

Nutrition For Endurance Sports

By **Freddy Lampret**



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Nutrition is the one topic that I find to be the most divisive in the context of endurance sports. I have been reading the research diligently over the course of the last 5 years and have read literally hundreds of studies on a full spectrum of nutritional topics; from topics relating diet to Diabetes, Cancer and Coronary Heart Disease to applications of various dietary strategies in both power and endurance sports, and everything in between.

The more I read and the more I study the topic, the less convinced I become of any particular “way” of eating. Sometimes we need to combine common sense with science and history to give a balanced view, but human nature often forces us to choose a side, with no grey areas in the middle. In recent times the debate has circled around the LCHF (Low Carb, High Fat) versus High Carbohydrate diets. The effects of diet are very different in different contexts. Lifestyle, exercise, genetics, socio-economic factors, culture and geography amongst other factors all make a difference in which foods people gravitate towards in their individual context.

Context and adaptation

People who advocate for high fat diets point to the Eskimos, who eat primarily fat and yet have a very low incidence of heart disease and cancer. High carb proponents, on the other hand, point to the native tribes who eat primarily natural carbohydrate, and interestingly also have very low incidence of cancer and heart disease. The one thing that we know for sure is that the human body will do its best to adapt to whatever food source you provide it with. If you provide the body with a nutritional source that it has adapted to over millennia, the body will have the tools to adapt to that diet without any ill effects. My own observation is that people and populations who consume food exclusively in its natural state have far fewer morbid complications. Foods in their natural state have a good balance of nutrients when compared to so-called “unnatural” foods. There are innumerable elements to this but as an

example, cows that graze off the land freely have a very different distribution of omega 6 and omega 3 fatty acids when compared to factory farmed cows. Industry and the extreme commercialisation within the food industry, in both agriculture and livestock farming, has ensured that the components within food are very different to the food our ancestors ate, and to put it simply; we have not yet adapted to the modern way of eating yet. The result is that we die younger and more frequently from diseases such as Heart Disease, Diabetes and Cancer.

“The body needs a consistent supply of a wide variety of nutrients, vitamins and minerals”

The Components every diet should have ^{61 - 63}

Before we can discuss a healthy diet for endurance athletes, we need to identify the key characteristics of what a healthy diet is, in general.

We are all familiar with the concept of nutritional deficiency, and in our early school years we all learned about the diseases such as Kwashiorkor, Pellagra, Scurvy and the like. Some diseases though are far more subtle and take much longer to manifest, but all disease relating to diet point to either excess or deficiency of one or more ingredients which are needed for optimal bodily functioning. The body needs a consistent supply of a wide variety of nutrients, vitamins and minerals.

The characteristics of a healthy diet would include the following:

- 1) Healthy fat profile. Remember that free range and wild animals have a better distribution of fat and the products from these animals are far healthier than the factory farmed versions. Also, a wide range of fats from a wide variety of sources (vegetable, fish and animal) is preferred in providing a balanced dietary fat profile.
- 2) Low proportion of simple sugars. This does not mean a carbohydrate deficient diet should be followed. It simply means that an excess of refined carbohydrates should be avoided. More on this later.
- 3) The diet should be Low GI. Food eaten in its natural state has a far lower GI.
- 4) The diet should be high in fibre. Lettuce, salads, fruit and vegetables should be eaten daily in abundance.
- 5) The diet should be high in antioxidant rich compounds. These include fruit (particularly berries), fresh fish and vegetables.
- 6) The diet should have anti-inflammatory properties.

As a general rule of thumb, the Mediterranean diet is a modern (and ancient) diet that ticks all of these boxes⁶¹, but it would need to be adapted to specific lifestyles, depending on the specific requirements of that lifestyle. It is also the one diet that has had inclusion in many different studies and shown consistently positive results, long term.

The Mediterranean diet and lifestyle places emphasis on the following:

- Eating a variety of fruits, vegetables, nuts and legumes as well as whole grains.
- Including a variety of fats from olive oil and canola oil, rather than only from butter.
- The use of herbs and spices, rather than exclusively salt.
- Limiting the intake of red meat, preferably to only a few times per month.
- Choosing fish and poultry as primary protein sources.
- Enjoying meals with family and friends.
- Drinking red wine in moderation.
- Getting plenty of exercise.

Interestingly, the Mediterranean diet is lower in carbohydrate, when compared to the average Western diet, but certainly not devoid of carbohydrate. It could be considered a naturally balanced diet. Another diet which shares many of the characteristics of the Mediterranean diet is the Japanese traditional (Okinawan) diet,⁶² and some say that considering the Japanese have the lowest incidence of cancer and heart disease amongst the G8 nations, the Okinawan diet is perhaps even healthier.

