What are Fats and Essential Fatty Acids?

Background

Fats are a group of chemical compounds that come in a number of forms. Each fat provides us with essential fatty acids.

Fats have become the most abused nutrient in our diet because of the misunderstanding of their benefits and the belief that all fat is bad and should be avoided. Fats are commonly viewed as the main food that leads to killer diseases such as heart disease, obesity and cancer but it is important to understand that there are good fats and bad fats. Some fats are likely to cause damage to our bodies while other fats are supportive and essential for our health and wellbeing. We need to understand which fats are bad for us and where they are found but the most important information is: what are the good fats, where can we obtain them and how much of them should we consume? Choosing the right from the wrong is vital.

We need a number of very important fatty acids in our diet - unsaturated or monounsaturated fats. These are found in olive oils, avocados, nuts and seeds. We also need polyunsaturated fats which come from food sources such as oily fish including sardines, salmon and trout. Additionally we need specific oils, such as olive oil, which provides omega 3 and omega 6 fatty acids (the term “omega” comes from the Greek alphabet, alpha as the first letter and omega the last letter of the alphabet. The number of the EFA e.g. 3 or 6 is the positioning of the first double carbon bond in the structure of the fat from the omega end) and saturated fat found in animal products such as meat, dairy products and eggs. While these are commonly considered bad, large studies involving close to 350,000 participants found no association between saturated fat and heart disease. In fact, eating a low fat, high-refined-carbohydrate diet may have contributed to the rising incidence of heart disease, obesity and type 2 diabetes. This simply shows how poor science many years ago, driving low fat diets, may have contributed to the current pandemic of these diseases and conditions.

The bad fats are the transfats or hydrogenated-fats which are derived through a food-processing method called hydrogenation to make soft, spreadable products that are not liquid at room temperature, such as margarines. These are used in many food products and junk foods, including biscuits, cakes, icings, microwave popcorn, to name but a few.
**Let’s look at the different type of fats**

**Cholesterol** is found in all animal products. It has been given a lot of adverse press, following dated and poor research. For over 50 years it has been blamed for causing heart disease with the result that the average consumer believes ALL cholesterol is bad and must be avoided. Most of us have 1,100mg to 1,700mg of cholesterol in our body. More than 70% of cholesterol is actually produced by the liver or intestine. Only 25% of cholesterol comes from the diet and it has limited impact on blood cholesterol levels. Cholesterol levels can increase also due to external factors such as smoking, stress, refined sugar, food additives and environmental pollutants.

In fact cholesterol is required for many important body functions:

- Cholesterol is converted to Vitamin D (which is important for our skeletal health and strength) in the skin when exposed to sunlight.
- Cholesterol supports the use of carbohydrates by the body.
- Cholesterol helps make very important steroid hormones such as cortisol, testosterone and progesterone.

It is not cholesterol that is bad but one of its carrier proteins called Low Density Lipoprotein (LDL). This transports approximately 65% of our blood cholesterol around the body. Oxidized LDL (as a result of oxidative stress and free radical damage—see below) can deposit cholesterol in the arteries and cause the formation of plaque in them, which can increase the risk of these blood vessels rupturing.

There are two other cholesterol transporters: Very Low Density Lipoprotein (VLDL) which transports approximately 15% of cholesterol around the body. It also stimulates the liver to produce more LDL protein carriers and is therefore not good for the body. This is especially true when there are high amounts of unstable molecules called Reactive Oxygen Species (ROS) - also known as free radicals. These increase the oxidation of the LDL proteins. The other protein transporter is High Density Lipoprotein (HDL) which carries approximately 20% of total cholesterol and has the ability to reduce the risk of atherosclerosis (a narrowing and hardening of the arteries caused by deposition of plaque and fatty material in their inner walls) as it transports cholesterol without depositing it in the arterial walls.

