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Healthy and Happy Monthly Newsletter

Volume 3, Issue No.25, April 2013

Cholesterol and Fat Always Get a Bad Wrap: But They're Essential for Life and as Simple as Math

While the food that we eat on a daily basis is essential for sustaining life, it is also the main component for creating several of the debilitating health conditions that many Americans now find themselves suffering from, in epidemic proportions. More specifically, food is what we put into our bodies through our mouths that can determine if we have robust immune systems, strong hearts, and lucid minds, or frequent infections, hypertension, and emotional and psychological shortcomings. For some people, heredity can play an important role, but for most of us, it is our dietary habits that send us down the slippery slope to being unwell.

So, aside from tasting delicious, what else do all American foods like cheeseburgers, French fries and bacon have in common? They are all high in cholesterol. The truth is that a diet high in cholesterol, saturated fats and trans fats can raise your risk of obesity, stroke, heart attack and sudden death. What the mainstream information feed does not emphasize is that a healthy amount of cholesterol is essential for the body in more ways than one. Would you be interested to know that cholesterol is essential for making vitamin D, and that it is the building block for all steroid hormones? Would it surprise you to know that cholesterol helps to create bile salts that are necessary for your body to digest fat, and that it is an essential element to support the structural integrity of every cell in your body? If so, read on as we highlight and explore the truth about cholesterol, and how too much or too little can lead to unintentional and undesirable results.

Produced in the livers of vertebrate species, cholesterol is a fatty, waxy substance found in all animal tissue. The human liver produces around 1000mg of cholesterol each day, which is enough to sustain the body without additional cholesterol intake through diet. But, like sugar, it is difficult to avoid cholesterol all together through dietary intake because so many foods contain it.

Concern over dietary intake of cholesterol in American society began to enter the mainstream in the 1980s. According to a report issued in 1984 by the National Institutes of Health, the average daily cholesterol intake for Americans was around 500mg. Based on clinical evidence linking high cholesterol to heart disease; the report recommended that individuals consume no more than 250-300mg of cholesterol each day. Today the recommended daily dietary intake remains virtually the same, with the caveat that if you have heart disease, then you should eat less than 200mg/day.

The most recent data from the American Heart Association indicates that the average American blood cholesterol level has fallen as much as ten percent from the 1980s due to increased awareness that a poor diet is directly linked to an increased risk for heart disease. Interestingly, heart disease is the leading cause of death in the United States today, at approximately 28.5% of the total population. With almost one in three Americans destined to die from heart disease, and most people thinking that it could never happen to them, it should be obvious that there is much more work to be done in terms of educating people so that they can make better choices when it comes daily dietary intake and long term health ramifications.

It should come as no surprise that too much cholesterol can be harmful. Similar to carbohydrates, cholesterol has been labeled as bad. This reputation has blurred the fact that most people do not know or understand that cholesterol is essential for survival, and in normal amounts it actually does the body a lot of good. Cholesterol is a fat, often referred to as a lipid. Lipids are organic compounds that are fatty acids, or derivatives, that are insoluble in water, but soluble in organic solvents like alcohol and ether. Cholesterol is also a sterol. Sterols are found in the tissues of animals, plants, fungi and yeasts. They are unsaturated solid organic compounds that are necessary for the formation of steroid hormones like estrogen and progesterone in women and testosterone in men.



Cholesterol flows through the body in the bloodstream, but due to being insoluble in water, getting there is not a simple process. Lipids like cholesterol are oil soluble and so if they were dumped into the bloodstream they would quickly congeal into unusable greasy globs. To get around this problem, cholesterol must bind with proteins to form micro particles called lipoproteins that do blend well with blood and allow fats to move through the water inside and outside of cell membranes. The fat in these particles is made up mainly of cholesterol and triglycerides.