The bottom line is that both diets share the common characteristics mentioned above, and so long as the essential components needed by the body are present in the diet, it hardly matters which geographical location the food source originates from. In a recent review, it was demonstrated that the micronutrient quantities that occur naturally in the Mediterranean diet are related to a lower prevalence of micronutrient deficiencies, when compared to the typical Western diet. Furthermore, they showed that the Mediterranean diet is one of the only recognised and tested eating patterns that is associated with a lower all-cause mortality, including Cardio-vascular disease, Type 2 Diabetes, certain cancers and neurodegenerative conditions.⁶³

Again, it is not the particular diet, but rather the characteristics of the contents of the diet, which make all the difference. There are numerous diets around the world that could be considered “similar” to the Mediterranean diet and there would therefore be sufficient reason to consider them “healthy”.

There are certainly things that should be avoided in the diet, as far as is possible. The following list is a list of the components that should be limited, and in some cases totally eliminated in a diet. There is no “need” for them, nutritionally, at all:

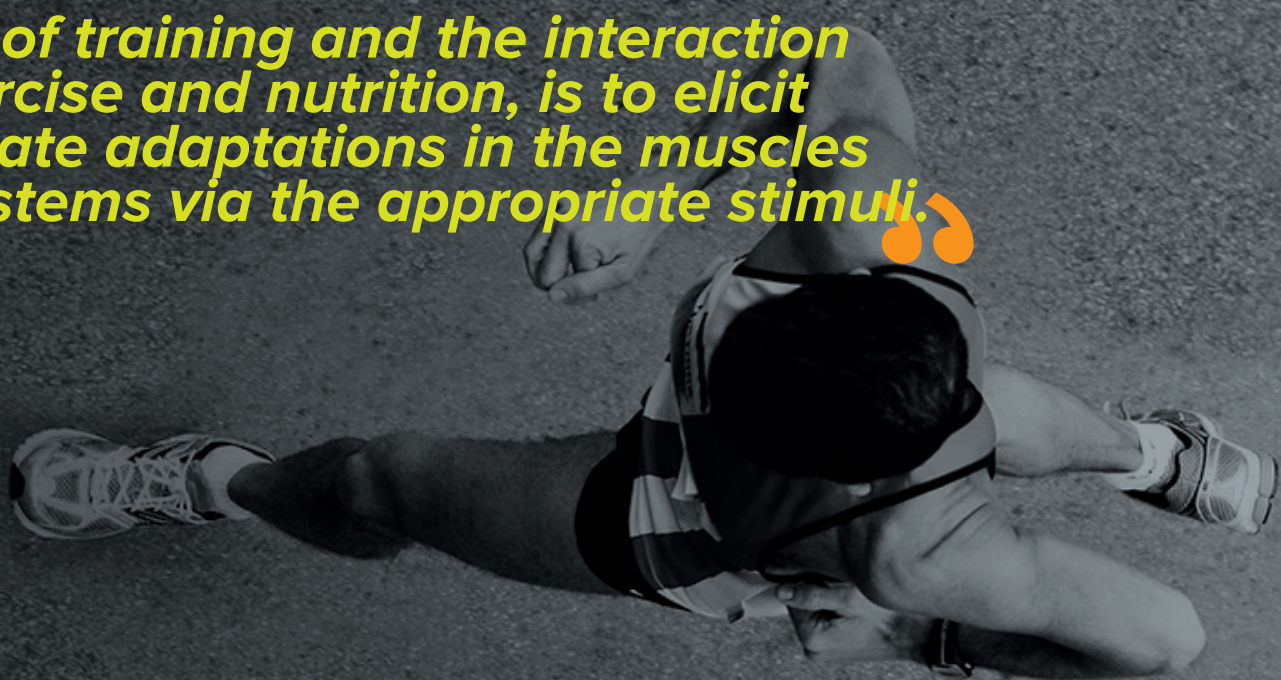
- “Trans” fats. These fats are found in minute quantities naturally yet commercially they occur in abundance.
- Simple sugars. These can be consumed in small quantities, but are not needed at all in the diet. In other words it is perfectly safe to eliminate them altogether, even though it is not necessary in every individual. Sweets should be eaten very infrequently, if at all.
- Processed meats. These have consistently been shown to be linked to Cancer and Heart Disease. These should be eaten very rarely, and should not be a part of the staple diet.
- Artificial sweeteners, colourants and preservatives should be avoided as much as possible. Avoiding these where possible will avoid having them in excess, although these components are so ubiquitous in modern food that it is almost impossible to avoid totally. Where you can, try to avoid them. Rather choose fresh food and freshly prepared food where the choice is available.
- Sweets and confectionary. These are to be enjoyed on the proverbial “blue moon” or preferably never. I would exclude chocolate from this list, as the benefits of cocoa are well documented, if consumed in moderation, and preferably in the varieties with the lowest possible simple sugar content.