**Trans-fat or hydrogenated fats** evolved because of the myth that all saturated fats were bad. These fats are made from oils with a food-processing method called hydrogenation in order to help keep them liquid or soft at room temperature and therefore easier to use for cooking. They are particularly bad for our health. These hydrogenated trans-fats are used in many foods such as breads, biscuits, cakes, cereals, soups, chocolate, chips and fries and other convenience/junk foods. They may:

- Increase the risk of cancer
- Increase the risk of diabetes
- Increase the risk of heart and cardiovascular disease
- Interfere with insulin function
- Decrease hormones such as testosterone
- Increase unhealthy low density lipoprotein (LDL) cholesterol
- Lower healthy high density lipoprotein (HDL) cholesterol

Be aware that trans fats are usually referred to on food labels as hydrogenated oil.
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**Saturated fat** comes mainly from animal sources such as red meat, poultry, and full-fat dairy products. These foods have been consumed since the beginning of human evolution but have received very bad press over the past 50 decades due in part to initial poor research. Saturated fats if consumed in excess may:

- Raise the level of total blood cholesterol levels and low-density lipoprotein (LDL) cholesterol levels
- Increase the stickiness of the platelets
- Interfere with insulin function
- Decrease the functioning of our essential fatty acids such as omega 3 and omega 6

Saturated fats include butter, coconut and palm oils. They are solid at room temperature and are extremely important in many health conditions. They contain good fats including **Conjugated Linoleic Acid (CLA)** which has many health benefits. These include:

- Cancer fighting properties
- Reduces the risk of cardiovascular disease
- Helps fight inflammation
- Lowers cholesterol and triglyceride levels
- Helps reduce appetite

**Liptropics**

Liptropics including choline, inositol, betaine and methionine are commonly used to help prevent excessive fat accumulation in the liver as they help to keep cholesterol soluble and support liver detoxification.
**Essential fatty acids**

Essential fatty acids are called “essential” because they must be derived from food and cannot be manufactured in the body.

Essential fatty acids come in varying structures and are numbered based on these and the location of the bonds holding the structure together. Omega 3 is the smaller chain molecule which reduces inflammation while the longer chain molecules are larger and include omega 6, 7 and 9 molecules and cause inflammation.

**Why is Omega 3 important and what does it do?**

Omega 3 fats are divided into two main forms: DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid). These are the most important of the omega fats.

Omega 3 essential fatty acids are required for cell membrane structure and in forming prostaglandins series 1 and 3 (hormone like molecules) that are important for the down-regulation of inflammation, pain and swelling, blood pressure, kidney function and fluid balance, inflammation, nerve transmission, hormone production, heart function and gastrointestinal function. In our modern diet Omega 3 intake is commonly poor and an excessive Omega 6 fatty acids is dominant. Omega 6 EFAs produce prostaglandins (series 2) that promote inflammation and platelet stickiness apart from one omega 6 essential fatty acid called gamma-linolenic acid (GLA) and its subsequent conversion to DGLA which is anti-inflammatory. (Be careful not to confuse this with alpha-linolenic acid (ALA), an omega-3 fatty acid). This increases the risk of coronary heart disease. Increased consumption of Omega 6 fatty acids may promote poor health and inflammatory conditions but it is important to balance Omega 6 essential fatty acids with omega 3 fatty acids in your diet. The ratio should be in the range of 2:1 - 4:1, omega-6 to omega-3 -- and some health professionals advocate even lower ratios. The average diet commonly provides an excess of omega-6 fatty acids, so supplements are usually not necessary.

When there is an imbalanced intake of essential fatty acids, it is important to look at the ratio between Omega 3 and Omega 6 intake. The focus should be on increasing Omega 3 essential fatty acids in the form of DHA and EPA.

