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HISTORY OF DIETARY RECOMMENDATIONS

Food Guide Pyramid

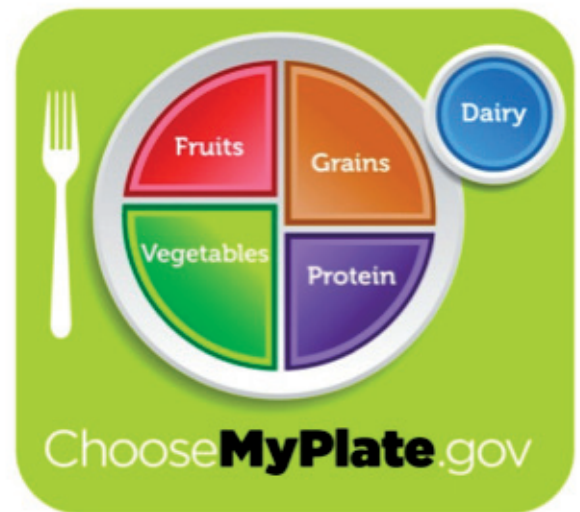
In 1992 the USDA released the new "Food Guide Pyramid." This guide now contains 6 food groups; bread, cereal, rice and pasta; vegetable; fruit; milk yogurt and cheese; meat, poultry, fish, dry beans, eggs and nuts; and fats and oils, and sweets.

It was developed for the sole intention of having an illustration to assist in establishing well-balanced and varied eating plans. To put it simply, the pyramid illustrates the importance of balance among food groups in a daily eating pattern.

- Choose most of your foods from the grain products group, 6-11 servings
- Vegetable group, 3-5 servings
- Fruit group, 2-4 servings
- Eat moderate amounts of foods from the milk group, 2-3 servings
- Meat and beans group, 2-3 servings
- Choose sparingly foods from the fats and sugar groups

What counts as a serving?

- Grain Products Group – 1 slice of bread, ½ cup of cooked cereal.
- Vegetable Group – ½ cup of vegetables, 1 cup leafy vegetables
- Fruit Group – 1 medium apple, ¾ cup fruit juice.
- Milk Group – 1 cup milk or yogurt, 2 ounces of cheese.
- Meat and Beans Group – 2-3 ounces of cooked lean meat, ½ cup dry beans,
2 tablespoons of peanut butter, 1 egg



Since the inception of this pyramid, there have been many other pyramids developed by numerous other organizations. They are based on dietary habits from around the world as well as cultures and disciplines from this country; i.e. The Mediterranean Food Pyramid, the Vegetarian Food Pyramid and the Sports Pyramid to name just a few.

The Sports Pyramid flip flops grains and vegetables and fruits making vegetables the primary carbohydrate source at 6 servings/day, fruit at 4 servings/day and grains at 3 servings/day. Fats and sweets are cut in half adding supplementation to fill out the top.

UNDERSTANDING FOOD LABELS

In 1973, voluntary nutrition labeling appears on food packages. In 1990 it became mandatory by law.

All food labels are required to include a statement of identity or product name, net contents, name, and address of manufacturer, ingredient labeling, nutrition labeling, and the nutrition and health claims.

What do the claims mean?

- Sugar Free – less than .5g per serving.
- Reduced Sugar, Fat or Calories– at least 25% less per serving.
- No Added Sugar – Processing does not increase the sugar content above the amount naturally present in the ingredient.
- Fat Free – less than .5g per serving.
- Low Fat – 3g or less per serving.
- Sodium Free – less than 5mg per serving.
- High Fiber – 5g or more per serving.

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container about 2

Amount Per Serving
Calories 250 Calories From Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
<i>Trans</i> Fat	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Proteins 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

If a label reads low fat, it can be misleading:

Example:

- A label reads: 1 serving is 67 calories; 9g from carbs, 1g from protein and just 3 grams of fat. The product can claim that this is a low fat food however; 3g of fat is 27 calories or 40% of total calories from fat. Watch out!

GENERAL NUTRITION GUIDELINES

Understanding Nutrient Balance

Nutrition is defined as the process by which a living organism takes on and uses food for the purpose of growth and tissue replacement. The primary role in food is to provide the substances, nutrients, essential for maintaining optimal health and performance. A nutrient is something that nourishes.