Triglycerides are the backbone of lipids and a major form of fat stored in the body. In fact, triglycerides make up about 90% of the total dietary intake of fat in the food that we eat. Triglycerides consist of three molecules of fatty acids combined with a molecule of the alcohol glycerol. Triglyceride levels are elevated by recent fat and alcohol intake. Elevated levels are considered to be a significant risk factor for hardening of the arteries and heart disease. Triglyceride containing lipoproteins that transport fat in the body also transport cholesterol. Like cholesterol, the body needs triglycerides to create energy, but too much can be bad for the arteries and the heart.

The two most important types of lipoproteins are high-density lipoproteins (HDL) and low-density lipoproteins (LDL). These lipoproteins may sound similar, but HDL and LDL are polar opposites. The main difference relates to their densities, which is a direct correlation to the fat to protein ratio of each particle. High-density lipoproteins have a higher protein to fat ratio and low-density lipoproteins have a higher fat to protein ratio. As far as lipoproteins go, there are several, but in order to understand how your dietary intake influences your cholesterol levels and how cholesterol affects your body, HDL and LDL are two that should be thoroughly understood.



At a basic level, people know that LDL is bad cholesterol and that HDL is good cholesterol. Most cholesterol is LDL, which is the kind that makes the blood thicker and stickier, clogging the blood vessels and preventing blood from flowing throughout the body the way that it should under normal circumstances. On the other end of the spectrum, HDL helps to remove bad cholesterol from the blood vessels by transporting it back to the liver where it is then processed and sent out of the body through waste.

Most people are also familiar with saturated and unsaturated fat. While all fats are similar, like LDL and HDL, saturated fat is unhealthy and unsaturated fat can have a healthy effect, helping the body to lower LDL cholesterol. There are many misconceptions about fat that the media perpetuates at every opportunity. Mainstream society has been bombarded with information that fat is bad, but make no mistake, the problem is not the fat itself, but the type of fat that most Americans consume that can lead to obesity and heart disease.

The truth is that fat, along with proteins and carbohydrates, is an essential macronutrient needed by our bodies to provide us with calories. In addition to being a component of energy production, fat helps to carry vitamins throughout the body, acts as an insulator, helps to repair damaged cells in hair, skin, organs and joints, and helps to regulate blood sugar. In the United States today, too many people are eating the wrong type of fat too often, and along with out of control carbohydrate consumption, this is what can lead to inflammation and disease.

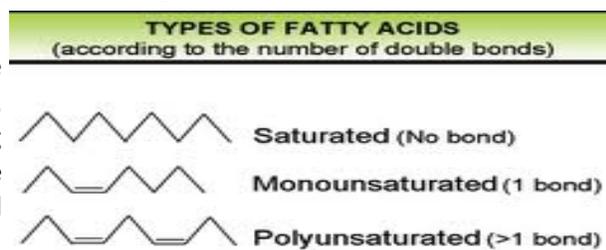
It is important to understand that eating fat is not what makes people gain weight, but eating too many calories does. Fat has 9 calories per gram, and carbohydrates and protein have 4 calories per gram. So, since fat has over double the amount of calories that carbohydrates and proteins have per gram, eating fatty foods makes it easier to consume more calories by eating less food.

Eating foods that are rich in saturated fat can increase blood levels of LDL, bad cholesterol, and triglycerides. When LDL levels are high, cholesterol is deposited on the walls of the veins and arteries, forming a hard substance known as plaque. Over time plaque can clog the arteries, and decrease blood flow, leading to hardening of the arteries, hypertension, heart attack and stroke.

Unsaturated fats work against developing heart disease because they lower LDL concentrations in the blood. All fats are similar in chemical structure, a chain of carbon atoms bonded to hydrogen atoms. What makes them different is the length of the carbon chain, and the number of hydrogen atoms bonded to it. Saturated fat has a larger number of hydrogen atoms attached to the carbon chain; it holds as many hydrogen atoms as possible, so that the carbon chain is literally saturated. Unsaturated fat has fewer hydrogen atoms attached to the carbon chain, and consists of polyunsaturated and monounsaturated fats.

