

# WHAT TO KNOW ABOUT CARBOHYDRATES, FATS AND PROTEIN

TOMLINSON LIFESTYLE MEDICINE & CONSULTANT





# CARBOHYDRATES

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Carbohydrates are critical for providing the body with energy. They are found in various foods, such as fruits, vegetables, grains, and dairy products. The body breaks down carbohydrates into glucose, which is then used for energy or stored for later use. Glucose, or blood sugar, is the primary source of energy for your body's cells, tissues, and organs. Glucose can be used immediately or stored in the liver and muscles for later use.

Carbohydrates provide fuel for the central nervous system and energy for working muscles. They also prevent protein from being used as an energy source and enable fat metabolism. They also influence mood and memory.



*The type and quantity of carbohydrates consumed can affect blood sugar levels, with refined grains and added sugars often causing rapid spikes.*

## WHAT ARE THE DIFFERENT TYPES OF CARBOHYDRATES?

**Complex carbohydrates (Starches)** - are made up of sugar molecules that break down slowly to help you sustain that full feeling. Sources of complex carbohydrates include peas, beans, whole grains, and vegetables like sweet potatoes.

**Simple carbohydrates (Sugars)** - are made with processed or refined sugar, and do not have vitamins, minerals nor fiber. Simple carbohydrates are often called “empty calories” because they are loaded with calories from sugars and fats, and are not important to the diet. Simple carbs can also lead to weight gain and other health conditions.

While complex carbs provide more energy, foods high in simple carbohydrates break down too quickly in the body, leaving you feeling hungry, leading to spikes in blood sugar levels and sugar highs.

*Some people go on a low-carb diet to try to lose weight. This usually means eating between 25 g and 150 g of carbs each day. This kind of diet can be safe, but you should talk to your health care provider before starting it. One problem with low-carb diets is that they can limit the amount of fiber you get each day. They can also be hard to stay on for the long term.*



## INDIGESTIBLE FIBERS

**Indigestible dietary fibers** - dietary fibres are classified as complex carbohydrates, and they also play a vital role in our health. Fibers can provide the fuel that helps to speed the elimination of faeces.

Carbohydrate containing foods that are good for your body and provide abundant sources of other good nutrients include:

- Fruits
- Vegetables and starchy vegetables
- High-fibre whole grains such as whole wheat bread, oatmeal, brown rice, whole wheat pasta, and whole-grain cereals
- Legumes
- Low-fat and nonfat milk



## SUGARS

**Sugar** - is the generic name for sweet-tasting, soluble carbohydrates, many of which are used in food. The various types of sugar are derived from different sources.

Simple sugars are called monosaccharides and include glucose (also known as dextrose), fructose, and galactose.

Table sugar or granulated sugar refers to sucrose, a disaccharide of glucose and fructose. In the body, sucrose is hydrolysed into fructose and glucose.

Despite the sugar industry's efforts to influence public perception, scientific evidence increasingly points to negative health consequences from excessive sugar consumption. We now know that sugar impacts just about every organ system in the body. Limit your sugar intake for health reasons.



# FATS

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Fat is the body's primary way of storing energy. When the energy comes from the food and drinks you consume, your body stores it for later use. Fat from your diet plays an important role. For example, fat fuels your body, cushions and protects your organs and bones, helps produce hormones, and supports healthy blood pressure regulation, helps to maintain healthy skin, hair, and nails.

Most people consume more fat than their body need. When eaten in large quantities, even healthy fats can contribute to health problems such as heart disease, obesity, type 2 diabetes, and other health conditions. Including small amounts of healthy fats can support your weight and overall health.

*Be mindful of the different types of fats listed on food labels to make well-informed decisions.*





## WHAT ARE THE DIFFERENT TYPES OF FATS?

**Saturated Fats** - can raise the harmful Low-density lipoproteins (LDL) cholesterol, a chemical substance found in all animal fats. This extra cholesterol causes the arteries to clog. This increases your risk for a heart attack, stroke, or poor circulation.

