POWERBAR® NUTRITION COACH FOR RUNNERS

GETTING TO THE FINISH LINE FASTER NEEDS SUCCESSFUL TRAINING SUPPORTED BY THE RIGHT NUTRITION.

YOU'RE STRONGER THAN YOU THINK™

PowerBar®

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Official nutrition partner of:

BMW BERLIN MARATHON

ING NEW YORK CITY MARATHON
PREMIER EVENT OF NEW YORK ROAD RUNNERS

Bupa great run

Haile Gebrselassie Running Legend

SportScheck STADTLAUF 2013

zürichmarathon

HUMAN RACE

"A car needs fuel, without fuel you can not drive a car. Without enough nutrition you can not run. That's why I advise athletes to take enough nutrition during and after the race or before training or after training. Even during the race or during the training."

Haile Gebrselassie
Running Legend
PowerBar® User since 1998

CONTENT

1. INTRODUCTION – WHY SPORTS NUTRITION?

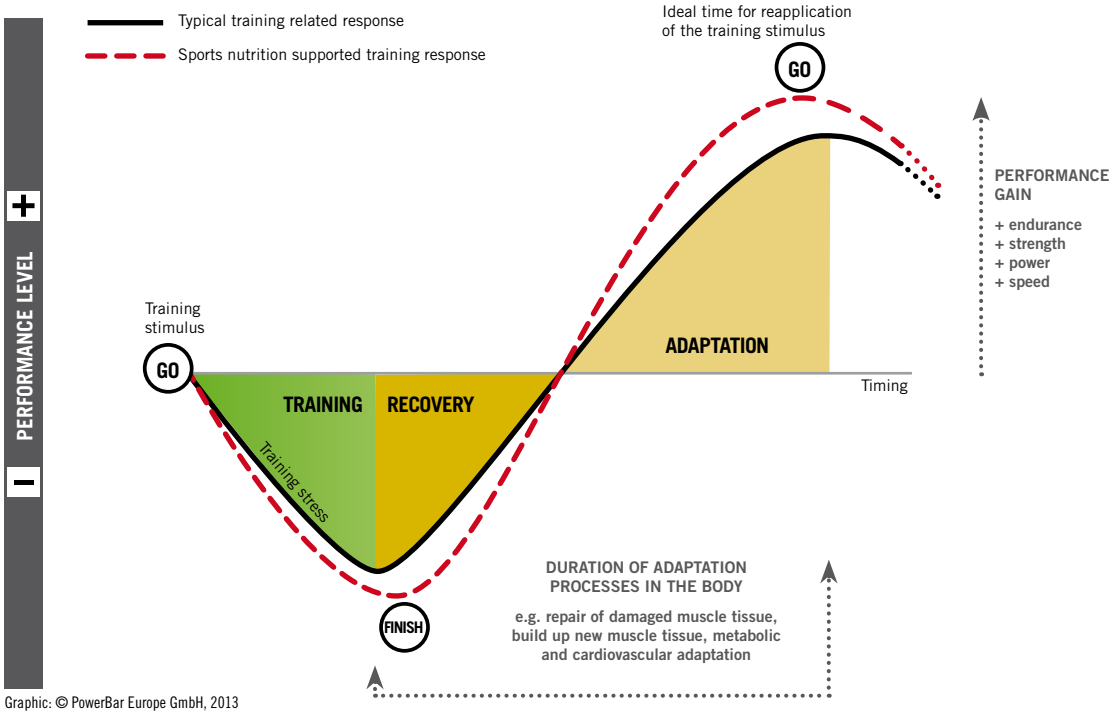
At first glance, running seems to be a relatively easy form of exercise. All you need to do is put on a pair of running shoes and off you go! However, long race distances covered at a fast pace put an enormous physical strain on the body - Your legs and core muscles have to work extremely hard to keep you moving forwards.

In order to keep up the pace and finish strong the body must be supplied with the right amount of fluid and nutrients during endurance competitions or training. A healthy and varied diet that is adapted to your daily needs will give you a good foundation. Together with targeted sports nutrition strategy **BEFORE**, **DURING** and **AFTER** training, you can get the most out of your training and improve your performance.

The following model explains training adaptation processes with or without sport nutrition usage.

