

Dilemma of Saturated & Unsaturated Fats

By Dr Harold Gunatillake-Health writer

“All dietary fats are absorbed into the body as fatty acids whether they come from saturated or unsaturated fats and stored as triglycerides in the adipose tissue. This article recognizes both saturated and unsaturated fatty acids being stored as triglycerides with no differentiation or categorizing as unsaturated and saturated triglycerides in the adipose tissues.

The body stores them all as triglycerides. So how can the researchers say that saturated fats are bad for you, and unsaturated fats are heart-friendly, reduces cholesterol, and reduce risk of heart disease and stroke, and good for you”

As food, we all need macronutrients: carbohydrates (carbs), fats and proteins, and essential micronutrients, in trace amounts, like the vitamins (folate, iron, magnesium, vitamin D and D) minerals, fish oils and supplements, among others. Micronutrients play a central role in metabolism and in the maintenance of tissue function.

Complex carbs we consume are broken down into monosaccharides (glucose) and several enzymes assist in the process.

Proteins- we eat in meat, cheese, milk, yogurt, beans, lentils, and many others, are broken down into smaller chains of amino acids by digestive enzymes in the small gut.

Fats in our food are composed of fatty acids chains, mainly classified as saturated, unsaturated and trans fats. The unsaturated fatty acids are further classified as mono and polyunsaturated fatty acids.

Why do we refer to fatty acids as acids when they are not acids? A fatty acid is a carboxylic acid with a long aliphatic chain (aliphatic means relating to organic compounds whose carbon atoms are linked in open chains). Hence, it is called an acid but does not change the pH of your body.

Generally, a fatty acid contains a straight chain of an even number of carbon atoms (4-28 carbon atoms), with hydrogen atoms linked on either side, and at one end of the



Too much of good things.
Pic courtesy WebMD

chain there is a carboxyl group (-COOH). It is that carboxyl group that makes it an acid (carboxylic acid).

A significant amount of the fatty acids in the body are obtained from your diet, and they are found as triglycerides, phospholipids, cholesterol esters, mainly stored in the fat cells (adipocytes). These could be obtained from either plants or animals. The fats obtained from terrestrial animals tend to be more saturated, whilst from fish and plants the triglycerides obtained are more polyunsaturated fats and hence the fatty acids are oil at room temperature. Virgin coconut oil being saturated, should be solid at room temperature.

Dietary fats are broken down into smaller molecules called fatty acids and glycerol by enzyme lipase from the pancreas, in the small gut. With the assistance of bile acids formed in the liver and stored in the gall bladder, the dietary fats (triglycerides) are broken down by pancreatic lipase enzyme (a process of emulsification) to monoglycerides fatty acids and cholesterol.

These monoglycerides would say 'goodbye' to their mates- carbs (glucose) and proteins (amino acids), because the latter two enters the portal vein which takes them to the liver for further processing and the monoglycerides from the breakdown of fats, takes another path.

The monoglycerides are taken into the intestinal cells. Triglycerides and cholesterol esters (an organic compound made by replacing the hydrogen of an acid by an alkyl or other organic group.) are reformed in the intestinal cells.

They are packed with a protein (phosphate group) referred to as a lipoprotein or chylomicrons -which enters the lymph system called lacteals- the capillaries of the lymph system. They are carried as chylomicrons in the lymph and through the thoracic duct enters the venous blood system at the junction of the left jugular vein and left subclavian veins on the lower left-hand side of the neck. These chylomicrons are triglycerides chemically and they are small fat globules found in lymphatic fluid and in the blood and transported to the liver and adipose (fat) tissue, including heart, muscles.

These chylomicrons (triglyceride micro-globules) give the blood serum a milky color. They are absorbed mainly into the adipose tissue found in every part of your body, including under the skin (subcutaneous), deeper tissue above and below the deep fascia, in the abdominal cavity as visceral fat. It is the fat beneath the deep fascia that is sucked out in 'liposuction' procedure.