Six Basic Nutrients

- Carbohydrates – 65%
- Proteins – 20%
- Fat – 15%
- Water
- Vitamins
- Minerals

Every individual has a particular range of intake of each nutrient that will yield optimum function. Because we are all individuals and we vary as much as our lifestyles and environments, our nutritional requirements are unique. To suggest that one eating plan will fit everyone is silly. The macronutrients have been assigned percentages to suggest guidelines and should be used only as starting points to help you achieve your goals. These percentages can vary by as much as plus or minus 10% based on your metabolic profile and performance goals.

Notice that Carbohydrates are the biggest percentage. Contrary to many of the latest “fad diet experts,” carbohydrates are the most important macronutrient for replenishing our energy stores all day. This is our body’s natural energy source.

Example:

65% of the average diet of 2000 calories is 1300 calories or 325 grams of carbs. Divided among five meals and you see that you need 65 grams of carbohydrates per meal. That sounds like a lot to the carb phobes, but it’s necessary to keep energy levels up and to allow protein and fat to be used for what nature intended.

Protein is the next largest macronutrient needed in calories every day, but because these molecules are built right into your very structure, it is even more important than carbs. Over 50% of the dry weight of your body is protein. Even the hemoglobin that carries the oxygen in your blood is protein. Your genes and your brain cells is totally protein. All bodily functions from the blink of an eye to the creation of new muscle are controlled by thousands of different enzymes – and all enzymes are proteins.

You must get it right all the time. You can make big mistakes with carbs and fats and correct them easily.

GENERAL NUTRITION GUIDELINES

But your mistakes with protein build right into your structure, and hamper your performance for months.

Last but not least is fat. Once thought of as the villain, we realize now that fat plays a valuable roll in our body. From the main components of cell membranes, exclusive ways in the brain, inner ear, eyes, adrenal glands, and sex organs, hormone production to insulation, we absolutely need

some fat in our diets however as the number indicates, no more than 15% of our daily calories.

Example

A 175lb athlete who has 15% body fat keeps about 12% as reserve for energy. This equates to about 75,000 calories. Enough to run 150 miles.

Tips for Healthy Eating

Healthy eating isn't a simple, single lifestyle decision. It's actually thousands and thousands of smaller choices, a mixture of everyday nutritional yes's and no's that adds up over time and shows how much of a commitment you've really made to yourself.

How you think, feel, look and perform, all depend on what eating choices you're making every minute of the day, from the moment you wake up until the time you go to bed. A healthy lifestyle is a combination of making the right nutritional choices while avoiding as many eating errors as possible.

Mini-Meals

Breaking up your daily caloric intake into five smaller meals, instead of three large ones, can help curb binges while keeping your sugar levels stable throughout the day. Larger meals raise blood sugar levels, triggering an increase in the release of insulin within the bloodstream. Insulin, in turn, tells your body to store excess calories as fat, rather than using them for energy.

Breakfast

Missing breakfast, or any meal, elicits an emergency response from your system. Believing it's on the brink of starvation, your body stores a larger percentage of what you eat next as fat, no matter what you just ate.

Lunch

Depending on your own routine now may be a good time to indulge in a large meal replete with complex carbs, protein and fat; especially if you are going to be working out two to three hours later. Never eat a large meal immediately before a workout. Digestion requires too much energy. This energy is needed for an optimum workout.

GENERAL NUTRITION GUIDELINES

Dinner

Create dinners rich in protein and less in carbs unless you have just worked out. Remember; do NOT skip your recovery shake. It is essential for recovery while your meal one hour later will keep a steady flow of insulin being released to the brain for hours later.

Diet Summary

Eat a variety of foods everyday. Eat every 2 ½ to 3 hours starting at breakfast and combine your macronutrients in each meal. Try to eat as many whole foods and as few processed foods as possible. Oriental cultures believe you should consume 30 different foods a day. Variety is truly the spice of life.

PRINCIPALS OF NUTRITION

Optimal bodily function cannot occur without the daily ingestion of precise mix of 59 substances. Some you need a lot of, others only an infinitesimal amount. The most important of these are: Oxygen, Hydrogen, Nitrogen, Carbon, and Sulfur. The rest are Minerals, Vitamins, Co-factors, Essential Amino Acids and Essential Fatty Acids.

