NUTRITIONAL STRATEGIES FOR CYCLING

BEFORE THE EVENT

GLYCOGEN STORAGE (1-4 days before the event)

Glycogen storage facilitates the storage of carbohydrates in muscles to provide energy for longer durations. However, carbohydrate loading is likely to increase body weight due to water retention. Carbohydrate loading requires a training taper. Athletes should reduce training levels for 2-3 days prior to the competition event. Failing to rest will compromise carbohydrate loading because the consumed carbohydrates will be used for the event so that less is available for glycogen storage. It is recommended that enough fluids should be consumed, especially water, as ±2.7g water is required to store 1g of carbohydrates.

GOALS	GUIDELINES
Adequate amount of carbohydrates	- 7-11g/kg body weight together with enough fluids and proteins. - The intake of carbohydrate-dense sources such as sugar, cordial, soft drink, sports drinks, jam, honey and tinned fruit will help achieve a higher carbohydrate intake. - Athletes may need to cut down on high fibre sources as they tend to make you feel fuller for longer, may cause gastro-intestinal disturbances and carbohydrates provided in the form of fibre do not contribute to glycogen storage.
Appropriate carbohydrate sources	- Requires mixed carbohydrate intake (fast and intermediate releasing carbohydrates) that provides carbohydrates directly after training but also over a longer period of time for optimal glycogen storage.
Include protein	- Protein forms part of the enzymes that facilitate glycogen storage. - Protein helps to stabilize blood sugar levels and have an insulin stimulating effect which is essential for glycogen storage. - Research confirms that protein in the presence of carbohydrates enhances glycogen storage (pre- and post-training). - Furthermore, protein nourishes the muscle and joint tissue.
Appropriate timing	- A high carbohydrate intake 1-4 days before the event combined with rest or training tapering. - The intake of carbohydrates before and during training sessions will have a glycogen sparing effect. - The intake of carbohydrates within 30 minutes after training is essential for optimal glycogen storage because the uptake of carbohydrates during this period is increased.

The use of a supplement such as ***REIGNITE*** for glycogen storage has several advantages:

- Athletes may struggle to take in large amounts of carbohydrates and the intake of a fluid supplement is easier to digest than solid food. It also contains no fibre that could cause stomach upset. Its taste and convenient packaging are practical considerations.
- ***REIGNITE*** contains peptides which may assist effective glycogen storage.

PVM RECOMMENDATION
- Increase your intake of carbohydrates i.e. fruit, starchy vegetables (sweet potato, butternut and potatoes), starches - Consume 1-3 portions of ***REIGNITE*** throughout the day - Consume ***REIGNITE*** directly after training/the event because the uptake of nutrients are high, making it the ideal time for glycogen storage

PRE-EVENT MEAL (2-3 hours before the event)

The goal of the pre-event meal is to ensure that training is started with adequate energy levels (both ATP and glycogen), without experiencing gastro-intestinal discomfort. There are a few research based guidelines that the pre-event meal should preferably comply to. These are listed below.

GOALS	GUIDELINES
Adequate energy	- Ensure adequate calorie intake - Adequate intake of slow to intermediate releasing carbohydrates 2-3 hours before the event AND both slow/ intermediate and fast releasing carbohydrates 30 min before the event
Stable blood glucose level	- Include slow and/ or intermediate releasing carbohydrates - Include moderate amounts of protein - Include small amounts of fat
Optimal hydration status	- 200-600 ml water/ fluid
Prevention of gastro-intestinal discomfort*	- Avoid large quantities of fat and fibre - Avoid foods that you are allergic or intolerant to - Avoid foods known to upset your stomach - Avoid foods that cause flatulence e.g. legumes, cabbage, broccoli, cauliflower, Brussel sprouts, cucumber, onions and artificial sweeteners e.g. sorbitol and mannitol

* Gastro-intestinal discomfort includes any gut-related symptoms that cause discomfort e.g. diarrhoea, nausea, vomiting, flatulence, etc.

SAMPLE PRE-EVENT MEAL (2-3 hours before event):

1-1½ cup ***PVM MEALIE MEAL MIX*** + 200 ml fruit juice
OR
1-1½ cup low fibre muesli + 250 ml low fat yoghurt + 1-2 tsp sugar/honey/syrup+ 200 ml fruit juice

OR
1-1 ½ cup All-Bran flakes with 1 cup milk + 1 glass fruit juice + 1-2 scrambled eggs (little oil).

