The Reinvention of Nutrition Basics

Anthony A. D'Assisi, BPHE, CSCS, RNCP

Just when you thought you had nutrition figured out, another book on how we should eat for optimal bodyweight and health is on the shelves disputing everything you once believed. If you keep up with the latest health and fitness trends, you have heard of The Atkin's Diet Revolution, Protein Power, and countless others like them. The similar thread these diets share is the claim you will lose weight and become a healthier person by restricting carbohydrates and replacing them with a higher consumption of protein and fat. For short-term weight loss these diets usually work, not because you are omitting a food group, but because you are severely restricting your caloric intake. Therefore, you are depriving your body of one of the main fuel sources it relies on for energy. Since every microstructure of our remarkable human bodies is affected by total nutrition, we must re-evaluate the basics of nutrition for bodyhealth success.

For many years, we were taught the best method to rely on for a healthy body was to eat in moderation from the various food groups on the food guide pyramid. However, an article in a recent issue of Newsweek claims the 1992 food guide pyramid is now widely viewed as flawed. The pyramid is far too simple and does not make clear distinctions between good and bad carbohydrates, and similarly between good and bad fats[1].

The article entitled "The Perfect Diet," examines Harvard's Healthy Eating Pyramid. The new and improved pyramid, developed by Dr.'s Stampfer and Willett from the department of Nutrition at the Harvard School of Public Health, focuses on individual foods, promotes good carbohydrates and fats, and has physical activity and weight control as the foundation level.

Basic nutrition begins with an understanding of the six major nutrients our bodies need to thrive. These six nutrients are carbohydrates, protein, fat, vitamins, minerals, and water.

Carbohydrates

Carbohydrates are composed of a mixture of three atoms: carbon, hydrogen, and oxygen (CHO). These atoms can be linked together in different ways and numbers to form various types of carbohydrates. There are three main variations: 1) complex carbohydrates, 2) simple carbohydrates, which are stored as glycogen (the fuel that supply our bodies with energy) in the liver and muscles, and 3) fiber which contains non-digestible cellulose that gives plants their shape.

Complex carbohydrates are the large branched chains formed by many sugar molecules linked together. This is called a starch, and includes whole grains, vegetables, fruits, legumes (soybeans and kidney beans for example), seeds, and nuts. These are considered the "good" complex carbohydrates, whereas the white bread, white rice, pasta, and potatoes would be the "bad" carbohydrates. A more detailed look at starches and the glycemic index (GI) can give us a better idea as to what makes a carbohydrate good or bad. A basic chart of carbohydrates with their glycemic values is shown on the next page.

Basic Glycemic Index Chart			
High Glycemic Index *"Bad Carbohydrates"*		**Low Glycemic Index** *"Good Carbohydrates"*	
Maltose (beer sugar)	110	Whole rice	50
GLUCOSE *Glycemia Marker*	100	Whole wheat bread	50
White bread	95	Whole wheat pasta	45
Instant potatoes	95	Fresh white beans	40
Honey, jams or jelly	90	Oatmeal	40
Cornflakes, popcorn	85	Whole rye bread	40
Carrots	85	Green peas	40
Refined sugar	75	Whole grain cereals	35
Corn	70	Dairy products	35
Beets	70	Wild rice	35
White rice	70	Fresh fruits	35
Cookies, pastries	70	Lentils	30
Boiled potatoes	70	Chick peas	30
White flour pasta	65	Dried beans, peas	30
Bananas	60	Soya (most)	15
Raisins	60	Green vegetables	<15

The glycemic index (GI) is a numerical system of measuring how fast a carbohydrate triggers a rise in circulating blood sugar. A GI of 70 or more is high, a GI of 56 to 69 is moderate, and a GI of 55 or less is low. So a low GI food will cause a small rise, while a high GI food will trigger a dramatic spike.

