzel alongside the carrot and hummus.

### Nutrition Information Per Serving:

<b>330</b>	<b>14</b>	<b>48</b>	<b>12</b>	<b>4</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

## Cherry Lime Reboot

-  **Number of portions:** 1
-  **Estimated make time:** 5 minutes
-  **Difficulty rating:** Easy



### Ingredients

- 12 oz Gatorade thirst quencher lemon and lime
- 1 oz tart cherry concentrate
- Ice cubes

### Recipe

1. Combine the Gatorade with the tart cherry and shake well.
2. Pour into your favorite glass and add ice cubes.

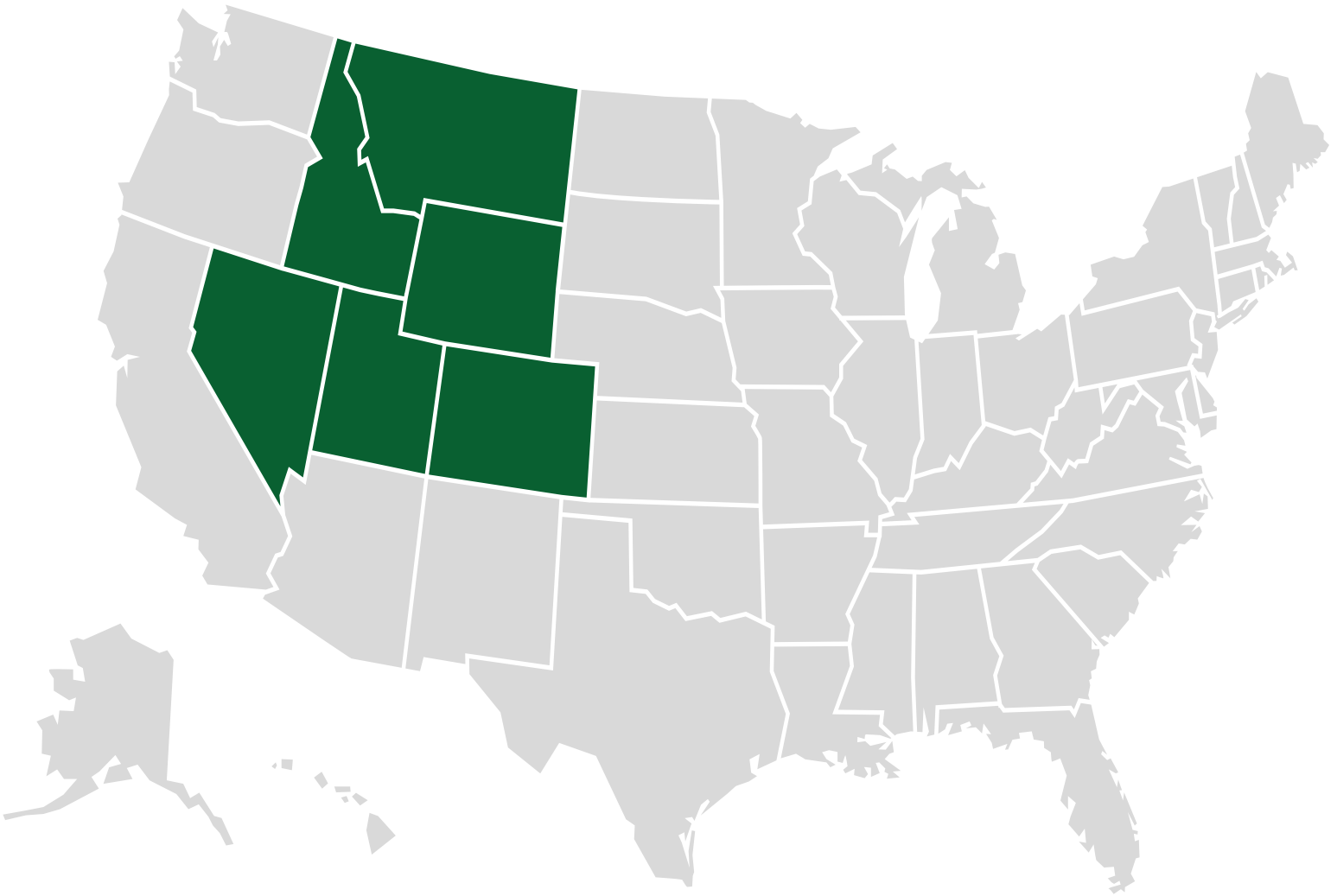
### ATHLETE ADVICE

Tart cherry is high in antioxidants and may help muscle recovery which makes this ideal to consume post-exercise.

