

Introduction

There are two types of athletes in this world: those who think they know what optimal nutrition is, and those who actually do know what optimal nutrition is. The distinction between these two is that while the former may achieve great feats, they will have to work much harder than the latter, and they still may never reach their full potential. In today's world of science, it has become increasingly evident what an important role nutrition has in determining athletic performance. Indeed, if you want any chance of keeping up with your competitors, you'd better start taking nutrition seriously! Fortunately, you have just stumbled upon gold! For, within the next few pages, you will have a foundation on nutrition that can, and will, take your performance to new heights.

Defining and understanding the role of Macro and Micronutrients

Many athletes today will just consume food, without any idea of what they are even consuming, or even why they are consuming it. Guess work with your nutrition will not cut it, and may lead to under or over consumption of unnecessary calories.

Now the nutrients we get from food can be divided into two broad categories: macro and micronutrients. The former are nutrients needed in large amounts through diet and include proteins, carbohydrates, and fats. While the latter are nutrients needed in smaller amounts and include minerals and vitamins. The next few paragraphs will discuss what these are in detail, how you should get them through diet, and how much you should consume.

Proteins

As you are no doubt aware, proteins, which are composed of 20 amino acids, are the building blocks of muscles. In fact, studies indicate that over 80% of the anabolic (muscle building) response from a meal is the result of the protein content! Further, more and more research is coming out showing the benefits of a high protein diet including decreases in diseases such as diabetes, and cardiovascular disorders; as well as greater performance, lean body mass, recovery, and less fat.



Figure 1.0 Factors in a meal responsible for muscle protein synthesis

Yet, we have this wide chasm of recommendations between the RDA and the athletic population. The RDA for protein is 0.8 g/kg, while athletes are known to consume up to 10 times this amount! So who is right? Well, studies seem to suggest that it is probably somewhere in-between. Based on the research, it can be advised for athletes to consume about 1 gram of protein per pound of bodyweight, with no adverse effects, and a multitude of benefits.

High quality sources of protein include whey, eggs, milk, and meats such as chicken and fish.

Summary: Protein is made up of 20 Amino Acids that repair and promote muscle growth. An Athlete should consume 1g of protein per pound of bodyweight (i.e. 180 lb Athlete should consume 180g of protein per day) from high quality sources such as eggs, milk, chicken, fish or whey protein.

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Carbohydrates

Carbohydrates are well documented as the power foods which help our bodies move. Classic research by David Costill and colleagues shows that endurance athletes who are depleted of carbohydrates greatly suffer in athletic performance.

However, there are numerous diets today which restrict, or even eliminate carbohydrates. Why is this? Primarily because of the anabolic hormone insulin. While insulin does promote muscle growth, it also is a powerful inhibitor of fat metabolism, and can increase fat storage. So where is the happy medium between optimal performance and maintaining a lean muscular body?

Research at the University of Illinois has proposed a carbohydrate threshold in which people who consume less than 150 grams of carbohydrates per day, and higher protein are significantly leaner and gain more muscle than higher carbohydrate, lower protein diets. Thus, for optimal leanness, we would advise consuming 150 grams of carbohydrates in the diet. However, whether this threshold rises for elite athletes is unknown. It is likely that endurance athletes can get away with a much higher amount of carbohydrates and still stay lean. It will also depend on your body type and metabolism – whether you are someone who is more or less prone to gain fat. We therefore advise that a range be used between 200–600 grams of carbohydrates daily for the elite athlete, depending on their goals and body type. Those who tend to gain fat may want to stay towards the lower end; while those who are naturally lean, may go towards the higher end.

The majority of your carbohydrates should come from foods high in dietary fiber that are slower digesting. This will minimize the insulin response and maintain your energy and satiety (duration of fullness between meals) much longer. The only exception would be after a long strenuous workout; during this time it would be wise to consume faster digesting carbohydrates such as simple sugars, or whole foods with minimal fiber content such as pasta. Quality slow digesting carbohydrates include: potatoes, oatmeal, whole grains, and fruits and vegetables.

Summary: Carbohydrates are well documented as the power foods which help our bodies move. While carbohydrates are important for performance, as well as recovery and muscle growth, over consumption of them can lead to fat gain through secretion of the hormone insulin. Research shows that keeping your carbohydrate intake below 150 grams daily will keep you leaner and healthier. However, elite athletes, particularly endurance athletes, likely require more carbohydrates, ranging from 200–600 grams daily. Those who tend to gain fat may want to stay towards the lower end; while those who are naturally lean, may go towards the higher end.