Viscera is composed of the membranous apron like tissue hanging from the greater curvature of the stomach. This tissue now referred to as an organ can encase a massive quantity of fat that is mainly responsible for the "protuberant bellies of adult males. Fat also accumulates round the organs such as the kidneys, pancreas, intestines, mesentery, and even in the abdominal wall covered by the peritoneum (para-peritoneal fat)

Such dispersion of fatty acids throughout the body has an insulating protection to maintain the body temperature, protects your internal organs by stabilization, and preventing shocks due to jerky movements of your body, in addition to providing energy on demand.

Excess visceral fat has a deleterious effect on the heart and runs the risk of heart disease, and further linked with insulin resistance

This intra-abdominal fat must be dissolved by walking daily (10,000 steps) and with other workouts and dieting, if you consider a long healthy life.

All other digestive products pass into the liver, except these fat-soluble products which enter the general blood circulation directly. Natures reason for this strange phenomenon is not understood.

What is important to know is that dietary fats are composed of mainly triglycerides. They are broken down into fatty acids and again in the intestinal cells reformed into triglycerides-we refer to as chylomicrons. The reason for being broken down is because they are too large to be taken into the intestinal cells.

The dietary fatty acids are not water soluble, and by mixing with bile acids, both dietary triglycerides and cholesterol become water soluble and the enzyme lipase could access in the process and the dietary triglycerides can be broken down into mono and di-glycerides for further absorption.

All fatty acids (chylomicrons) are stored in the adipocytes (adipose cells) in the body, including the liver, where they are resynthesized into triglycerides using glycerol derived from glucose in the glycolytic pathway. These triglycerides formed in the liver is in the form of very low-density lipoproteins (VLDL). They enter the blood stream as endogenously produced lipids and cause damage to the arterial walls (atherosclerosis) and adds to the plaques causing blockage of vessels, when formed in excess.

What is important to know, so far not explained, is that the body does not recognize whether triglycerides that are resynthesized in the adipose tissue comes from unsaturated fatty acids or saturated fatty acids.

If such differentiation is available, we need to classify triglycerides as good and the bad like cholesterol.

All triglycerides resynthesized are from both unsaturated fatty acids and saturated fatty acids. They are resynthesized as mentioned above using glycerol derived from glucose.

These undifferentiated triglycerides are stored in adipose tissue until required as fuel. When less carbs are consumed these triglycerides provide energy by producing ketone bodies.

The liver also produces fatty acids by converting the excess glucose used for the synthesis of glycogen. These fatty acids also combine with glycerol to form triglycerides which are stored in packages in droplet forms. These chylomicron droplets form the very low-density lipoprotein (VLDL).

Those who eat too much of foods with added sugar, corn syrup, ice creams, milk shakes, among others need to be aware that such highly dense foods do add to your waist-line, cause fatty livers and the excess triglycerides formed due to conversion into fatty acids- all damage your health.

Glucose is converted in your body into acetyl Co A. When your body requires immediate energy, acetyl Co A enters the Citric acid Cycle in the liver. The energy molecules thus created is called ATP. If glucose is consumed in excess, more than you require the acetyl Co begins the fatty acid synthesis becoming triglyceride molecules.

So, consuming too much of glucose and its derivatives creates triglycerides which will be stored in the fat cells (adipocytes) and create a condition called 'Hypertriglycaemia' that can cause many metabolic harms in the body.

We have been talking about triglycerides (TAG), but how are they formed.

Each triglyceride molecule is formed of one glycerol derived through glycolysis of glucose, and three fatty acids. These fatty acids may come from dietary saturated fats or unsaturated fats, and the body makes no difference to where they come from, but they form bad 'Triglycerides (TAG) that's going to harm you in excess.

These triglycerides are stored in the body in the adipose tissue, as discussed before. The adipocytes have the unlimited capacity to store triglycerides as lipid droplets, and

no wonder you see many obese people who stocks such lipid droplets and compromise cell function.

As mentioned before the triglycerides formed in the liver are converted to very low-density lipoprotein. These particles seem to be remodeled in the liver to form low density lipoprotein (LDL-cholesterol), which seems to be the bad fellow.

Triglycerides whether synthesized from saturated fatty acids or unsaturated fatty acids have deleterious effects on the body. It is difficult to explain why we believe that unsaturated fats can reduce cholesterol levels and reduce risk of heart disease and stroke. If that is true we should have 'good' triglycerides stored in our fat cells (adipocytes) to carry out such beneficial function. But the truth is that whether triglycerides stored come from unsaturated fats or saturated fats, they all do harm in excess.