Training and sports nutrition adaptation model (TSA Model)

Getting more from your training when consuming the right types of high quality nutrients and fluid, in the right amount – 1 BEFORE, 2 DURING and 3 AFTER exercise.



1. TRAINING
The body's reaction to a training load/stress is fatigue which leads to a reduction in performance. When providing the body with the right source and amount of nutrients (e.g. carbohydrates) and fluid, you are able to train for longer and more intensely.

2. RECOVERY AND ADAPTATION
After exercise recovery is key. The body needs carbohydrates to replenish its glycogen stores, protein to repair the damaged muscle tissue and to build new muscle tissue as well as fluid and electrolytes (especially sodium) for efficient rehydration. With the right sports nutrition strategy you optimize the recovery phase to enhance training specific adaptations which ultimately improve performance.

A sport nutrition strategy helps you getting more out of your training. For a better understanding of **which** products to use and **when** to use them, we created the 1 BEFORE 2 DURING 3 AFTER system on our packaging to help everyone understand the best time to use our products around their exercise. 1 stands for **BEFORE**, 2 stands for **DURING**, 3 stands for **AFTER**.

PowerBar® Performance System

You will find the colours of the performance system on our product packaging. E.g. all blue products will optimise your training success and are taken after exercise.

2. SPORTS NUTRITION KEY PRINCIPLES

The three most important key principles of a sports nutrition strategy for endurance athletes are:

Hydration - supply of the body with sufficient fluids
Energy - fuel for your muscles
Recovery - nutrition strategy to optimize regeneration and help promote training adaptations

2.1 Hydration

Dehydration (lack of water in the body) is one of the major causes of fatigue when taking part in sports. In general, physical and mental performance can be reduced when more than 2-3% of the pre-exercise body weight is lost as fluid.

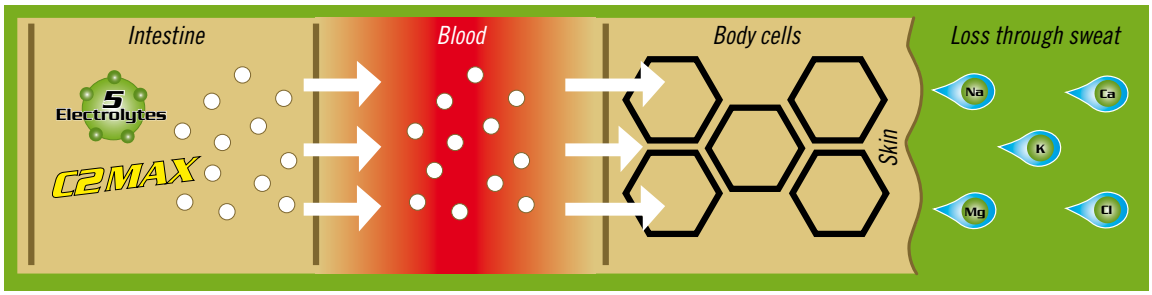
Three simple steps to optimize your hydration level:

- **Start** your ride well hydrated
- **During** running drink at regular intervals
- **After** the ride rehydrate to recover faster

The longer the distance and the higher the temperature and humidity, the greater the need for fluids. The individual's fluid need during endurance activities depends on various factors, e.g. climatic conditions, sweating rates or running duration and intensity. A general hydration strategy for endurance exercise lasting more than 60 minutes is to drink amounts of circa 400-800ml/hour, consumed regularly in small quantities over each hour (e.g. 150ml every 15 minutes). If you compete in a hot environment, you will need a little more fluid per hour than in a cold environment.

Isotonic Sports Drinks – A closer look

Isotonic sports drinks (carbohydrates-electrolyte solutions, with e.g. C2MAX*) are the choice for most athletes. They have the same particle density (osmolality) as blood plasma and are therefore rapidly emptied from the gut, which quickly replace fluids lost by sweating and maintain hydration during prolonged exercise.



*C2MAX is a special mix of carbohydrates from PowerBar® - for more information see page 7

Caffeine – A closer look

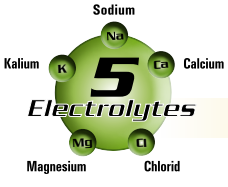
For many of us, a morning cup of coffee helps us to wake up, and a coffee after lunch gets us through the afternoon. Not only coffee contains the stimulant caffeine but also other caffeinated beverages or sports nutrition products. Caffeine has numerous actions on different body tissues. Already as little as 75mg caffeine per portion can increase mental performance.

