

Capitalizing – Consumer Confusion

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OILS AND FATS

Today most people are aware that oils & fats create blockages in our heart. We also keep hearing words like trans fats (TFA), saturated oils, unsaturated oils, mono unsaturated oil, hydrogenated fats (vanaspati), lipids, cholesterol, low-density lipoproteins (LDL) or "bad", cholesterol, High-density lipoproteins (HDL) or "good" cholesterol, very low-density lipoproteins (VLDL), triglycerides (TG or TRIG), essential fatty acids, etc., with little or no understanding from all and sundry.

Oil manufacturing companies to sell their produce join the clutter with their misleading advertisements claiming that their product is superior to all others available in the market enticing all of us to consume more and more oils and fats. Medical experts, researchers, nutritionists, keep professing their opinions basing it on the latest research papers that crop up on a regular basis completing the confusion on consumers. This paper, will try explaining these medical terms in an easy to understand simple language enabling us to take an informed decision.

The foods that we consume contain oils and fats. Oils and fats in turn have cholesterol, triglycerides, and trans fats. Excess cholesterol in our blood leads to the formation of blockages in coronary arteries. Cholesterol, triglycerides that are present in oils and fat, combine with proteins in our body during our metabolism and form LDL, HDL, and VLDL. It is important to note that none of our foodstuffs, including oils and fats contains LDL, HDL, or VLDL.

CHOLESTEROL

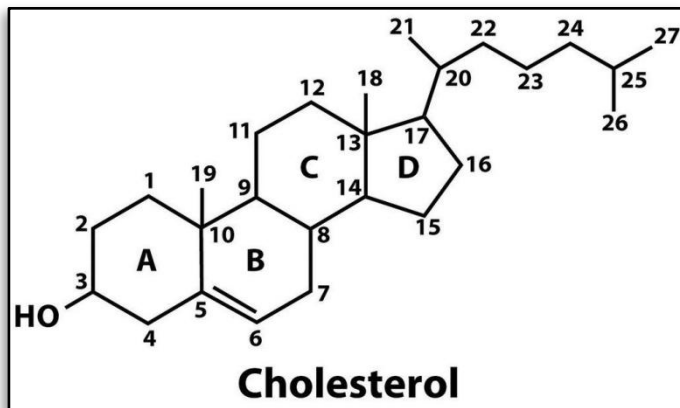
Chemically cholesterol is a long chain fatty acid and plays a very significant role in heart ailments. Excess cholesterol in blood builds up the walls of our arteries causing atherosclerosis. Cholesterol buildup makes the arteries narrow, blocking the blood flow to the heart muscles eventually leading to heart disease. A normal individual has 130-200 mg of cholesterol per 100 ml of blood serum. Cholesterol increase in our blood serum is mainly due to two reasons. One is through food intake and the other due to its formation in our liver during metabolism. Animal food like meat, fish, eggs, milk, and milk products largely contribute our cholesterol intake.

Vegetables and plant products do not contain cholesterol they are all cholesterol free. Only animal products contain cholesterol. This point is very important to remember as some vegetable oil and non-animal or plant produce manufacturers highlight the absence of cholesterol in their product as a unique selling point (USP) to make higher sales. This 'zero cholesterol' promotion by unscrupulous food product manufacturers is only to mislead the consumer to consume more and more of the product they market.

Indiscriminate vegetable oil consumption may not lead to increased cholesterol levels in blood serum, but it can surely increase triglyceride content in blood serum to unacceptable levels. Likewise, nuts like almonds, cashew

nuts, walnuts, and groundnuts may be free of cholesterol however, they are loaded with triglycerides.

Avoiding animal foods is one the best ways to prevent excess cholesterol in our blood serum. In case of vegetarians 70 to 80%, of their body cholesterol requirement is from liver manufacturing and the remaining is due to intake of milk and milk products. Consuming skimmed milk is one simple option to reduce cholesterol intake for vegetarians.



Cholesterol is a waxy substance present in our body cells, that is required by our body to make Vitamin D, hormones, etc., and help in the digestion of food. Cholesterol plays a major role in producing body hormones such as, estrogen, testosterone, progesterone, aldosterone, and cortisone. Cholesterol helps the body in producing vitamin D when sunrays fall on our skin surface. Cholesterol produces bile acids, aiding digestion, help absorption of vitamins, in creation and maintenance of human cell membrane.

