



**RED BULL GIVES YOU WINGS.
INFORMATION FOR COMPETITIVE
ATHLETES AND THOSE WHO
FOLLOW IN THEIR FOOTSTEPS.**





MORE ENERGY MEANS MORE SUCCESS.

Athletes experience intense mental and physical stress and strain during competitions and also when they are training. Red Bull Energy Drink has been specially developed to provide the additional energy that athletes need to overcome physical and mental stress throughout training as well as before, during and after competitive events. Athletes from a variety of sports rely on

the power of Red Bull Energy Drink, and there is a good scientific basis for them doing so. Red Bull Energy Drink and its benefits have been tested and proven repeatedly in a series of comprehensive studies.

This brochure explains how Red Bull Energy Drink works, and gives competitive athletes advice on how to use it successfully.

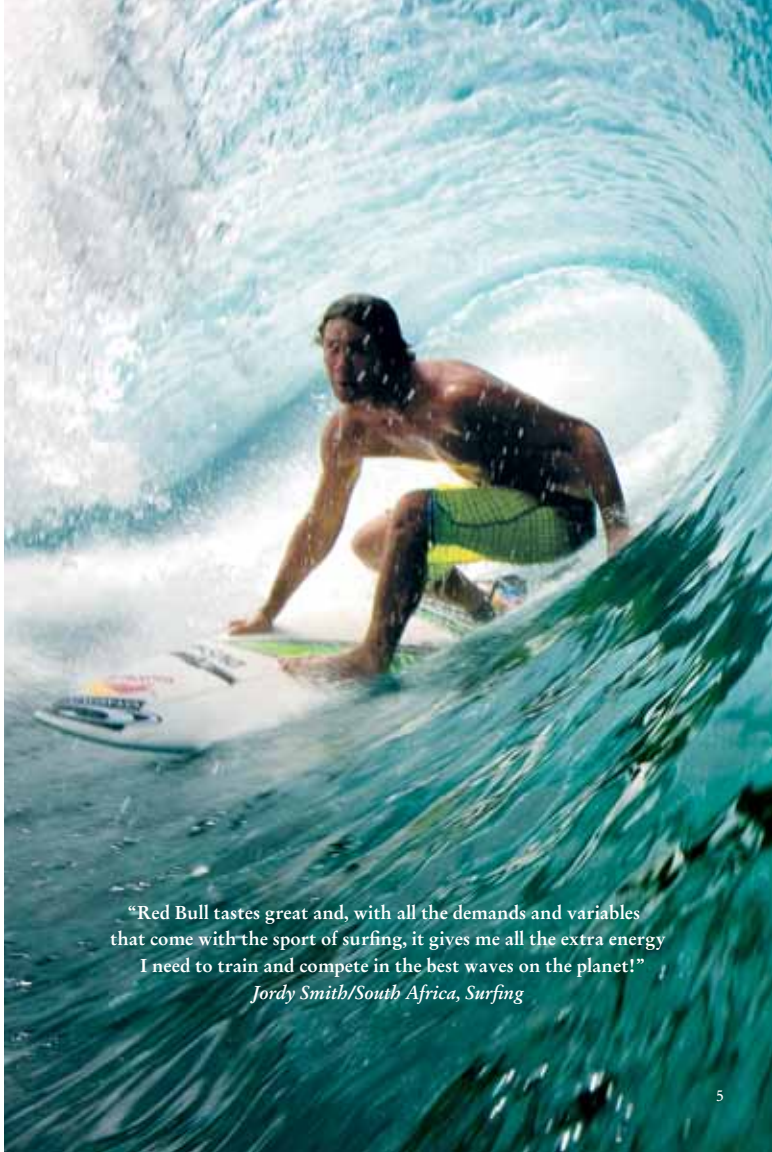
"I drink Red Bull 30 minutes before every race, when I drive and any time I get tired. Red Bull gives me that extra boost that I need!"

Lindsey Vonn/USA, Alpine Skiing

RED BULL. THE ENERGY DRINK THAT VITALIZES BOTH BODY AND MIND.

Since its launch in 1987, quite a number of studies have been undertaken to understand the physiological significance of Red Bull Energy Drink and its unique combination of ingredients. These studies, carried out by doctors and scientists renowned in their particular fields, indicate that Red Bull Energy Drink produces a significant increase in both physical performance and cognitive functions. The studies, some of which had the participation of top athletes, provide evidence of

enhanced performance following consumption of Red Bull Energy Drink. Ever since Red Bull Energy Drink was introduced to the market, it has been used by champions in both recreational and competitive sports to achieve improved performance. In addition to the results obtained from scientific studies, the ongoing partnership between a wide variety of athletes and Red Bull Energy Drink is testimony to the fact that Red Bull Energy Drink actually works.