It doesn't tell you how much of that carbohydrate is in a serving of a particular food. Simply stated, a "bad" carbohydrate increases the potential for the hormone insulin to be released more readily and in larger amounts. Conversely, the "good" Carbohydrates cause the release of lower amounts of insulin. Insulin promotes fat synthesis (production) from glucose in the liver, and fat storage in adipose tissue by blocking fat release from adipocytes (fat cells).

Simple carbohydrates, such as sucrose (table sugar), are the smallest unit or molecule of carbohydrate. One gram of carbohydrate, whether complex or simple, will yield four calories of energy when burned up by our cells. The importance of this fuel lies in how the body absorbs these two different molecules, their effect on our blood sugar and the secretion of insulin. Most people should consume approximately 5 – 10 g/kg. Generally this translates to 55 – 60% of one's daily intake of carbohydrates.

The third variation of carbohydrate is fiber, the carbohydrate our bodies cannot digest. The value behind this is the fact that fiber acts as a sweeper of our intestines, keeping them free of harmful substances and potential cancer-causing chemicals. Most North American diets only achieve 8 – 12 grams of fiber per day. In a recent study, an intake of 30 grams per day was associated with a decrease in heart disease and cancer[2].

The authors of the high protein diets are trying to persuade us to change our eating habits by eliminating carbohydrates. But as the pervious discussion shows, they are neglecting the importance of this food group, which includes the "good" carbohydrates and fiber.

Proteins

Protein is a very important nutrient since it is in every cell in our body and is the primary structure that composes our muscles. However, it should not be the nutrient we eat in place of a healthier balanced nutrition plan that includes good carbohydrates as well.

Protein is a more complex mix of atoms when compared to carbohydrates. This is because of the addition of nitrogen to the carbon, hydrogen, and oxygen mixture. However, one gram of protein, similarly to one gram of carbohydrate, will also yield four calories of energy when burned up by our cells.

Proteins are made up of amino acids, of which there are twenty-two. Eight of these amino acids are considered dietary essentials, and two others are considered as semi-essential. They are considered essential because our bodies cannot produce them, and therefore they must be acquired through the food we eat. It is important to note that the reason we eat protein sources is not to provide the body directly with protein. Rather, it is to supply the body with the amino acids it requires to make its own proteins.

With sufficient amounts of carbohydrate available to meet energy demands, the channeling of protein for energy is spared and this protein-sparing effect helps regulate protein metabolism.

As in the case of the high protein diets, if the body has a level of protein above the body's needs, the excess is burned as fuel. There is a benefit of a higher amino acid blood concentration, and that is the release of the hormone glucagon. Glucagon has an effect opposite to that of insulin: it increases the release of free fatty acids from adipose tissue[3].

Unfortunately, the burning of proteins is not as clean as the burning of carbohydrates. This is due to the nitrogenous waste accumulation mainly in the form of urea. This waste has to be handled by the body and puts extra stress on the liver, kidneys, and urinary tract.

Many people ask, "How much protein should I eat?" General recommendations range from 0.4 – 0.9 g/kg depending on activity level. However, current research suggests between 0.8 g/kg for the average sedentary individual, up to 1.7 g/kg for a strength athlete who runs 70 miles per week or performs daily heavy resistance exercise[4]. On average, this equates to 12 – 15 % of your daily caloric intake.

Fats

Lipids are most commonly known as fats, oils, waxes, and related compounds that are not soluble in water. Fats are primarily a mix of carbon, hydrogen, and oxygen atoms. They differ from carbohydrates because they have fewer oxygen atoms present. One gram of fat will yield 9 calories of energy when burned by our cells.

All fats have both saturated and unsaturated fatty acids. The degree of saturation of fat depends on how many hydrogen atoms are present, and whether it is liquid or solid at room temperature. In general, the saturated fatty acids are worse for the body because they are artery clogging. These fats usually come from animal sources and are solid at room temperature. When a pair of hydrogen atoms are missing from the fatty acid it is usually monounsaturated, if more are missing it is polyunsaturated. Just as there are essential amino acids, there are essential fatty acids. These are the polyunsaturated fats or Omega 3 and Omega 6 fatty acids. These are the "Good Fats" that are necessary for body metabolism, and cannot be manufactured by the body, so they must be supplied in the diet. These essential fatty acids can be found in foods like sesame seeds, olive oil, wheat germ, sardines, and salmon to name a few.

