



## **REVIEW PeptoPro in Sports Performance**

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### **1. Nutrition and Sporting Performance**

Optimal and good nutrition is vital to sporting performance. Following a well balanced healthy diet is prudent to maintain good health and well being in normal and active individuals. It has since been recognized that participation in certain sports increases the bodies demand for total energy; carbohydrate, protein and fat. Adequate energy needs need to be consumed to maintain body weight, maximize training effects, maximize performance and to maintain health. Restriction of single macronutrients such as carbohydrate, protein or fat is not recommended (1).

Carbohydrate is important to maintain blood glucose levels during exercise as well as to replace muscle glycogen levels after exercise. The recommendation for carbohydrate in active individuals is 6 to 10 g per kg of body weight per day. The amount required depends on individual athlete's daily energy expenditure, type and intensity of sport played and gender and environmental conditions (1).

Protein requirements are slightly increased in highly active individuals. Protein requirements range from 1.2g to 1.7g of protein per kg of body weight per day. The recommendation for protein intake can usually be met through diet alone. However, dietary supplements are beneficial when attaining energy and protein needs are not achieved through diet alone. It is important to note that a well balanced healthy diet should be the basis of any athlete's diet (1).

Fat is an essential macronutrient providing essential fat soluble vitamins and fatty acids. Fat is an important energy fuel for athlete and should not be restricted. Fat should comprise 20 to 25% of an athlete's diet (1).

Adequate hydration is crucial to maintaining exercise intensity and performance. Adequate hydration before, during and after events is necessary for optimal performance. Two hours prior to exercise 400 to 600ml of fluid should be consumed and 150 to 200ml of fluid should be consumed every 15 to 20 minutes during intense exercise. After exercise, it is important to replace fluids that were lost during exercise, 450 to 675ml of fluid for every 0.5kg of body weight lost during exercise. Water is the fluid of choice before events and a carbohydrate solution (4-8%) is the most appropriate form of fluid replacement during and after events (1).

### **2. Carbohydrate & Sporting Performance**

Carbohydrate is the most important fuel source during sporting performance and endurance activities. Blood glucose and muscle glycogen quickly become depleted in prolonged exercise. Muscle glycogen becomes depleted within 1.5 to 2 hours of heavy exercise resulting in fatigue compromising exercise performance and intensity. The consumption of carbohydrate based beverages are essential during (to provide a blood glucose source thereby sparing muscle glycogen) and after heavy exercise (to replenish

muscle glycogen stores) (2,3). Ingesting 150-200ml of a 4-8% carbohydrate solution (sports drink) every 15-20 minutes, or with 30 – 60g of carbohydrate per hour during high intensity exercise is recommended. Higher concentration carbohydrate solutions are often associated with gastric discomfort (4).

### 3. Protein & Sporting Performance

Proteins are comprised of hundreds of amino acids in a long chain or bundle. Proteins are naturally broken down in the body by enzymes which cleave the protein into smaller chains and amino acid which are then absorbed in the small intestine. Protein hydrolysates have been shown to have beneficial effects in sporting and exercise performance. Ingestion of protein during exercise increases endurance, extending time to fatigue, and ingestion of protein after exercise accelerates post exercise muscle glycogen synthesis when ingested with a carbohydrate. Recent studies suggest that the right combination of macronutrients before, during and after training can augment exercise training, recovery, reduce muscle damage and improve exercise performance (4,5,6,7,8).

Branch chain amino acids (BCAA) have been shown to have potential benefits in muscle growth and repair. Some studies show reduced pain and enhanced recovery with a BCAA supplement. From such studies it appears that the requirement for protein may be higher in endurance athletes, because some amino acids, including BCAA, are oxidized for energy during exercise. Consuming carbohydrates with protein can reduce BCAA oxidation (9).

Milk protein has been shown to be more effective than soy protein with regards to protein balance in strength training. Traditionally intact whey protein is absorbed faster than intact casein protein. Intact proteins are harder and take longer to digest than peptide formulas. Hydrolyzing or cleaving proteins is an effective way to enhance protein absorption by reducing the need for digestion (10,11).

- Protein hydrolysates are predigested proteins which are more easily absorbed than intact proteins.
- The cleaving of the protein structure to produce smaller peptide chains often results in a bitter aftertaste.

**PeptoPro** is a di- and tri-peptide (2-3 amino acid chain) casein hydrolysate which is soluble in water. When mixed with a carbohydrate containing drink (especially designed for athletes e.g. Energade or Powerade) will provide required protein and carbohydrate necessary for optimal muscle glycogen and protein recovery. Conventional protein drinks are thick suspensions and give a full feeling often unwanted during and directly after sporting events. The di and tri peptides require no digestion and are easily absorbed and digested by the intestine (11).

