

## Water

Water is one of the most important nutrients. Athletes, especially, need a lot of water to replace the fluids they lose through sweating.

I recommend drinking at least 3/4 of a gallon of pure water every day.

## Protein

Proteins are the structures that build up our body. Seventy percent of the dry weight of our bodies consists of proteins.

Proteins are chains of **amino acids**. Those amino acids are essential for growth; for building and repairing new and old cell structures; for producing enzymes, collagen, hormones and DNA; and in some cases even for delivering energy. There are many different amino acids, but only six of them are essential. That means they cannot be produced by our body, and therefore have to be supplied by our diet.

The following table introduces some of the most important amino acids and highlights their major functions in the human body. All amino acid supplements should be taken in between meals for better absorption. It is also important to take some Vitamin B-Complex to help the absorption and usage of amino acids. I have marked those amino acids with red that I think are important.

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|---------------|--|
| Alanine       | Improves immune system, alleviates hypoglycemia, supplies energy (it can be converted to glucose in the liver), helps detoxify liver and kidneys, and lowers bad cholesterol levels.   |
| Arginine      | Increases sperm count in men, stimulates growth-hormone release, increases creatine stores, accelerates wound healing, helps metabolize stored body fat, plays a role in ammonia detoxification (ammonia is toxic and levels increase with exercise), promotes physical and mental alertness. Arginine can aggravate herpes.   |
| Aspartic Acid | Improves immune system and endurance, detoxifies ammonia and preserves glycogen storage by elevating the level of free fatty acids in the blood. It should be taken with caution because it is a neurotransmitter in the brain and can be toxic in excessive amounts. The artificial sweetener aspartame breaks down into aspartic acid and phenylalanine, and can also be toxic in excessive amounts, as well as causing headaches and dizziness. |
| Carnitin      | Improves fat metabolism, works as an antioxidant in the brain, helps lower bad cholesterol levels, and cleans the blood from ketones that are formed when the body is breaking down fat. It can also help to improve memory, alertness and mood.   |
| Cysteine      | Detoxifies the body; serves as antioxidant; can be used to produce taurine, glutathione and glucose; helps to prevent liver damage; and  |

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|                        | breaks up mucus. It is also a component of hair and insulin.  |
| GABA                   | A neurotransmitter in the brain, it has a calming, blood-pressure-lowering effect, optimizes the body's use of vitamin C, and can be transformed into glutamic acid and glutamine.  |
| Glutamic Acid          | Improves alertness and mood, plays a role in the metabolism of carbohydrate, detoxifies the muscles from ammonia by forming glutamine, and is required for the production of energy from BCAA's. Athletes should take 0.5-2.0g Glutamic acid per day together with BCAA's and vitamin B6.   |
| Glutamine              | Helps produce mucus, accelerates wound healing, improves immune system, and helps with the regeneration and the synthesis of niacin. It has an anticatabolic effect because it neutralizes cortisol.  |
| Glutathione            | An antioxidant, it helps the liver in its detoxifying function, stabilizes blood-sugar levels, and prevents oxidation from LDL cholesterol, which clogs arteries. Glutathione levels increase with cysteine supplementation.  |
| Glycine                | Helps with glycogen production and lowering bad cholesterol, has a calming effect, and is an antioxidant. Accelerates wound healing, stimulates growth-hormone release, and can increase creatine storage.  |
| Histidine              | Can reduce stress and increase libido. Not recommended as a supplement for adults because it can be toxic in high dosages.  |
| Isoleucine (essential) | It is one of the BCAA's, which are used to produce energy and hence spare muscle tissue from breakdown. BCAA's help the body reduce stress; regulate blood-sugar levels; and accelerate wound healing, muscle growth and regeneration.  |
| Leucine (essential)    | Another BCAA. Leucine is the amino acid the body uses the most, which is why it's so important to supply via supplements.   |
| Valine (essential)     | Another BCAA.   |
| Phenylalanine          | An important precursor for many brain chemicals, including tyrosine, dopamine and epinephrine. Phenylalanine can help alleviate depression, suppresses appetite, increases blood pressure, and accelerates tissue growth. Can be toxic in high doses. If you have a lot of aspartame in your foods, you don't need to supplement this amino acid. |
| Lysine (essential)     | Important for metabolism, the immune system and growth. Increases calcium absorption, mental alertness, fertility and regeneration from connective tissues. It can help to reduce skin outbreaks.   |
| Methionine             | Plays a role in metabolism, reduces fat depots (especially in the liver), protects the kidneys, promotes healthy skin, helps detoxify the body from heavy metals, lowers bad cholesterol, supports the growth of bone tissue, and can aid in depression.  |
| Proline                | Found in connective tissues and bone, it accelerates wound healing. It is not necessary to supplement this amino acid, since it can be synthesized by the body from ornithine and glutamic acid. High doses   |