Animal fats from eggs, dairy products, and meats are very high in saturated fats. Other foods that are high in saturated fats include peanut butter, hard margarines, lard, coconut oil, ghee or clarified butter, vegetable ghee and palm oil, creams, gravies, bacon, and sausage. Limit your foods with saturated fats. Saturated fats are solid at room temperature.

**Monounsaturated Fats** - are known to improve blood cholesterol levels and are liquid at room temperature. They are found in olive oil, canola oil, peanut oil, non-hydrogenated margarine, avocados and some nuts that include almonds, pistachios, cashews, pecans and hazelnuts.

Monounsaturated fats have been shown to raise the level of High-density lipoproteins (HDL), the 'good' cholesterol that protects against heart attacks. With moderation, monounsaturated fats can be part of a healthy diet.

**Polyunsaturated Fats** - can lower cholesterol levels (LDL cholesterol) and are also liquid at room temperature.

A type of polyunsaturated fat is omega-3 fatty acid, essential for heart health, brain function, and reducing inflammation. Because the body cannot produce omega-3 fats on its own, they must be obtained through food sources such as fatty fish (salmon, mackerel, sardines), walnuts, chia seeds, and flaxseeds.

Numerous studies show that a diet rich in omega-3 fatty acids could help prevent blood clotting, reducing your risk of stroke, and lowering triglycerides, a type of blood fat linked to heart disease.





It is important to note that individuals who are taking more than 3 grams of omega-3 fatty acids from capsules should do so only under a physician's care. A high intake is found to cause excessive bleeding in some people.

**Cholesterol** - your body produces all the cholesterol you need. Cholesterol has many vital functions in the body. However, having high levels of cholesterol increases your risk for heart disease.

Cholesterol is found only in foods that come from animals. Foods that are very high in cholesterol include egg yolks and organ meats, such as liver and kidney. It was once thought that eating too many cholesterol-containing foods (such as eggs) was the primary dietary cause of high blood cholesterol levels. We now know that eating too many foods containing higher amounts of saturated and trans fats is a bigger problem and has a much greater influence on blood cholesterol levels.



*Limit the products that list “vegetable oil shortening” or “partially hydrogenated” oil in the ingredients.*

**Trans Fats** - are similar to saturated fats; they raise cholesterol levels (the bad LDL). It is found in partially hydrogenated margarines, deep-fried foods from fast-foods and many packaged crackers, cookies and commercially baked products. Eating a diet that is high in trans fats is bad for your health, as these fats can increase your risk of heart disease and other conditions.

Industrially produced trans fats are banned from Canada's food supply. In 2018, Health Canada put a ban on adding partially hydrogenated oils, or PHOs. This ban applies to all foods sold in Canada, including those imported and prepared in restaurants and other food service establishments.



# PROTEIN

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Protein is made up of essential and nonessential amino acids, for good health. Your body makes 13 nonessential amino acids, which are not available from food.

For the body to process protein properly, the foods that you eat must contain the 9 essential amino acids that are available only from dietary sources.

Protein helps to maintain and replace the tissues in your body. Your muscles, organs and many of your hormones are made up of protein. Protein also makes haemoglobin, the red blood cells that carry oxygen to your body.

## GOOD SOURCES OF PROTEIN

- Good low-or non-fat sources of protein include:
- Beef, poultry, pork and lamb
- Fish and shellfish
- Dairy products, including cottage cheese, cheese, yogurt and milk
- Eggs, egg whites or egg substitutes
- Dry beans, peas, oats and legumes
- Tofu and soy products
- Nuts and seeds





Although many good sources of protein are found in meat or animal products, vegetarians can still consume adequate amounts of protein.

Vegetarians who eat dairy products and eggs can still choose from a variety of plant and animal protein sources.

Vegans who eat only plant sources of food can still rely on tofu, soy products, oats, beans, lentils and peanut butter for protein.