The European Food Safety Authority (EFSA) recently stated that caffeine intake in an effective dose of 3-4mg/kg bodyweight one hour prior to the endurance exercise increases endurance performance and reduces perceived exertion. However, individuals respond differently to the effects of caffeine and it does not work for everyone.

Try out caffeinated products up to 60 minutes before or during prolonged runs!

You will find caffeine in the following PowerBar® products: ISOMAX Isotonic Sports Drink, ENERGIZE bar coconut, POWERGEL® Original black currant and green apple, POWERGEL® FRUIT Mango Passion fruit, POWERGEL® HYDRO Cherry, CHARGER, POWERGEL® Shots Cola.

PowerBar® ISOACTIVE and **ISOMAX Isotonic Sports Drink** are designed to maximise your rate of hydration while leaving you refreshed. Made up with water they provide a carbohydrate electrolyte solution which contributes to the maintenance of endurance performance. Sodium, the primary of the 5 main electrolytes lost in sweat, enhances the absorption of water during prolonged endurance exercise. In addition, sweat contains among other substances the minerals chloride, potassium, calcium and magnesium.



IN RUNNING, CONVENIENCE IS KEY, AS MOST SNACKS HAVE TO BE SQUEEZED INTO A JERSEY POCKET. BARS, GELS AND SHOTS ARE POPULAR FOR THIS VERY REASON.

2.2 Energy

Physical activity requires energy. The more intense (higher speeds) or longer duration of the activity the higher the rate of energy used.

Carbohydrates are the primary and fastest fuel for endurance activities and can be stored as an energy source in our body in the form of glycogen in the liver and muscle. Muscle glycogen is a readily available carbohydrate source for the working muscle. On the other hand the main role of glycogen in the liver is to maintain a constant blood glucose level. As blood glucose levels drop hypoglycaemia (low blood sugar) may develop resulting, for example, in reduced mental alertness and ability to concentrate.

You'll only discover how far you can go if your 'energy tanks in muscle and liver' are stocked-up. As a general rule, you should eat low-fat, carbohydrate-rich meal that is low in fibre and easy to digest 3-4 hours before your exercise (e.g. pasta with low-fat tomato sauce, cold or hot cereal with banana, honey and low-fat yoghurt; see also PowerBar® plate model page 10).

Small carbohydrate-rich snacks (e.g. 1 **PowerBar® ENERGIZE Bar**, **POWERGEL® SHOTS**, ripe banana, toast with honey) should be taken up to 1 hour before. If you tend to suffer from pre-competition jitters and/or don't feel like eating, try liquid carbohydrate sources instead (i.e. isotonic drink or gel dissolved in water) if you cannot face solid food.

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When your glycogen stores are depleted, you are not able to continue running at a high intensity. Therefore, you need to provide your body with the right source and right amount of carbohydrate during prolonged running activities. **PowerBar® ISOACTIVE** and **ISOMAX Isotonic Sports Drink, ENERGIZE Bar, POWERGEL® and POWERGEL® SHOTS** have been developed for endurance sports with C2MAX Dual Source Carb Mix, a special ratio of glucose and fructose sources. The recommended carbohydrate intake depends on duration and intensity of the ride and lasts up to 90g carbohydrates per hour:

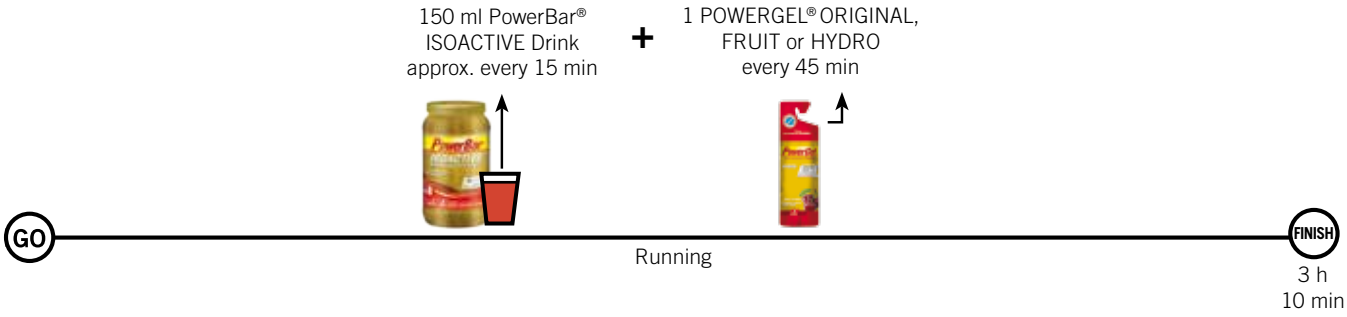
OPTIMISE YOUR TRAINING SUCCESS AND DO NOT FORGET: YOU´RE STRONGER THAN YOU THINK™!

Duration of exercise:	Scientifically recommended amount of carbohydrates during exercise:
1-2 HOURS OF EXERCISE	**UP TO 30 g CARBOHYDRATES PER HOUR** 1 ENERGIZE Bar + 150-300 ml fluids + Within 60 min before GO 500 ml ISOACTIVE Drink (ca. 29g carbohydrates) **or** 1 POWERGEL® ORIGINAL (ca. 27g carbohydrates) **or** 1/2 ENERGIZE Bar (ca. 20g carbohydrates)
2-3 HOURS OF EXERCISE	**UP TO 60 g CARBOHYDRATES PER HOUR** 1 ENERGIZE Bar + 150-300 ml fluids + Within 60 min before GO 500 ml ISOMAX Drink (ca. 41g carbohydrates) + 1/2 ENERGIZE Bar (ca. 20g carbohydrates) **or** 750 ml ISOACTIVE Drink (ca. 29g carbohydrates) + 5 POWERGEL® SHOTS (ca. 27g carbohydrates)
> 3 HOURS OF EXERCISE	**UP TO 90 g CARBOHYDRATES PER HOUR** 1 ENERGIZE Bar + 150-300 ml fluids + Within 60 min before GO 500 ml ISOMAX Drink (ca. 41g carbohydrates) + 1/2 ENERGIZE Bar (ca. 20g carbohydrates) + 1 POWERGEL® HYDRO (ca. 27g carbohydrates)

Our tip: In training sessions, experiment with what you will take, how much of it you will take and how often. Never try something new on race day!

Example:
Sports nutrition strategy for an ambitious half marathon runner (1 hour 50 min) with approx. 27g carbohydrates per hour

Example:
Sports nutrition strategy for an ambitious marathon runner (3 hours 10 min) with approx. 60g carbohydrates per hour



2.3 Recovery

After intense endurance training or competition recovery is key. Rapid recovery is a must during periods of heavy training and anytime you have more than one training session a day. In addition, sports nutrition strategies help promote training related adaptation processes (see graphic page 3) which helps you to get the most from one training session to the next.

It's important that you give your body the right nutrients and the right amounts directly after exercise. The body needs

- **Carbohydrates** to refill its glycogen stores
- **High-quality protein** to repair the damaged muscle tissue and to build new muscle tissue
- **Fluid and electrolytes** (especially **sodium**) for efficient rehydration

As soon as possible after training – ideally before taking a shower – the body should be supplied with a combination of carbohydrates and protein, in addition to sufficient fluid. If you don't feel like eating a meal or solid foods try a recovery drink: **PowerBar® RECOVERY Regeneration Drink** is designed for immediate use after exercise to provide your body with high quality protein sources, carbohydrates and minerals. A delicious **PowerBar® PROTEIN PLUS 30% Bar** in combination with fluid or a protein shake possibly mixed with a ripe banana are other options directly after a ride. To optimize the muscle glycogen stores this should be followed by carbohydrate-rich meals as increasing the total amount of carbs consumed after exercise is the most important factor for long-term recovery.

3. BE WEIGHT SMART

Your nutritional demands are not constant and depend upon your goals regarding body weight (maintain, gaining or losing bodyweight) and training volume. Heavy caloric loads are for heavy training. When you cut back on your training or racing, such as during the off-season or if you need to reduce your body fat, do the same with calories. A negative energy balance is the basic requirement for weight loss and body fat reduction. Additionally, weight loss strategies during intense training periods are not recommended, as you then run the risk of slowing recovery and increase the risks of illness and injury.