A full-page photograph of a surfer with long dark hair and a beard, wearing green and yellow patterned shorts, riding a surfboard inside the barrel of a massive, curling blue-green wave. The surfer is in a crouched position, looking towards the camera. The water is splashing around him, creating a dynamic and powerful scene.

"Red Bull tastes great and, with all the demands and variables that come with the sport of surfing, it gives me all the extra energy I need to train and compete in the best waves on the planet!"

Jordy Smith/South Africa, Surfing

"Before I ride, I use Red Bull to prepare my body to give me what I need when I really start to push the limit."

Daniel Pedrosa/Spain, Motorbike Road Racing



RED BULL IS THE ENERGY DRINK THAT DOES WHAT IT PROMISES.

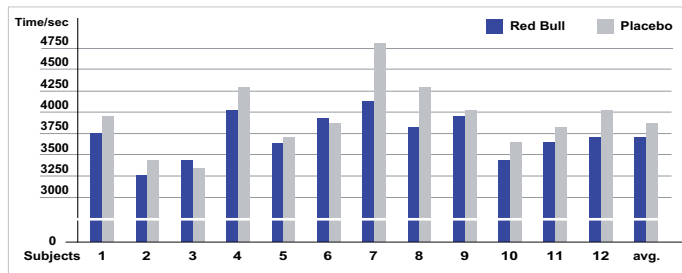
Red Bull Energy Drink and its effect on the body. Since the beginning of the 1990s, a series of sportsmedicine studies on Red Bull Energy Drink have explored its effects on physical performance. Some of the major studies are described below.

A study by Ivy et al., University of Texas, U.S.¹, investigated the effects of Red Bull Energy Drink, ingested prior to exercise, on endurance performance. Following a 12 h fast, trained cyclists, male and female, consumed either 500 ml of flavored placebo or 500 ml of Red Bull Energy Drink 40 min prior to a simulated cycling time trial.

Performance was measured as time to complete a standardized amount of work equal to 1 h of cycling at 70% W_{max} (max. workload). When compared to the cyclists who consumed the placebo, those who drank Red Bull Energy Drink showed improved performance, although there was no difference in rating of perceived exertion between treatments (Fig. 1).

These results demonstrate that consumption of Red Bull Energy Drink prior to exercise can improve endurance performance, and that this improvement might be due in part to increased effort without a concomitant increase in perceived exertion.

Fig. 1 - Time-trial for each participant after ingestion of Red Bull Energy Drink or the placebo. The average (avg.) shows a significant difference between treatments.

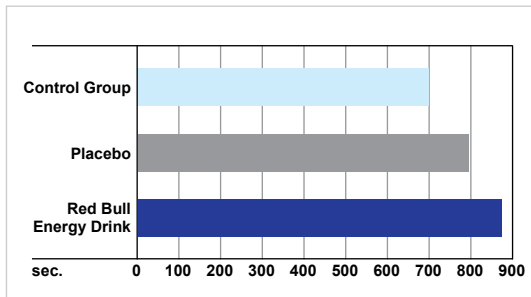


In a study carried out by ISME (the Institute for Sport, Medicine and Nutrition in Germany)², the effects of Red Bull Energy Drink on performance were determined for endurance-trained athletes. Cycling on a cycle ergometer, the subjects performed three trials and were given different drinks between each one: a placebo (carbohydrate solution), a control drink (carbohydrate solution with caffeine) and Red Bull Energy Drink.

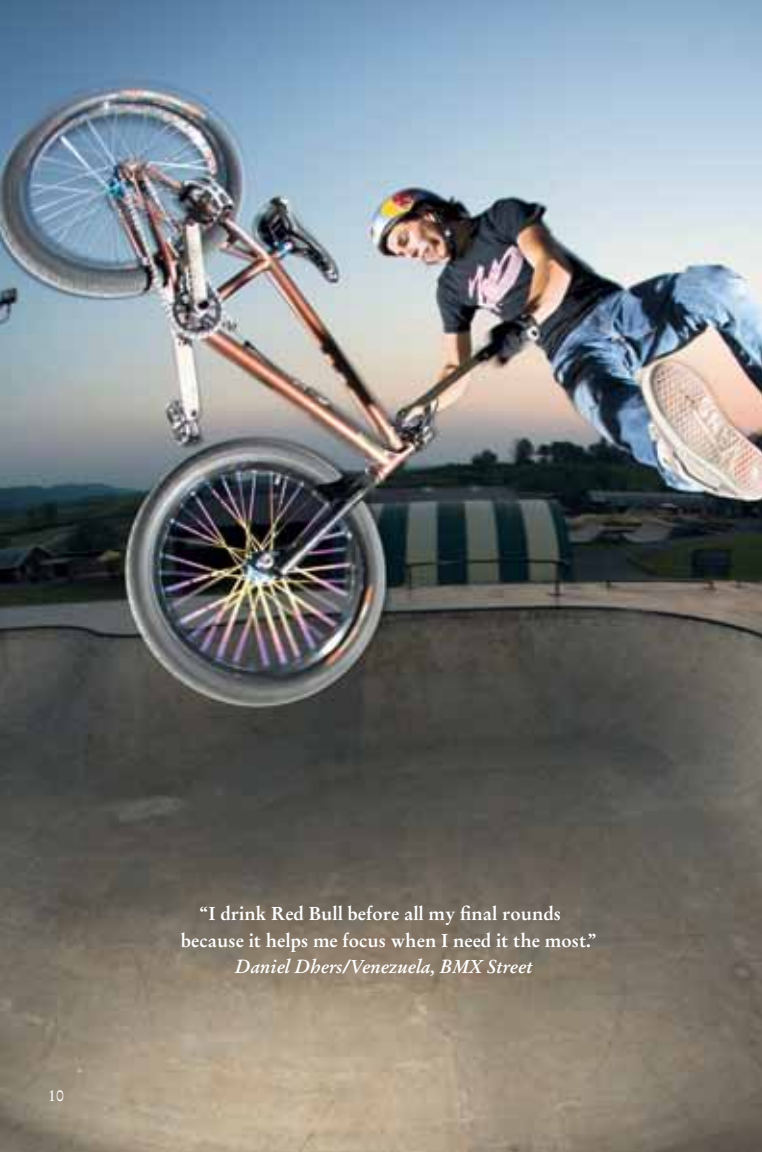
The study revealed a significant increase in endurance at the maximum intensity level with Red Bull Energy Drink compared to placebo and control drinks (Fig. 2).