Polyunsaturated fats have long carbon chains with more than one double bonded carbon in the molecule that is not saturated by hydrogen atoms. Polyunsaturated fats consist of omega-3 and omega-6 fatty acids, which are essential for, but not produced by the human body, and must be obtained through diet. Polyunsaturated fats like omega-3 and omega-6 fatty acids play an important role in brain function and normal growth and development of the body.

Monounsaturated fats are fats that have one double bonded carbon in the molecule that is not saturated by hydrogen atoms. Like polyunsaturated fats, monounsaturated fats help to reduce bad cholesterol and the risk of developing heart disease. Monounsaturated fats include food such as vegetable oils, like olive oil, peanut oil, canola oil, and sesame and sunflower oil. Other healthy food sources of monounsaturated fats include nuts and seeds as well as avocados.



While a healthier form of fat, man has figured out a way to make unsaturated fat unhealthy by turning it into trans fat. Trans fats are created through a man made industrial process whereby hydrogen atoms are added to vegetable oil, polyunsaturated fat, to make it more solid at room temperature. Another name for trans fats is “partially hydrogenated” oils. This type of fat is equally, if not more unhealthy than saturated fats, because both forms of fat increase LDL cholesterol, but trans fats lower HDL cholesterol as well. In fact, when compared to saturated fat, population based studies indicate that trans fat can have significantly more dangerous effects on health influencing the risk of heart disease and type two diabetes in adults.

The good news is that the amount of LDL in your bloodstream is directly proportional to the amount of saturated fat and cholesterol in the foods that you eat. To take it a step further, some research scientists are now indicating that while bad cholesterol and saturated fats are biomarkers for an increased risk of heart disease, compared to refined carbohydrates, like the ones found in white bread, snack food, and sweets, these fats are less likely to raise the risk of heart disease.

To put this into context, today the average American diet consists of 62% processed food, which is mostly low quality refined carbohydrates such as starches and sugars. Since the 1980s when high “bad cholesterol” levels became more of a concern, the percentage of the American diet that consists of total fat and saturated fat has decreased, but our consumption of refined carbohydrates has exploded. While most processed foods do contain fat and cholesterol, even low fat processed foods can be unhealthy because they are often rich in refined carbohydrates, sugars and salt. In general, refined foods are devoid of fiber and micronutrients which slow down the absorption of sugars. What this means is that by limiting saturated fatty foods like butter, eggs and cheese, and increasing refined carbohydrates like white flour, white rice and refined sugar, we have actually increased the risk of heart disease and produced dangerous spikes in blood sugar, adding diabetes risk as well.

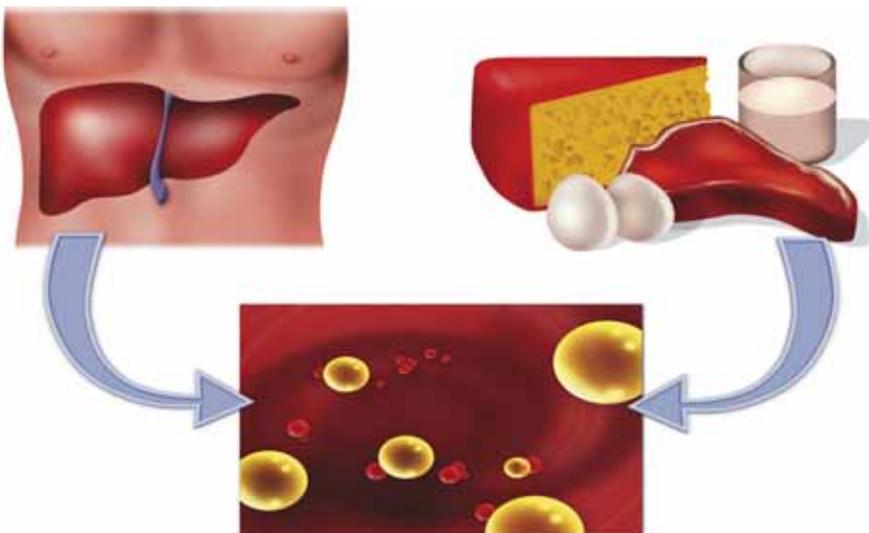
To be clear, please do not think that saturated fat is good for you. But at the same time, recognize that replacing it with refined carbohydrates can be a worse choice to make. Instead, consider eating proper portions of all food groups, not just limiting one in exchange for another. Try to add daily servings of nuts to your diet, replace refined carbohydrates with intact carbohydrates like whole grains, and add extra daily servings of fresh, raw fruits and vegetables and reduce trans fat consumption if possible. Evidence suggests that making these small dietary changes will do more to reduce your bad cholesterol and risk of diabetes and heart attack than simply reducing saturated fat and cholesterol rich foods.