Any of these ingredients that are consumed by accident, in small quantities or very rarely (less than once per month) will have very little statistical effect on diabetes, cancer and heart disease.

The basic guidelines mentioned above are congruent with the latest research on food and nutrition, and its effect on morbidity and mortality. These could be considered basic guidelines for eating a well-balanced, nutritious diet.

Eating natural, whole foods is the take home message. For the endurance athlete, the timing and quantities of these foods needs to be considered in the context of the training program and nutritional requirements of what needs to be achieved through each training session

“The purpose of training and the interaction between exercise and nutrition, is to elicit and accumulate adaptations in the muscles and other systems via the appropriate stimuli.”



The Endurance sportsperson's diet

A few years ago I decided to try the LCHF (Low Carb, High Fat) diet, and it is a diet that is still very popular in many athletic circles. Not only that, I convinced a number of athletes I was coaching to try the diet with me, all of whom were Professional or Elite age group competitors. The research I had read was very promising⁴⁻⁹ and suggested that there may be a metabolic advantage to be gained by manipulating the diet in order to make the body more efficient at burning fat. But, unfortunately, and even confirmed by Tim Noakes, there was no concrete evidence to prove this benefit would result in an improved performance in actual racing performance, capacity to train, ability to recover, ability to concentrate, on the effects on the immune system or risk of injury.³ It was a worthwhile experiment which I followed for almost 2 years, and in the process I learned a lot about my body and the effects of certain foods on performance in general.

Here are a few of my experiences, and the experiences of the athletes I coached, while we were on the LCHF diet:

- We developed incredible endurance. I remember a few of us cycling 200km with only water to fuel us, and we still averaged over 30km/h. It was incredible to know that the human body could develop that level of endurance.
- All of the males in our little experiment became light and very lean, which we considered to be a very good sign. The ladies in the group, interestingly, did not have the same success with weight at all. I cannot give an explanation for this, it is merely what was observed.
- Over time, I found that I lost my desire to compete. In my thoughts I rationalised that perhaps the competitive desire was unnatural and that I was better off not needing competition. I felt that perhaps I had reached a point in my life where I had outgrown childish pursuits. I no longer had a desire to compete. At the time I did not know if it was good or bad.
- I also found that I was unable to perform as fast as I had previously over anything longer than 30 seconds in any discipline. Sure I could run the whole day if need be, but speed became a problem. I record my training meticulously, and before the diet change I had run a set of 10 x 800m at an average of 2:32, with a minutes rest after each. When on the LCHF diet, my best was an average of 2:45, but I always felt I could do another 10 afterwards, despite going as hard as I could. It felt just as hard

during each rep. It felt like I had lost a gear.

- My legs were often very sore. In fact, not only my legs – I remember my neck always struggled to hold my head up when I was making lunch, without the luxury of carbohydrate as an energy source.
- Although my moods were pretty stable, I constantly longed for sleep.

In time I came off the diet, and reverted back to eating more carbohydrate, although in technical terms I still eat a relatively “low carb” diet. I had a reignited desire to compete, my speed soon returned in all disciplines and all the negative effects soon dissipated. My weight is now at least 2-1kg heavier although I am pretty sure the difference is mainly made up of extra metabolic water that gets stored along with the glycogen in the muscles.

My anecdotal experiences are no proof that the LCHF diet does not work for endurance athletes. In fact, the LCHF diet has shown to be very effective in weight loss and blood glucose levels in particular, in many people.

It is merely our experience of the diet which came with significant benefits but, for us, unacceptable detriments in one day endurance sports performance.

Since those days, there has been a lot of research that has emerged that has helped complete the picture for us, and has for the most part confirmed our anecdotal evidence.

What the research is saying.

First, the obvious: The purpose of training and the interaction between exercise and nutrition, is to elicit and accumulate adaptations in the muscles and other systems via the appropriate stimuli.¹⁰

The question most athletes ask though is: “Will it make me faster?” The answer of course can be quite complicated. No doubt if the goal race is a race across the desert, over 1000km, without any support – best you take the LCHF approach and teach the body to make use of the internal fat stores for energy. Endurance and survival are the goal. Conversely, if you want to race a one day endurance event, where speed is a major component, then you would be best off developing the muscular capabilities of power, stamina and muscular fatigue resistance.