4 golden tips for losing body fat while sparing lean mass:

- Don't restrict kcals too severely, especially when combining energy restriction with a training program
- The calorie intake can be reduced by avoiding meals and sauces that are rich in fat, as well as alcohol, soft drinks and sugary foods
- Select foods high in fibre, including whole grains, whole fruits and vegetables
- An increased protein intake during a diet maintains muscle mass better: Consume adequate high-quality protein sources, especially after exercise, and spread protein throughout the day. Examples of foods high in protein which fits into a calorie-reduced diet:

  - Lean meat (e.g. chicken, ham)
  - Fish
  - Low-fat dairy products (e.g. cheese, plain yoghurt)
  - Tofu
  - Sports nutrition products like **PowerBar® PROTEIN PLUS 80%** or **PROTEIN PLUS 92%** shakes may assist timed protein supply and allow more food variety

4. PREPARING FOR A COMPETITION

Try new nutrition strategies in training first, especially as factors such as training intensity and duration play a crucial role in tolerances. For example, high exercise intensity or nervousness can reduce the bodies tolerance of food and drinks. Therefore, you need to work out yourself 'what product', 'when' and in 'which amounts' suits you best. Never experiment in an important race or in training the day before – you could still be suffering next day if you experiment the day before.

4.1 Carbohydrate-loading principle

If you're planning to compete in a competition (e.g. Marathon distance) that will require your body's muscle glycogen stores to be at their maximum then carbohydrate loading – a special technique in which you taper your training one or more days before a race, whilst increasing your intake of carbohydrates – might be right for you. Done correctly, the net result is a significant boost in your muscle stores of glycogen.

Carb-loading methods have changed dramatically in recent years. Very complicated and extreme diet-exercise methods are no longer essential to increase muscle glycogen stores successfully. An effective and easy strategy to maximize your energy stores before a competition is to consume a high-carbohydrate intake (8-12g carbohydrates/kg bodyweight) in the week prior to competition in combination with a reduced training schedule.

The **PowerBar® plate model** offers a meal planning approach that is simple and helps you get an idea about the balance between the food groups for meals which are high in carbs:

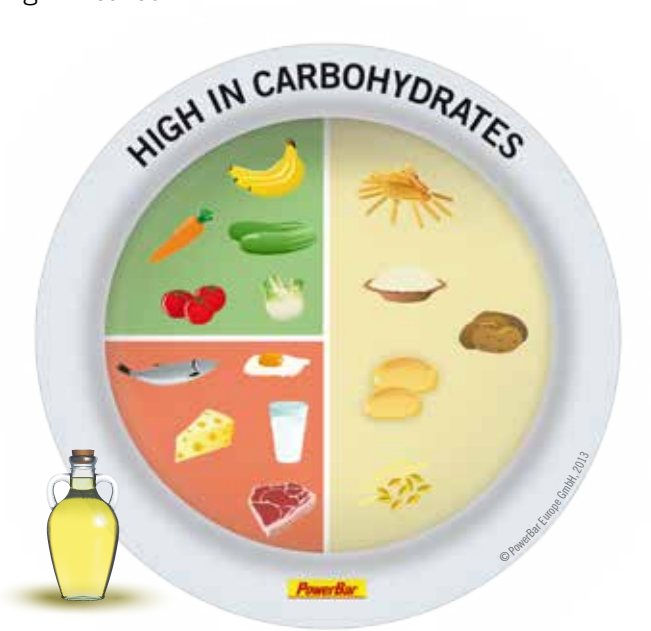
PowerBar® plate model

Easily-tolerated grain products (e.g. pasta, white bread, instant oatmeal, cornflakes, cereals), rice, quinoa, amaranth, millet, potatoes

Fish, seafood, lean meats (e.g. lean beef, veal or lamb), poultry, eggs, low-fat milk and dairy products

Seasonal or frozen and easily-tolerated cooked vegetables, carbohydrate-rich ripe fruits (e.g. banana), fresh vegetable and fruit juices / smoothies in a great variety and in different colors (e.g. red = tomato, yellow = carrot), dried fruits (e.g. raisins)