There is another "Bad Fat" structure related to the unsaturated fatty acids (called the trans fatty acids or TFA's) that has been getting a lot of publicity lately. A recent study of 80,000 nurses showed that the risk of developing heart disease almost doubled for every 2% increase in consumption of TFA's[5]. Trans fatty acids are fats produced by heating liquid vegetable oils in the presence of hydrogen. This process is known as hydrogenation. The more hydrogenated an oil is, the harder it will be at room temperature. It can be found in products such as margarine, cookies, doughnuts, french fries, fish sticks, and even baby cookies. Soon there will be a change in food labeling making it easier for consumers to understand how many grams of TFA'a are in the foods we buy.

After a high-fat feeding that may occur when on a high-protein diet, there is an inadequate amount of carbohydrate available for energy needs, and the excess fat is oxidized or metabolized forming ketones. If these ketones are allowed to accumulate, the condition known as ketoacidosis occurs, putting stress once again on the kidneys which try to rid the body of the intermediate waste products of protein and fat metabolism.

While fat is a necessary nutrient, too much can lead to obesity, heart disease, and cancer. Limit the fat in the diet to 30% whereby 10% or less is from a saturated source. On an average 2000 calorie diet this is 45 grams of "good" fats, and 20 grams of allowable saturated fat.

Vitamins & Minerals

Vitamins are organic compounds with no caloric value, but are used to help regulate metabolic reactions in the body. They cannot be synthesized by the body and therefore must be obtained through the diet or supplementation. Vitamins can be divided into two specific groups, water-soluble and fat-soluble. The water-soluble vitamins (B complex, C, and the bioflavonoids) are absorbed directly into the blood stream and are not stored in the body. For this reason it is important to replenish them daily. The fat-soluble vitamins (A, D, E, and K) require fats/oil to be absorbed. When too many fat-soluble vitamins get stored there is a potential for toxicity. Therefore it is crucial not to "megadose" with vitamins A, D, E, and K.

Minerals are simple chemical elements that also cannot be synthesized by the body. There are sixteen different minerals, some are major (if your body requires 100 mg/day or more), and some are trace (required intake under 100 mg/day). They are used as non-protein substances to assist enzymes in their functions, and serve as building materials for bones, teeth, tissue, muscle, blood, and nerve cells.

Water

Without food you could survive for almost two months, but without water you'd be lucky to last two weeks. The general recommendation for the consumption of water is eight to ten eight ounce glasses per day. Post-exercise, the body can handle up to eight ounces of fluids every twenty minutes or so. It is suggested that ingested fluids be cooler than ambient temperature (between 15° and 22° C or 59° and 72° F), with the addition of the proper amount of carbohydrate and electrolytes if the activity is longer than one hour[6]. Water loss of 9 – 12% of your bodyweight can be fatal. Second only to oxygen, water is the most important element the body needs to survive.

Conclusion

Since each and every human being is biochemically unique we still need to learn how to more accurately discover an individual's peculiar needs. The Reinvention of Nutrition Basics has given you at least a rough idea as to what the nutrition essentials are for healthier eating. To make up for any deficiencies and to ensure you get the proper mix of carbohydrates, protein, fat, vitamins, minerals and water, it's necessary to eat from every food group in the new and improved Food Pyramid each day.

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About the Author

Anthony D'Assisi earned a Bachelor's of Physical Health & Education from the University of Toronto in 1992. He currently is working towards a Masters of Science in Applied Nutrition. He has been involved in the health and fitness industry for the past 18 years as a personal fitness trainer, conditioning specialist, lifestyle coach, and nutritional consultant.