USDA in 1992 abandoned the four food groups and reclassified meats and dairy as optional foods; emphasizing whole grains, then vegetables, the fruits as the basis for nutrition, with meats and dairy as minor foods.

The human body has evolved over 2.6 million years to convert a mix of certain compounds that occur in nature into muscles, bones, organs, glands, and brain. We are simply an interaction of all these compounds. Every time you screw around with them they screw around with you.

- Example - Your body only requires 2 micrograms of B12 each day. Your blood only contains about 5 nanograms (billionth of a gram) per liter, less than a speck of dust. If you lack that infinitesimal speck of dust, your whole body declines into serious disease of pernicious anemia.
1. Synergy – Nutrients do not function singly. They function only by the interdependent interactions with each other.
 - Example - Vitamin E interacts with both copper and zinc. Together they interact to protect membranes against free radical damage (lipid peroxidation). When E is deficient, more zinc is used by the body to pinch hit for the missing nutrient. This action has the added effect of increasing body levels of copper.
 2. Biochemical Individuality – Because of genetic variations, individual bodies are biochemically different from each other. Each athlete requires an individual nutrition program.
 - Example - Every body is radically different from the next. From the shape of your nose and toes, to the patterns of fingerprints, texture of hair, range of movements of limbs, even the sound of your voice. Inside you are just as different. Your muscles, glands, organs, nerves, and brain are all different in size, shape, and function right down to the molecular function of individual cells. A sport nutrition program has to fit your individual form and function at least as well as your shoes fit your feet.
 3. Lifestyle Dynamics – Lifestyle and environment radically affects your needs. Food quality, smoking, alcohol, pollution, medication, occupation, training, age, and a zillion other factors.
 - Example - Training can quickly show evidence of physiological decline when begin a more intense program.
 4. Precision – There is only a narrow range of intake of each nutrient that will produce optimum function.

PRINCIPLES OF NUTRITION

- Example - Interactions between nutrients change radically when some are taken to excess. Excess zinc, interferes with iron metabolism, excess, fatty acids deplete the body of vitamin E, excess iron disrupts copper metabolism.
 - Example - a person who exercises regularly has increased requirements for certain nutrients such as vitamin E and chromium, but not for others. A person, who lives in a smog polluted area, has an increased requirement for vitamin A and other antioxidants that would be an overdose to people living in clean air.
5. Physiological Dynamics – Improved nutrition must wait on nature to renew whole bodily systems before effects can show.
- Example - A blood cell lasts 60-120 days. In three to four months your whole blood supply is completely replaced. In six months almost all proteins in your body die and are replaced, even the DNA of your genes. In a year all your bones and even the enamel on your teeth is replaced, constructed entirely out of the nutrients that you eat.
 - Example - Remove vitamin C from your diet, within four weeks blood vitamin C will drop to zero, but you will see no symptoms of disease at four weeks. You have to wait until healthy cells are replaced by unhealthy cells. It is another 12 weeks until symptoms of scurvy start to ravage your body.

CARBOHYDRATES

The Basics

The primary roll of carbohydrates in the body is as a source of energy.

Carbohydrates are considered macronutrients and are found in food sources that include vegetables, fruits, grains, legumes, rice and sugars. Carbohydrates provide (4) calories per gram. They are broken down into sugars, absorbed through the small intestine, shuttled off into the blood system used or stored in the muscles and liver until needed for energy. Carbohydrates are our revolving fuel source; meaning, all activities depend entirely on the energy derived from consuming carbohydrates all day long. If enough carbohydrates aren't consumed throughout the day, dietary proteins first then proteins found in the muscles are converted into carbohydrates for energy. Carbohydrates allow protein and fats to be used for the purposes that they were intended.

Our bodies can only store a limited amount of stored carbohydrates app. 2100 calories at a time; barely enough to sustain an individual through an hour and a half of intense exercise. Stored Carbohydrates are called glycogen.

Recommended Intake

Most experts and sports nutritionists agree that the majority of your calories should come from complex carbohydrates. Current dietary recommendations range from 50-70% of total daily calorie intake should come from carbs, while only 10% of those calories should come from simple carbohydrates.

