CONSUMING the right balance of food and drink is important for everyone, and more so for sportspersons. A number of factors contribute to success in sports, and diet is a key component.

Eating well for physical activity and sport has potential benefits including enhanced performance, reducing the risk of injury and illness, and also ensuring the best recovery after exercise or a training programme.

All sports people require a balanced diet with an appropriate intake of carbohydrate, protein, fat, minerals and vitamins.

**Carbohydrate:** The body needs sufficient carbohydrates to prevent muscle fatigue and stabilise blood sugar and glycogen levels in the muscles. The main role of carbohydrates is to provide energy. Smaller sugars (glucose, fructose, galactose etc.) get absorbed and provide energy while rest of the carbohydrates is stored as glycogen in liver and muscle – these stores are used as a source of fuel for the brain and muscles during physical activity.

**Protein:** Protein is needed for nutrient transfer in the blood, connective tissue support and repair of tissue in response to periods of exercise. Protein is involved in tissue building, and helps in the recovery of muscles and bones. Some good sources of carbohydrates in the diet include bread, breakfast cereals and porridge oats, rice, couscous, potatoes (with skins) and other starchy vegetables (e.g. sweetcorn), beans and pulses.

**Guidelines for Carbohydrate Intake**

- **10-12 g per kg each day =** 5-6 hours moderate intensity exercise, high total energy requirements.
- **7-10 g per kg each day =** maximise muscle carbohydrate stores, enhancement of daily training (1-3 hours), or to load prior to competition.
- **5-7 g per kg each day =** less than one hour moderate intensity exercise, aim to reach general nutritional goals.

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It is important to gain most of the calories from carbohydrate because in its absence, intensity cannot be maintained and premature fatigue occurs. It has also been documented that low carbohydrate intake increases the amount of energy derived from protein sources, so the body would potentially be breaking down some of the key enzymes, and muscle structures which the person is actually trying to develop through training. Poor recovery and restricted growth also occurs with an inadequate carbohydrate intake and may lead to symptoms of overtraining syndrome.

**Protein:** Protein is needed for nutrient transfer in the blood, connective tissue support and repair of tissue in response to periods of exercise. Protein is involved in tissue building,
For most sports people, foods high in fat, particularly saturated fat, are avoided or, at the very most, eaten in moderation. If foods containing fat are consumed, the majority of the fat content should come from unsaturated fat. Dietary fat should never be totally excluded as it plays an essential role in normal body function. The sports person should aim to eat less than 1 g per kg of fat each day. Fats such as polyunsaturated and monounsaturated fats which are found in fish, nuts, seeds, canola and olive oils and avocados are good fat choices.

Vitamins and Minerals: Vitamins are required in wide variety of bodily functions and minerals are required for structural development of tissues. The essential minerals that should be included in the diet are calcium, iron, potassium, magnesium, sodium and zinc.

### Performance Enhancing Supplements

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Mechanism of Action</th>
<th>Efficacy</th>
<th>Safety</th>
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</thead>
<tbody>
<tr>
<td>Antioxidants (Vitamin C &amp; E) and Co-enzyme Q₁₀</td>
<td>Minimise free-radical damage to skeletal muscle, thereby reducing muscle fatigue, inflammation and soreness</td>
<td>Do not directly improve performance, appear to hinder some physiological and physical exercise-induced adaptations</td>
<td>Gastrointestinal disturbances with vitamin C intake of more than 2000 mg/day in adults, increased risk of hemorrhagic effect with vitamin E intake of more than 1100 IU/day in adults.</td>
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<tr>
<td>Beta-alanine</td>
<td>Increases synthesis of carnosine, a dipeptide that buffers changes in muscle pH, thereby reducing muscle fatigue and loss of force production</td>
<td>Little or no performance benefit in activities lasting more than 10 minutes</td>
<td>Paresthesia (tingling) in face, neck, back of hands, and upper trunk with at least 800 mg or over 10 mg/kg body mass; pruritus (itchy skin)</td>
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<tr>
<td>Caffeine</td>
<td>Blocks activity of the neuromodulator adenosine; reduces perceived pain and exertion</td>
<td>Might enhance performance in endurance-type activities (e.g., running) and intermittent, long-duration activities (e.g., soccer) when taken before activity</td>
<td>Insomnia, restlessness, nausea, vomiting, tachycardia, and arrhythmia; risk of death with acute oral dose of approximately 10–14 g pure caffeine (150–200 mg/kg)</td>
</tr>
<tr>
<td>Creatine</td>
<td>Helps supply muscles with energy for short-term, predominantly anaerobic activity</td>
<td>May increase strength, power, and work from maximal effort muscle contractions</td>
<td>Weight gain due to water retention; anecdotal reports of nausea, diarrhea, muscle cramps, muscle stiffness, heat intolerance</td>
</tr>
<tr>
<td>Glutamine</td>
<td>Involved in metabolism and energy production; contributes nitrogen for many critical biochemical reactions</td>
<td>May help with recovery of muscle strength and reduce muscle soreness after exercise</td>
<td>Safe use of up to 0.42 g/kg body weight</td>
</tr>
<tr>
<td>Ribose</td>
<td>Involved in production of adenosine triphosphate (ATP)</td>
<td>Little to no effect on exercise capacity in both trained and untrained adults</td>
<td>No safety concerns for up to 10 g/day for 8 weeks</td>
</tr>
<tr>
<td>Arginine</td>
<td>Increases blood flow and delivery of oxygen and nutrients to skeletal muscle, serves as a substrate for creatine production</td>
<td>Little to no effect on vasodilation, blood flow, or exercise metabolites</td>
<td>No safety concerns for use of up to 9 g/day for weeks; adverse effects possible with larger doses</td>
</tr>
</tbody>
</table>