FOODS WHICH HAVE CHOLESTEROL (Values per 100gm Edible Portion)

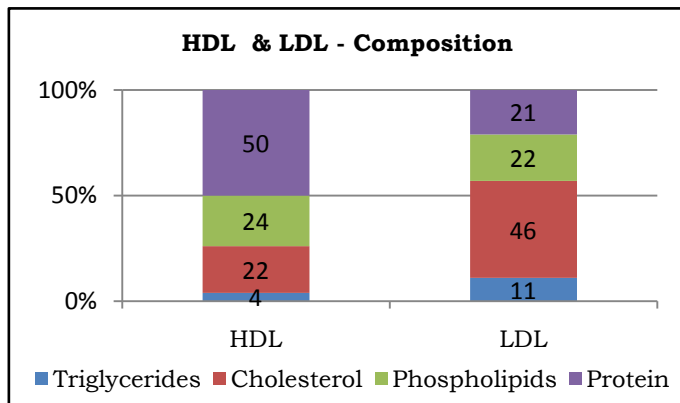
Food	Cholesterol Content(Mg)
Meat & Its Products	
Yellow of eggs	550
Chicken (broiler)	60
Mutton (goat) (medium fat)	65
Lobster	200
Liver	300
Kidney	375
Brain	250
Pork	70
Oysters	230-470
Shrimps	125
Crab	105
Lamb	70
Milk & Milk Products	
Whole milk	11
Whole Milk Powder	85
Skimmed Milk	3
Cheddar Cheese	100
Cheese spread	65
Cream	100
Butter	250
Cheese(Cottage)	15
Plain Ice-cream	45
Animal Fat	90

Human liver manufactures cholesterol from oils, fats and other foods we consume. Liver produces cholesterol, as much is necessary by our body. However, in some persons liver produces cholesterol in much excess. Although the exact reasons for this are unknown, it could also be due to their family genes. Thus, people not consuming any animal product may still have high cholesterol content in their blood and end up in the high-risk category for getting heart disease. In all these cases, an over working liver is the culprit. Proper control and medication will only be able to keep check of excessive cholesterol levels in the blood.

LOW-DENSITY LIPOPROTEINS (LDL) & HIGH-DENSITY LIPOPROTEINS (HDL)

Cholesterol is a lipid and does not easily mix or travel very freely in blood. Mainly due to this reason, some amount of cholesterol picks-up proteins and phospholipids on the way, forming complex lipoproteins (combination of lipid & protein) to transport cholesterol through the bloodstream to cells that need it for various functions.

Lipoproteins comprises of small structures made of fat or lipids on the inside and proteins on the outside. The two kinds of lipoproteins that carry cholesterol through out the body are the Low-density lipoproteins (LDL) cholesterol, and High-density lipoproteins (HDL) cholesterol. Healthy levels of lipo proteins in our blood are necessary to maintain good health free from heart ailments. Although LDL and HDL both play roles in transporting cholesterol within our body, they have very different structures, functions and effects on our health. See composition chart below for details.

