

Using Diet to Help Control High Triglycerides

When people hear the word triglycerides, they typically think of fat. They create images of excess fat floating around in the blood and think of impending heart attacks. While there is some degree of truth in these associations, it is important and interesting to learn about triglycerides and their function in the diet and inside the body.

What are Triglycerides?

While most individuals equate triglycerides with fat, this is kind of a misnomer. The official term for what most people call *fat* is *lipids*, which indicate a variety of substances – necessary to the body – that won't dissolve in water. Triglycerides are one type of lipid. Other lipids include cholesterol (and other sterols), waxes, several hormones and other substances.

Triglycerides – what we generally refer to as fat – are a necessary, fundamental and essential part of the body's structure – like protein and carbohydrates. So much negative attention comes to fat, however, because the typical American diet far exceeds the normal amounts needed for proper functioning.

Triglycerides are the package that fat comes in within food and it is the form in which we store "fat" in the body. Excess triglycerides become the excess fat deposits that are seen in the body tissue and contribute to overweight or obese status if there is too much excess stored. However, triglycerides (fats) that are eaten come in different forms and are first broken down in digestion to be either used for energy or stored as fat in the adipose cells if energy needs are already met.

What's in a name?

Triglycerides are given this name because of their chemical composition. (Today, they are more accurately referred to as *triacylglycerols* in scientific literature). Triglycerides are composed of a glycerol molecule (-glyceride) attached to three (tri-) fatty acids. The three fatty acids can come in different forms depending on their chemical bonds. A saturated fatty acid is one that is missing no hydrogens; therefore they are "saturated" with hydrogen. If one hydrogen is missing in the fatty acid, it is considered monounsaturated (mono = one). If two or more hydrogens are missing from the fatty acid, it is considered a polyunsaturated fatty acid (poly = many).

While this chemical jargon may seem confusing to some, the major point is that fatty acids come in different forms and when they are eaten, they are ingested in the form of a packaged triglyceride. The more hydrogens that are missing, the easier the fatty acids are to break apart in digestion and use for energy. This is one reason that saturated fatty acids are considered "bad"; they are more difficult to break apart and more easily stored as fat in the body. Polyunsaturated fats

are more easily metabolized and used as energy than either monounsaturated or saturated fats. A good rule of thumb in general is that the more liquid the fat – such as oils and tub margarines – the more unsaturated the fat is.

Fat as Energy.

One of the major functions of fat is to provide energy. Whether for immediate energy or energy packaged and stored for use later in the body's tissue, triglycerides are a concentrated source of energy.

One gram of fat has twice the calories as one gram of protein or carbohydrate because of their chemical structure and the way they are packaged. One gram of fat equals 9 calories versus protein or carbohydrate which each yield only 4 calories per gram. Fat, unlike protein and carbohydrate, can be “stored” in the body for later use. Protein and carbohydrate cannot be stored, but if more protein or carbohydrate is consumed than the body needs for normal functioning, a series of chemical processes will begin to convert them into fat for storage.

Other functions of triglycerides.

Besides being an important form of energy, fatty acids serve several other functions in the body that are integral to one's health. Fats are an integral part of all cell walls, giving structure and stability to the cells. They are also necessary for normal cholesterol metabolism and transportation in the blood. Fatty acids from triglycerides are involved in communication between cells and play an important role in many body functions including the regulation of blood pressure, the process of blood clotting, and others. They are also involved in the production and storage of other cell regulators like prostaglandins and of hormones like estrogen.

Very importantly, fats are necessary for the absorption, transportation and storage of the fat-soluble vitamins A, D, E, and K. Overall, fats are essential for maintaining normal function and balance within the body.

So, do we need to eat fat?

Body has ability to synthesize saturated fatty acids to the level that is necessary. However, certain polyunsaturated fatty acids cannot be synthesized in the body and therefore must be eaten in the diet. This is why polyunsaturated fatty acids are commonly referred to as essential fatty acids. Rich sources of polyunsaturated fatty acids include fish such as salmon and mackerel, corn oil, and flax seed. Olive oil and canola oil are rich sources of monounsaturated fatty acids.

Some fat is found in virtually all foods. Fat is necessary in small quantities to perform the functions mentioned previously. Much research has been done that suggests that fat plays a role in satiety – or the feeling of fullness associated with ending a meal with a sense of satisfaction at having eaten enough.

The general recommendation to maintain optimal health and overall function is to keep fat intake at or below 30% of the total calories. No more than 10% of the total calories should be from saturated fat, leaving the other 20% from mono- and polyunsaturated fats. The Nutrition Facts food labels give information on the quantity of total fat and saturated fat in food items. Mono- and polyunsaturated fats may or may not be labeled but can be estimated by subtracting the saturated fat from the total fat.

If fat is necessary to the normal function of the body, why is there so much concern about the amount of fat Americans eat?

Based on years of scientific research, humans require a maximum of 30% of total calories in the diet to come from fat to maintain optimum health. Diets that are very high in fat are associated with obesity and increased prevalence of several chronic diseases and health conditions like high blood pressure, coronary heart disease, and certain cancers. At the same time, diets that are too low in fat – some below 15% - have shown to be inadequate to support normal growth and functioning, unless it is prescribed as a specific, medically supervised diet for a certain condition.

Americans, on average, consume 38% of their calories from fat and 95% of the fat is consumed as triglycerides. Because this is above the recommended 30% and because of the high incidence of obesity, heart disease, and other chronic diseases, there is much concern and increasing focus on monitoring triglycerides in the blood and working to decrease risk by lowering high levels.

Triglycerides in the Blood

When a healthcare provider draws blood for analysis, one of the components that are typically measured is the triglyceride level. The triglyceride level is the amount of circulating fat in the blood – and high levels are considered a major risk factor for cardiovascular disease. Hypertriglyceridemia is another name for high blood triglycerides. Hypertriglyceridemia is defined as:

Borderline high	200-400 mg/dL
High	400-1000 mg/dL
Very high	>1000 mg/dL

The normal range – or goal – for blood triglycerides is below 200 milligrams per deciliter.

Genetics, obesity, decreased physical activity, drinking a lot of alcohol, diabetes and high carbohydrate/very low fat diets can lead to high triglyceride levels – and increased risk for heart disease. There is growing evidence that triglycerides over 240 mg/dL promote atherosclerosis, or hardening of the arteries, similarly to “bad” LDL cholesterol.

Potential effect of lifestyle changes.

By consuming a diet with 30% or less of the total calories from fat, staying physically active and maintaining a healthy weight, one can reduce their risk of

obesity, cardiovascular disease and other chronic diseases. By paying attention to fat intake and periodically monitoring triglyceride levels (as well as cholesterol levels) in the blood, one can maintain health and minimize disease risk.

Some medications are currently available that help lower triglyceride levels, but lifestyle changes such as reducing fat intake, decreasing weight and increasing activity are some of the most powerful modifications one can make. Consulting a Registered Dietitian or professional healthcare provider can be a good step to understanding more about individual triglyceride intake and blood levels, as well as establish a plan for making healthy lifestyle changes.

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