In addition: Healthy fats e.g. refined rapeseed oil for cooking or virgin olive oil to prepare cold meals in small quantities



Ingalena Heuck
PowerBar® User since 2012

*Examples of high carbohydrate-rich meals based on the **PowerBar® plate model** include:*

- Porridge with low-fat milk and fruits
- Breakfast cereal with low-fat milk and banana
- Pasta with low-fat tomato sauce and 1-2 tablespoons of grated low-fat cheese
- Toast spread with a little low-fat cream cheese, jam or honey and a glass of fruit juice

Examples of high carbohydrate-rich snacks include:

- Dried fruits
- Banana smoothies
- **PowerBar® NATURAL ENERGY CEREAL Bar**

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Glycogen is stored in the muscles together with water. That means that if you've effectively super compensated your muscle glycogen stores, you'll naturally be a bit heavier because of the extra water you're carrying. This is why it's important to try out before a competition. Be sure to practice your carbohydrate loading regimen before long training sessions. This will help you optimize the right types and quantities of foods and beverages you'll personally need to successfully carb-load, and will also help you get a sense of the performance benefits you can expect as a result.

4.2 Nutrition on the competition day

Below are some examples of suitable meals and snacks with timings in relation to the exercise. When it comes to food tolerances, there is an enormous amount of variation between individuals, so you should check for yourself to find out WHAT suits you best, WHEN and in WHAT quantity. Other factors, such as training intensity and duration, play a crucial role in tolerance as well. For example, high exercise intensity or nervousness can reduce the body's tolerance of food and drink.

PowerBar® Nutrition guidelines on the important day

	WHEN?	WHAT?	RECOMMENDATIONS
BEFORE EXERCISE	3 - 4 hours before	Easily digestible meal: high in carbohydrates, low in fat and fibre, combined with sufficient fluid (5 - 7ml per kilogram of body weight is recommended)	• Pasta with low-fat sauce (e.g. tomato sauce or low-fat bolognese sauce) + fluid • Rice with steamed carrots and chicken breast + fluid • Baked potato with low-fat herbed soft cheese + fluid • Light vegetable soup with bread + fluid • Toasts with honey or jam + fluid • Sandwiches with low-fat cold cuts or cheese + fluid • Easy-to-digest breakfast cereals, such as cornflakes, with milk (providing you don't have a milk intolerance), banana + fluid • Fruit-flavoured buttermilk with banana
1 BEFORE	Up to 60 minutes before	Carbohydrate-rich drinks or snacks with sufficient fluid	• White bread with honey + fluid • Ripe banana + fluid • PowerBar® ENERGIZE bar + fluid • PowerBar® ISOMAX drink or ISOACTIVE drink • PowerBar® POWERGEL® SHOTS + fluid • PowerBar® NATURAL ENERGY cereal bar + fluid
2 DURING	Drink and eat little and often (e.g. drink 150 - 200ml every 15 minutes) Start drinking as soon as possible and do not wait until you are thirsty	Snacks and/or drinks that are rich in carbohydrate (30 - 90 grams of carbohydrate per hour is recommended) and contain sodium	• PowerBar® ISOMAX drink or ISOACTIVE drink • PowerBar® POWERGEL® + fluid • PowerBar® POWERGEL® SHOTS + fluid • PowerBar® ENERGIZE bar + fluid
3 AFTER	Immediately after	1 - 1.2g carbohydrates per kg of body weight, plus approx. 20 - 25g protein and sufficient fluids and electrolytes for rehydration	• Flavoured milk drink and dried fruits • Rice cakes with fruit-flavoured buttermilk • Yoghurt with easy-to-digest cereals, instant porridge oats + fluid • Semolina or rice pudding + fluid • PowerBar® RECOVERY drink with low-fat milk • PowerBar® PROTEIN PLUS 30% bar + fluid • PowerBar® PROTEINPLUS 92% + 1 handful raisins

FOR FURTHER INFORMATION PLEASE CONTACT OUR EXPERTS: NUTRITIONTEAM@POWERBAR-EUROPE.COM

EXPERTS IN SPORTS NUTRITION SINCE 1986

High quality - PowerBar® only uses high-quality ingredients and also allows products to be tested for banned substances in sport by the internationally recognised, independent laboratory HFL Sport Science.