- 6 gm/kg of body weight per day for athletes training one hour per day.
- 8 gm/kg of body weight per day for athletes training two hours per day.
- 10 gm/kg of body weight per day for athletes training three hours or more per day.

Types of Carbohydrates

Simple Carbohydrates

Carbs made from one or two carbohydrate molecules are defined as simple sugars. Monosaccharides and disaccharides respectively, are simple sugars.

Most simple sugars once digested turn into glucose molecules quickly giving a quick rise to the amount of glucose in the blood. But our bodies' only want so much glucose in our blood at one time, so a hormonal response kicks in and the pancreas releases insulin to help usher excess levels of glucose out of the blood to be stored as glycogen or if there is too much, fat. Fructose, is found in many fruits however, does not have the same reaction in our bodies. It has to be broken apart, changed shape and recombine in order to become glucose. This requires special enzymes and time. This is a good thing because fruit needs to be a part of everyone's diet.

CARBOHYDRATES

Complex Carbohydrates

These are found when sugars link themselves together to form long chains of carbohydrates or polysaccharides. Complex carbohydrates exist in the form of starches in plants and glycogen in animals. During digestion they are broken down into glucose to be utilized for energy by the body. Some complex carbs breakdown quickly and some slow. Some complex carbohydrates and many starches are just long chains of glucose which can break down very quickly. Avoid these when possible, ex. baked potato. They can also give quick rise to blood sugar. Eat foods containing complex carbohydrates that are slow digesting in all meals except your post workout recovery meal.

Fiber

Carbohydrates also include a non-digestible portion known as fiber. This includes water-soluble and water-insoluble. Fiber only comes from plant sources and predominately from complex carbohydrates. Since fiber is non-digestible, foods high in fiber have a relatively low caloric density. In other words, you feel full quicker without eating as many calories. Soluble fiber, like the fiber found in fruits may help to lower cholesterol by binding to dietary cholesterol as it travels through the gastrointestinal tract. Also, they trap carbohydrates to slow their absorption and digestion, helping to prevent wide swings in blood sugar levels. Insoluble fiber is found in whole grain products and also the skins of many fruits and veggies. They absorb the water into the large intestines causing the stools to be softer and bulkier which in turn tends to pass through the digestive tract quicker reducing the amount of time toxins can be absorbed through the intestinal tract. Insoluble fiber helps to reduce the risk of colon cancer.

Recommended Intake

Recommendations for fiber intake should be between 25 and 35 total grams per day of both forms of fiber.

SUGAR

Sugars are carbohydrates. Carbohydrates are foods that are composed of glucose molecules.

1. Monosaccharide – composed of a single glucose molecule
 - Glucose – corn syrup (dextrose), grape sugar, vegetables, honey
 - Fructose – honey, fruits, corn syrup, vegetables
 - Galactose – product of lactose after digestion
2. Disaccharides – composed of two glucose molecules
 - Sucrose (glucose + fructose) – cane sugar, beet sugar, maple sugar, fruits and vegetables, sorghum syrup
 - Lactose – milk and milk products
 - Maltose (glucose + glucose) – sprouted grains, beer
3. Polysaccharides – complex carbohydrates. Composed of many glucose molecules
 - Starch – grains, legumes, vegetables

Single and double sugars break down quickly into glucose molecules which are absorbed rapidly in the blood stream to supply energy to the body.

Sweeteners

All sweeteners are forms of sugar. Sugar is manufactured by green plants during their conversion of sunlight into food, a process called photosynthesis. Except for the mineral content, all components of plants are derived from this sugar. A refined sugar is one that is separated from the rest of the food substances in a plant, sucrose from sugar cane, for example.

1. Aspartame – combination of Aspartic Acid and Phenylalanine (two amino acids that make up protein). Aspartame is not derived from these sources, however. The aminos are synthesized from hydrocarbons or by fermentation.
2. Fructose - A little fructose in the diet is very helpful. Fructose is metabolized in the liver, and yields greater repletion of liver glycogen than glucose. After digestion, complex carbs are converted to glucose to enter the bloodstream. Most of the glucose bypasses the liver.