Fats

Fats are the ugly step child of our macronutrient buddies. Outcasts if you will. They have been purported to increase mortality, clog your arteries, and of course, make you fat! In reality, these claims are not supported by evidence. Contrary to this, many fats have actually been shown to improve indicators of health and increase fat loss and muscle growth. Indeed, fat plays a key role in body function including production of hormones which increase growth and support a positive affect (mood). They also play an important role in tissue repair and maintenance.

“Good fats” include monounsaturated fats (particularly olive oil) and polyunsaturated fats (particularly omega 3 fatty acids). Both of these fats are purported to promote a healthy heart and body. While saturated fats have commonly been considered “bad fats”, there is little evidence actually supporting the claims that they increase risk for cardiovascular disease. Contrary, they are important for the production of anabolic hormones such as testosterone. While the majority of your fats should come from monounsaturated and polyunsaturated fats, don't be afraid to consume some saturated fats.

Good sources of monounsaturated fats include olive oil, avocados, grape seed oil, and peanut oil. The highest sources of omega 3 polyunsaturated fatty acids come from fish, particular salmon; while most meats are high in saturated fats. We advise 20-30% of your calories to come from fats. Most of your fats should come from monounsaturated fats (particularly olive oil) and polyunsaturated fats (particularly omega 3 fatty acids).

Summary: While many have claimed consumption of fat leads to increase incidence of heart disease and even death, there is little support for these claims. On the contrary, consuming fat, particularly the right kinds of fats, can promote health and performance. The best kinds of fats are monounsaturated fats (particularly olive oil) and polyunsaturated fats (particularly omega 3 fatty acids); while saturated fats have commonly been considered "bad" fats, there is little evidence actually supporting the claims that they increase risk for cardiovascular disease. Contrary, they are important for the production of anabolic hormones such as testosterone. So don't be afraid to include some meat in your diet.

Lastly, while we do advocate moderate consumption of fats during the day – especially healthy fats – we strongly advise against "junk food" restaurants, which are not only loaded with saturated fat, but also sugar. Junk food is also extremely calorie dense, meaning you can eat thousands of calories of junk without even knowing it!

Vitamins and Minerals

Vitamins and minerals play integral roles in body functions which we often take for granted such as digestion, nutrient transport, and fluid regulation. While we clearly need to be consuming vitamins and minerals, overconsumption of them can be a serious issue, which results in many side effects. Further, there are virtually no studies which support mega doses of vitamins, including the much hailed prima donna vitamin C.

Without getting overcomplicated, in order to get your daily requirements of vitamins and minerals, consume plenty of greens, in addition to your daily intake of carbohydrates and proteins, and you should be fine. A multi-vitamin is likely unnecessary unless your food intake is very restricted or limited for one reason or another. Some sodium replenishment post workout would be advisable as well. Sodium helps regulate fluid volume, and will help replenish the water you lost during exercise, keeping your body hydrated. Calcium supplementation may also be necessary, as people are commonly deficient in this mineral.

Summary: Vitamins and minerals play integral roles in body functions which we often take for granted such as digestion, nutrient transport, and fluid regulation. With a properly balanced diet, you should be able to consume an adequate amount of vitamins and minerals without supplementation. The only supplements you may require are calcium, and sodium, particularly around your workouts for optimal hydration.

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Advanced Nutrition Questions

Optimal Meal Frequency

On one hand, we have the traditional diet of 3 square meals a day. And on the other hand, we have the athletic proposed diet of 6 or more meals a day. Which is right? Well, one way to think about it is how long do these nutrients last after a meal? If you are consuming a well balanced meal consisting of proteins, carbohydrates, and fats, then these types of meals may last 3-4 hours in the blood, providing your body with nutrients during that time span. So based on this, we would advise eating at least every 3-4 hours, or about 5-6 meals daily.

Nutrient Timing

“Grandad, it ain't what you eat, it depends when you eat it - that's how muscles grow!” - Michael J. Rennie

A flood of research has indicated that there is a short window of opportunity in which nutrients are used purely for growth, fuel, and replenishment; while fat gain is much less likely. These times are pre and post workout.

In brief, what the evidence shows is that 3 hours pre-workout, you should consume a slow digesting carbohydrate and regular source of protein for sustained energy. Within 30 minutes of your workout, you should spike plasma amino acids with a rapid digesting amino acid supplement. While post workout, you should consume a fast digesting whole protein such as whey protein, and fast digesting carbohydrates, along with a small amount of sodium (1/4 of a tablespoon) and a large amount of water (4 cups or more). There are specially formulated protein shakes with a blend of macro & micro nutrients that can supply the athlete with all these nutrients.

Effective and safe Dietary Supplements

People have often asked us, “I want to get serious with my training, so what kind of supplements should I look for, and what should I avoid?” Well, our response to this is, if you want to get serious about your training, then you should get serious about your diet, first. Therefore, before investing money into supplements, we strongly advise applying the correct dieting techniques discussed above; otherwise, your money will go to waste. Supplements are only a part of the equation, but if you do have everything else in place, they certainly can help. The following supplements may be advantageous to athletes:

Whey protein powder – this is a high quality, fast digesting protein powder well documented to support leanness, health, and performance.