#### Nutrition Information Per Serving:

<b>190</b>	<b>1</b>	<b>47</b>	<b>0</b>	<b>0</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Mountain West



**Mountain Skillet**



**Tater Tot Casserole**



**Spinach & Feta Devilled Eggs**



**PB & J Power Up**

## Mountain Skillet

**Number of portions:** 2

**Estimated make time:** 40 minutes

**Difficulty rating:** Moderate

Contains eggs



### Ingredients

- 1 ½ lbs all round white potatoes
- 4 medium lean chicken sausage
- 2 eggs
- 1 cup mushrooms, sliced
- ½ red bell pepper, chopped
- ½ can black beans, drained
- 1 tbsp olive oil
- 1 tsp paprika

### Recipe

1. Dice the potatoes, then bake in the microwave for 4-5 minutes to soften.
2. Cook sausages according to package instructions.
3. Heat oil in a large skillet over a medium heat, add the onion, red pepper and mushrooms. Stir until softened.
4. Add the potatoes, sausages and beans to the skillet along with the paprika. Cook until golden and crispy.
5. Crack in the eggs and serve whilst keeping sunny side up.

### Nutrition Information Per Serving:

**540**  
Calories (kcal)

**33**  
Protein (g)

**74**  
Carbohydrate (g)

**17**  
Fat (g)

**12**  
Fiber (g)

# Tater Tot Casserole

**Number of portions:** 2

**Estimated make time:** 2 hours

**Difficulty rating:** Moderate

Contains gluten & dairy



## Ingredients

### Homemade Tater Tots (or use store bought)

1 lb potatoes  
2 tbsp flour  
1 tsp garlic powder  
½ tsp onion powder  
½ tsp salt  
½ tsp black pepper  
Cooking spray

### Casserole Base

6 oz lean turkey mince  
1 garlic clove, minced  
1 cup carrots, chopped  
1 cup zucchini, chopped  
½ medium white onion, diced  
1 tsp olive oil

### Homemade Sauce

1 cup chicken stock  
½ cup Greek yogurt  
1 tbsp all purpose flour  
½ tsp smoked paprika  
½ tsp thyme

## Recipe

1. Peel potatoes and boil for 15 minutes until soft. Then drain and mash.
2. Combine flour and seasonings with the potato until it forms a dough consistency. Let chill for 30 minutes.
3. Form the potato tots by scooping 1 tbsp of mixture and rolling into small cylinders. Let chill for 15 minutes.
4. Preheat oven to 375 F
5. In a large pan heat oil over a medium heat. Sauté onion and garlic until fragrant.
6. Add turkey mince and cook until browned. Add in the chopped vegetables and continue to stir.
7. Slowly add the chicken stock along with the flour and stir.
8. Simmer until sauce thickens, then remove from heat. Stir in the yogurt and seasonings for the remainder of the sauce.
9. Transfer to a baking dish and top with the tater tots.
10. Bake uncovered for 30 minutes until tots are golden.

## Nutrition Information Per Serving:

**530**  
Calories (kcal)

**37**  
Protein (g)

**84**  
Carbohydrate (g)

**9**  
Fat (g)

**10**  
Fiber (g)

## Spinach & Feta Devilled Eggs

**Number of portions:** 4

**Estimated make time:** 20 minutes

**Difficulty rating:** Moderate

Contains eggs & dairy



### Ingredients

- 6 eggs
- 1 cup spinach
- ½ cup low fat feta cheese
- 2 tbsp low fat Greek yogurt
- 1 tsp olive oil
- ½ tsp chili flakes

### Recipe

1. Hard boil the eggs and then let cool.
2. Peel the eggs, slice them in half lengthwise and scoop out yolks into a bowl.
3. Heat oil in a pan on medium heat and lightly sauté spinach, then chop finely.
4. Mash the yolks with yogurt, crumbled feta, spinach until smooth.
5. Spoon the mixture back into the egg whites and sprinkle with chili flakes.
6. Serve 3 egg halves per person.

