The sheer volume of training undertaken by committed triathletes calls for a high-energy diet. This should contain sufficient carbohydrate to fuel working muscles; protein to promote training adaptations; with high quality fats to provide the essential fatty acids necessary for health, all whilst maintaining adequate hydration status. Good nutritional practices ensure that you are fuelled for training, recover sufficiently, and promote adaptations.

“At the sharp end of professional triathlon races, the athletes are so well physically conditioned and gifted that winning and losing is ultimately decided by other factors, such as your nutrition.” - Jack Maitland - Coach to the Brownlee Brothers

**Hydration**

It is important to think about fluid intake on a daily basis, not just during exercise. Water typically accounts for 60% of your total body mass. It plays numerous roles within the body including the transport of nutrients, and regulation of body temperature. Water requirements vary from person to person depending on a variety of factors, and therefore fluid intake is highly individual.

A simple indicator of your hydration status is to check the colour and volume of your urine. If your urine is pale in colour and plentiful in volume you are probably well hydrated. If it is dark in colour and low in volume, or you notice you haven’t been to the toilet in a while, then you are most likely dehydrated.

**Tips:**
- Water should be your main source of fluid during the day
- Drinking little and often is the key
- Monitor your hydration status via the colour and volume of your urine

**Carbohydrates**

The energy required for endurance exercise comes from the carbohydrate that you store in your muscle, liver and blood. Here is how to make sure you eat enough of the right stuff.

Carbohydrate is stored in the body in relatively small amounts and soon becomes depleted after prolonged strenuous exercise. Your daily requirements will depend on the intensity of your training and competition schedule. Here are some general guidelines, which you should try out, and then learn from experience to make small adjustments to tailor them to your needs.
Suggested Carbohydrate Intake (per kg body weight)

<table>
<thead>
<tr>
<th>Carbohydrate</th>
<th>During Training (moderate to high intensity, 1-3 hours/day)</th>
<th>6-10g/kg/d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>During Training (moderate to high intensity, 4-5 hours/day)</td>
<td>8-12g/kg/d</td>
</tr>
<tr>
<td>Preparation for events &gt;90 minutes (carbohydrate loading)</td>
<td>10-12g/kg/d</td>
<td></td>
</tr>
</tbody>
</table>

Use these guidelines and then learn from experience to make small adjustments to tailor them to your needs.

During periods of training and competition (moderate to high intensity, 1-3 hours/day) you need 6 to 10 grams of carbohydrate per kg of body weight per day. For a 70kg athlete, that’s around 400-700 grams of carbohydrate each day. To give you an idea, the following foods contain 50 grams of carbohydrates:

- 2 medium/large bananas
- 1 large bowl (60g) breakfast cereal
- 200 to 250g cooked pasta/ rice
- 1 large potato (250g)

Carbohydrate Tips

Nail your carbohydrate needs with these pearls of nutritional wisdom:

1. Eat well before and after big workouts, but less on days when you don’t exercise. High protein and vegetable meals will fill you up more on rest days.
2. Avoid refined sugary carbohydrates and opt for ones that are nutrient dense carbohydrates such as fruits, vegetables and whole grains.
3. Brightly coloured fruits and vegetables are rich in nutrients. Eat a variety of colours.
4. Stir fries and soups are a tasty way to increase your vegetable consumption.
5. Bulky, high fibre foods such as vegetables are low in calories, but will help to fill you up.
6. Look out for hidden calories. Fizzy drinks, milkshakes and take-away coffees are all good examples, and sometimes contain more calories than a chocolate bar.
7. Don’t be fooled into thinking “low-fat” products are low in calories. They often contain lots of sugar to help them taste good.
8. Try using a smart-phone app to track your calories burned from training versus your calories consumed. Even a couple of weeks of this will help you make more educated food choices.
Protein

Whether it's for lean body mass or to help you adapt better to training, protein is an essential part of your diet. Here's how to make it work for you:

Protein is the major structural component of all cells in the body, so it's vital for growth and maintenance. Proteins that contain all of the essential amino acids are referred to as being complete or high quality proteins. Examples of these are eggs, milk and meat. Grains and beans generally do not contain all the essential amino acids, but you can often obtain them by combining foods (for example rice and beans).

