

## our Qualifications

Science in Sport grew out of the desire to provide the best nutritional products and advice to athletes. The Company mixes qualified sport scientists, food technologists, and a physician with keen athletes and sports people who have competed from local level to the world stage. As a result of all this experience they have an unprecedented knowledge of the nutritional needs of athletes. Science in Sport also collaborate with leading Universities on research projects, as well as getting involved at the sharp end of sports performance.

Initially Science in Sport grew in cycling thanks in part to the use and endorsement of the products by Chris Boardman, who liked the Company ethos, and helped to inspire the creation of REGO, total recovery sports fuel. It wasn't long before the word began to spread and Science in Sport's products became more popular at the top level of many other sports. To date Science in Sport have helped to win Olympic Gold's, World Championships, Premiership Titles and set numerous World Records. Science in Sport designs, develops and manufactures its own products to ensure they are of the highest quality - *they have to be, we don't know when an Olympic gold medal may depend on it!*



Science in Sport is continually striving to innovate and improve products to assist all athletes to reach their goals and maintain its position as leaders in sports nutrition.

# Nutrition for Performance

**“The critical nutritional factors determining sports performance are hydration and energy supply”**

As little as 2% loss in body weight through dehydration can decrease performance by up to 20%, and once carbohydrate energy is used up performance decreases by about 50%.

### Something to think about?

If you are serious about your training and racing it is.

### Body Fuel

The body provides energy by burning fats, carbohydrates and some proteins. Carbohydrate has a much lower oxygen cost than fat, so more energy can be produced with a given amount of oxygen using carbohydrate as a fuel rather than fat, i.e. you can go faster and further per breath!

The efficient use of fat is also dependent upon the availability of carbohydrate. It is often said that "fat burns in the flame of carbohydrate". The rate of energy production from aerobic use of carbohydrate is 50 to 100% greater than the rate of energy production from the aerobic use of fat alone. Carbohydrate can also be used to provide anaerobic energy for sprint efforts.

Fat is a very efficient store of energy, for instance, scientists have deduced that the fat stores of an average man could provide enough energy to fuel about 3.5 days running at marathon pace, so you are unlikely to run out of fat even in the longest race.

### Endurance Performance

There have been many studies which have shown that endurance performance correlates with carbohydrate stores (muscle glycogen), and that fatigue occurs when these stores are used up.

Most cyclists are aware of glycogen depletion and describe it as "hunger knock" or "bonk". Since it is impossible to burn fat anaerobically, workouts of high intensity deplete the body of carbohydrate rapidly. It is possible to deplete carbohydrate stores with as little as 20 minutes of interval training.

So carbohydrate is important for power as well as endurance athletes. This is why it is important to have a diet that is high in complex carbohydrate and why many athletes have adopted the strategy of carbohydrate loading.

Recent work has shown that it is possible for trained athletes to achieve an increased carbohydrate store by tapering training and eating carbohydrate in the days preceding competition. The only major problem with this is physically eating the required quantity of carbohydrate, which is usually more than that with which the athlete feels comfortable, 600g per 24 hours e.g. 3 kg of potatoes! **PSP22** has been recommended as a more palatable way of ingesting the required amount of calories without eating too much fat or protein.



Tim Lawson - SIS director

photo : Phil O'Connor



## Pre Event Feeding

The conventional advice for the athlete is that the pre event meal should be taken 3 hours before competing, and should be relatively light but high in carbohydrate and low in fat. **PSP22 Energy** and **GO-Gels** can be useful in this pre event meal to increase the carbohydrate content without increasing the bulkiness of the meal. Eating anything within an hour before an event has, in the past, been considered detrimental to performance due to the possible insulin response.

There is also evidence, however, that it may be beneficial to take a strong (25 to 30%) solution 5 to 10 minutes before competition.

This is certainly recommended once into warm-up, especially if consuming carbohydrate during the event is not possible. **PSP22 Energy** and **GO-Gels** are particularly useful for taking in high concentrations of energy since they are easily tolerated due to the unique carbohydrate structure.

People vary in their response to pre-race feeding and, as with any nutritional strategy, it is worth experimenting with different combinations during training, to work out which strategy best suits the individual. Many cyclists prefer, and what we tend to recommend, is to continue sipping **PSP22 Energy** from the pre event meal right through the warm up and into the event.

## Hypotonic Isotonic Hypertonic

These terms describe the relative concentration of the drink. The best way to compare the concentration of drinks is to look at the number of dissolved molecules

### HYPOTONIC solutions

Contains less molecules in solution than body fluids. Science in Sport products are designed to be used at hypotonic concentrations

### ISOTONIC solutions

Contains approximately the same number of molecules in solution as body fluids. The relative concentration of body fluids varies between individuals and according to their hydration status. Isotonic solutions are unlikely to be in exact balance with each individual.