The sugar fructose is an anomaly. It has a low Glycemic index and does not cause sharp fluctuations in blood glucose or insulin. But fructose is only half as effective as complex carbs for repletion of muscle glycogen. High fructose diets also cause a rise in blood fats, and a rise in blood uric acid levels. Both are degenerative conditions and should be avoided.

Nevertheless, a little fructose can be very helpful. After digestion, complex carbohydrates are converted to glucose to enter the bloodstream. Most of the glucose bypasses the liver. Fructose, however, is mostly metabolized in the liver, and yields greater repletion of liver glycogen than glucose.

SUGAR

Pancreas

The pancreas produces insulin. Carbs stimulates the secretion of insulin more than any other component of food. Slow absorption of the carbohydrate in our food means the pancreas doesn't have to work so hard and produces less insulin.

Insulin

Insulin is a hormone that is needed for carbohydrate metabolism. High insulin levels are key factors for heart disease and hypertension. Insulin influences the way we metabolize foods determining whether we burn fat or carbohydrates to meet our energy needs and ultimately determine whether we store fat in our body.

Glycemic Index

Ranking of foods from 0 to 100 that tells us whether a food will raise blood sugar levels dramatically, moderately, or just a little.

Myths

1. Sugar is fattening. Not true. Sugar has no special fattening properties. It is no more likely to be turned into fat than any other carbohydrate. Sugar, which is often present in foods high in energy and fat, may sometimes seem to be "turned to fat," but it's the total energy (calories) rather than the sugar in those energy-dense foods that may contribute to new stores of body fat.
2. Sugar is the worst thing for people with diabetes. Not true. Sugar and sugary foods in normal servings have no greater effect on blood sugar levels than many starchy foods. Saturated fat is far worse for people with diabetes.
3. Sugar causes diabetes. Not true. Sugar has no unique role in causing diabetes. Foods that produce high blood sugar levels may increase the risk of diabetes, but sugar has only a moderate effect.
4. Starchy foods are fattening. Not true. Bread and potatoes are rich in carbohydrates, the easiest fuel for our bodies to burn – and therefore among the best foods you can eat to help you lose weight.
5. Starches are best for optimum athletic performance. Not true. In many instances starchy foods (e.g. potatoes) are too bulky to eat in the quantities needed for active athletes.

PROTEIN

Whey Protein

What is whey protein? Whey protein is a pure, natural, high quality protein from cow's milk. Whey is a by-product of making cheese. It takes approximately 10 pounds of milk to make one pound of cheese, the remaining nine pounds is Whey. Whey has considerably less fat, sodium, lactose and calories than milk. It is a rich source of the essential amino acids needed on a daily basis by the body. In its purest form, as whey protein isolate, it contains little to no fat, lactose or cholesterol.

Whey is made up of molecules that are chains of Amino Acids called Peptides. The human body can only absorb very small di and tripeptides. Larger peptides must be enzymatically broken down (hydrolyzed) before any absorption can occur. Breakdown and absorption of protein occurs primarily in the duodenum of the small intestine (a one foot area). Once it is past this area of the small intestine there is essentially no further absorption. Undigested protein passes into the colon where it is a known health hazard. Beef, poultry, fish, eggs, soy and grains have no di and tripeptides. Having none, they will not breakdown in time and limit absorption to 30% at best. Absorption is key to being assimilated in the body so it is important that you choose your protein wisely.

Not all Whey is the same

There are two different forms of Whey Protein. Protein Concentrate has anywhere between 29% and 89% protein depending upon the product. As the protein level in Whey Concentrate decreases, the amounts of fat and/or lactose usually increase. Whey Concentrates have a higher percentage of large Peptides and therefore are not as readily absorbed by the body. Protein Isolate is the most pure and concentrated form of protein available. It contains 90% or more protein and very little (if any) fat and lactose. The process of making an Isolate involves hydrolyzation or fermentation which breaks down the larger Peptides into smaller ones called Isolates. These very small Peptides are easily absorbed by the body.

When selecting your Protein Supplement, read the label. Remember you get what you pay for. If the price looks like a great deal then chances are the first ingredient is Protein Concentrate. Your body will not absorb this as well as its cousin; Protein Isolate.