OR
3-6 slices rye/ brown bread OR 2-4 brown rolls
+ 5 slices lean ham OR 2 hamburger patties OR ¾ cup grated cheese (preferably low fat e.g. Mozzarella, Edam, Ricotta)
+ ½ cup salad/veggies (optional)
+ 1 large fruit (e.g. apple) **OR** 200 ml fruit juice
+ 2 tsp margarine / butter (spread thinly) or oil (e.g. olive oil) for meal preparation
OR
If not able to eat (e.g. due to nerves or unavailability of food):
2 portions ***FUSION***
+ 1 ***PVM ENERGY BAR*** (optional)
+ 1 large fruit (e.g. apple/pear/peach) **OR** 200 ml fruit juice

To drink: Mineral water (plain/ flavoured) or plain water or diluted fruit juice (no sugar-containing carbonated drinks or large quantities of fruit juice, in order to prevent severe blood sugar fluctuation causing sluggishness/fatigue/poor concentration during competition)

SUPPLEMENTS (30-45 minutes before the event):

OCTANE 4.0 (take a few sips every now and again)
OR 1 ***OCTANE GEL*** + water
OR 1 ***PVM ENERGY BAR*** + water
OR a combination of above (Keep in mind, no more than 30-60 g carbohydrates per hour)

DURING THE EVENT

Research indicates that sports drinks containing carbohydrates, electrolytes and vitamins are significantly better absorbed than water. Water alone provides fluid replacement but not energy, electrolytes, vitamins and other nutrients essential for performance. Guidelines for choosing the optimal supplement are listed below.

GOALS	GUIDELINES
Sustained energy	- Contains both slow and fast releasing carbohydrates - Contains 30-60 g carbohydrates per hour
Stable blood glucose level	- Contains slow and/ or intermediate carbohydrates - Contains 1-2% protein per solution (peptides are easily absorbed, which ensures that this amount of protein could be added to ***OCTANE 4.0)***
Replenishment of fluid and electrolytes lost	- 400-900 ml water/ fluid per hour - Contains the electrolytes sodium, potassium, chloride, calcium, phosphorus and magnesium - Contains 6-10% carbohydrates
Prevention of gastro-intestinal discomfort	- Ensure that a hypo- or isotonic solution is consumed - Avoid excess carbohydrate intake (no more than 30-60 g/h)
Support the immune system	- Contains vitamins and minerals - Contains glutamine (Could be part of protein or additionally added)
Increased concentration/ mental alertness	- Ensure optimal blood glucose levels are maintained - Consider the intake of choline
Improved performances	- Include selected ergogenic aids for the specific sport
Shortening of recovery time	- Contains carbohydrates which may decrease the extent to which glycogen re-synthesis after training has to take place - Contains protein peptides which promote the uptake of nutrients
Promotion of muscle synthesis	- Both training and muscle synthesis requires energy. The intake of carbohydrates and protein during training contributes to the total energy requirements for muscle synthesis - Protein peptides increase synthesis

***** Hypo- or isotonic refers to osmolality. Osmolality can be defined as the number of particles dissolved in water. Optimal absorption of fluids within the body is best when the solution equals the osmolality of interstitial fluids. Hypertonic solutions attract water into the gastrointestinal tract and may cause diarrhoea.

PVM RECOMMENDATION

There are various factors that influence hydration in athletes, making it impossible to prescribe fluid guidelines that will meet the needs of all athletes. **The general recommendation is to drink according to thirst.** You will have to determine the amount you are able to tolerate and to plan your intake accordingly. It is recommended to start with ± 500ml ***Octane 4.0*** or 2 ***Octane gels*** with ± 500 ml additional water per hour. You may also add a ***PVM Energy bar*** or make use of a combination of different supplements. If carbohydrate requirements are met with sports drinks and sports gels, additional water may be taken according to thirst. Take care not to consume too much carbohydrates in the form of sports drinks, sport gels or sport bars during training or the event. Most people can tolerate 30-60 g carbohydrates per hour, without experiencing gastro-intestinal discomfort.

Example 1 for a 7-hour ride:
Hour 1: 50 g Octane (5 scoops+ 500-750 ml water)
Hour 2: 2x PVM Gels with 250 ml water per gel
Hour 3: 50 g Octane (5 scoops + 500-750 ml water)
Hour 4: 1x Bite Size Energy Bar (or ½ Energy bar) + 250 ml water & 1x 50 g Reignite + 400 ml water.
Hour 5: 50 g Octane (5 scoops+ 500-750 ml water)
Hour 6: 1x PVM Bite Size Energy bar + 250 ml water & 1x Gel + 250 ml water
Hour 7: 50 g Octane (5 scoops + 500-750 ml water)
**To make an isotonic 750 ml solution, add 7.5 scoops (75 g) Octane to 750 ml water*

Example 2 for a 7-hour ride:
*Prepare an isotonic Octane solution in a 750 ml bottle: A*dd 7.5 scoops (75 g) Octane to 750 ml water*

Hour 1: 250 ml Isotonic Octane + 1 Octane Chocolate Gel (100 mg caffeine) – drink Gel with 250ml water
Hour 2: 250 ml Octane + 1 Banana
Hour 3: 250 ml Octane + 1 Bite Size Energy Bar
Hour 4: *1x Sandwich with lean ham and 1 tsp butter **OR** 1 Energy Bar + 500ml water
Hour 5: 500 ml Octane

Hour 6: 250 ml Octane + 1 Bite size + 250 ml water
Hour 7: 2x Octane Gels + 250 ml water per gel