Protein requirements for triathletes are higher that of a sedentary person. You should aim to consume approximately 1.3 to 1.8 grams of protein per kg of your body mass per day. Protein requirements can be met through a healthy balanced diet and don't necessarily need to be supplemented. A 70kg athlete should look to consume 100 to 130g of protein per day. To give you an idea, here are some foods that contain 20 grams of protein:

- 3 medium eggs
- 600 ml of cow's milk
- 400g of baked beans
- 100g of fish or chicken

Protein Tips

The best ways to include high quality proteins in your diet
Choose lean sources of protein such as chicken or fish, and only eat fatty ones in moderation.
Consume your protein in doses of at least 20 to 25 grams per meal (e.g. three eggs).
Equally space your protein meals throughout the day
Consuming protein before you go to bed can be an effective strategy for achieving your daily protein intake and can aid in the recovery process

Fat

Fat isn't all bad. In fact it's an essential part of an athlete's diet. Here's how to leave the bad ones behind and eat enough of the health-boosting ones.

Fats have many important functions in the body including the transport of vitamins, providing fuel for cells and protecting your vital organs. Unlike carbohydrates, we can store large quantities of fat, although over-consumption can lead to unwanted increases in body weight.

Tips

Saturated fats are solid at room temperature and excessive consumption should be avoided
Dietary fat should come predominately from nuts, seeds, avocado, olive oils and oily fish

When training for an event it is important that you plan and practice your nutritional strategies in as much depth as your training.
Common Nutritional Mistakes

- Not consuming enough protein in the first meal of the day – many tend to think of ‘breakfast foods’ as being cereal and bread. However, this generally provides insufficient amounts of protein, especially after an overnight fast.
- Avoiding fat – the body requires the intake of fat to obtain necessary ‘Essential Fatty Acids’ – these EFA’s play numerous vital roles within the body – nuts, seeds and oils are a good source of EFA’s.
- Indiscriminate use of dietary supplements – supplements are there to supplement your diet not make up for poor food choices. Food should be your first point of call to obtain vitamins and minerals!

Plan Your Diet: 5 Essential tips

- Forward planning is essential – take the time to plan what foods you need to meet the demands of your training for the upcoming week
- Ensure you are getting sufficient protein at breakfast – this may involve introducing eggs or dairy in the form of milk or cottage cheese
- Variety is key: Aim to eat your protein, fats and carbohydrates from a variety of sources to ensure you meet your micronutrient requirements too
- We all need treats, so allow yourself a few beneficial ones like a glass of red wine and a few squares of dark chocolate
- Ensure that your nutritional strategy matches up to the goal of the session – if you aim to exercise early in the morning without eating then a longer, slower run may be the best option. However, if you plan on doing a high-intensity session then consuming carbohydrate either immediately before or during the session may be advisable.
When training for an event it is important that you practice your nutritional strategies in training.

You work so hard to get yourself into the best possible shape for race day so don’t let any surprises ruin the experience. Planning and executing your race day strategies in training will ensure you minimise the risk of this happening. In the weeks leading up to your event, there are a number of questions you should ask yourself to make sure you are as prepared as you can be:

If you are staying in a hotel the night before it is well worth planning what food options are available. You may have to rely on local convenience stores so packing snacks will ensure you have familiar foods available.

What time does your race start? Many triathlons start early in the morning. How will this affect what you eat? Make sure you eat something familiar that won’t cause any discomfort during the race. The energy and fluids that you take on board during your race can have a big impact on your performance. Many races will have nutrition products available on course. If you are going to rely on these products to fuel your performance it is important that you start to use them in training first. It would be a real shame if your race day experience was spoilt by taking a product that you react badly to.