Based on different parameters measured during the study, the authors concluded that the increase in endurance was due to an improvement in the heart's pumping capacity.

Fig.2 - Endurance time at the individual maximum intensity level



"I like drinking Red Bull each time to push my limits!
Red Bull gives me wings!"
Guillaume Chastagnol/France, Snowkiting

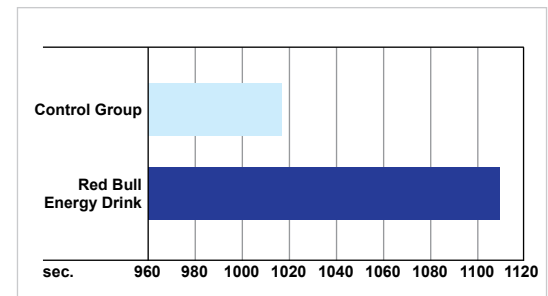


"I drink Red Bull before all my final rounds
because it helps me focus when I need it the most."
Daniel Dbers/Venezuela, BMX Street

A study on the physical performance of non-athletes was conducted at the Department of Psychology, University of the West of England, Bristol³. This study demonstrated a significant increase in aerobic endurance and anaerobic performance following administration of Red Bull Energy Drink versus the control drink (*Fig. 3*).

This finding further confirms the previous results obtained by Geiss et al., and once again demonstrates the role of Red Bull Energy Drink in boosting endurance.

Fig.3 - Aerobic endurance time at highest intensity level



Improved pumping capacity of the heart increases the maximum oxygen uptake, which leads to improved performance (endurance). The pumping capacity of the heart can be determined directly by means of ultrasonic tests (echocardiography). This type of testing was carried out by the Institute of Sports Medicine at the University of Paderborn in Germany⁴ to establish the effect of Red Bull Energy Drink on heart performance. Subjects were given different drinks before maximum exertion. It was shown that their cardiac stroke volume (the quantity of blood pumped into the arteries with each heartbeat) was higher after taking Red Bull Energy Drink than after drinking the placebo or control drinks (Fig.4).

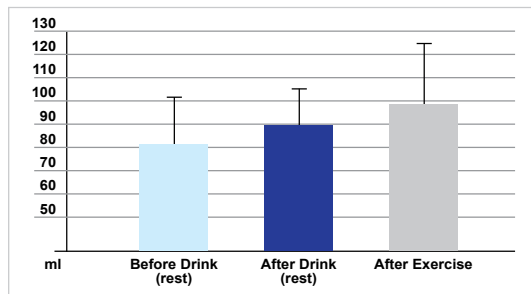
Athletic performance and, in particular, endurance, depends on an

optimum supply of energy. Athletes need proper training and nutrition to maximize their performance. In addition to proper sports nutrition, adequate fluid intake (water, etc.) is crucial, especially during intense sporting activities. Without adequate fluid intake, this intense physical activity could lead to dehydration. As Red Bull Energy Drink has not been formulated to deliver rehydration, we encourage those who are engaged in sport to also drink lots of water during intense exercise.

Summary

Red Bull Energy Drink is an energy drink specially developed for periods of increased physical exertion. As shown above, there is extensive evidence of Red Bull Energy Drink increasing endurance performance.

Fig.4 - Stroke Volume



"Paddling on whitewater requires full concentration and fast reactions. Drinking Red Bull before paddling helps me to stay vigilant."