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|                        | can cause imbalances of other amino acids.  |
| Hydroxyproline         | Found in connective tissues and bone, it accelerates wound healing. It is not necessary to supplement this amino acid because it can be synthesized by the body from ornithine and glutamic acid. High doses can cause imbalances in other amino acids. |
| Serine                 | Can produce cellular energy and alleviate pain. Necessary for the immune system and fat metabolism. It is not necessary to supplement this amino acid because it can be synthesized from glycine.   |
| Taurine                | Essential for children. Plays an important role in many organs by keeping fluid and mineral balances stable in the cells. It is a neurotransmitter and can have a calming effect. Can enhance the action of insulin.                                    |
| Threonine (essential)  | Can be used to produce glycine. Is important for growth, helps prevent fatty buildup in the liver, and stimulates the immune system. Necessary for protein utilization.   |
| Tryptophan (essential) | Used as a sleep aid. Has a relaxing effect and increases the release of growth hormone.   |
| Tyrosine               | A precursor of many other amino acids, dopamine and melanin. Helps maintain a healthy thyroid gland. Aspartame increases tyrosine levels in the brain because it can be synthesized by phenylalanine.   |
| Ornithine              | Not a part of proteins, it is synthesized from arginine and via the detoxification of ammonia. Arginine and ornithine are known to increase growth-hormone production.  |

### How much protein should I eat?

This question is not easy to answer. The amount of protein the body needs is dependent on exercise intensity, lean body weight, and the goals of particular sports. A bodybuilder, for instance, needs more protein than athletes from other sports because he or she needs to maximize muscle mass. For the typically physically active person, I recommend 1.5-2.5g protein/kg of lean body weight per day. But a bodybuilder who is competing should eat at least 3g/kg of lean body weight per day.

### High-quality proteins

When it comes to protein, quality is as important as quantity. Make sure that the proteins you eat are high-quality, easy-to-absorb proteins with good amino acid profiles. I don't count the proteins I get from eating vegetables because their amino acid profiles are different from those needed by the human body. Meat, for example, has a very similar amino acid profile to human muscle tissue. Egg and milk are designed to feed mammal babies, so their profile is excellent for growth. Science uses the biological value of protein to determine its quality. BV defines what percentage of a protein is being used in our body.

Below is a list of protein sources, ranked in order by their biological value. Note that whey protein is the highest and soy protein is the lowest when it comes to quality.

**Biological Value of Proteins:**

1. Whey Protein
2. Egg and Milk
3. Egg
4. Meat
5. Milk
6. Egg white
7. Soy protein

## Carbohydrates

There are three main types of carbohydrates:

Monosaccharide are one-sugar molecules (for example, glucose, fructose, sorbitol, galactose)

Disaccharide are two-sugar molecules (for example, lactose, maltose)

Polysaccharide are three or more sugar molecules, also known as complex carbohydrates (for example, starch, dextrin, cellulose, glycogen)

Although all carbohydrates that enter our body ultimately form glucose, the speed with which they are absorbed is important. Glucose doesn't need to be broken down; that's why it is immediately absorbed. A large amount of simple sugars will raise our blood-sugar level too high, causing our body to release more insulin to remove the glucose from the blood. It is then stored as glycogen in our muscles and liver, with the excess stored as body fat. High fluctuations of blood-sugar levels limit our performance. The body works best with constant absorption from a moderate amount of carbohydrates, which is achieved by eating complex carbohydrates. Eating high amounts of sugar raises another problem. If a large amount of insulin is released in response to high blood-sugar levels, it doesn't take long until blood-sugar levels fall below their normal level. This triggers another reaction in our body: We get hungry again, even though we just ate. People who eat high amounts of sugar thus tend to get fat because their high insulin levels make them hungry even though they ate enough calories. That doesn't mean you have to cut out all the foods that contain sugar out of your diet. Small amount of simple sugars don't do any harm.