How to reduce triglycerides in your body

It is important to reduce your triglycerides level in your blood to below 150 milligrams per deciliter of blood (mg/dL) and high triglycerides values are over 200 mg/dL.

This is reflected in your annual lipid test. These triglycerides are important for your body as stored energy to be released when required, but too much in your blood can hurt your heart and lead to other health problems, irrespective of the fact that these stored triglycerides are synthesized from saturated or unsaturated fatty acids.

When triglyceride levels are too high you may end up with metabolic syndrome and your chances of developing cardiovascular disease, stroke and diabetes is very high. In metabolic syndrome you have more than 150mg/dL of triglycerides in your blood. A fasting blood sugar level of 100mg/dL or greater.

You may have high blood pressure-over 130/85 mmHg or higher. Your good cholesterol may be low -less than 40 mg/dL and your waist circumference would be more than 40 inches in men and 35 inches in women.

Contributing factors for metabolic syndrome and high triglycerides in blood are lack of activity and mobility, obesity, genetic factors and age.

Diet-wise, reduce your added sugars, sodas, breakfast cereals with added sugar, flavored high fat yogurt, ice cream and bottled fruit juices. Limit eating starchy, like corn and peas. Eat plenty of cauliflower, kale, and mushrooms. Eating too much pasta, potatoes, or cereals may increase your triglycerides in your blood. Limit your servings as much as possible.

You could lower your triglycerides by consuming fish oil supplements daily (1000mg) of the combined omega-3 DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid), and eat fruits low in sugar, such as apples, pears, and bananas in your diet to get enough fiber to lower triglycerides naturally. You may need to limit yourself to 2-3 pieces of fruit a day, and that way you may not eat too much of natural sugars that are in fruits.

Too much alcohol drives your blood triglycerides very high, because of the high sugar content in wines, beer, or liquor

Coconuts though described as a poison in a speech given at the University of Friedberg by Dr Michel because of its high saturated fat content, you should not take that message as the truth and not use coconuts in your curries and other Asian cuisine. Coconut fat being a medium chain triglyceride (MCT), is totally metabolized in the liver and do not cause high triglyceride levels in your blood.

Limit your honey and Maple syrup as they have more natural than refined sugar and the triglyceride levels can shoot up.

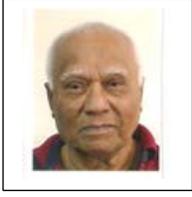
Avoid high fat meat as much as possible, but you may choose leaner cuts. You should avoid processed meats, including bacon, sausage, and ham, as these types of processed meats can raise your triglycerides in your blood.

Daily exercise is most important to remove your extra triglycerides in your stored fat accumulations in your body. Exercise seems to burn more kilo calories, and just a few weeks of walking 10,000 steps a day will dissolve most of the fat in your muscles, tissues, viscera, among other areas of your anatomy, and you will lose weight and feel more comfortable and relate to your love ones much better. Walking dissolves fat fast.

Bottom-line:

WE believe that both saturated and unsaturated fats in excess are harmful to your body, though the current thoughts are in favor of unsaturated fats considered as heart friendly. The reason we contribute is that the triglycerides in your body cannot differentiate between the two kinds of fat described earlier, and the triglycerides which is synthesized by both unsaturated and saturated fats are harmful. Eat less fat of both varieties to bring down too much of triglycerides stored as fat in your body.

Hope reading this article will open your eyes to realize the truth.



Dr Gunatillake-Health editor is a member of the Academy of Medicine, Singapore. Member of the Australian Association of Cosmetic Surgery, Fellow of the Royal College of Surgeons (UK), Corresponding Fellow of the American Academy of Cosmetic Surgery, Member of the International Societies of Cosmetic surgery, Fellow of the International College of Surgery (US), Australian diplomat for the International Society of Plastic, Aesthetic & Reconstructive Surgery, Board member of the International Society of Aesthetic Surgery, Member of the American Academy of Aesthetic & Restorative Surgery, Life Member of the College of Surgeons, Sri Lanka, Bachelor of Medicine & Surgery (Cey). Government scholar to UK for higher studies and training.