Proteins are considered either complete proteins (which supply enough essential amino acids) or incomplete proteins (which lack adequate essential amino acids). Meat, eggs and dairy products are considered complete proteins, but vegetables, beans and other plant products are considered incomplete proteins.

Some incomplete proteins can be combined to create a complete protein - rice and beans, peanut butter and jelly, and corn and beans are examples of complete-protein meals.



*Your protein intake will be dependent upon your age, medical condition, and activity level and body size.*







Fat-Soluble Vitamins			
Vitamin	Actions	Sources	Possible Effects of Taking Too Much
A (retinol, retinal, retinoic acid)	Needed for vision; maintains healthy skin and mucous membranes; key to immunity, tissue repair, bone growth and the development of embryos; acts as an antioxidant (protects the body from damaging substances called free radicals)	Liver, fish, dairy products, egg yolks, carrots, sweet potatoes, tomatoes, fortified breakfast cereals	<p>Nausea; vomiting; headache; dizziness; blurred vision; clumsiness; birth defects; liver problems; possible risk of osteoporosis</p> <p><b>NOTE:</b> You may be at greater risk of these effects if you drink high levels of alcohol, or you have liver problems, high cholesterol levels or don't get enough protein.</p>
D (calciferol)	Helps your body absorb calcium and phosphorous; may help prevent fractures from osteoporosis; prevents rickets and osteomalacia (diseases that cause weak bones); helps immune system function	<p>Saltwater fish, eggs from hens that have been fed vitamin D, fortified milk products and fortified cereals</p> <p><b>NOTE:</b> Vitamin D is also made in your body after you've been in the sunlight.</p>	<p>Nausea; vomiting; poor appetite; constipation; weakness; weight loss; confusion; heart rhythm problems; deposits of calcium and phosphate in soft tissues</p>
E (tocopherol)	Acts as an antioxidant; helps blood flow; helps repair body tissues	Fish, milk, egg yolks, vegetable oils, nuts, fruits, peas, beans, broccoli, spinach, fortified cereals	<p>Risk is low</p> <p><b>NOTE:</b> If you take blood thinners, talk to your doctor before taking vitamin E pills.</p>
K	Important for blood clotting and forming bones	Cheese, spinach, broccoli, brussels sprouts, kale, cabbage, tomatoes, plant oils, margarine	<p>None reported</p> <p><b>NOTE:</b> If you take blood thinners, talk to your doctor before taking vitamin K pills.</p>



<b>Water-Soluble Vitamins</b>			
<b>Vitamin</b>	<b>Actions</b>	<b>Sources</b>	<b>Possible Effects of Taking Too Much</b>
B <sub>1</sub> (thiamin)	Helps your body use carbohydrates for energy; good for your nervous system	Lean beef, pork, liver, legumes, nuts, enriched whole-grain products	None reported
B <sub>2</sub> (riboflavin)	Helps your body process protein, carbohydrates and fats; helps maintain healthy skin	Lean beef, pork, liver, legumes, eggs, cheese, milk, nuts, enriched whole-grain products	None reported
B <sub>3</sub> (niacin)	Helps your body process protein and fats; helps maintain a healthy nervous system, skin and digestion	Liver, turkey, tuna, salmon, swordfish, peanuts, beans, yeast, enriched whole-grain breads and cereals	Flushing (redness) of the skin; upset stomach
B <sub>5</sub> (pantothenic acid)	Helps your body process nutrients; helps your body make red blood cells	Organ meats, beef, chicken, lobster, milk, eggs, peanuts, peas, beans, lentils, broccoli, yeast, cereals, whole grains	None reported
B <sub>6</sub> (pyridoxine, pyridoxal, pyridoxamine)	Helps your body use protein and fats; supports your nervous and immune systems; helps your blood carry oxygen to your body's tissues; helps break down copper and iron; prevents one type of anemia; helps maintain normal blood sugar levels	Organ meats, pork, beef, poultry, fish, eggs, peanuts, bananas, carrots, yeast, fortified cereals	Nerve damage to the arms and legs, which may cause numbness, trouble walking and pain
B <sub>12</sub> (cyanocobalamin)	Maintains healthy nerve cells and red blood cells; needed to make genetic material in cells; prevents one type of anemia	Liver, poultry, clams, sardines, flounder, herring, eggs, milk, blue cheese, fortified cereals	None reported
C (ascorbic acid)	Helps form connective tissues, such as cartilage and tendons; acts as an antioxidant and protects your body's cells from damage from free radicals (by-products of metabolism); good for your immune system	Broccoli, green peppers, spinach, brussels sprouts, citrus fruits, tomatoes, potatoes, strawberries, cabbage	Upset stomach; kidney stones; increased iron absorption
H (biotin)	Helps your body use	Liver, kidney, egg	None reported



