

4. Sports nutrition, pyramid of health, healthy eating, Mediterranean and other diets

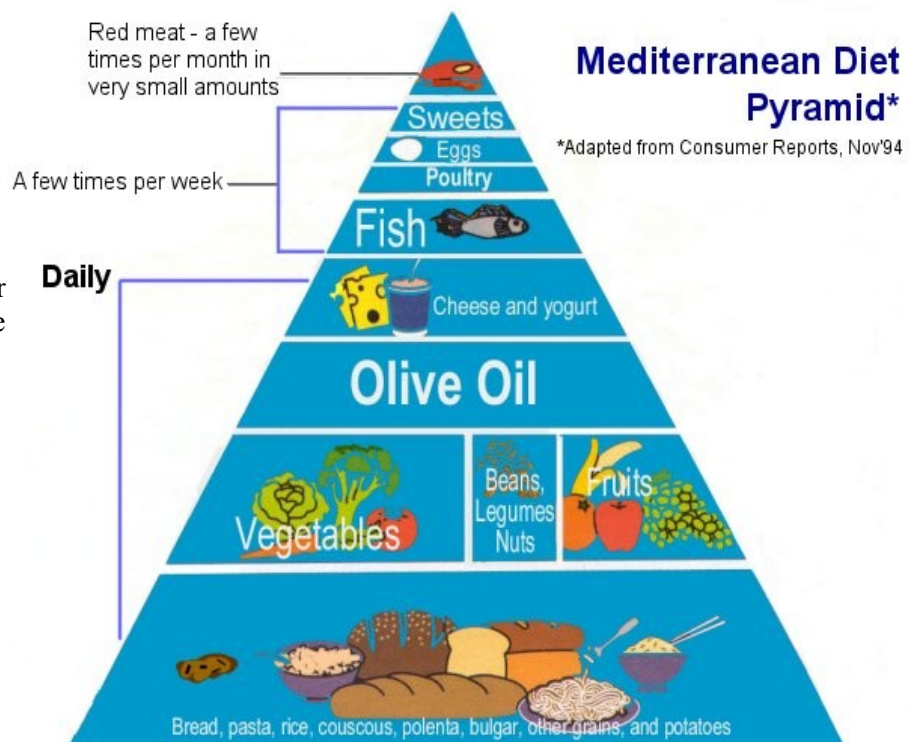
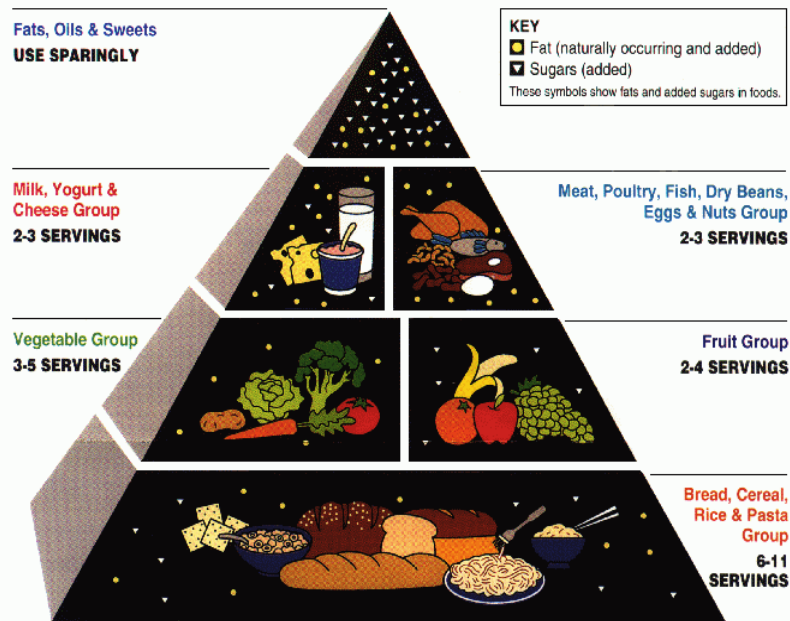
Sports nutrition

Peak performance requires commitment to training and a number of other aspects. Our diet - what we eat and drink - is one of the areas which can influence sports performance. Sports nutrition is the what, when and how much of food and fluids we should consume.

Macronutrients and micronutrients

1. The keys to good nutrition are *balance*, *variety* and *moderation*. To stay healthy, your body needs the right balance of carbohydrates, fats, and protein --the three main components of nutrition, or macronutrients.
2. You also need micronutrients vitamins, minerals and other substances from many different foods, and while some foods are better than others, no single food or food group has it all--so eating a variety of different foods is essential.

Moderation means eating neither too much nor too little of any food or nutrient. Too much food can result in excess weight and even too much of certain nutrients, while eating too little can lead to numerous nutrient deficiencies and low body mass.



Carbohydrates

Carbohydrates: the basic building block of a carbohydrate is a sugar molecule, a simple union of carbon,

hydrogen, and oxygen. The human body uses carbohydrates in the form of glucose and it can convert both simple and complex carbohydrates into energy very quickly. The brain needs to use glucose as an energy source, since it cannot use fat for this purpose. This is why the level of glucose in the blood must be constantly maintained above the minimum level. The liver and muscles store some as glycogen, a complex carbohydrate that the body can easily and rapidly convert to energy. The amount of carbohydrates stored as glycogen is equivalent to about a day's worth of calories.