Explained briefly above, cholesterol is so important to the human body that it actually makes it itself, around 1000mg/day. Interestingly, the body has the power to regulate the amount of cholesterol in the blood, and it can produce more when dietary amounts are inadequately provided. Cholesterol is important for every cell in the body, more so for areas of the body that use it in higher proportions, like the testes in men and the ovaries in women. Cholesterol is also important for the digestion process as well as producing nutrients like vitamin D.

Cholesterol is found in every cell in your body. It is especially concentrated in cell membranes, where it helps to maintain the integrity of the membrane and enhances your cells ability to communicate with each other, a phenomenon called cell signaling. Cholesterol adds firmness and integrity to each cell, and without it, not only would our cells be unable to communicate with one another, but we would cease to be human and turn into a pile of mush.

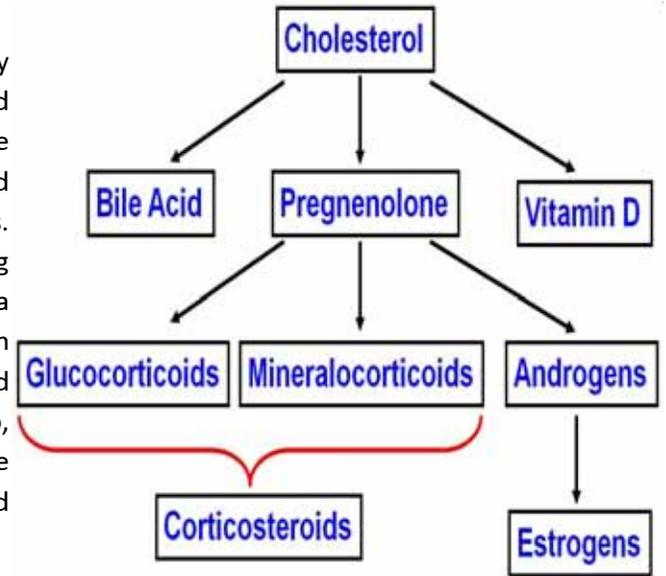
Cholesterol is also used to make bile. Bile is a greenish fluid that is produced by the liver and stored in the gallbladder. Bile is a necessary component for digesting foods that contain fat. It acts as an emulsifier, breaking down large globules of fat into smaller particles so that they can mix better with the enzymes that digest fat. Once the fat is digested, bile helps the body to absorb it and other food ingredients. For example, the presence of bile is required in the intestines in order to absorb cholesterol from foods, as well as vitamins A, D, E, and K, which are fat soluble nutrients.

Based upon a regular dietary intake of animal foods that are higher in cholesterol, your body can decrease its production of cholesterol. Or, if your diet is high in fruits and vegetables, your body can increase its production of cholesterol to compensate for the lack of dietary cholesterol intake. If cholesterol is present in excess, your body can use the bile that it produces to eliminate it. When bile is released into the intestines, whatever is not used is reabsorbed to be used again. To maintain a balanced level of cholesterol, the body can dissolve whatever it does not need in the bile, and it can go a step further by converting more cholesterol into bile acids so that it can be eliminated with the feces.