Jana Dukatova/Slovak Republic, Kayak

"A can of Red Bull enables me to keep my concentration high and, at the same time, increases my endurance and reaction speed."

Antonio Cairoli/Italy, Motocross



RED BULL MAKES CHAMPIONS.

Even extremely fit athletes fail to give their best performance if they lose concentration during a sporting activity. Attention or vigilance, concentration and reaction time reflect the mental capacity of the brain and can play a critical role in winning or losing a game or race. While it is relatively easy for an athlete to evaluate his or her physical strength, it is considerably more difficult for them to determine their mental strength. It is often only during the analysis that takes place after a defeat that athletes recognize the existence of problems like lack of attention and concentration and/or delayed reaction time. This can be a real problem for athletes. The secret lies in good mental preparation, adequate sleep, rest and relaxation, and adequate sports nutrition. Optimizing these elements has been shown to enhance mental power. Enhanced mental focus, together with fierce determination, are critical factors, not only in sport, but also in everyday life. They are factors that determine success or failure.

Red Bull Energy Drink contains substances that have a positive influence on mental strength. This has been demonstrated through neurophysiological and neuropsychological tests applied by various working groups.

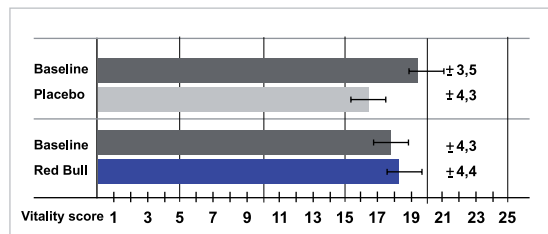
The Institute for Sports Medicine at the University of Paderborn in Germany used EEG (electroencephalography) to analyze the influence of Red Bull Energy Drink on brain activity. Athletes were recruited for this study⁵, which involved testing on a cycle ergometer.

The test consisted of three trials, and the volunteers were given a placebo (carbohydrate solution), a control drink (carbohydrate solution with caffeine) or Red Bull Energy Drink before each one. The results revealed the greatest increase in readiness potential – which indicates alertness and concentration – in those who had drunk Red Bull Energy Drink as opposed to those who were given the control and placebo drinks.

In a double-blind, placebo controlled study carried out at the University of Vienna, Austria ⁶, volunteers were subjected to electro-physiological tests to evaluate their attention, mood and reaction time. The study showed that reaction time improved in the group that had been given Red Bull Energy Drink's active ingredients (caffeine/taurine/glucuronolactone). To gauge the "perceived state" of the volunteers, the "Basler Befindlichkeit" questionnaire, a standard test for assessing mood in terms of life quality and emotional well-being, was used.

The test demonstrated that the values for vitality and social extroversion as well as the sum of the values for well-being were much lower in the placebo group than they were in the one given the Red Bull Energy Drink's active ingredients (*Fig. 5*). Psychometric tests were also performed to evaluate attention. One, the so-called "d2", is a speed-and-power test that measures attention capacity in a stressful situation. The "d2" showed an improvement in the values for psychomotor speed as well as for overall power of concentration in a stressful situation following consumption of the Red Bull Energy Drink's active ingredients (caffeine/taurine/glucuronolactone).

Fig.5 - Vitality



"With Downhill Mountain Biking being such an intense sport, you need every advantage you can get, and any competitive edge you can gain over your rivals has got to be capitalized on. I drink Red Bull to ensure that I am alert and on top of my game when I need to be."

Gee Atherton/UK, Mountainbike Downhill



“Red Bull picks me up after a hard training session. And apart from the drink itself, the can reminds me of my racing car, which always gives me a lift.”

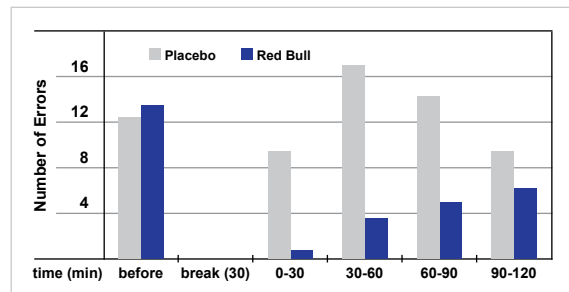
Sebastian Vettel/Germany, Formula 1



Two further studies were conducted at Loughborough University in Leicestershire^{7,8}, which houses the leading British institute that specializes in the effects of tiredness and sleep. Researchers used a car simulator to examine the effects of Red Bull Energy Drink on sleep-deprived drivers, those who are likely to have concentration lapse-related accidents. The findings showed a consistent reduction in subjective sleepiness after taking Red Bull Energy Drink. These findings were corroborated by corresponding EEG tests.

According to the study, in addition to lessening subjective sleepiness, unforced driving errors and reaction time were significantly reduced in the sample group that had drunk Red Bull Energy Drink (Fig. 6). Fatigue from exertion could also lead to fatal accidents in motor sports and other competitive or extreme sports. These incidents are not uncommon in sports, and the data suggests that the consumption of Red Bull Energy Drink may help to reduce their frequency.