### HYPERTONIC solutions

Contain more molecules in solution than body fluids. Hypertonic solutions tend to be heavy on the stomach and empty very slowly. Simple sugar solutions are hypertonic over 6% solution and most pops and sodas are 15-18% simple sugar solutions. Some hypotonic solutions can breakdown to hypertonic solutions when ingested.

## Energy Drinks

The problem with ordinary glucose drinks is that glucose is highly osmotically active. This means that a glucose solution greater than 5% (5g/100 ml.) will empty only very slowly from the stomach. In some cases it may even draw fluid into the stomach from the body and so contribute to dehydration. To avoid this, an energy drink must be less osmotically active than blood, i.e. at or below the isotonic level.

The preferred alternative to an ordinary glucose drink is a glucose polymer solution that is less osmotically active than glucose, and can therefore be taken in much higher

## Percentage solution explained

In simple terms this is just a measure of the strength of the drink. Making up a solution of PSP22 energy drink is a process of dissolving the powder into water. The percentage solution can be found by dividing the number of grams of powder by the volume of the finished drink. For instance

**100g of glucose polymer powder dissolved in a litre bottle gives 100/1000 = 10% solution**

It would be correctly designated a 10% solution weight by volume sometimes abbreviated 10%w/v.



concentrations without affecting gastric emptying. A solution such as this can thus contribute to re-hydration as well as provide a significant energy source during exercise. **PSP22 Energy** is isotonic at over 50% solution so it can provide over 10 times the energy of glucose.



This can be explained in a simple way by saying that the stomach will only allow so many molecules through in a given period of time, so if you drink a glucose polymer solution that has say twenty glucose units in one molecule, then your stomach will be able to process more glucose units than it would if you drank a simple glucose solution.

A useful starting point for working out the amount of **PSP22 Energy** that should be used is to use 1g per kilogram body weight for each hour of exercise, though some researchers say 60g per hour regardless of size.

This is roughly equivalent to drinking a 10% solution of **PSP22 Energy** in a standard sized cycling bottle each hour. Solutions used in this way have been shown to improve performance significantly. Go-Gels, the world's first isotonic energy gel, provide 25g of carbohydrate in a 70ml isotonic solution.

## Are you drinking enough?

Try weighing yourself before and after training. Any weight loss will mostly be due to not drinking enough. If you do this a few times and have notes on how much you drank and the weather, a quick look outside will give you a few clues about how much drink you should take out. You will need to drink 1.5 times the mass of any loss in fluid after exercise to fully re-hydrate.



## Dehydration

When dehydration is a problem, electrolyte loss may also be significant. This can often occur when training indoors or in high heat and humidity. Electrolytes are the minerals lost in sweat, and high losses can decrease performance. Electrolyte loss may also be a factor in ultra endurance events, as losses can be significant after 4 hours of exercise. Taking on board electrolytes with a glucose polymer drink such as **GO Electrolyte**, has been shown to counteract this loss as well as improving water absorption.

## Carbohydrate replacement

for optimum performance try to replace at least 60g of carbohydrate per hour of exercise using PSP22, Go Electrolyte and Go-Gels. Go bars also contain about 46g of carbohydrate per bar.



## Choosing an energy drink

When choosing an energy drink it is important to remember that not all glucose polymers or maltodextrins are the same. They may differ markedly in their properties according to the size and structure of the polymer, and the consistency of the product - additives including flavours can also affect the performance enhancing properties of the drink. Drinks containing small amounts of fructose may be beneficial as it is absorbed in a different way. However, it is probably best to avoid energy drinks with high concentrations of fructose as fluid absorption is compromised, and osmotic diarrhoea and gastro intestinal distress common.

Always look for a product with a high percentage of higher saccharides that is hypotonic at the strength of solution you wish to use.

It is also important to remember that you will have to drink the solution during competition and training, so its taste is important. Find out in training if the drink is to your liking, **Science in Sport** offer a range of flavours. Anything added to a polymer solution will increase the osmotic potential of the drink, and so compromise the properties of it. Therefore, it is probably better to avoid

drinks with hundreds of 'magical' ingredients. Find a product that works for you, but always experiment during training with any new product before using it in competition.



photo : Dave Wearm

## Recovery

It can take about 48 hours to replace muscle glycogen stores when relying on a normal carbohydrate diet. Since most serious cyclists train more than once in 48 hours, they run the risk of chronic exhaustion associated with muscle

glycogen depletion. This can be overcome by taking on board Carbohydrate immediately after exercise in order to optimise recovery.