Protein in the Body

Squeeze all the water out of your body and what is left? Mostly protein. Over 50% of the dry weight of your body is protein. Even the hemoglobin that carries the oxygen in your blood is protein. The structure of your genes and your brain cells is totally protein. All bodily functions from the blink of an eye to the creation of new muscle are controlled by thousands of different enzymes – and all enzymes are proteins.

You must get it right all the time. You can make big mistakes with carbs and fats and correct them easily. But your mistakes with protein build right into your structure, and hamper your performance for months.

Body proteins are not forever; they die continually. 98% of the molecules of the human body are completely replaced each year. Bits and pieces of all your structures are constantly being replaced with new proteins. In six months your biceps, your blood, your enzymes, even the structure of your genes are all

PROTEIN

completely replaced. The body you have today is built almost entirely of what you have eaten over the last six months.

The human system is ingenious at stitching, and pinch-hitting, but it can't build premium tissue from garbage. A Twinkies and coffee diet will yield a Twinkies and coffee body.

Whey protein is an excellent protein choice for individuals of all ages. It provides a number of benefits in areas including sports nutrition, weight management, immune support, bone health, and general wellness. Protein is also involved in many cellular processes. Proteins make up the major part of many hormones, so they are essential for communication throughout the body.

Weight Management

Studies show that achieving and maintaining a healthy weight can add years to your life while helping to prevent weight related complications, including diabetes, cancer, and heart disease. Diet plays a key role in any weight management program and adding whey protein often helps make a positive difference. Here are some of the reasons why.

- The body requires more energy to digest protein than it does other foods (thermic effect) and as a result you burn more calories after a protein meal.
- Whey protein isolate is pure protein with little or no fat or carbohydrates. It is a perfect complement to any low carbohydrate or low glycemic index diet plan.
- Recent studies by Dr. Donald Layman, a professor at the University of Illinois, have highlighted the role of the essential amino acid leucine in improving body composition. High quality whey protein is rich in leucine to help preserve lean muscle tissue while promoting fat loss. Whey protein contains more leucine than milk protein, egg protein and soy protein.
- Protein helps to stabilize blood glucose levels by slowing the absorption of glucose into the bloodstream. This in turn reduces hunger by lowering insulin levels and making it easier for the body to burn fat.
- Whey protein contains bioactive components that help stimulate the release of two appetite-suppressing hormones: cholecystokinin (CCK) and glucagon-like peptide-1 (GLP-1). In support of this, a new study found that whey protein had a greater impact on satiety than casein, the other protein in milk. Adding whey protein to a mid-day snack or beverage provides healthy energy and may help control food intake at the next meal.
- By increasing the body's Lean Muscle Mass, it adds bulk to those who have a hard time gaining weight and raises the resting metabolism of those trying to lose weight.
- Whey protein supplies some of the highest amounts of BCAA's (Branch Chain Amino Acids) of any food. BCAAs play a critical role in maintaining and building muscle. The more muscle...the higher your metabolism and the more fat you burn...even while you sleep.

Anti-Aging Properties

Glutathione is a tripeptide present in every cell in the human body. There is a direct correlation between

PROTEIN

Glutathione levels and longevity. Using cold processed whey protein raises Glutathione levels. People who maintain higher levels of Glutathione live longer, healthier lives. Deficiencies have been directly linked to macular degeneration and cataracts.

Immune-Boosting

Whey protein is high in the amino acid Lysine, which plays a critical role in supporting our immune system.

Whey protein helps athletes maintain a healthy immune system by increasing the levels of glutathione in the body. Glutathione is an anti-oxidant required for a healthy immune system and exercise and resistance training may reduce glutathione levels. Whey protein helps keep athletes healthy and strong to perform their best.

Cardiovascular

Whey contains several compounds....one of which is Lactoferrin. Lactoferrin prevents the LDL (bad) cholesterol from oxidizing and damaging arterial walls. It helps to prevent heart and vascular diseases.

Growing Muscle

What makes you grow muscle, protein or weights?

It is not the amount of protein intake that controls muscle growth, but rather the demand for growth caused by the trauma of intense exercise.

Recommended Intake

Most experts and sports nutritionists agree that a minimum of 12% of your daily calories should come from protein

Personal Program

Choose the Class the best fits your profile then align your body weight in pounds to see the amount of protein in grams you should consume in a day.

Class 1

Sports that demand strength first, then speed, then endurance. I.E. Weightlifting, shot-put, javelin, discus, men's gymnastics.