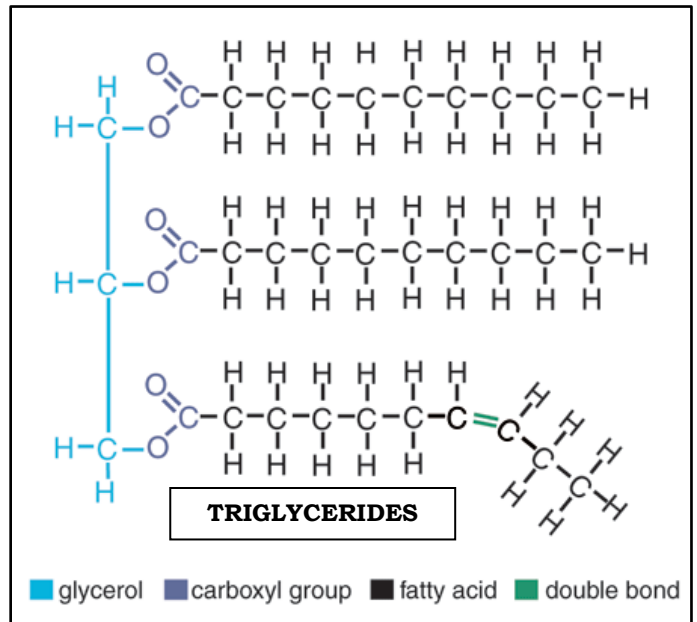


High-density lipoproteins (HDL) have little cholesterol and can pick up more cholesterol from the arterial blockages. They are therefore "good" cholesterol unlike Low-density lipoproteins (LDL) or "bad" cholesterol, which already has plenty of cholesterol in itself and so unable to pick up some more cholesterol that may lead to arterial blockages. LDL cholesterol, with elevated cholesterol, builds up in the walls of our arteries, making them hard and narrow. If the arteries that supply our heart with blood (coronary arteries) are affected, we may have chest pain and other symptoms of coronary artery disease. Most pathological laboratories do not physically measure LDL, but mathematically calculate it using the formula,

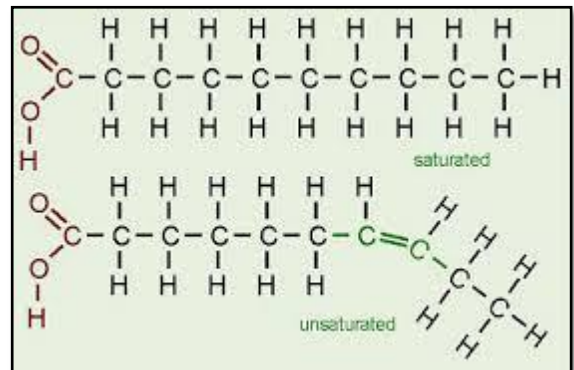
$$\text{LDL} = \text{Cholesterol} - (\text{Triglycerides}/5) - \text{HDL}.$$

TRIGLYCERIDES (TG or TRIG)

Triglycerides like cholesterol also cause arterial blockages. Triglycerides are a different class of lipids. We call them



triglycerides because the base molecule is glycerol and it combines with three fatty acid chains. Many types of triglycerides exist depending on the fatty acid chains present in them which again depends on the fat source. The fatty acid chains are either saturated or unsaturated.



Triglycerides very similar to cholesterol travel alone as well as in combination with proteins. We already know that triglycerides are present in LDL and HDL. Closely packed triglycerides in lipoproteins, better known as Very-low density lipoproteins (VLDL) also travel along with triglycerides in human blood. Similar to LDL pathological laboratories calculate VLDL, mathematically as follows,

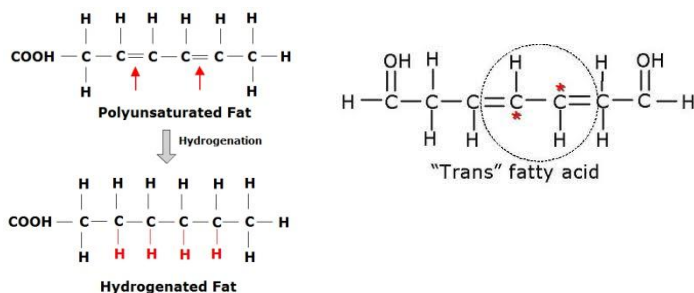
$$\text{VLDL} = \text{Triglycerides}/5$$

WHY EXCESS CHOLESTEROL AND TRIGLYCERIDES ARE HARMFUL TO HEART?

Excess lipids like cholesterol, triglycerides, and their sub products namely LDL & VDL over a period of 20-50 years, deposit on the inner arterial wall of the heart causing Atherosclerosis. This process starts with the White Blood Corpuscles (WBC) in our blood mistaking the various above lipids to be foreign bodies attacking and taking them inside their cell structure. Slowly excess fat keeps increasing within these WBC, forming foam cells, which then sticks to the wall of the heart blood vessels creating blockages. When foam cells leads to more than 80% blockages we call this condition as Angina. When these blockages break the covering membrane, it forms a clot leading to heart attacks.

TRANS FATS (TFA)

Hydrogenated oils are saturated fats and could contain a good amount of trans fatty acids, or trans fats (TFA) if manufacturers for commercial gains carry out partial hydrogenation of oils or polyunsaturated fats.



TFA leads one to having adverse health effects. TFA are neither saturated nor unsaturated fats. Our body recognizes TFA as saturated fats and it treats it likewise, biochemically in the human body. TFA are as bad or even worse for your arteries than saturated fats.