Finally, it is important to look at the range of temperatures for the location and time of year. There can be some surprisingly warm days during the winter months during the year and not having access to enough fluid could impact your performance.

Use the check sheet on the next page to help you prepare for the big day:
Race Day Questions

1. Are you staying in overnight accommodation?
   If yes, are your normal foods available in local shops or do you need to take them with you?
   A: __________________________________________________________________________
___________________________________________________________________________

2. If yes, will you need an early pre-race breakfast and can your accommodation provide what you need?
   A: __________________________________________________________________________
___________________________________________________________________________

3. What energy drinks, bars, gels etc do you need to take with you from home?
   A: __________________________________________________________________________
___________________________________________________________________________

4. What time will you have your pre-race meal, and what will you have?
   A: __________________________________________________________________________
___________________________________________________________________________

5. What will the range of temperatures be? Could it be humid?
   A: __________________________________________________________________________
___________________________________________________________________________

6. How many feed stations are there?
   A: __________________________________________________________________________
___________________________________________________________________________

7. How much will you carry on the bike?
   A: __________________________________________________________________________
___________________________________________________________________________

8. Will you carry anything on the run or just rely on feed stations?
   A: __________________________________________________________________________
___________________________________________________________________________
9. What brands of drinks, gels, and energy bars are available on the route? Are you used to them?

A: ____________________________________________________________

10. What is the duration and intensity of the event? And how much carbohydrate and liquid do you estimate will you need?

A: ____________________________________________________________
Whether it's a training session or race day, starting adequately hydrated and fuelled will help you get the most out of the session.

**What to Eat Beforehand (2–4 hours before)**

Triathlons are completed over various distances from ‘sprint’ to ‘Ironman’. Each has different nutritional requirements, but the main principles remain the same.

No matter how long your race is, you should always eat a high carbohydrate meal 2 to 4 hours before exercise to ensure optimal glycogen stores, which is the body’s primary energy source. This meal should contain between 100 to 200 grams of carbohydrates, depending on your size and how long you’re racing for.

This pre-race meal should be low in protein, fibre and fat to minimise the risk of gastro-intestinal discomfort. To give you an idea, the following foods contain 50 grams of carbohydrate:

- 2 medium/large bananas
- 1 large bowl (60g) breakfast cereal
- Enjoy one of these menu’s 2 – 4 hours before exercise to make sure you are well fuelled:

**Sample Meals**

**Menu 1:**

- 50g Rolled Oats with 350ml skimmed milk
- 1 Bagel with 30g light cream cheese
- 330ml Orange Juice and 1 medium banana

*Nutritional Information: 680kcal; 145g carbohydrate; 32g protein*

**Menu 2:**

- 1 bagel with 100g sliced turkey breast and mustard
- 330ml Orange Juice and 1 medium banana
- 500ml Gatorade Perform

*Nutritional Information: 737kcal; 134g carbohydrate; 36g protein*
Menu 3:

- 100g penne pasta with 1 chicken breast and 100g pasta sauce
- 1 slice of white bread
- 330ml orange juice

Nutritional Information: 777kcal; 135g carbohydrate; 37g protein

Use these recommendations to help determine what works for best for you! Ensure you try out any strategy in training first.

What to Drink Beforehand (2–4 hours before)

Starting exercise dehydrated can impair your performance. Ask yourself these questions in the hours leading up to exercise

- Am I thirsty?
- Is my urine dark in colour?
- Is my body weight noticeably lower than yesterday?

Answering “yes” to any of these questions may indicate inadequate hydration. Here are some tips to ensure you start exercise hydrated:

Slowly drink 5-7 ml fluid per kg of your body weight, for example: 350-500ml for a 70kg athlete. Consuming foods or drinks that contain sodium (salt) will also help to stimulate thirst and retain the consumed fluids.

Monitor your urine colour and volume as a simple indicator of hydration status – if your urine is dark in colour and low in volume you need to drink more.

Use the handy poster on the next page to ensure that you’re always adequately hydrated before a session:
Are You **Hydrated**?