Source: ods.od.nih.gov

and forms part of key enzymes and hormones that carry out functions at rest and during exercise. Protein is also a key component of antibodies that are associated with our protective immune system.

The protein requirements of a normal adult are 0.75 g per kilogram of body weight per day. For strength and endurance athletes, protein requirements are increased to around 1.2-1.7 g of protein per kilogram of bodyweight per day. Good sources of protein are fish, lean meats and poultry, eggs, dairy, nuts, soy, and peanut butter.

**Fats:** Fat is primarily used as a fuel during low to moderate intensity exercise. Fat is also engaged in providing structure to cell membranes, helping in the production of hormones, lining of nerves for proper activity and make it easier for the process of absorption of fat-soluble vitamins.
Vegetarian sports persons are at risk of being deficient in vitamin B12, vitamin D, riboflavin, iron, zinc and calcium and are advised to take a multivitamin to prevent deficiencies and a calcium supplement (1000 mg/day) to help prevent bone loss.

**Fluids and Electrolytes:** The human body can survive for a long duration without any of the micro and macro nutrient but not without water. In sports, water is important for temperature regulation, lubrication of joints and transport of the nutrients to active tissues. It regulates the body’s temperature. The body loses vital fluids through perspiration and breathing.

Dehydration reduces your blood volume, which leads to a rise in body temperature, and can lead to cramping and heat exhaustion. If the body is not getting enough fluids, the muscles start to weaken. So drink up especially if you are engaged in an intense workout.

**Sports drinks**
Sports drinks are usually rich in carbohydrates and also contain electrolytes (minerals such as chloride, calcium, magnesium, sodium and potassium) which, along with body fluid, diminish as you exercise and sweat.

Sports drinks are very useful for events/training that lasts greater than 30 minutes. In events that are shorter than 30 minutes, no performance benefits have been noted, however, if the taste encourages you to drink more fluid then these drinks are going to help your training and recovery. Always experiment with different sports drinks in the weeks or months before competition to make sure they are right for you.

**Drinks Regimen**
- **Before training:** Drink plenty of fluid (1 litre per hour in the two hours prior to training).
- **During training:** Drink before you feel thirsty, thirst is a delayed response to dehydration.
- **After training:** Fluid intake is vital for recovery, so 1 litre per hour following training is advised.

Sports drinks can be split into three major types:

**Isotonic sports drinks** contain similar concentrations of salt and sugar as in the human body. This can be useful for shorter duration, high intensity exercise where getting carbs quickly can be more important than warding off dehydration. It is the preferred choice for most athletes, including middle and long-distance running or those involved in team sports.

**Hypertonic sports drinks** contain a higher concentration of salt and sugar than the human body. It can be taken during ultra distance events to meet high energy demands, but must be used in conjunction with Isotonic drinks to replace lost fluids. Normally consumed post-workout to supplement daily carbohydrate intake and top-up muscle glycogen stores.

**Hypotonic sports drinks** contain a lower concentration of salt and sugar than the human body. They quickly replace fluids lost by sweating. Suitable for athletes who require fluid without a carbohydrate boost, e.g. gymnasts.

However, some of the sides-effects of sports drinks could include gastrointestinal upset, poor dental health or dental erosion, abnormal weight gain, type 2 diabetes mellitus, liver fibrosis and decreased brain function.

**Performance Enhancing Supplements**
There are performance enhancing supplements that contain numerous ingredients such as caffeine, protein, creatine, beta-alanine, and glutamine. However, sportspersons take these supplements on the advice of doctors or trainers.