Carbohydrates can be classified as *simple* (monosaccharides and disaccharides) or *complex* (oligosaccharides and polysaccharides):

- **monosaccharides** (glucose, fructose, galactose, xylose and ribose) typically in fruits, berries, vegetables and honey.
- **disaccharides** formed by two monosaccharides (sucrose and lactose) in table sugar, i.e. sweets, cookies, cakes etc. and lactose comes primarily from milk
- **oligosaccharides** grains and vegetables
- **starch polysaccharides** found in cereals, whole grains, rice, pasta, potatoes, peas, corn and legumes.
- glycogen: found in the liver and muscles
- **non-starch polysaccharides**: dietary fiber such as cellulose, hemicelluloses, pectins

Simple sugars are absorbed directly by the small intestine into the bloodstream, where they are then transported to where they are required. Complex carbohydrates are broken down by enzymes into their constituent sugars which are then absorbed into the bloodstream while dietary fiber moves food through the digestive system.

Non-starch carbohydrates are the main components of dietary fiber. These are the indigestible portion of plant foods, such as cellulose, the major component of plant cell walls that consists of several thousand glucose units.

Fats

Besides being a source of energy, fat stores protect the internal organs of the body. Some essential fats are also required for the formation of hormones. Fats are the slowest source of energy but the most energy-efficient form of food. Because fats are such an efficient form of energy, they are stored by the body either in the *abdomen* (omental fat) or *under the skin* (subcutaneous fat) for use when the body needs more energy.

Fats that are in foods are combinations of four main types:

- **Saturated fats**: They are called saturated because they are fully saturated with hydrogen atoms and cannot incorporate more. They are solid at room temperature and are most often of animal origin. Examples are *butter, cheese, lard*. An excess of these fats in the diet however, is believed to raise the LDL cholesterol – low density lipids or bad cholesterol – level in the bloodstream. (E.g. *Butter, cheese, meat, meat products (sausages, hamburgers), whole milk and yoghurt, pies, pastries, lard, dripping, hard margarines and baking fats, coconut and palm oil.*)
- **Monounsaturated fats**: These are composed mostly of monounsaturated fatty acids. They are liquid at room temperature. Examples are *olive, peanut, canola oil*. They appear to protect against heart disease, in that they reduce LDL cholesterol levels. (E.g. *Olives, rapeseed, nuts (pistachio, almonds, hazelnuts, macadamia, cashew, pecan), peanuts, avocados, and their oils.*)
- **Polyunsaturated fats**: These fats are composed mostly of fatty acids such as linoleic or linolenic acids, as for example *corn oil, sunflower oil*. They are also liquid at room temperature. Polyunsaturated fats are thought to reduce the risk of coronary heart disease. The omega-3 forms are believed to play an important role in brain and eye function. Oily fish such as *salmon, herring and mackerel* are examples of omega-3s, and they are also found in *walnuts* and some oils like *soybean*.
- **Trans fatty acids**. They are produced by the partial hydrogenation of vegetable oils and present in *hardened vegetable oils, most margarines, commercial baked foods, and many fried foods*. An excess of these fats in the diet is thought to increase the risk of heart disease.

Proteins

Proteins are important biological molecules (biomolecules) that consist of strings of smaller units called amino acids, the “building blocks” of proteins.

They are present in every living cell. In the skin, hair, callus, cartilage, muscles, tendons and ligaments, proteins hold together, protect, and provide structure to the body. As enzymes, hormones, antibodies, and globulins, they catalyze, regulate, and protect the body chemistry. Important biomolecules like hemoglobin, myoglobin and various lipoproteins, that carry oxygen and other substances within the body are also proteins.

Besides providing energy to the body, dietary protein is also required for growth—especially by children, teenagers, and pregnant women, tissue repair, immune system function, hormone and enzyme production, and for lean muscle mass and tone maintenance.

There are 20 amino acids and the body can make some of them from components within the body, but it cannot synthesize nine of them, accordingly called the “essential amino acids” since they must be provided in the diet. They include: histidine, isoleucine, leucine, methionine, phenylalanine, threonine, tryptophan, and valine. Protein that comes from animal sources are called “*complete proteins*” because they contains all of the essential amino acids while protein from plants, legumes, grains, nuts, seeds and vegetables are called “*incomplete proteins*” because they are lacking one or more essential amino acid(s).

Proteins are complex molecules and the body needs time to break them down. This is why they are a slower and longer-lasting source of energy than carbohydrates. If more protein is consumed than is needed, the body stores its components as fat. Proteins are broken down during digestion, which exposes them to acid in the stomach and to degradation by the action of enzymes called proteases.

Foods that are a source of protein include:

- **Animal protein:** Meat, poultry, fish, eggs, milk, cheese and yogurt provide high biological value proteins, because they contains all the essential amino acids.
- **Plant proteins:** Plants, legumes, grains, nuts, seeds and vegetables provide low biological value proteins. However, combining proteins from different plant sources in the same meal often results in a mixture of higher biological value. Examples of such combinations are: beans with rice, pasta or manioc, chickpeas with bread, lentils with potatoes, vegetables with cereals.

<http://www.diet.com/g/macronutrients>