### ATHLETE ADVICE

Store chilled and wrap in kitchen foil for a quick and convenient snack when you are on the go!

#### Nutrition Information Per Serving:

**170**  
Calories (kcal)

**17**  
Protein (g)

**1**  
Carbohydrate (g)

**11**  
Fat (g)

**0**  
Fiber (g)

# PB & J Power Up

**Number of portions:** 1

**Estimated make time:** 5 minutes

**Difficulty rating:** Easy

Contains nuts & dairy



## Ingredients

- 1 cup kefir or milk
- ½ cup non fat Greek yogurt
- 1 ½ tbsp peanut butter
- ½ cup frozen strawberries
- Ice cubes

## Recipe

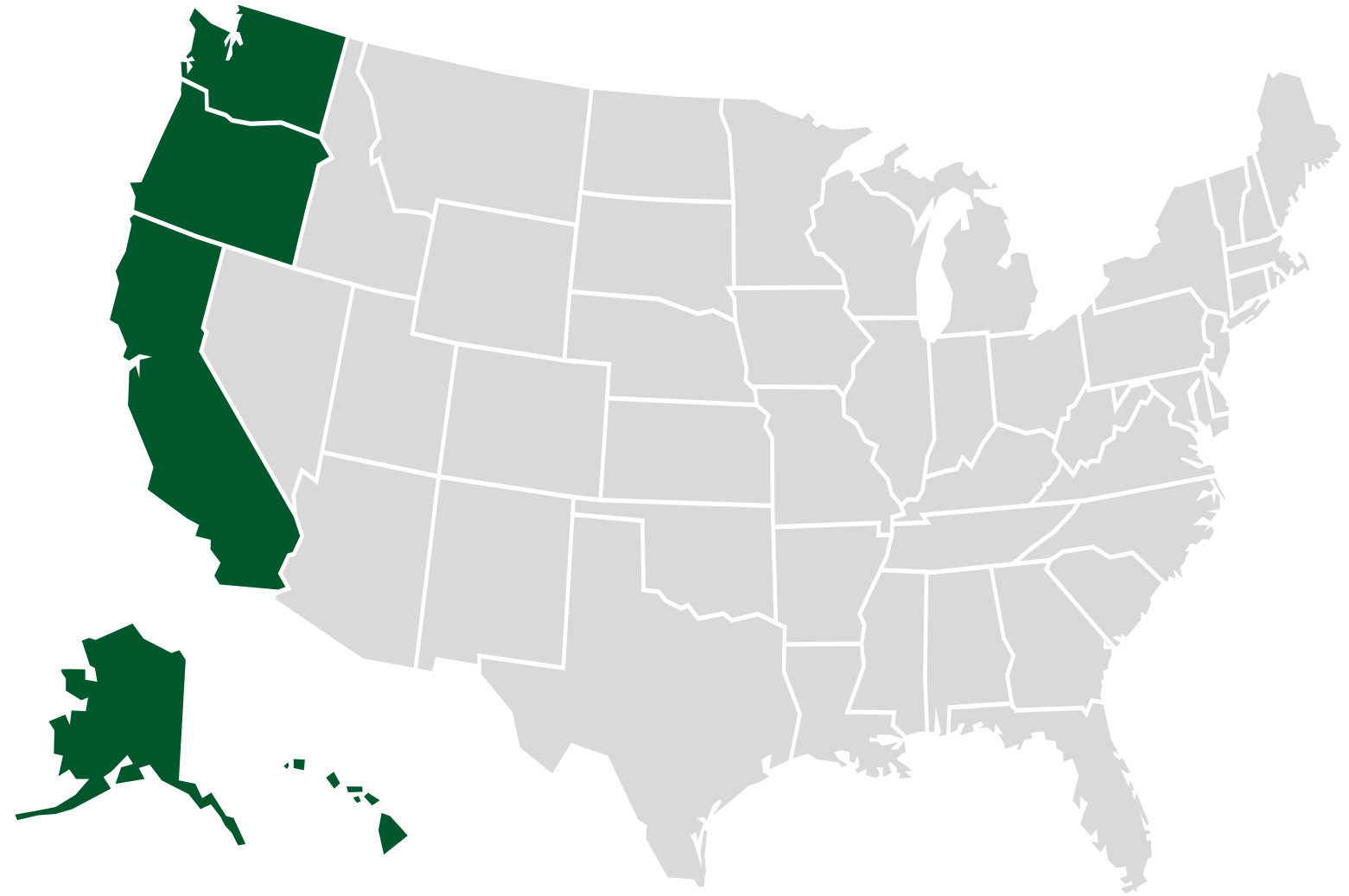
1. Combine all ingredients into a blender and serve in your favorite glass.