The body stores excess calories as body fat. As long as we don't eat more calories than our body is using, we don't get fat. But blood-sugar levels are not the only reason why you should consider eating more complex carbohydrates; they also deliver other important nutrients like minerals, vitamins and fibers. So watch those labels!

### Glycemic Index

The glycemic index is the blood-glucose response for two hours after the food is ingested, compared to the two-hour response to ingestion of an equivalent amount of glucose. The lower the glycemic index, the smaller the glycemic response (release of insulin) to the food eaten. As you will see in the table below, the blood-sugar level isn't only influenced by the chain size of carbohydrates. Fiber and fat contents influence the blood-sugar because they slow down the digestion and absorption process of carbohydrates, resulting in a lower glycemic index. But that doesn't mean that it is OK to eat large amounts of sugar as long as you combine them with large amounts of fat. Remember, sweets have no other nutrients to offer besides sugar and fat. Small amounts of sweets won't harm you, but you have to make sure that you include them in your daily calorie allowance. Most people underestimate the calorie amount of sweets.

| Foods            | glycemic Index | Foods             | glycemic Index |
|------------------|----------------|-------------------|----------------|
| Glucose          | 100            | Orange and Juice  | 40-49          |
| Corn Flakes      | 80-90          | whole wheat Pasta | 40-49          |
| Carrots          | 80-90          | sweet Potatoes    | 40-49          |
| instant Potatoes | 80-90          | Tomatoes          | 30-39          |
| Maltose          | 80-90          | Apples            | 30-39          |
| Honey            | 80-90          | Ice cream         | 30-39          |
| Potato chips     | 80-90          | Milk              | 30-39          |
| white Rice       | 70-79          | Yogurt            | 30-39          |
| broad Beans      | 70-79          | Meats and cheeses | 30-39          |
| fresh Potatoes   | 70-79          | Kidney Beans      | 20-29          |
| white Bread      | 60-69          | Fructose          | 20-29          |
| brown Rice       | 60-69          | Soy Beans         | 10-19          |
| Muesli           | 60-69          | Peanuts           | 10-19          |
| Bananas          | 60-69          |                   |                |
| Raisins          | 60-69          |                   |                |
| Mars Bars        | 60-69          |                   |                |
| Buckwheat        | 50-59          |                   |                |
| white Pasta      | 50-59          |                   |                |
| sweet Corn       | 50-59          |                   |                |
| Oatmeal          | 50-59          |                   |                |
| Peas             | 50-59          |                   |                |
| Yams             | 50-59          |                   |                |
| Sucrose          | 50-59          |                   |                |

**Fibers** are mainly indigestible complex carbohydrates like cellulose, pectin and a variety of gums. Because fibers cannot be digested, they are fermented by bacteria, a process that creates gas. That's why protein shakes with a lot of gum, which thickens the shake, can give people an uncomfortable amount of gas.

Fibers have some very beneficial qualities, however. For example, they improve the process of digestion, ease the evacuation of stool, slow down the absorption of glucose, and are known to help to prevent cardiovascular diseases and cancers of the intestines and diabetes. The recommended amount is 150g per day, and the main sources are vegetables and fruits.

## Fat

Fat is one of the most misunderstood macronutrients. It is essential for our body to function properly by providing us with fat-soluble vitamins (A,D,E and K), essential fat acids (for repair of cell membranes and production of steroids and other hormones) and energy. It also isolates and protects you internal organs.

I recommend keeping the fat content of your diet between 10% and 20% of your daily calorie intake. It is important to maximize the portion of essential- and omega-3-fatty acids, and to minimize saturated fatty acids and cholesterol.

Like vitamins, fatty acids are heat sensitive. If vegetable oil is used to fry or cook foods, it loses its essential component and trans fatty acids are created. They are suspected of playing a major role in the development of heart diseases. Fried foods contain a high amount of those trans fatty acids. Prepare food in a nonstick pan.