Class 2

Sports demanding speed first, then strength, then endurance. I.E. Sprints of all kinds, jumping, boxing,

PROTEIN

wrestling, karate, judo, sprint swimming, women's gymnastics, ball games.

Class 3

Sports where endurance dominates. I.E. Middle and long distance running, triathlon, cross country skiing, cycling, and tennis.

Body Weight	Sports/Training Category		
<u>Lb</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class3</u>
88	80	68	56
110	100	85	70
132	120	102	84
154	140	119	98
176	160	136	112
198	180	153	126
220	200	170	140
242	220	187	154
264	240	204	168

- 6 gm/kg of body weight per day for athletes training one hour per day.
- 8 gm/kg of body weight per day for athletes training two hours per day.
- 10 gm/kg of body weight per day for athletes training three hours or more per day.

FAT

Overview

Fats or lipids are the most concentrated source of energy in the diet. When oxidized, fats furnish more than twice the number of calories per gram furnished by carbs and proteins. One gram of fat yields approximately 9 calories to the body. In addition to providing energy, fats act as carriers for the fat-soluble vitamins, A, D, E, and K. By aiding in the absorption of vitamin D, fats help make calcium available to the body tissues, particularly the bones and teeth. Fats are also important for the conversion of carotene such as "beta carotene" to vitamin A. Fat deposits surround, protect, and hold in place organs, such as kidneys, heart and the liver. A layer of fat insulates the body from environmental temperature changes and preserves body heat. Fat prolongs the process of digestion by slowing down the stomach's secretion of hydrochloric acid.

Athletes do require special fats, as the main components of cell membranes, around every cell around the body. These fatty acids are also used in an exclusive ways in the brain, inner ear, eyes, adrenal glands, and sex organs. In these very active tissues, special fats are essential for the high level of oxygen use and energy transformation require for optimum performance.

Fatty Acids

The substances that give fats their different flavors, textures, and melting points are known as the fatty acids. There are four types of fatty acids: saturated, monounsaturated, polyunsaturated, and trans-fatty acids.

Saturated fat, have their carbons saturated with hydrogen atoms, that is, they will not hold any more hydrogen. Unsaturated fats have empty spaces where hydrogen atoms are missing. These spaces link up with molecules of other substances in the body, so they make unsaturated fats much more biologically active. In contrast, saturated fats have no empty links and are virtually inert. Their only biological role is as calories, to be burned for energy. Because most athletes carry more energy reserve than they will ever use, there is no use for saturated fats.

Essential Fatty Acids

Linoleic acid and alpha-linolenic acid, long chain (18 carbons), must be provided by your diet. Your body has the ability to change the long-chain fats of more than 16 carbons or more into unsaturated forms by inserting empty spaces called double bonds.

EPA and DHA are two fats that your body can produce however due to degraded food sources; it probably can not produce enough. It produces it from alpha-linolenic acid in the diet. The best sources are: salmon, mackerel, sardines, and trout. The best vegetable sources for these oils are flaxseed or linseed oils. Olive oil contains just linoleic acid, but it also contains cis-oleic acid, excellent for lowering serum cholesterol and other beneficial effects on blood lipids. Other sources of the two essential fatty acids are pumpkin seeds, walnuts and soybeans. Also, the dark green leaves of leaf vegetables.

Cholesterol

Cholesterol is a lipid or fat-related substance necessary for good health. It is a normal component of most body tissues, especially those of the brain, nervous system, liver, and blood. It is needed to form sex and adrenal hormones, vitamin D, and bile salts. Bile is needed for the digestion of fats. Cholesterol also plays a part in lubricating the skin. Cholesterol is part of all cell membranes and is a precursor to steroid hormones.

How Much

Every ounce of extra body fat increases the energy required to move your body. Also, every ounce of extra body fat increases body temperature during exercise, not only because of extra weight and insulation, but because you have less water for cooling. Bodyfat is only 50% water where as muscle is 75% water. Keep fat intake below 15%.