Joint Support Supplements – there are some high quality joint support supplements which help strengthen cartilage and decrease inflammation. These can be vital for sustaining a long, health career.

Meal replacement powders or protein bars – these formulas can be a life saver, especially if you are in a rush and can't grab a whole meal. Having emergency meals like these around would be wise so you don't miss any meals.

Calcium – calcium is vital to bone health, but people are often deficient in this. You should get at least 1.5 grams of calcium daily, through a combination of diet and supplementation.

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Fish Oil – as explained above, this supplement can help support cardiovascular health, as well as leanness. Just a serving of fish daily, or taking a fish oil supplement is adequate.

Glutamine – this is a popular amino acid which may become deficient with extreme training. It is purported to support immune function and spare lean muscle.

HMB – this is a metabolite of the popular amino acid leucine, and purported to improve recovery and performance. It is most effective during situations of enhanced muscle damage.

Essential amino acid supplement powder – it is well documented that the essential aminos, particular the amino acids leucine, valine, and isoleucine (branched chain amino acids) are very effective for promoting lean mass. Having an essential amino acid powder between meals or pre workout is very effective.

Lastly, we advise **against** dangerous supplements including ephedrine, pro-hormones, and of course, steroids and the like.

Different Diets for Different Goals

Now you should have a strong foundation on your diet, but how do we put all this together? Glad you asked! We'll do so below, and show you how to individualize it for your specific goals.

There are really two main factors that will differ based on your goals:

1. **Calories**
2. **Carbohydrates**

If your goal is optimal performance, then you will want to consume more carbohydrates. While if your goal is to change your body composition, then you will have to modify your calories and carbohydrates. Simply put, if you want to gain weight, you have to eat more than you metabolize; if you want to lose weight, you must eat less. Further, by consuming fewer carbohydrates, and more protein, you will be more likely to spare lean mass and lose fat.

Lastly, eating less **does not** mean skipping meals. An athlete must maintain a steady supply of nutrients to their body; just more or less nutrients per meal, depending on your goals.

Eating for Performance

If your goal is performance, then again, we advise a range from 200-600 grams of carbohydrates daily, depending on your activity in a given day and body type. You should still consume a gram of protein per pound of body weight, and have 20-30% of your calories from fat. You should also be in a caloric surplus. Below is a sample diet.

Breakfast: 1 cup of oatmeal, 1 banana, 40 grams of whey protein

Lunch: a chicken salad, with olive oil, and 2 large sweet potatoes,

Pre-workout: essential amino acids

Post workout: 40 grams of whey protein, 70 grams of sugar, 1/2 tablespoon sodium

Dinner: 2 cups of brown rice, chicken, broccoli

Pre-sleep: salmon, mixed salad, walnuts

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The diet of a bodybuilder

Bodybuilders are unique because they are mostly concerned with body composition – being huge and lean at the same time. Of course, these athletes know that in order to achieve these goals they also need to be able to perform well in the gym, because lifting heavy weights = gaining size. So bodybuilders seek a happy medium between optimal body composition and optimal performance, with a trend with their diet to support the former goal. Thus, you will need to be cautious with your carbohydrates – less than 150 on weight loss diets, depending on your body type, and 150-300 on weight gain diets, again, dependent on body types. Your calories also will vary dependent on your goals. As stated, if you want to gain weight, you have to eat more than you metabolize; if you want to lose weight, you must eat less. Below is a sample bodybuilding diet. You will note it is similar to the performance diet; just less carbs.

Breakfast: 1/2 cup of oatmeal, 1 banana, 40 grams of whey protein

Lunch: a chicken salad, with olive oil, and 1 large sweet potato,

Pre-workout: essential amino acids

Post workout: 40 grams of whey protein, 40 grams of sugar, 1/2 tablespoon sodium

Dinner: 1 cups of brown rice, chicken, broccoli

Pre-sleep: salmon, mixed salad, walnuts

Water

Lastly, in all of these diets remember to consume lots of water. Water is 70% of our body weight, and vital for virtually all chemical reactions that occur. What studies indicate is that if you are thirsty, then you are already dehydrated. So avoid being thirsty! For prolonged endurance events, you may want to add a little bit of sodium to your drink during the workout as well; this will help preserve body fluids.

Conclusions

There are two types of athletes in this world: those who think they know what optimal nutrition is, and those who actually do know what optimal nutrition is. After reading and applying the principles in this guide, you can boldly say you fall in the latter category.

Keep it Hardcore

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