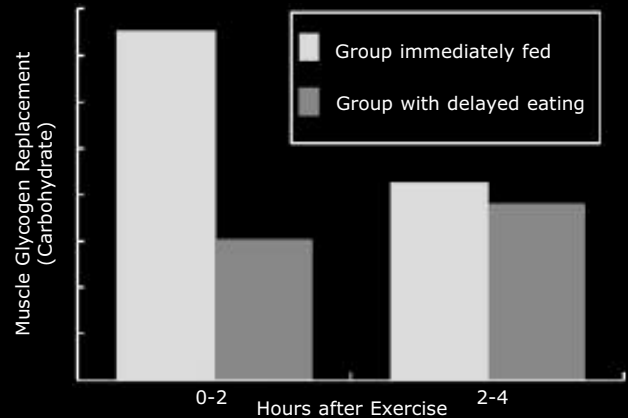
Research, measuring muscle enzyme activity, has shown that it is probably most beneficial to take carbohydrate within 20 minutes of completing the workout. Taking on board a carbohydrate/protein complex such as **Rego Recovery** improves recovery rates still further. **Rego Recovery** goes further by not only replacing carbohydrate stores, but also helping to rehydrate, maintain glutamine status, enhance protein synthesis, protect against free radical damage and replace the co-factors depleted during exercise.

Post event preparation should have a fair amount of sodium and potassium in order to facilitate post event hydration. It is probably best if this kind of product is fortified with vitamins and minerals in balance with the energy content of the drink. Just taking neat carbohydrate and protein will undoubtedly speed up recovery fast but it is best not to take too many "empty" calories.

Post exercise must also be a great time for replacing all those vitamins and minerals which are co-factors in the body's enzyme complexes involved in the production of energy and vitamins which protect against free radical damage. Remember a major goal of training is to

increase these enzyme capacities.

**Glutamine** can be depleted by hard training leading to overtraining and depressed immune function.



**Rego Recovery** contains protein high in glutamine to help maintain glutamine levels after hard training. **Glutamine** has many other useful properties including maintaining muscle cell volume (**see our website for more information or send £1 for a fact sheet**).

**Science in Sport** has been promoting the use of recovery formulations for nearly 10 years. **REGO** was launched in 1995 as such a revolutionary concept that it made the front cover of New Foods Verlag. When Rego was launched it was predicted that many copycat products would follow. Now there is an increasing number of recovery drinks to choose from, but **REGO** remains the benchmark for which all others will be measured. **REGO Rapid Recovery** and the Science in Sport protein kinetics system ensure that for those wanting to maximise their performance gains the choice is always Science in Sport.

## Fast and Slow Proteins - Protein Kinetics

Recent years have seen an increasing amount of research directed beyond absolute protein supply and nitrogen balance. Modern techniques have enabled studies to look at speed of absorption, protein turnover and other bioactive properties. Some proteins have been shown to be absorbed more rapidly than others and make good post exercise recovery formulations. Science in Sport recently supported a study to see if there were any advantages in using whey protein isolate over soy protein isolate and found that they were equally effective. However, Milk proteins containing casein have been shown to empty very slowly from the stomach and should be avoided post exercise. For this reason it is best to make your post exercise recovery drink with water rather than milk.



**Science in Sport** has utilised the specific absorption characteristics of different proteins to develop the **Protein Kinetics System**. The slow release characteristics of casein have been harnessed in Science in Sport's anti-catabolic night-time formulation **Rego Nocté**.

**Don't go hungry. Adapt whilst you sleep.**

With synergistic anabolic mineral support and fructo-oligosaccharides. Part of the **SIS Protein Kinetics System**.

# SIS

SCIENCE IN SPORT



## YOUR ENERGY SYSTEM

### PSP22 ENERGY

#### HIGH ENERGY

The choice to give you extra energy during exercise. Ideal for long work outs, carbo loading or when you need that extra boost. PSP22 is very versatile and can be used at high concentrations to give you the ultimate energy drink. PSP22 should be your choice for a fast and sustained energy boost. Ideal before, during or after exercise.

orange | blackcurrant | lemon | original



### GO ELECTROLYTE

#### HYPOTONIC ENERGY

Ideal for indoor work outs, exercise in the heat and any time when you are sweating heavily or dehydrating. Go provides fast rehydration, sustained energy and is ideal during or after exercise. Go puts back what you sweat out.

lemon&lime | blackcurrant | watermelon



### REGO RECOVERY

#### TOTAL RECOVERY

A carbohydrate and protein mix that helps speed up recovery from intense exercise and enables you to get the most out of each days training. Ideal for those who have training sessions close together.

strawberry | chocolate | banana



### GO-GEL

#### ENERGYBOOST

Go-Gel provides 25g of isotonic energy in a convenient fast-flow gel. Essential emergency rations on long rides.

orange | blackcurrant



### GO-BAR

#### POWERSNACK

THE power snack that's high in carbohydrates, rich in micro-nutrients and low in fat.

banana | chocolate&orange | mango&papaya | apple&blackcurrant



### EASY MIX SYSTEM

Simply pour the powder straight into your drinks bottle - no scoops required. The marks on the bottle show you just how much powder to add. no mess no fuss improved hygiene



CLEAN  
FAST  
CONVENIENT

FUEL

HYDRATION

RECOVERY

POWER SNACK

Science in Sport

Ashwood Laboratories, Brockhall Village, near Blackburn, BB6 8BB

tel 01254 246060

fax 01254 246061

WWW.SCIENCEINSPORT.COM