Fig. 6 - Driving mistakes caused by somnolence



The group of scientists from the University of the West of England in Bristol³ reported that Red Bull Energy Drink had positive effects on cognitive tasks. They described a significantly reduced reaction time and improved subjective alertness, concentration and memory (*Fig. 7*).

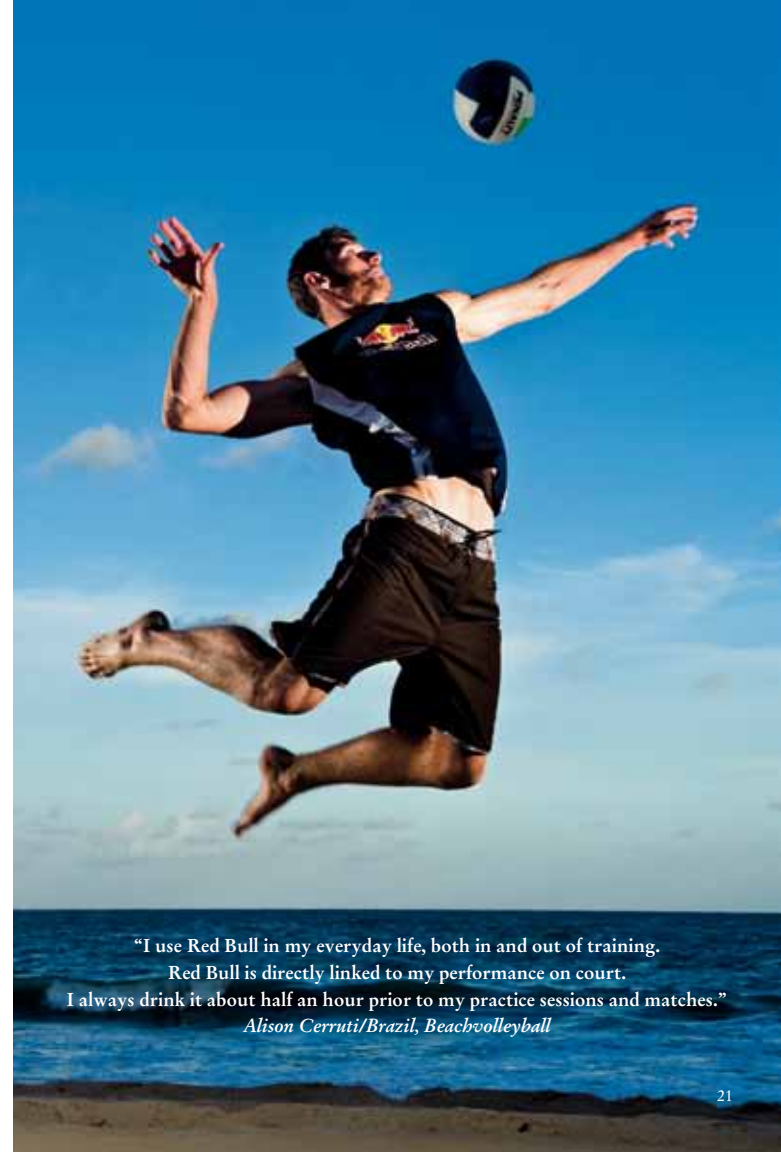
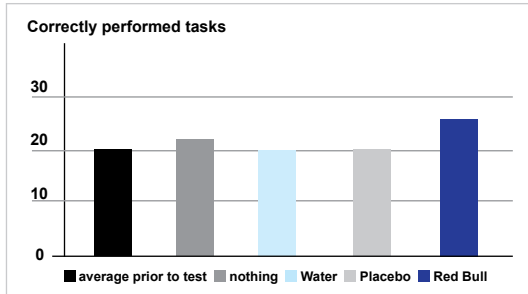
Summary

Ample evidence exists to show that a sound mind is just as important as a healthy body when it comes to winning.

This includes mental focus and determination. Red Bull Energy Drink, with its effects on mental acuity and subjective well-being, is the ultimate partner to your sporting career.

Red Bull Energy Drink increases and improves vigilance, reaction speed and concentration.

Fig.7 - Concentration task



"I use Red Bull in my everyday life, both in and out of training.
Red Bull is directly linked to my performance on court.
I always drink it about half an hour prior to my practice sessions and matches."
Alison Cerruti/Brazil, Beachvolleyball



“I drink half a can of Red Bull about 20 minutes before competition starts, then the rest right before my final run.”

Tanner Hall/USA, Freeskiing

THE RECIPE FOR THE SUCCESS OF ATHLETES AROUND THE WORLD.

Red Bull Energy Drink contains ingredients that enable the body and the mind to function at a high level, even in situations that cause mental and physical strain.