1. Example – A 175lb athlete who has 15% body fat keeps about 12% as reserve for energy. This equates to about 75,000 calories. Enough to run 150 miles. Compared this with sugar in the form of glycogen, the body's other main source of energy. His 450 grams of stored glycogen reserve at four calories per gram are worth only 1,800 calories. Because of the body's cycle of glycogen use with exercise, and because of the minimum level of glycogen needed for muscle to function, that is only enough to run 20 miles. So the limiting energy source for energy is always sugar, never fat.

Labels are Misleading

Be careful when reading labels. Even though they may report that a product has low fat, it is really relative to the total weight of the product. This includes water. They don't ever tell you that. This applies to meats as well as all processed foods that may contain moisture.

1. Example – Milk contains 87.6% water (0 calories), 3.8% fat (69 calories), and 8% carbs and protein (64 calories). That makes it more than 50% fat. Even low-fat 2% milk is over 25% fat.
2. Example – A turkey roll labeled 90% fat free, only 10% fat. Ingredients are given by weight. The real numbers for a 100 gram (3 ½ oz) serving are:

• Water weight	70 grams	0 calories
• Fat weight	10 grams	90 calories
• Protein weight	20 grams	80 calories
	Total	170 calories

The actual fat content is a whopping 53%.

FAT

Rules

- Eliminate saturated fats from your diet.
- Use extra virgin olive oil as your main source for fat.
- Eat two meals weekly of cold-water fish.
- Athletes over 30 take a daily capsule of gamma linolenic acid.
- Keep fat intake down into 15% of total calories.

WATER

1. The most important nutrient in your body.
 - Example: Brain is 76% water, blood is 82% water and your lungs are 90% water.
2. The quality of your tissues, their performance, and their resistance to injury, is absolutely dependent on the quality and quantity of the water you drink. Dehydrate a muscle by only 3% and you cause about a 10% loss of contractile strength, and an 8% loss of speed.
 - In a 10K, a loss of 3% water, that's 3-5 pounds for a 165 lb man, performance drops by 7%. For an athlete who can normally do this time in under thirty minutes, that adds two minutes to his time.
3. Polluted Water; no high performance machine can operate at optimum with dirty lubricants.
 - Our tap water is treated only to minimum standards, by sedimentation, filtration, chemical conditioning, and disinfection with chlorine. The toxic metals, pesticides, industrial chemicals are all still in there when it comes out your tap. So are the 50 or so chemicals used in the water treatment. So are the dead bacteria killed by chlorine. So are the carcinogenic trihalomethanes from the chlorine itself, which are known to cause liver and colorectal cancers.
4. Bottled water is simply tap water put through minimal conditioning filters to make it taste better. The FDA regulations do not require water bottlers to test their wares for minerals, or for huge variety of other toxic contaminants likely to be present.
5. Reverse Osmosis can remove up to 97% of contaminants. It is not the best. Pure Water Inc of Lincoln, Nebraska (402) 467-9300 is perhaps the best in home distiller.
6. Performance levels are affected by overheating, disruption of chemical balances, and dehydration. The biggest problem is overheating.
 - Example: Exercise increase body temperature in direct proportion to the exercise load. Your body tries to maintain a resting temperature of 98.6F, by moving the extra heat to the skin via the blood. There it dissipates into the air, mainly by evaporation of sweat. But your blood must also carry oxygen and nutrients to the muscles, and remove the wastes of muscle metabolism. Available blood is shared between all these tasks. The higher your core temperature rises, the more blood is used for cooling, and the less is available for the muscles. So the cooler you stay during exercise, the better your muscle function..
 - Example: Heavy exercise can increase heat production in muscles to more than 20 times their resting rate. Even with optimum hydration and a cool environment, this heat load can raise your core temperature to 103F within 15 minutes. But when temps rise above 104F, your physiology starts to disintegrate, leading to feeling overheated in the face, throbbing temples and chills. Continuing to press, temps can rise to 105F and above giving away to symptoms of feeling dizzy, weak, and disoriented. Above these levels, you are at risk of heat stroke.

Myths

1. Water – RO water will leach minerals from the body. As soon as water enters your gut it becomes a soupy mixture with the contents of your gut. On absorption through the intestinal wall, the mixture immediately becomes a part of you. There is no physiological way it can suck minerals out. Also, other folks claim that although it may not leach out minerals, distilled water does not contain essential minerals found in ground water. Wrong, minerals come from the foods that you eat