If your urine is pale like lemonade, that’s a sign of proper hydration. If it’s dark like apple juice, you need more fluids.

Gatorade contains carbohydrates and electrolytes to hydrate and provide energy to working muscles.
15 minutes before:

Consuming carbohydrates before exercise essentially starts to meet the fuelling requirements of the session. Doing this before the swim is a viable tactic as it is often difficult and impractical to consume anything during this discipline.

**GATORADE PRIME**

The science doesn't lie, and research has proved it: preparing before exercise can have a big impact on your performance. Simply put: the better you prepare, the better you'll perform.

Gatorade PRIME is designed to provide a convenient and easily digestible source of carbohydrate energy shortly before exercise.

*Nutritional Information: 118ml; 24g carbohydrate; 106mg sodium*

“Most top triathletes have a tried and tested pre-race breakfast that they rely upon. My favourite breakfast is a bowl of cereal, with some toast and a croissant.” - Jonathan Brownlee
The longer the event, the more crucial your race-day nutrition becomes. Here is a guide on what to eat and drink during your race.

There’s plenty of scientific research about what you should eat and drink on race-day. However, every athlete is different and what works for one may not work for another. Therefore, your race-day nutrition should be based on the following recommendations and tailored to what works for you.

**Fuel Requirements**

The energy that you need to fuel your race comes predominately from the carbohydrate that you store and the carbohydrate that you take on board during exercise. Fatigue during prolonged exercise is often associated with the depletion of these stores3.

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**30–60 minutes**

You do not need to take on extra fluid or carbohydrate when exercising for under 60 minutes. However, it certainly wouldn’t hurt to take a quick swig of a sports drink. There has been research on the effects of mouth rinsing with a sports drink that shows small improvements in high intensity performance lasting under an hour6.

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**1–2 hours**

Your carbohydrate stores can become severely depleted in events lasting up to 2 hours. The means you will need to consume carbohydrate from a sports drink, energy gel or whatever you’re used to using as your carbohydrate source. Aim for at least 30g of carbohydrate per hour, and if you can tolerate more it certainly won’t hurt.
2–3 hours

As the duration increases, so does the importance of consuming carbohydrate. Aim to consume up to 60g per hour. This may require some training as there is an increased risk of stomach discomfort with high carbohydrate intakes.

Over 3 hours

During events lasting longer than 3 hours, carbohydrate recommendations may exceed 90g per hour. Consuming carbohydrate blends (glucose and fructose) will take advantage of the multiple transport systems in the intestine which allow for higher rates of carbohydrate oxidation and can improve performance.

It is not uncommon for athletes participating in events lasting longer than 3 hours to consume foods such as rice cakes or sandwiches. Eating these kinds of foods will also provide an opportunity to consume other nutrients that may be of benefit. Consuming foods with a small amount of protein and/or fat will improve the feeling of being full and will provide a different taste profile from sports drinks and energy gels.

It is important to note that high intakes of carbohydrate during exercise can increase the risk of GI discomfort. It is important to practice your fuelling strategies in training first and find out what works for you.

**GATORADE PERFORM**

As an athlete, you need to maintain your performance during exercise.

Gatorade PERFORM has been scientifically proven to help athletes replace fluids, refuel working muscles and replenish electrolytes during activity.

*Nutritional Information: 500ml: 30g carbohydrate; 250mg sodium*

**Recommended Carbohydrate Intakes**

<table>
<thead>
<tr>
<th>Event</th>
<th>Carbohydrate Required</th>
<th>Recommended Intake</th>
<th>Carbohydrate Type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–2h</td>
<td>Small Amounts</td>
<td>Up to 30g/h</td>
<td>Glucose</td>
<td>500ml Sports Drink</td>
</tr>
<tr>
<td>2–3h</td>
<td>Moderate Amounts</td>
<td>Up to 60g/h</td>
<td>Glucose, Maltodextrin</td>
<td>500ml Sports Drink &amp; 1 Gel</td>
</tr>
<tr>
<td>&gt;3h</td>
<td>Large Amounts</td>
<td>Up to 90g/h</td>
<td>Glucose/Maltodextrin &amp; Fructose</td>
<td>1 Litre Sports Drink &amp; 1 Gel</td>
</tr>
</tbody>
</table>

Modified from Jeukendrup (2011)
Hydration

When we exercise heat is produced, the main mechanism by which the body loses this heat is by sweating. If we do not replace the fluid that is lost as sweat you become dehydrated.