The ingredients in Red Bull Energy Drink are carefully selected and combined.

Red Bull Energy Drink contains the following key ingredients:

taurine	B Vitamins	Sugars
caffeine	niacin	sucrose
glucuronolactone	pantothenic acid	glucose
inositol	vitamin B6	
	vitamin B12	

PROPERTIES AND PHYSIOLOGICAL EFFECTS OF THE INGREDIENTS.

Caffeine

Caffeine is known for its stimulating effects on psychological and physiological functions – such as concentration, reaction speed, alertness and endurance performance.⁹

Caffeine also stimulates the burning of body fat during endurance activities, which means it helps to use fat stores in the body for energy instead of its glycogen (= sugar), which can then be preserved. Caffeine intake during endurance activities, therefore, results in a more efficient supply of energy. During extended periods of exertion especially, this leads to a significant improvement in performance and endurance.

Because it acts as a stimulant, caffeine was initially placed on the list of banned substances for athletes. As of January 1, 2004, however, the World

Anti Doping Agency (WADA) has removed caffeine from its doping list. While the IOC (International Olympic Committee) has accepted this, it is only a recommendation, which means that it is not binding on countries and associations. In spite of this, we still suggest that athletes limit their consumption of Red Bull Energy Drink to 3–4 cans, which equates to 240–320 mg of caffeine, prior to and during events. Before this IOC decision, the limit they set was 12 mg of caffeine per litre of urine. That was equivalent to the consumption of 500–600 mg of caffeine (6–8 cans of Red Bull Energy Drink or 6–8 cups of filter coffee) over a period of 1–2 hours. During strenuous physical activity, we recommend athletes drink sufficient fluids in the form of water, preferably in a 1:1 ratio, in addition to their Red Bull Energy Drink.



“Seriously, Red Bull makes a big difference in my skating days, gives me more disposition, strength, concentration and willingness to always go more.”

Sandro Dias/Brazil, Skateboard Vert

“Red Bull keeps me focused and energized so that I can compete at my best both on and off the field. It gives me the extra push needed to continually perform at top levels.”

Thierry Henry/France, Soccer



Taurine

Taurine is one of the most abundant amino acids in the human body. It is found in high concentrations in muscle, brain, heart and blood. A person weighing 70 kg has approximately 70 g of taurine distributed throughout their body. Put another way, a 70 kg person has 70 times the amount of taurine in his body naturally than that contained in one can of Red Bull Energy Drink. Taurine is also found in the daily diet (e.g. scallops, fish, poultry).

To date, more than 2,500 reports have been published regarding taurine and its physiological effects.

Taurine is often described as a conditionally essential amino acid (an amino acid that under certain circumstances is not synthesised in sufficient quantities in the body). Premature infants show renal taurine loss, which is the reason for the ingredient's inclusion in most infant formulas.

Taurine has several physiological functions in the body. Inter alia, it is involved in detoxification processes.¹⁰

Glucuronolactone

Glucuronolactone is a carbohydrate derivative, which is a natural constituent of the human body. It is also present in human nutrition such as red wine and grain.