PowerBar® products are based on the latest scientific knowledge and are developed together with athletes.

NestléNutritionInstitute

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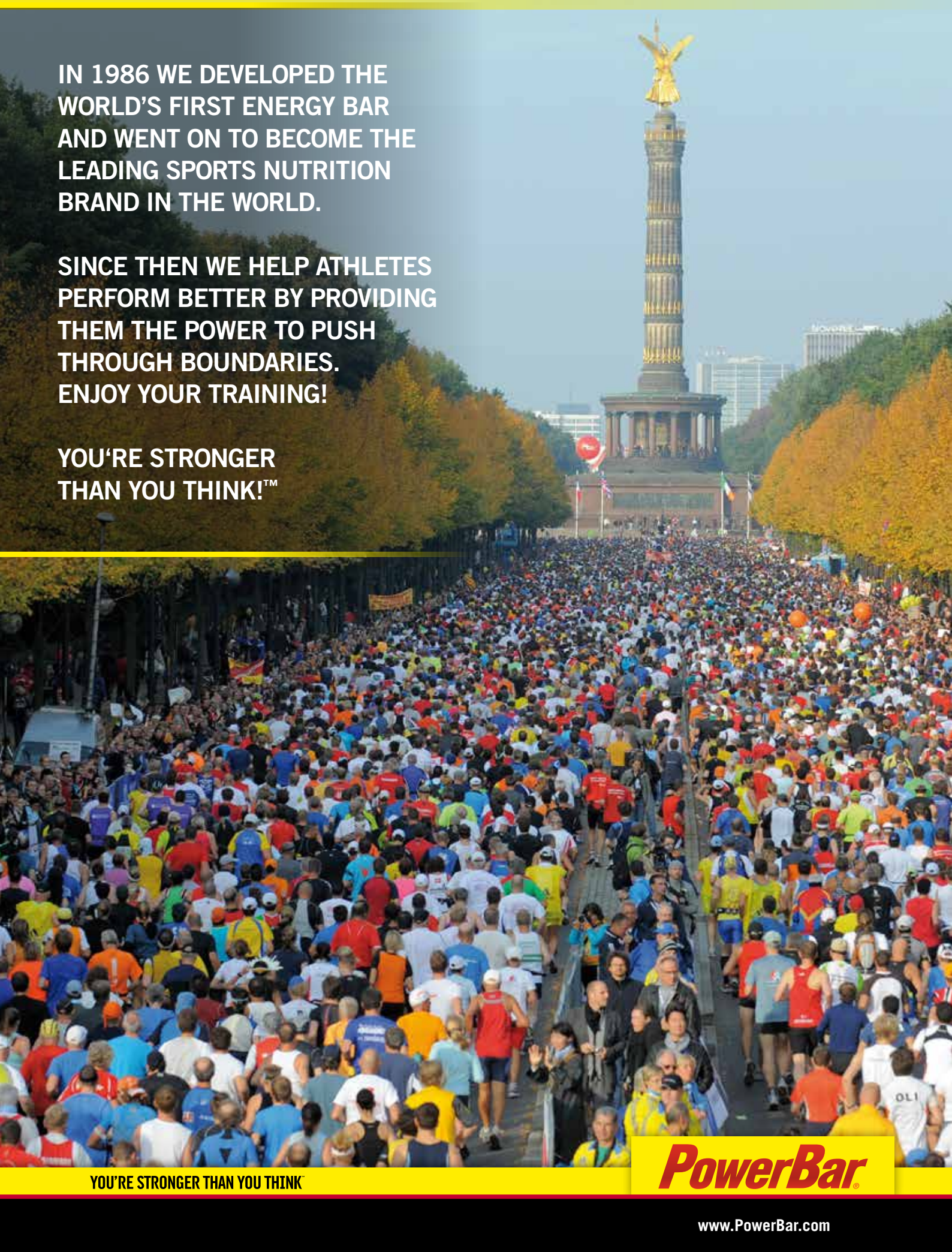

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SINCE THEN WE HELP ATHLETES PERFORM BETTER BY PROVIDING THEM THE POWER TO PUSH THROUGH BOUNDARIES. ENJOY YOUR TRAINING!

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