* As you compete for hours on end you might start feeling hungry. Consume snacks/light meals during your race keeping in mind **not to exceed 30-60g per hour**. Examples of light meals include:

- 1x 50 g portion Reignite recovery drink
- 1x Marmite/Bovril sandwich (white bread)
- Lean biltong/boiled eggs (Increase fluid intake with biltong due to salt)
- Peanut butter + Syrup sandwiches (white bread with thinly spread peanut butter)
- Lean ham with low fat cottage cheese sandwiches. Do not add butter or only spread thinly.
- Mash prepared with low fat/skim milk
- Banana bread with peanut butter spread thinly
- Flapjacks with low fat cottage cheese and syrup.
- Low fibre muffins – chocolate or blueberry muffins
- Butternut soup
- French toast with thinly spread peanut butter and syrup.

AFTER THE EVENT

The intake of carbohydrates and protein as quick as possible after training/the event is crucial for the recovery of glycogen stores and the repair of muscle tissue. This initial period after training/the event is called the window period during which the speed of nutrient uptake is fast. Guidelines for choosing the optimal supplement are listed below.

GOALS	GUIDELINES
Glycogen re-synthesis/ replenishment	- Contains fast releasing carbohydrates for immediate recovery. The addition of slower releasing carbohydrates will prevent blood glucose fluctuations.
Protein synthesis/ building	- Contains 10-20 g protein
Fluid and electrolyte replacement	- Includes water/ fluid. One litre of water is required to replace 1 kg of body weight lost during training. - Contains the electrolytes sodium, potassium, chloride, calcium, phosphorus and magnesium - Contains 6-10% carbohydrates
Immune system support	- Contains vitamins and minerals, especially anti-oxidants (Vitamin A, C and E) - Contains 5 g glutamine per serving - Contains some protein that also supports the immune system

PVM RECOMMENDATION

It is recommended to consume the following as quick as possible after the event:
- Training/competing ≥ 90 minutes: 75g ***REIGNITE RECOVERY DRINK*** in 600 ml water.
- Training/competing < 90 minutes: 50g ***REIGNITE RECOVERY DRINK*** in 400 ml water.

Alternatively:
- 2 portions ***FUSION***

If a supplement is not available or required, the following food intake is recommended:
2 Slices brown or white bread/ 1-2 hamburger rolls + 50g cheese/ 1-2 hamburger patties + water

If you struggle to meet your energy requirements or feel that you are not recovering well:
- Consume ***REIGNITE*** directly after the event/ training AND
- Consume ***FUSION MASS*** an hour after the event/ training

Balanced meal 1-3 hours after the event:

This meal is important for optimal replenishment, even more so when you are going to train/compete for consecutive days. It should contain both carbohydrates and protein. Remember to replace fluids lost during training (1-1.5 litre for 1 kg water lost during training).

SAMPLE MENU: POST-EVENT MEAL
1-1.5 cups cooked rice (preferably parboiled/Basmati) **OR** 1-1.5 cups pasta (preferably durum wheat type) **OR** 2 large potatoes, slightly cooled + 200-300g fish / chicken / lean mince / steak + 1½ cup mixed veggies **OR** 2 cups salad + 1 cup fresh fruit salad **OR** 200 ml fruit juice

Protein supplements are best consumed before bedtime because the release of growth hormones is highest at night during sleep and in the early morning hours. Growth hormones play a role in the lean muscle synthesis along with proteins. Protein provides the fuel, while growth hormones facilitate the process. Protein at night thus fuels protein synthesis during sleep. Protein supplements are only recommended when protein needs are not met through the diet or occasionally after strenuous training/competing such as the longer/tougher stages of a race. In such cases, **1 portion *Protein XTR* may be consumed 30 minutes before bedtime.**

Endurance athletes are prone to a variety of gastro-intestinal disturbances. One of these is gastro-intestinal bleeding due to repetitive jarring trauma, nonsteroidal anti-inflammatory drug-induced ulcers or mesenteric ischemia (decreased blood flow to the gastro-intestinal tracts). This may cause relative malabsorption resulting in diarrhoea, dehydration and weight loss which will affect recovery during multistage events. In extreme cases, athletes may also develop anaemia. It is recommended that athletes stick to the fluid and carbohydrates guidelines provided during the event. These ranges have been proven to minimise risk in most athletes, whilst providing them with the benefits of additional carbohydrate and fluid intakes. At risk athletes may also increase their energy intake in the days before strenuous endurance events to increase total body weight. Adding Fusion or Fusion Mass as a snack during the day may be a practical way to achieve this. Carrying extra body weight may help to minimise the impact of relative malabsorption and low energy intakes during the event. Iron supplements to prevent anaemia are not recommended, because it may have several side-effects. Iron supplements should only be taken when directed by a doctor or dietitian.

Please note that this is only approximate guidelines. For a more individualised diet plan (taking age, length, body structure, gender, dietary preferences, training, etc. into account) or any other nutritional enquiries, please contact our Registered Dietitian for assistance.