Carbohydrates

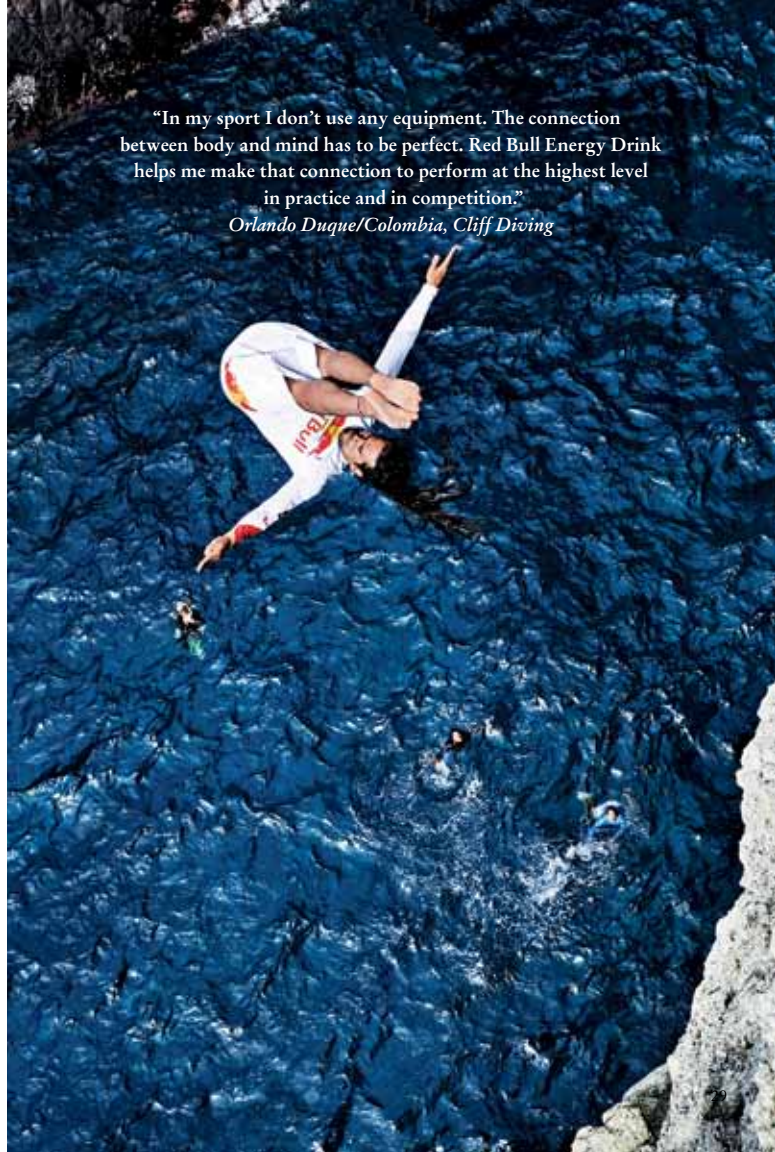
Red Bull Energy Drink contains carbohydrates in the form of sucrose and glucose, which give a caloric value of 45 kcal/100 ml. The consumption of drinks high in carbohydrates, especially before, during and after exercise, is important because the body will use them for energy, protecting muscle's own immediate reserves of glycogen. This means that periods of exertion can be maintained for longer and more intensely. The carbohydrates found in Red Bull Energy Drink can also supply new sources of energy when the body's reserves of glycogen are exhausted. Liquid nutrients can also help offset the effects of an insufficient intake of foodstuffs. This is particularly important after exercise because after periods of intensive physical and mental activity, the athlete may feel a distinct lack of appetite.

Vitamins

Vitamins are essential micronutrients that are required for maintaining normal physical functions. The B vitamins contained in Red Bull Energy Drink inter alia play a key role in mental performance and energy metabolism (buildup and breakdown of carbohydrates, fat and protein). A shortage of B vitamins leads to a drop in both physical and mental abilities.¹¹

"In my sport I don't use any equipment. The connection between body and mind has to be perfect. Red Bull Energy Drink helps me make that connection to perform at the highest level in practice and in competition."

Orlando Duque/Colombia, Cliff Diving





RED BULL GIVES YOU WINGS, WHENEVER YOU NEED THEM.

It is generally recognized that during physical activity our bodies require more micro- and macro-nutrients. An athlete can only realize his or her full performance potential if the levels of these nutrients remain adequate. The way Red Bull Energy Drink is used in sports varies depending on the athlete and the type of sport. Based on the experience of many top athletes, there are a number of different ways of using the product:

Before:

“You need a lot of physical and mental energy in my sport. More than anything else, you need to be able to concentrate properly to make the right split-second decisions. Red Bull gives me added energy and helps me concentrate at just the right moment.”

Shaun White / USA, Snowboarding

“I use Red Bull during very intensive and long training units. After my regular warm up, I drink a can of Red Bull in order to prepare my body for the rest of the workout. It not only gives me the power to sustain intensive training sessions, but also prepares my mind for the rest of it.”

Daniel Unger/Germany, Triathlon

During:

“My favorite Red Bull is in T2. This means after a one hour swim and five hours bike. Then I have a cold Red Bull before I start the marathon with wings...”

Natascha Badmann/Switzerland, Triathlon

After:

“There are three times in particular when I use Red Bull: after training and competitive events to recover faster, and during the race itself. Between the qualifying and the final rounds, I drink a can of Red Bull to refill my energy tanks.”