- Studies show that TFA raise blood cholesterol levels, similar to the cholesterol-raising effects of saturated fats and provide little nutritional benefit to the body.
- TFAs raise the levels of LDL that transports cholesterol throughout our body.
- TFA increases Lp(a) lipoprotein a type of LDL cholesterol found in varying levels in our blood, depending on our genetic makeup. TFA make Lp(a) into smaller and denser lipid particles, which promote a buildup of plaques in our arteries. Plaques, can reduce blood flow through our arteries. If plaques tear or rupture, a blood clot may form, blocking the flow of blood or breaking free and plugging an artery downstream. If the blood flow to one part of our heart stops, we will suffer a heart attack. If blood flow to a part of our brain stops, a stroke occurs. A high LDL cholesterol level is a major risk factor for heart disease.
- TFAs reduce levels of HDL that picks up excess cholesterol and takes it back to our liver.
- TFAs job of raising the bad cholesterol LDL and lowering of the good cholesterol HDL in blood is double trouble.
- TFA increases triglycerides in our blood contributing to hardening of the arteries (atherosclerosis) or thickening of the artery walls, which increases the risk of stroke, diabetes, heart attack, and heart disease.
- TFAs may increase inflammation, which is a process by which our body responds to injury. Researchers believe that inflammation plays a key role in the formation of fatty blockages in heart blood vessels. TFA appears to damage the cells lining the blood vessels, leading to inflammation. Studies show that TFA decrease the body's ability to produce natural anti-inflammatory prostaglandins.
- TFA or hydrogenated fats may interfere with the ability of the cells of the body to metabolize the fats that are good, damaging cell membranes of the brain and nerve cells leading to chronic, degenerative diseases.
- Human brain and placenta have a biochemical way of filtering most trans fatty acids that occur naturally in some foods (meat and dairy products) by metabolizing these fats as energy sources before they have a chance to do any cellular damage, and then use the good fats

(the essential fatty acids) as healthy nutrients for the cells. However, this protection is incomplete if the diet is overwhelmed with TFA.

- Eating a diet high in nutritionally worthless hydrogenated fats lessens a person's daily intake of essential fatty acids that are important for growth and function of vital organs, like the brain. This is especially true in case of children whose daily diet is high in processed and deep fat-fried foods and snacks.
- TFAs links to other health problems as well, including decreased testosterone, abnormal sperm production, and prostate disease in men, overweight to obesity, immune system depression, and diabetes.
- Studies carried out by National Institute of Nutrition (NIN) to evaluate the effects of TFA from Indian Vanaspati in rats show that both saturated fatty acids and TFA increase insulin resistance. Moreover, TFA intake by mothers increases the susceptibility to biochemical / metabolic alterations increasing the risk of diet related chronic diseases.

WHAT IS GOOD ABOUT TRANS FATTY ACIDS?

TFAs form naturally in the stomachs of animals such as cattle, sheep, and goats and are stored in their fat cells. Products such as milk, yogurt, cheese, and meat from these animals, therefore, contain TFA in the form of conjugated linoleic acid or CLA. Natural TFA may have either a neutral



effect or a moderating effect on LDL and no effect on HDL cholesterol or triglycerides. In addition to not being harmful, naturally occurring TFAs may actually be good.

SUGGESTIONS & RECOMMENDATIONS

The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) suggest that diets should provide a very low intake of TFAs. In practice, this implies an intake of less than 1% of daily energy intake. As for saturated fats and total fats, the FAO and WHO recommend an intake of less than 7-10 % and 15-30% of daily energy intake respectively. **An individual with a daily energy intake of 2000 kilocalories should limit the daily intake of TFA to less than 2 grams, saturated fats to less than 20 grams and total fats to less than 60 grams.** Studies confirm that rural India consumes 20 grams Vanaspati fat daily and urban India around 30 grams. Considering that only 10% TFA is available in Vanaspati, still the person will derive 0.9 and 1.35 % energy from the TFA exceeding the 1% energy, limit for TFA recommended by World Health Organization, WHO.

Cholesterol, triglycerides, trans fat, although important for the normal functioning of our body, is extremely harmful when in excess. We may be able to reduce TFAs, and TRIG, in our body by limiting consumption of products high in triglycerides and trans fats, but we cannot do this with cholesterol, as it is our body, which produces it naturally.

Avoiding animal food totally and reducing oils and fats consumption is an easy practical option.

