



Nutrition Tips

The Ins and Outs of Macronutrients,
Micronutrients, and Resting Metabolic Rate

What are Macronutrients?

- ▶ Macronutrients are nutrients that provide calories or energy. Nutrients are substances needed for growth, metabolism, and for other body functions. Since “macro” means large, macronutrients are nutrients needed in large amounts. There are three macronutrients:
 - ▶ **Carbohydrate**
 - ▶ **Protein**
 - ▶ **Fat**
- ▶ While each of these macronutrients provides calories, the amount of calories that each one provides varies.
 - ▶ **Carbohydrate provides 4 calories per gram.**
Protein provides 4 calories per gram.
Fat provides 9 calories per gram.
- ▶ This means that if you looked at the Nutrition Facts label of a product and it said 12 grams of carbohydrate, 0 grams of fat, and 0 grams of protein per serving, you would know that this food has about 48 calories per serving (12 grams carbohydrate multiplied by 4 calories for each gram of carbohydrate = 48 calories).
- ▶ Besides carbohydrate, protein, and fat the only other substance that provides calories is alcohol. Alcohol provides 7 calories per gram. Alcohol, however, is not a macronutrient because we do not need it for survival.

Why do we need Carbohydrates?

- ▶ Carbohydrates are the macronutrient that we need in the largest amounts. According to the Dietary Reference Intakes published by the USDA, 45% - 65% of calories should come from carbohydrate. We need this amount for many reasons, carbohydrates are:
 - ▶ Body's main source of fuel
 - ▶ Easily used by the body for energy
 - ▶ All of the tissues and cells in our body can use glucose for energy
 - ▶ Needed for the central nervous system, the kidneys, the brain, the muscles (including the heart) to function properly
 - ▶ Stored in the muscles and liver and later used for energy
 - ▶ Important in intestinal health and waste elimination
 - ▶ Mainly found in starchy foods (like grain and potatoes), fruits, milk, and yogurt. Other foods like vegetables, beans, nuts, seeds and cottage cheese contain carbohydrates, but in lesser amounts
 - ▶ Fiber refers to certain types of carbohydrates that our body cannot digest. These pass through the intestinal tract intact and help to move waste out of the body. Diets that are low in fiber have been shown to cause problems such as constipation and hemorrhoids and to increase the risk for certain types of cancers such as colon cancer. Diets high in fiber; however, have been shown to decrease risks for heart disease, obesity, and they help lower cholesterol. Foods high in fiber include fruits, vegetables, and whole grain products

Why do we need Protein?

- ▶ According to the Dietary Reference Intakes published by the USDA 10% - 35% of calories should come from protein. Most Americans get plenty of protein, and easily meet this need by consuming a balanced diet. We need protein for:
- ▶ Growth (especially important for children, teens, and pregnant women)
- ▶ Tissue repair
- ▶ Immune function
- ▶ Making essential hormones and enzymes
- ▶ Energy when carbohydrate is not available
- ▶ Preserving lean muscle mass
- ▶ **Protein is found in meats, poultry, fish, meat substitutes, cheese, milk, nuts, legumes, and in smaller quantities in starchy foods and vegetables.**
- ▶ When we eat these types of foods, our body breaks down the protein that they contain into amino acids (the building blocks of proteins). Some amino acids are essential which means that we need to get them from our diet, and others are nonessential which means that our body can make them. Protein that comes from animal sources contains all of the essential amino acids that we need. Plant sources of protein, on the other hand, do not contain all of the essential amino acids.

Why do we need fat?

- ▶ Although fats have received a bad reputation for causing weight gain, some fat is essential for survival. According to the Dietary Reference Intakes published by the USDA 20% - 35% of calories should come from fat. We need this amount of fat for:
- ▶ Normal growth and development
- ▶ Energy (fat is the most concentrated source of energy)
- ▶ Absorbing certain vitamins (like vitamins A, D, E, K, and carotenoids)
- ▶ Providing cushioning for the organs
- ▶ Maintaining cell membranes
- ▶ Providing taste, consistency, and stability to foods
- ▶ Fat is found in meat, poultry, nuts, milk products, butters and margarines, oils, lard, fish, grain products and salad dressings. There are three main types of fat, saturated fat, unsaturated fat, and trans fat. Saturated fat (found in foods like meat, butter, lard, and cream) and trans fat (found in baked goods, snack foods, fried foods, and margarines) have been shown to increase your risk for heart disease. Replacing saturated and trans fat in your diet with unsaturated fat (found in foods like olive oil, avocados, nuts, and canola oil) has been shown decrease the risk of developing heart disease.