## ATHLETE ADVICE

Choose yogurt or kefir with clearly labelled probiotic strains and doses to ensure it contains beneficial bacteria that provide health benefits.

### Nutrition Information Per Serving:

<b>400</b>	<b>28</b>	<b>27</b>	<b>22</b>	<b>14</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)



**Stir Fry Fuel**



**Salmon  
Mango Poke  
Bowl**



**Becca's Berry  
Chia Pudding  
Parfait**



**Golden Gator  
Fruit Punch**

## Stir Fry Fuel

**Number of portions:** 2

**Estimated make time:** 45 minutes

**Difficulty rating:** Moderate

Contains gluten, soya & sesame



### Ingredients

- 8 oz raw firm tofu
- 24 oz cooked white rice noodles
- 1 cup green beans
- 1 cup red bell pepper
- 1 garlic clove
- 1 tbsp honey
- 1 tbsp olive oil
- 1 tbsp low sodium soy sauce
- 1 tbsp rice vinegar
- 1 tsp sesame oil
- 1 tsp corn-starch
- 1 tsp ginger, grated

### Recipe

1. Boil noodles according to package instructions, drain and rinse with cold water to prevent sticking. Set aside.
2. Press tofu to remove excess moisture, then cube and cook in oiled pan until golden on all sides. Remove and set aside.
3. In the used pan, cook the garlic and ginger until fragrant.
4. Toss in the green beans and bell pepper. Stir fry for 3-4 minutes until tender crisp.
5. Make the sauce by whisking the soy sauce, vinegar, sesame oil, honey and corn-starch in a separate bowl.
6. Combine the tofu, noodles and sauce in the pan. Stir until everything is coated and sauce thickens, then dish.

### ATHLETE ADVICE

If you make extra portions, you can refrigerate or freeze and consume as lunch or dinner when you don't have time to cook.

#### Nutrition Information Per Serving:

**638**  
Calories (kcal)

**26**  
Protein (g)

**84**  
Carbohydrate (g)

**19**  
Fat (g)

**10**  
Fiber (g)

## Salmon Mango Poke Bowl

**Number of portions:** 2

**Estimated make time:** 45 minutes

**Difficulty rating:** Moderate

Contains fish, gluten & sesame



### Ingredients

7 oz salmon (cut into 3cm squares)

#### Salmon Coating

1 tbsp corn flour  
 ½ tsp onion powder  
 ½ tsp garlic powder  
 ½ tsp turmeric  
 Cooking spray

#### Dressing

1 tbsp reduced sodium soy sauce  
 1 tbsp honey  
 1 tbsp fresh ginger  
 ½ tsp chili paste

#### Salsa

½ mango chopped  
 1 fresh lime  
 1 tbsp cilantro  
 1 tbsp jalapenos

#### Coconut Rice

1 cup uncooked rice  
 400ml reduced fat coconut milk  
 1 tsp coconut oil

### Recipe

1. Preheat oven to 450 F.
2. In a pot, toss the rice in coconut oil. Add the coconut milk and boil over a high heat. Reduce heat to a minimum, cover and cook for 12 minutes.
3. Turn off the heat and let rice rest for 2 minutes. Fluff with a fork.
4. Mix the salmon coating ingredients in a bowl and season the salmon.
5. Spray the salmon lightly with cooking spray. Then place on a baking tray and cook for 10 minutes until crispy.
6. Meanwhile, mix the dressing ingredients together in a bowl. In a separate bowl mix the salsa ingredients.
7. Once the salmon is ready coat in the dressing and serve alongside the coconut rice and salsa.