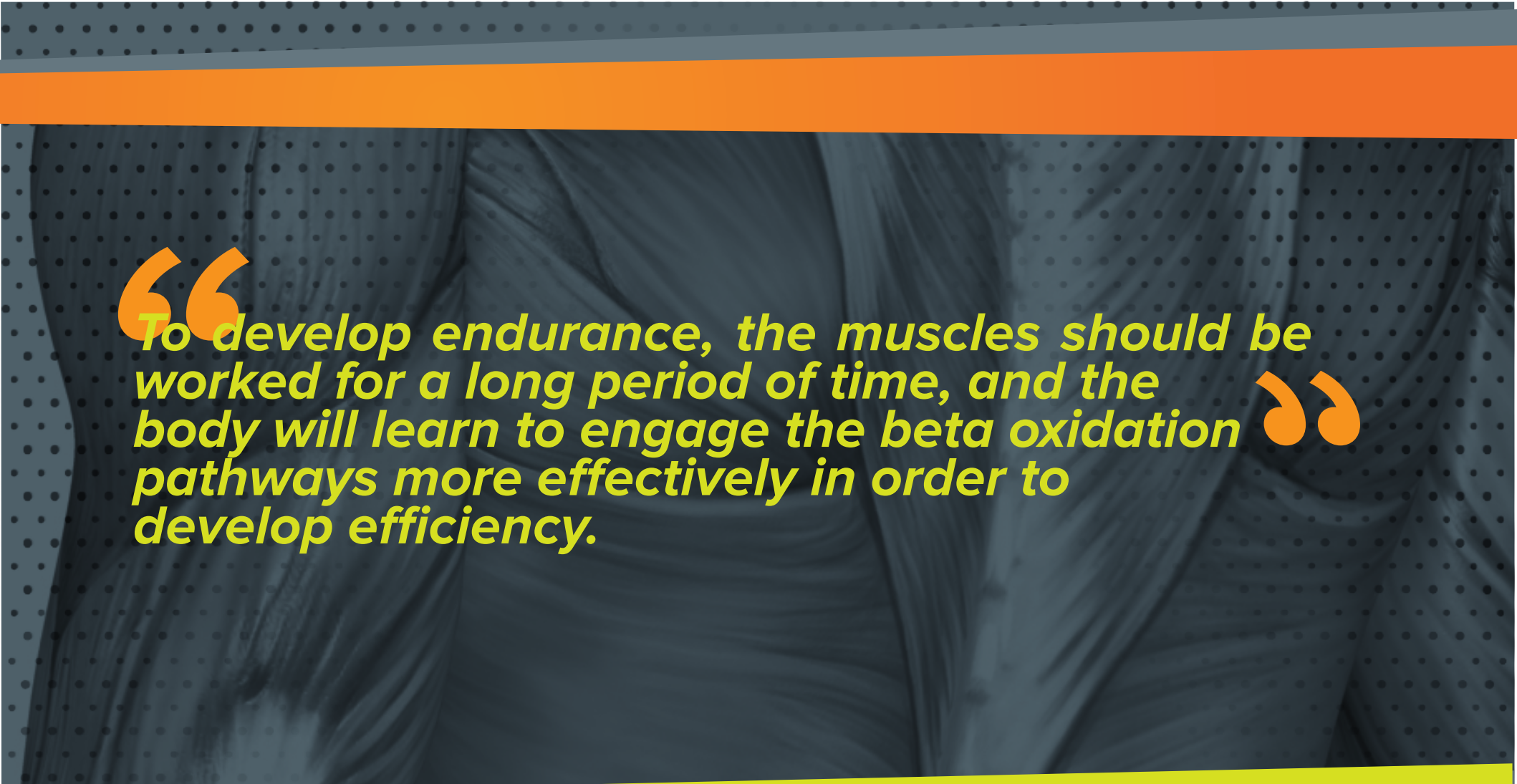
These components are best developed in the presence of carbohydrate.