Protein

1. Chicken
2. Turkey
3. Salmon
4. Eggs
5. Greek yogurt
6. Tuna
7. White fish
8. Lean GrassFed Red meat
9. Whey Protein Powder
10. Cottage cheese

Carbs

1. Sweet potato
2. Brown Rice
3. Rolled Oats
4. Beans
5. Quinoa
6. Apples
7. Berries
8. Buckwheat
9. Whole grain tortilla
10. Whole grain bread

Fats

1. Almonds
2. Coconut oil
3. Avocado
4. Flax seed/meal
5. Chia seeds
6. Pecans
7. Olive oil
8. Almond butter
9. Peanut butter
10. Salmon

Micronutrients

- ▶ Although macronutrients are very important they are not the only things that we need for survival. Our bodies also need water (6-8 glasses a day) and micronutrients.
- ▶ Needed only in small amounts, micro-nutrients are essential for the proper functioning of every system in the body and are vital for good health.
- ▶ There are two classes of micronutrients, vitamins and minerals. Each vitamin and mineral has a specific role in bodily function.
- ▶ Our bodies cannot make all of these micro-nutrients, so they must be supplied through the diet. Different foods contain different levels of vitamins and minerals, so it's important that you eat a wide variety of foods from the different food groups and a variety within each food group, to make sure you get an adequate supply of all the micro-nutrients your body needs.

Where to find Micronutrients

- ▶ Vitamin A - Milk, cheese, eggs (yolk), orange and yellow fruits and vegetables
- ▶ Vitamin B - Legumes, wholegrain cereals, nuts, seeds, green leafy vegetables
- ▶ Vitamin C - Citrus fruits, broccoli, strawberry, parsley, cabbage
- ▶ Vitamin D - Citrus fruits, broccoli, strawberry, parsley, cabbage
- ▶ Vitamin E - Olives and olive oil, avocado, wholegrain cereals
- ▶ Iron - Lean meat, green leafy vegetables, legumes
- ▶ Calcium - Dairy products, almonds, tahini, green leafy vegetables
- ▶ Magnesium - Nuts, seeds, whole grains, legumes, green leafy vegetables
- ▶ Zinc - Lean meat, chicken, fish, sunflower and pumpkin seeds
- ▶ Selenium - Brazil nuts, wheat germ, sunflower seeds, oats

A Healthy Diet with Essential Micronutrients is the Basis for a Healthy Life

Poor diet is the 4th biggest global risk factor for disease.

Source: DSM Nutrition Science & Advocacy

- A** **Vitamin A—Creating a Clear View**
Vision, growth, development, skin, fertility, immune system
- C** **Vitamin C—Strengthening Our Defenses**
Healthy tissue, immune system
- D** **Vitamin D—Building a Strong Foundation**
Bone development, immune system
- E** **Vitamin E—Protecting What We're Made Of**
Healthy tissue, fertility
- K** Blood clotting, bone health, heart health

Carotenoids

β-Carotene
Serves as an important source of vitamin A

Lutein
Vision, Antioxidant

Zeaxanthin
Vision, Antioxidant



B Vitamins—Establishing Healthy Growth

Nervous system, muscles **B₁**

Metabolism, tissues and organs, growth, vision **B₂**

Growth **B₃**

Metabolism, healing wounds **B₅**

Metabolism, brain function, immune system **B₆**

Hair roots, fingernails **B₇**

Red and white blood cells, nerve cells **B₉**

Red blood cells, metabolism **B₁₂**

Omega-3 PUFAs

Heart health, eye health, brain function

RMR – Resting Metabolic Rate

- ▶ Metabolic processes in the body require energy and are comprised of anabolic processes, which build up tissues, and catabolic processes, which break down tissues and fuel sources for energy. The rate at which these processes occur is measured in calories per unit of time, and is most often given in calories per day.
- ▶ Resting metabolic rate (RMR) is the energy required to perform vital body functions such as respiration and heart rate while the body is at rest. About 50 to 75% of one's daily energy expenditure can be attributed to resting metabolic rate.
- ▶ Increasing Your Metabolism
 - Tips:
 - Get plenty of sleep
 - Decrease stress
 - Stay hydrated
 - Eat small frequent meals
 - Exercise regularly (particularly resistance training)

Calculate your RMR!

- ▶ The Muffin equation for RMR:
- ▶ For men: $(10 \times w) + (6.25 \times h) - (5 \times a) + 5$
- ▶ For women: $(10 \times w) + (6.25 \times h) - (5 \times a) - 161$

- ▶ w = weight in kg

- ▶ h = height in cm

- ▶ a = age

To convert weight from Pounds into Kilograms – Pounds/2.2046

To convert height from Inches to Centimeters – Inches/.39370

Sources

- ▶ <http://www.mckinley.illinois.edu/handouts/macronutrients.htm>
- ▶ <http://www.bodyandsoul.com.au/nutrition/nutrition+tips/micronutrients+for+good+health,11435>
- ▶ <http://www.myfitnesspal.com/tools/bmr-calculator>
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- ▶ <http://weightloss.about.com/od/glossary/g/rmr.htm>
- ▶ http://www.health.utah.edu/peak/services/health_fitness_testing/rmr_information.html