### ATHLETE ADVICE

Salmon is a great source of omega 3 fatty acids.

#### Nutrition Information Per Serving:

**790**  
Calories (kcal)

**33**  
Protein (g)

**98**  
Carbohydrate (g)

**31**  
Fat (g)

**3**  
Fiber (g)

## Becca's Berry Chia Pudding Parfait

**Number of portions:** 1

**Estimated make time:** 10 minutes

**Difficulty rating:** Easy

Contains dairy & gluten



### Ingredients

- 4 tbsp low fat Greek yogurt
- 1 serving quaker oat granola of choice
- ½ cup mixed frozen berries
- 1 tbsp chia seeds

### Recipe

1. Find a tall glass or mug of choice.
2. Add some of the granola and berries to the bottom. Then add the yogurt and top this with chia seeds, berries and granola.
3. Finish by topping with the remainder of the yogurt.

### ATHLETE ADVICE

Chia seeds are an excellent plant source of omega 3 fatty acids.

#### Nutrition Information Per Serving:

**350**  
Calories (kcal)




**25**  
Protein (g)

**53**  
Carbohydrate (g)

**8**  
Fat (g)

**9**  
Fiber (g)

## Golden Gator Fruit Punch

-  **Number of portions:** 1
-  **Estimated make time:** 5 minutes
-  **Difficulty rating:** Easy



### Ingredients

- 2 glasses of orange juice from concentrate
- ½ cup pineapple
- ½ cup mango
- 1 sachet Gatorlyte cherry lime
- Ice cubes

### Recipe

1. Add all ingredients to a blender and mix.
2. Serve in your favorite glass and add ice cubes.

### ATHLETE ADVICE

This drink is a great way to get more carbohydrates in whilst staying hydrated on hard training days.

#### Nutrition Information Per Serving:

<b>280</b>	<b>3</b>	<b>69</b>	<b>1</b>	<b>4</b>
Calories (kcal)	Protein (g)	Carbohydrate (g)	Fat (g)	Fiber (g)

# Weekly Meal Plan

	Training/ Competition	Breakfast	Lunch	Dinner	Snacks	Drinks
<b>Monday</b>						
Calories (kcal)						
Carbohydrate (g)						
Protein (g)						
Fat (g)						
Fiber (g)						
<b>Tuesday</b>						
Calories (kcal)						
Carbohydrate (g)						
Protein (g)						
Fat (g)						
Fiber (g)						
<b>Wednesday</b>						
Calories (kcal)						
Carbohydrate (g)						
Protein (g)						
Fat (g)						
Fiber (g)						
<b>Thursday</b>						
Calories (kcal)						
Carbohydrate (g)						
Protein (g)						
Fat (g)						
Fiber (g)						
<b>Friday</b>						
Calories (kcal)						
Carbohydrate (g)						
Protein (g)						
Fat (g)						
Fiber (g)						



# Author Biographies



## Ian Rollo, PhD

Ian is head of GSSI International performance services and educational engagements. His current role involves providing sports science and sports nutrition support for professional athletes, sports clubs and organizations including Manchester City FC, Wrexham AFC and UEFA. Ian is a visiting research fellow at Loughborough University and fellow of the European College of Sport Science (ECSS). Ian continues to author publications and deliver invited presentations globally.



## Rebecca Randell, PhD

Rebecca is an Associate Principal Scientist leading the GSSI female athlete strategy. Rebecca completed her Bachelor's degree and PhD at the University of Birmingham, UK. She currently holds a position as visiting fellow at Loughborough University and is a fellow of the European College of Sport Science (ECSS). Rebecca has experience working with elite athletes and clubs and continues to author publications in peer reviewed journals and deliver invited presentations in the UK and abroad.



## Liam Brown, MSc

Liam is a Scientist for the GSSI International team, based in the UK. Liam earned his Bachelor's Degree in Nutrition and Food Science before completing a Master's Degree in Sport Nutrition at Liverpool John Moores University in 2018. Liam's current role with GSSI involves the provision of sports nutrition support for Gatorade partners, including professional soccer club Manchester City Football Club. In addition, Liam is responsible for managing and supporting GSSI service and education engagements internationally. This includes the production of novel education resources and delivering workshops and presentations globally.