### **The most important fat components in our body and food:**

|                                |  |
|--------------------------------|--|
| <u>Triglycerides</u>           | <p>They are mainly used to deliver energy for endurance activities. For explosive, short-duration activities like sprinting or weightlifting, glycogen is the main source of energy. Athletes are able to use more triglycerides even during intensive exercise than untrained people.</p>   |
| <u>saturated fatty acids</u>   | <p>Meats have a higher amount of saturated fatty acids than vegetable oils. You can recognize a high share of saturated fatty acids in fat by the liquidity of the fat at room temperature. You will realize that chicken, for example, has a softer fat tissue than beef, and that vegetable oil is more liquid than butter. Saturated fatty acids have been linked to heart diseases, just like cholesterol.</p> |
| <u>unsaturated fatty acids</u> | <p>Foods with a high amount of unsaturated fatty acids should be preferred over foods that are rich in saturated fatty acids. Essential fatty acids are unsaturated and vital to our health. Watch for oils with high amounts of polyunsaturated fatty acids, like fax seed oil and safflower oil.</p>   |
| <u>essential fatty acids</u>   | <p>Linolenic- and Alpha-Linolenic acids are essential fatty acids. They are essential to our health, hormone production, growth, recovery and normal body function. They cannot be synthesized by the body, so we have to supply them through our diet. A diet with high amounts of essential fatty acids can stimulate fat metabolism and is very important for bodybuilders.</p>                                 |
| <u>Omega-3-fatty acids</u>     | <p>They have a blood-thinning effect and disperse fatty acids and cholesterol in the bloodstream, which helps reduce the clogging of arteries. Bodybuilders who eat high amounts of meat are more than likely not able to consume less than the maximum allowance of 300 mg/day of cholesterol. That's why it is so important for bodybuilders to supplement omega-3-fatty acids. Fish is the main</p>             |

source of omega-3-fatty acids.,

### Phospholipids

Lecithin is one of the Phospholipids. It contains choline, which plays a role in creatine synthesis. Inositol contains Phospholipids that are crucial for fat metabolism. They are precursors to messenger molecules. Choline and Inositol can help to prevent fatty build-up in the liver.

### Cholesterol

Cholesterol is very important for the production of hormones and Vitamin-D. It protects brain and nervous-system tissues, and has been shown to increase the risk of heart disease if eaten in high amounts. The recommended daily amount is fewer than 300 mg, which is almost impossible for athletes who consume high amounts of protein.

## **Combining Carbohydrates, Protein and Fat**

How you combine these nutrients in your diet depends on the kind of activity you do, your lifestyle, exercise intensity, genetics and the goals you plan to achieve with your diet. There is no one-size-fits-all formula. You have to find out for yourself how your body reacts to different combinations of the main nutrients.

For the average active person, I would start with 20% fat, 30% protein and 50% carbohydrates. That means that 20% of the total calories per day will come from fat, 50% from carbohydrates etc. See for yourself how your body reacts to this ratio. From there, you can try out some variations. I would start someone on the above ratio, and then gradually raise the protein level whilst reducing the carbohydrate level in order to maximize muscle mass and minimize body fat.

Generally, people want to maximize muscle mass and minimize body fat. A bike racer, of course, would need a totally different approach to his diet because he would have different goals. But at the end, it comes down to our metabolism, which is genetically predetermined. Some people can improve their performance by eating higher percentages of fat or lower percentages of protein. Some athletes eat very low-carbohydrate, high-fat diets and it seems to work for them. But remember, extremely one-sided diets are never healthy, and an unhealthy body cannot deliver optimum performance.

## **Supplements**

### **Protein powders**

Protein powders are not necessary, but they are helpful.

Whey protein has the highest biological value of all proteins. It is easy to digest and, compared to most meats, is reasonable in price. Most protein powders also contain large amounts of vitamins, minerals and other supplements, sometimes including creatine, glutamine, etc. Reasons why you may want to include protein powders in your diet are:

1. You don't have to prepare so many meals.
2. They provide great amino acid profile.
3. They include nutrients along with protein.
4. They are easy to take on the road.
5. They are the fastest fast food.
6. They taste good.

### **Joint-protecting supplements**

Glucosamine is necessary to strengthen, build and repair connective tissues and cartilage. They are absorbed up to 95% intact through the gut wall. Thirty percent of the absorbed glucosamine is stored, so that the body can later synthesize more connective tissue.