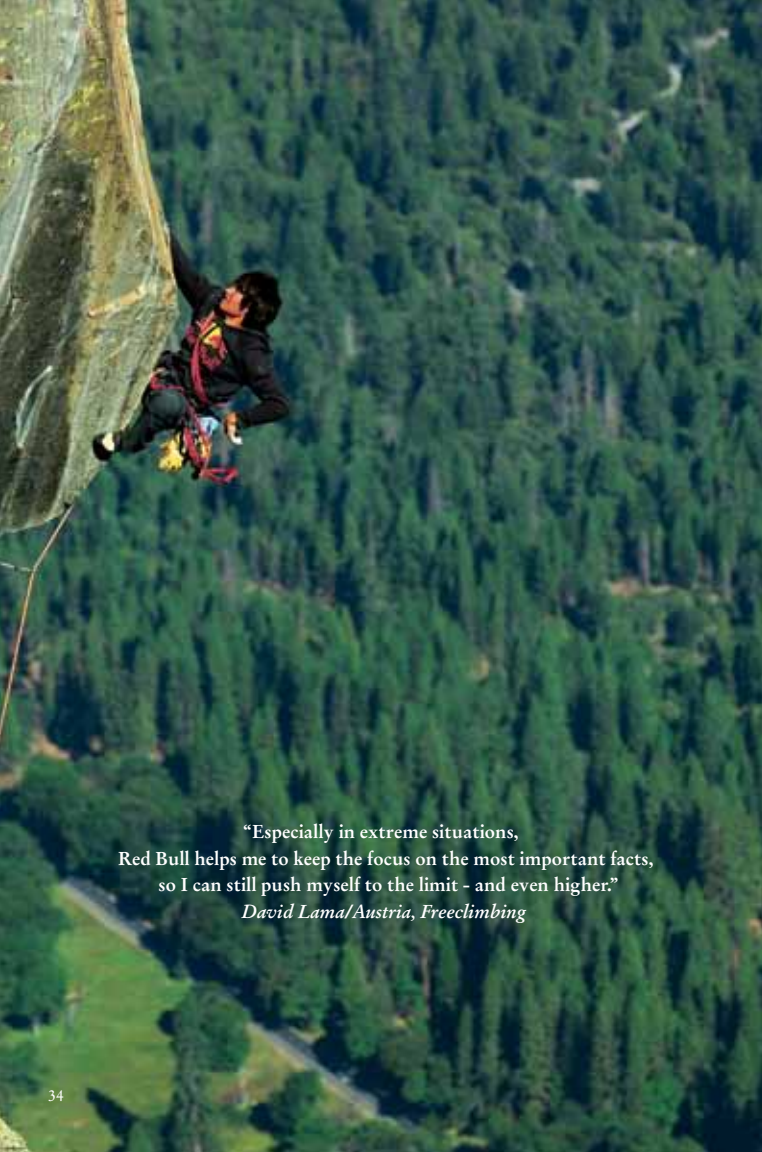
Robby Naish/USA, Windsurfing

Because of the active ingredients it contains – carbohydrates, taurine, glucuronolactone, caffeine and vitamins – the consumption of Red Bull Energy Drink can make a significant contribution to the enhancement of performance in sports.



“In an 82-game season, plus the NBA Playoffs, you’ve got to bring your A game every night, so I drink Red Bull to keep me focused and alert on the court. Red Bull gave me wings during my first playoff triple double.”

Rajon Rondo/USA, Basketball



“Especially in extreme situations,
Red Bull helps me to keep the focus on the most important facts,
so I can still push myself to the limit - and even higher.”

David Lama/Austria, Freeclimbing

LITERATURE.

- ¹ Ivy J.L., Kammer L., Ding Z., Wang B., Bernard J.R., Liao Y.H., Hwang J., Cycling time trial performance improved by ingestion of a caffeine energy drink. *International Journal of Sports Nutrition and Exercise Metabolism* 2009; 19: 61-78.
- ² Geiss K.R. et al., The effect of a taurine-containing drink on performance in 10 endurance-athletes. *Amino Acids* 1994; 7, 1, 45-56.
- ³ Alford C. et al., The effects of Red Bull Energy Drink on human performance and mood. *Amino Acids* 2001; 21, 2, 139-150.
- ⁴ Baum M., Weiß M., The influence of a taurine-containing drink on cardiac parameters before and after exercise measured by echocardiography. *Amino Acids* 2001; 20, 1, 75-82.
- ⁵ Barthel T. et al., Readiness potential in different states of physical activation and after ingestion of taurine- and/or caffeine-containing drinks. *Amino Acids* 2001; 20, 1, 63-73.
- ⁶ Seidl R. et al., A taurine- and caffeine-containing drink stimulates cognitive performance and well-being. *Amino Acids* 2000; 19, 3/4, 635-642.
- ⁷ Horne J.A., Reyner L.A., Beneficial effects of an “energy drink” given to sleepy drivers. *Amino Acids* 2001; 20, 1, 83-89.
- ⁸ Reyner L.A., and Horne J.A., Efficacy of a “functional energy drink” in counteracting driver sleepiness. *Physiology & Behaviour* 2002; 75, 331-335.
- ⁹ Goldstein E.R. et al., International society of sports nutrition position stand: caffeine and performance. *J Int Soc Sports Nutr.* 2010; Jan 27;7(1):5.
- ¹⁰ Lourenço R. Camilo M.E., Taurine: a conditionally essential amino acid in humans? An overview in health and disease. *Nutr Hosp.* 2002; Nov-Dec 17(6):262-70.
- ¹¹ IoM (Institution of Medicine): Dietary Reference Intakes for thiamin, riboflavin, niacin, vitamin B6, folate, vitamin B12, pantothenic acid, biotin and choline. National Academies Press, Washington DC. 1998.



“I use Red Bull before each contest in order to stay concentrated and efficient during my different runs. I like drinking Red Bull for training, because I need strength and power during a long period of time.”

Matthias Dandois Delaigue/France, BMX

www.redbull.com

*on cover page:
Robby Naish/USA, Kitesurfing Wave*