It stands to reason, therefore, that the fuel source and the training stress need to be matched in order to optimise this relationship. It is critical that the body uses the optimal fuel source for the specific demands of the particular physical stimulus^{11, 50, 56,} Having “metabolic flexibility” is the desired effect rather than a reliance on only one component of metabolism to provide for the needs of all types of activities.¹¹

So, the current evidence points to the diet being best used as a fuel source rather than a source of stress. For hard efforts, the muscles perform best if the glycolytic pathways are used and developed. In short, eat carbohydrate before intense exercise, and try to maintain blood glucose levels by consuming carbohydrate during the workout. Allow the carbohydrate stores to become depleted when trying to build endurance and this is best done by depleting the muscles of glycogen during the exercise so that the exercise lasts as long as possible, rather than starting the longer workouts depleted. Depleting the muscles before exercise will result in sub-optimal performance during that particular workout, and will risk a premature termination of the workout. Metabolic efficiency will come naturally if sufficient stimulus is provided in developing muscular endurance. Therefore, fuelling during and before both long and short workouts is important.

Although the rates of fat oxidation can be doubled by using fat adaptation strategies,²⁶ this “benefit” will be balanced with downregulated carbohydrate oxidation, and furthermore this downregulation persists in the presence of glycogen super-compensation and this reduction in carbohydrate oxidation persists even during high intensity exercise.^{31, 39, 42}

So, you will be able to store more carbohydrate within the muscles, but unfortunately you will not be able to use all of it, as the glycolytic pathway will be downregulated. Consuming fat during exercise has also proven to be both unsuccessful at improving performance, and impractical when compared to the alternatives^{22, 25}



“To develop endurance, the muscles should be worked for a long period of time, and the body will learn to engage the beta oxidation pathways more effectively in order to develop efficiency.”

The body has a glycolytic (breakdown of glycogen) pathway for a very good reason. If we neglect that pathway, the body is very efficient in reducing the resources it allocates to maintaining that particular pathway. From my experience, the best practice from an endurance athlete's perspective is to have both the beta oxidation (fat burning) pathways and the glycolytic pathways developed. The best way to develop the glycolytic pathway is by training hard, and to do this effectively, there needs to be a supply of glycogen ready to be broken down by the pathway to meet the energy demands of the working muscles. To develop endurance, the muscles should be worked for a long period of time, and the body will learn to engage the beta oxidation pathways more effectively in order to develop efficiency. All the systems should be used, and they will be maintained and developed by the body. So, to summarise, the current research seems to strongly suggest that the fuel source should not be the source of stress, but rather the physical exertion through training should be the stress. The diet should provide the right nutritional support to elicit the desired physical adaptations.

What does an Endurance athlete's ideal diet look like, practically?

First, the basic healthy eating guidelines should be followed in general terms. Aim for a “Mediterranean” or “Okinawan” type mix of food contents in your general diet. This diet will serve you well when you stop training as well, and there will be little need to make major life changes if you took a year off training. Weight gain will be limited and you will still provide the body with all the needed ingredients needed for optimal functioning.

Here are my 5 basic guidelines which Endurance athletes can work off:

- If you are going hard in a workout, make sure your muscles have enough glycogen to do the job and make sure you take enough on board during the training to cover some of the sweat loss and to maintain blood glucose levels. This might mean that 90 minutes before an intense workout, you eat healthy forms of carbohydrate (preferably natural) and during the workout you make sure you get enough carbohydrate and liquid in (I use 32gi Endure). This will vary from person to person and will be dependent on individual body size and individual sweat rates.
- Make sure you get enough carbohydrate and protein back into the muscles after the training so that they can recover and, more importantly, adapt to the stress you have provided. I like to eat a lot of fresh fruit and drink a lot of plain water, but I also make use of a plant protein based recovery drink (32gi) and eat natural food bars

(also 32gi) between workouts. Simple, easy to grab and go and no preparation time. You should be tired from training, not from a lack of food, or from hours of preparing food. This fact is critical in your long term athletic development. Generally, fresh foods in their natural state are simpler and quicker to prepare.

- Ensure that you drink enough fluid, mainly in the form of water. The colour of your urine will tell you how well or how poorly hydrated you are. Dark orange urine means you are very dehydrated, whereas very frequent colourless urine implies too much fluid intake.
- You don't need supplemental vitamins. Eat a well-balanced diet and the evidence shows that there is a high density of nutrients, which is sufficient.
- As an athlete you will sweat out minerals at a higher rate than normal, so adding a mineral supplement (magnesium, sodium, potassium in particular) to the diet will do no harm and could be highly beneficial in certain individuals.

At the end of the day, you are what you eat!

If you are still in doubt as to what you should be eating in relation to your training, get in touch with one of our highly trained and knowledgeable MPG coaches who can guide you towards healthy diet and healthy lifestyle practices.



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