Another vital role played by cholesterol in the body is to produce the steroid hormones estrogen and progesterone in women and testosterone in men. These hormones promote the physical characteristics that distinguish women and men, and more importantly they play an important role in reproduction. Cholesterol is actually the precursor to all steroid hormones including glucocorticoids (important for blood sugar regulation), mineralocorticoids (important for maintaining mineral balance and blood pressure regulation), and sex hormones.

A precursor is a substance by which another substance is formed, especially by a metabolic reaction. Cholesterol is the precursor to a hormone called pregnenolone, which fulfills important functions itself like helping with fatigue and increasing energy, brain health and memory, reducing stress and bolstering immunity, and reducing the effects of trauma and healing injuries. **Pregnenolone** is also the precursor to all other steroid hormones. Depending on what the body needs, pregnenolone can be converted to **progesterone**, a female sex hormone, **cortisol**, a stress hormone that effects inflammation and blood sugar, **aldosterone**, which regulates mineral balance and blood pressure, or **testosterone**, another sex hormone which regulates libido, muscle mass, energy, and more. Without sufficient cholesterol to meet the demands of a healthy body, hormone imbalance becomes inevitable, and physical and emotional symptoms begin to manifest.



As we age, pregnenolone is increasingly converted to cortisol, the stress hormone. This is due to the fact that in general, humans experience increased levels of stress the older we get. In addition to the proportional relationship between age and stress, other factors like poor diet and lethargic lifestyle exert a greater stress load on the body, leading the body to produce more cortisol in exchange for reduced sex hormone production, a phenomenon known as cortisol steal. Increased stress and cortisol production speeds the aging process, promotes inflammation, increases blood sugar and the likelihood of developing obesity and type 2 diabetes, slows metabolism and leads to heart disease. So cholesterol is neither an antagonist nor a protagonist, but it is what the body does with it that creates a beneficial or detrimental effect on our health.

Another function of cholesterol in the body is to act as a precursor to vitamin D. Vitamin D can also be obtained from foods. Interestingly, foods that provide vitamin D, many of which are animal in origin, tend to be rich in cholesterol as well. Vitamin D is known as the “sunshine” vitamin, and it is sunshine that is required to convert cholesterol into vitamin D. Unfortunately, misguided individuals have been scared into believing that you are supposed to avoid sunlight because it can lead to skin cancer. While prolonged exposure to sunlight can increase your chances of developing skin cancer, thirty minutes of direct summer time sunlight each day is enough that your body will produce several thousand international units of vitamin D. Avoiding sunlight will therefore undermine your body’s ability to make vitamin D, and eating foods that are low in cholesterol will only beget the problem since foods that are low in cholesterol also tend to be low in vitamin D.



With all of the alarming information about cholesterol and fat it is no wonder that they have such bad reputations. But as you can see from the information provided here, there is more than meets the eye. Cholesterol and fat are naturally occurring, and as with all things, too much of anything can pose a problem when it comes to maintaining a healthy body. The same goes with too little. With all of the functions and purposes that fat and cholesterol serve, a deficiency in either or both can cause the body to act in undesirable ways. In the simplest terms, a thorough understanding of good and bad cholesterol and healthy and unhealthy fats is necessary to make informed dietary decisions. It is one thing to read labels, but a food product with a nutrition fact label should be your first indication that it is likely not the best choice to satisfy your hunger. Fresh fruits, vegetables, nuts, lean meats and fish all contain healthy proteins, fats, and carbohydrates. A balanced daily portion of each, rather than the things that you eat from a bag, box, or can, will provide a significant amount of prevention and help to ensure that your body is getting the nutrition that it needs to be healthier in the long run. The topics discussed and statements made in this newsletter have not been evaluated by the FDA.

Information in this newsletter is not intended to diagnose, treat, cure or prevent any disease.