#### Tested Dose Recommendation:

8g of carbohydrate and 2g of protein per 100ml ingested in 150ml doses ever 15 minutes.

#### Upper tolerable amount:

2L of PeptoPro solution containing 90g of protein, consumed within 3 hours after exercise was well tolerated.

Consumption of up to 2g/kg per day is considered safe (12)

#### 4.1 Muscle Glycogen Storage and Recovery:

Glycogen is the stored form of glucose in muscle cells. Having adequate muscle glycogen stores is essential to ensure optimal athletic performance and endurance. When muscle glycogen stores become depleted or are low, training is suboptimal and performance is compromised. Athletes are encouraged to consume a high carbohydrate diet to ensure adequate glucose availability for working muscles and optimal glycogen restoration after intense exercise. As a result, traditionally, a high carbohydrate containing drink is consumed during and after exercise to optimized muscle glycogen recovery. 1g of carbohydrate is recommended per kg of body weight directly after exercise to ensure muscle glycogen recovery. This is often not easily achieved and results in sub-optimal muscle glycogen recovery (4,5,6,7,8).

Adding quick absorbing protein to a carbohydrate drink increases the rate of muscle glycogen recovery. When protein and carbohydrate are consumed in combination, insulin concentrations in the blood increase resulting in an increased uptake of glucose into muscle cells, which results in a more rapid glycogen restoration.

Cortisol is a stress induced hormone that increases in concentration during hard exercise. Cortisol, in high amounts, can cause muscle breakdown (catabolism) which is undesirable as muscle repair is of utmost importance in athletic performance. Ingestion of adequate amounts of carbohydrate during and after intense exercise reduces cortisol levels and assists in normalizing cortisol levels post exercise.

Existing research is positive but not abundant. The research suggests that the ingestion of protein together with a carbohydrate during and immediately after prolonged and intense exercise may have positive effects on enhancing the rate of muscle glycogen resynthesis, improved muscle repair and reduced cortisol levels.

The recommendation to include; 0.2g of a protein hydrolysate per kg body weight together with 0.8g of carbohydrate per kg of body weight, ingested within the first 30 minutes after exercise, may assist with the recovery process.

Table 1: Nutritional Composition of PeptoPro

	Per 100g	Per 10g sachet
Energy kJ	1470	147
kCal	350	35
Protein (g)	85	8.5
Carbohydrate (g)	0	0
Total Fat (g)	0	0
Malic Acid (g)	6	0.6
Sodium (mg)	1200	120
Chloride (mg)	180	18
Potassium (mg)	70	7
Calcium (mg)	50	5

- PeptoPro Powder: 85% protein
- PeptoPro contains all 20 amino acids and 19 – 22% Glutamine and Glutamic Acid

### PeptoPro Claims (Protein Hydrolysate)

- Good protein source derived from milk (casein)
- Contains direct and fast absorbing milk peptides
- Light and palatable – easily consumed prior to, during and immediately after exercise.
- Contains all 20 essential amino acids in the natural ratio contained in casein
- Exclusively developed and tested in well trained top athletes
- Contains unique and highly available milk peptides
- Peptides are small and easily absorbed by the body
- Is lactose free, fat free and hypoallergenic
- Increases post exercise insulin levels (Kaastra 2006, Keizer, Brenda)
- Increases physical performance in subsequent exercise (Saunders 2004)
- Officially tested and free of any doping substances
- Is supported by human trials
- Is safe and allowed in all countries

### Peptopro + Carbohydrate Claims

(PeptoPro in combination with a carbohydrate drink)

- Promotes water absorption and hydration
- Accelerates the regeneration of muscle energy depots
- Reduces the time needed for complete recovery from exercise
- Can increase physical performance
- Protects muscles during exercise
- Helps to maintain healthy muscles during exercise
- Replenishes lost amino acids during exercise
- Helps to meet the higher protein requirements of athletes
- Supplies building blocks for muscle growth
- Can increase the time to fatigue

Weight in kg	CHO (0.8g/kg)	Sports Drink (500ml) CHO (g)	Protein Hydrolysate (0.2g/kg)	Recommendation
50	40	35-45	10	1 PeptoPro sachet + 500ml Energade
70	56	35-45	14	1 ½ PeptoPro sachets + 750ml Energade
95	76	35-45	19	2 PeptoPro sachets + 1000ml Energade
1 PeptoPro Sachet = <b>8.5g</b> of Protein Hydrolysate				

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