“Performing or training in a dehydrated state has been shown to increase the physiological demands on the body and cause fatigue. This is a situation that should be avoided by athletes and understanding the importance of fluid intake before, during and after exercise will help prevent dehydration.” - Adrian Hodgson, Sports Scientist, Gatorade Sports Science Institute

Therefore, the goal of drinking during exercise is to prevent excessive dehydration (2-3% body weight loss) and changes in electrolyte balance as a consequence of sweating.

Watch this video that demonstrates how to measure your sweat rate:

Key points:

- Weigh yourself before training
- Weigh yourself after training, and subtract the weight of any drinks you consumed
- 1 kg of weight loss equals 1 litre of fluid loss. This should give you an idea of your sweat rate
- Do it several times to see how your body reacts at varying intensities and in different weather conditions

Following these recommendations should ensure that you drink enough fluid to prevent dehydration without over-drinking as this could put you at risk of a rare but serious condition called hyponatremia (low blood sodium concentrations)

Are You a Salty Sweater?

Some athletes lose more sodium in their sweat than others. These athletes may need to supplement their sodium intake during exercise.

- Do you get a salty taste of sweat in your mouth when you train and race?
- Do you get eye irritation from salt getting in your eyes?
- Are salt stains visible on your clothing?
The nutritional challenge after exercise is to rehydrate, replenish carbohydrate stores and to rebuild and repair muscle tissue by consuming protein.

After exercise you should drink 1.5 L of fluid for each kg of body weight lost. So if you lose 2 kg of body weight then you should drink 3 litres of fluid to ensure rehydration. This ‘extra’ fluid will account for the likely loss through urinary output and should commence as soon as you have finished exercise, but not all at once. Fluid should be consumed in small amounts for 2-3 hours until the figure is reached. Consuming foods and drinks containing sodium will help stimulate your thirst and promote fluid retention allowing for a speedier return to fluid balance.

Eating protein after exercise promotes training adaptations, so aim for 15-20g of a high quality protein such as milk protein, whey, egg or meat.

Your carbohydrate stores will be depleted so you should also aim to consume 1 - 1.5g per kg of body mass carbohydrates over several hours. For a 70kg athlete this equates to 70-105g carbohydrate. If rapid recovery is essential such as for a second session that day, then ingest high glycemic index carbohydrates. However if there is ample time for recovery, then the pattern and timing of carbohydrate intake is less critical.

**GATORADE RECOVER**

Nutrition is a vital part of your recovery process.

Gatorade RECOVER is a protein, carbohydrate and electrolyte drink that provides hydration and muscle-recovery benefit after a challenging workout. RECOVER has the consistency and great taste you'd expect from Gatorade to help you to prepare for the next challenge.

Nutritional Information: 500ml; 14g carbohydrate; 16g protein; 250mg sodium

“At the sharp end of professional triathlon races, the athletes are so well physically conditioned and gifted that winning and losing is ultimately decided by other factors, such as your nutrition.” - Jack Maitland - Coach to the Brownlee Brothers

**Practical Tips**

1. Plan your race day in advance. What factors will affect hydration and fuelling strategies?
2. Practice your fuelling strategies in training first - train your gut
3. Regularly weigh yourself before and after training so you can devise an individual hydration strategy
4. Arrive hydrated and fuelled
5. Amount and type of carbohydrate depends on intensity and duration
6. Replace 150% of fluid losses in the hours after exercise
Reference List