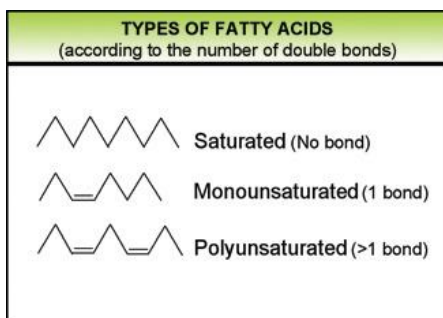


Cholesterol-reducing drugs like, 'Statins' that lower the blood cholesterol levels by slowing down the production of cholesterol in the liver is one such alternative. However, they cannot neutralize cholesterol that we consume through food. 'Statins' drugs are useful only if we stop consuming cholesterol rich food. Human liver

produces bile juice that helps our body in digestion. Bile juice contains a good amount of cholesterol. After food digestion, the body recovers the cholesterol by reabsorbing it back into our blood, when the digested food passes through our intestine. 'Ezetimibe' group of drugs stops reabsorbing of this cholesterol in the intestines thereby reducing overall cholesterol levels in our body. Limiting the consumption or intake of products rich in oils and fats can prevent triglycerides build-up in our body. 'Fibric acid' group of drugs largely lowers triglyceride levels in our blood and lowers cholesterol very slightly.

AS CONSUMERS WHAT CAN WE DO?

- Avoid hydrogenated fats, foods containing "hydrogenated" or "partially hydrogenated" oil.
- Avoid using butter and ghee since these are higher in saturated fat and cholesterol.
- Look for labels that mean "saturated-fat free" or "contains no cholesterol" or "TFA 0%," etc.
- Avoid eating commercially prepared baked foods, snack foods, and processed foods, including fast foods. To be on the safe side, assume that all such products contain TFA unless known otherwise.
- Avoid deep-fried foods, especially at fast-food joints and restaurants.
- Tropical oils, like coconut, palm kernel, and palm oils, contain a lot of saturated fat that also raises our LDL.
- Recent evidence indicates that coconut oil strongly increases HDL cholesterol, which may make it a good choice when a bit of hard fat is essential.
- Fat is a major source of energy for the body and aids in the absorption of vitamins A, D, E, and K. Fat is also important for proper growth, development, and maintenance of good health. **A healthy diet should include some fat, but well within limits.**



- **Aim for consuming less than 7% of fat calories from saturated fats.**
- Polyunsaturated fatty acids viz., alpha-linolenic (Omega 3) and linoleic (Omega 6) acids are important components of cholesterol lowering healthy diet. However, the benefits depend on the consumption of

an appropriate balance of these fatty acids. Replacing trans saturated fats with mono unsaturated fats and maintaining adequate intake with an appropriate



balance of Omega 6 and Omega 3 polyunsaturated fatty acids is necessary.

- Monounsaturated fat, found in virgin olive, groundnut, sunflower, etc., is a healthier option than saturated fat.
- Nuts, fish and other foods containing unsaturated omega-3 fatty acids are other good choices of foods with monounsaturated fats.
- Try baking, steaming, grilling, or broiling instead of frying.



- Eat plenty of foods that are naturally low in fat, such as whole grains, fruits, and vegetables.

It is important to realize that we cannot purchase good cholesterol or HDL in the market as it is our body that produces it. Daily exercise, eating green vegetables, only can increase it in our blood. Maintain cholesterol below 130, triglycerides below 100. Higher the HDL levels in blood the better. HDL above 40 mg/dl (1.03 mmol/L) for males and above 50 mg/dl (1.29 mmol/L) for females is best. In any case, HDL should be at least 25% of our cholesterol level. Doctors call it the cholesterol HDL ratio. This ratio should be below 4, meaning HDL is above 25%.

In addition, reduce systolic blood pressure (BP top number) at or below 120 and diastolic blood pressure (BP bottom number) at or below 80 mm Hg. Decrease fasting blood glucose below 100 mg/dl (5.6 mmol/L), HbA1c, less than 5.7%, and hs-CRP level below 1.0 mg/dl.

A trim waist circumference of less than 90 cm (35 inches) in males and 80 cm (31 inches) in females, lowering the fat or lipid consumption, totally avoiding trans fat, is good for our blood, better for heart and best for our health. Maintaining all this can go far to keep us healthy for long, protecting us from any impending heart attack.