## Ellie Pimlott

Ellie completed a student placement with the GSSI International and PepsiCo Europe Health and Nutrition Sciences team. Ellie is currently pursuing a Bachelor's degree in Food and Human Nutrition at Newcastle University, UK. Passionate about sports nutrition, Ellie's main roles at GSSI involved creating educational materials for athletes and supporting elite sport service engagements. She has a strong interest in gut and athlete health, particularly in female and youth athletes.



## Jack Turner

Jack completed a student placement with the GSSI International team during his Bachelor's degree in Sport & Exercise Science at Newcastle University, UK. Jack's main roles at GSSI encompass athlete education, sport services and research. Jack is a keen triathlete and runner. He has experience working in elite sports environments and particular interest in endurance sports and carbohydrate metabolism.



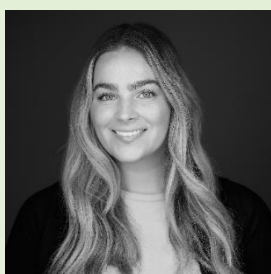
### Matthew Pahnke, PhD

Matt is an exercise scientist with interests in exercise physiology, sports nutrition, and human performance. His area of research specialization is in fluid and sodium balance in endurance athletes. Blending his scientific, athletic, and business expertise, Matt currently leads the Gatorade Sports Science Institute's innovation program. His team helps drive the sports nutrition brands' long-term innovation and commercialization initiatives through research, insights and scientific support on ingredients, products, technologies and services.



### Lisa Heaton, MS, RD, CSSD

Lisa is a Board-Certified Specialist in Sports Dietetics (CSSD), the premier credential for sports dietitians, with interests in sports nutrition, recovery, hydration and performance. As a sports dietitian at the Gatorade Sports Science Institute (GSSI), Lisa focuses on nutrition related education and translation of research. She also supports the GSSI athlete testing program and served as the Sports Dietitian for the Chicago Bulls for two seasons.



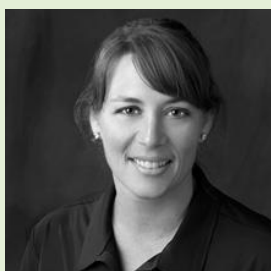
### Veronica Hindle, MS, RDN

Veronica is an R&D Scientist at Gatorade Sports Science Institute (GSSI) based in Chicago, Illinois. Her work focuses on translating scientific research into evidence-based content and brand-aligned messaging for athletes, practitioners, and consumers. Veronica earned her Master of Science in Food Science and Human Nutrition from the University of Illinois Urbana-Champaign, where she also completed the Dietetic Internship, and obtained Registered Dietitian Nutritionist credentials. Veronica also holds a Bachelor of Science in Dietetics from Michigan State University, with a minor in coaching and an emphasis in kinesiology.



### Leila Shinn, PhD, RDN, FAND

Leila is a PepsiCo R&D Life Sciences Associate Principal Scientist in Chicago, IL where she leverages her expertise in nutrition science, biotics, and the gut microbiome. In her role, Leila develops strategic roadmaps for internal gut function efforts, encompassing PepsiCo's progress, gaps and future directions in this space through cross-functional partnerships. Leila also collaborates with cross-functional colleagues, including Marketing, Regulatory and Legal, to support scientific claims substantiation across food and beverage brands.



### Kimberly Stein, PhD

Kim is a scientist with a background in exercise physiology and sports nutrition. In her current position, she works on programming in the translation of scientific information for influencers as well as athlete team testing. Kim earned her bachelor's degree at Beloit College (WI) in Chemistry and Sociology, where she also played basketball and softball, and her master's degree in Organic Chemistry from the University of Notre Dame. In 2005 Kim earned her doctorate at Purdue University from the department of Health and Kinesiology while training in the Interdepartmental Nutrition Program.

## Acknowledgments

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For more information about GSSI and to read our Sports Science Exchange (SSE) articles, please visit [www.gssiweb.org](http://www.gssiweb.org)



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