	nutrients; good for your nervous system; helps form red blood cells	yolks, peas, beans, nuts, tomatoes, yeast	
Folic Acid (folate)	Helps your body make and sustain new cells; prevents one type of anemia; prevents neural tube birth defects	Dark leafy vegetables, dry beans and peas, oranges, fortified cereals and grain products	<p>Risks are low</p> <p><b>NOTE:</b> High levels of folic acid may hide signs of B<sub>12</sub> deficiency (a deficiency that can cause nerve damage), especially in older adults.</p>



Minerals			
Mineral	Actions	Sources	Possible Effects of Taking Too Much
Calcium	Important role in forming bones and teeth; helps with blood clotting, and muscle and nerve function	Salmon, sardines, milk, cheese, yogurt, calcium-set tofu, Chinese cabbage, kale, broccoli	Kidney stones; faulty kidney function; high blood levels of calcium; calcium deposits in soft tissue; decreased absorption of iron, zinc and magnesium
Iodine	Part of the thyroid hormones; prevents goiter and a birth defect called infantile myxedema	Iodized salt, seafood, kelp	Elevated level of thyroid-stimulating hormone (TSH)  <b>NOTE:</b> You may be at greater risk of side effects from iodine if you have had iodine deficiency before, or if you have autoimmune thyroid disease or a nodular goiter.
Iron	Part of hemoglobin; helps your blood carry oxygen to your body's tissues and muscles; needed to make energy; supports immune system health; prevents one type of anemia	Meat, fish, poultry, lentils, beans, fortified breads and cereals	Upset stomach; constipation; diarrhea; dark stools; decreased absorption of zinc, calcium and copper  <b>NOTE:</b> Blood transfusions and hemochromatosis (a genetic disorder also known as "iron overload") put you at higher risk for serious problems from taking too much iron.
Magnesium	Helps maintain normal muscle and nerve function; sustains regular heartbeat; keeps bones strong; helps your body produce energy	Meats, seafood, milk, cheese, yogurt, green leafy vegetables, bran cereal, nuts	Diarrhea; nausea; appetite loss; muscle weakness; trouble breathing; low blood pressure; irregular heartbeat; mental changes; kidney failure  <b>NOTE:</b> Some <u>laxatives</u> contain magnesium. Using these laxatives and using supplements may increase your risk of serious problems from taking too much magnesium.
Phosphorus	Needed for healthy	Milk, yogurt, cheese,	Decreased absorption



	bones; helps your body produce energy	peas, meat, fish, eggs, some cereals and breads	of calcium; at high levels, can join with calcium in the blood and form calcium deposits in soft tissue and also lead to porous bones
Zinc	Supports your immune system; needed for wound healing and tissue repair; maintains your sense of taste and smell; helps digestion; supports normal reproduction, growth and development	Red meats, liver, oysters, certain seafood, milk products, eggs, beans, nuts, whole grains, fortified cereals	Decreased absorption of iron and copper; reduced immune function; reduced levels of high-density lipoproteins (HDL)—also called the “good cholesterol”