**Essential** omega 3 fatty acids help in many ways:

- Building healthy cell membranes
- Cell growth and cell division
- Storage and use the fat-soluble vitamins A, D, E, and K.
- Insulating the nerve fibers by producing the myelin sheath that surrounds them
- Making important hormones - sex hormones and prostaglandins to regulate important body functions such as reducing inflammation.
- Supporting neuronal health and brain function
- Reducing arteriosclerosis
- Supporting individuals with migraine
- Elevating mood and lifting depression
- Making hemoglobin
- Supporting some mental illnesses including schizophrenia, Alzheimer’s disease, Parkinson’s disease, Lou Gehrig’s disease (ALS), multiple sclerosis, autism, ADHD and learning disabilities
- Formation, protection and moisturizing skin, hair and nails
- Supporting leaky gut by reducing inflammation
- Supporting pre menstrual syndrome
- Supporting prenatal brain development in babies
- Protecting our DNA and RNA
- Transporting minerals
- Reducing LDL cholesterol

**What amount of Omega 3 essential fatty acids (DHA and EPA) do you need each day?**

Omega 3 essential fatty acids are a very important nutrient and should be consumed in excess of the omega 6 intake due to their associated health benefits.
The DRI (Daily Recommended Intake) / RDA (Recommended Daily Allowance) of dietary Omega 3 essential fatty acids as DHA and EPA are listed below:

Please Note: By definition, the DRI/RDA recommendations apply only to 98% of healthy individuals and are not sufficient for those with higher nutrient requirements based upon their biochemical individuality, genetics, health status, medications, deficiencies, lifestyle, and toxic exposures.

<table>
<thead>
<tr>
<th>Docosahexaenoic acid (DHA)</th>
<th>Eicosapentaenoic acid (EPA)</th>
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</thead>
<tbody>
<tr>
<td><strong>Adult</strong></td>
<td>Adult</td>
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<tr>
<td>• Most studies have used 1,000 - 2,500 mg of DHA.</td>
<td>• The adequate daily intake of EPA for adults should be at least 220 mg.</td>
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<tr>
<td>• In the diet: 2 - 3 servings of fatty fish per week equals 1,250 mg EPA and DHA per day.</td>
<td>• In the diet: 2 - 3 servings of fatty fish per week, which is the same as about 1,250 mg EPA and DHA.</td>
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<td>• Fish oil supplements: 3,000 - 4,000 mg standardized fish oils. Read the label to check levels of DHA and EPA, which are not the same as mg of fish oil. Individuals taking blood-thinners, such as warfarin (Coumadin), clopidogrel (Plavix), or aspirin, or hemophiliacs should check with their doctors for a safe dose.</td>
<td>• Fish oil supplements: 3,000 - 4,000 mg standardized fish oils. Read the label to check levels of DHA and EPA, which are not the same as mg of fish oil. Individuals on blood-thinning medication, such as warfarin (Coumadin), clopidogrel (Plavix), or aspirin, or hemophiliacs should check with their doctors to see what is a safe dose.</td>
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<tr>
<td>• Pregnant women: 200 mg DHA.</td>
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<tr>
<td>• DHA supplements from algae: 200 mg.</td>
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**Pediatric**

• Babies who are breastfed should get enough EPA as long as the mother has enough EPA in her diet. Some infant formula also has added DHA.

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• Babies who are breastfed should get enough EPA as long as the mother has enough EPA in her diet.
• Experts recommend that infant formula has less than 0.1% EPA.

Fish oil capsules have both DHA and EPA. Do not give supplements with EPA to a child unless advised by a pediatrician because they upset the healthy balance between DHA and EPA during early development. Pregnant women should take their doctor’s advice before taking fish oil supplements.

Fish oil capsules may cause minor side effects, such as loose stools, stomach upset, and belching. They also may raise the risk of bleeding. If you are taking blood-thinning medication, talk to your doctor before taking fish oil.
<table>
<thead>
<tr>
<th>Nutrient Deficiency Symptoms and Conditions</th>
<th>What are possible Omega 3 (DHA and EPA) deficiency conditions and symptoms?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angina</td>
<td>High blood pressure</td>
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<tr>
<td>Allergies</td>
<td>High cholesterol</td>
</tr>
<tr>
<td>ADHD</td>
<td>Hyperactivity</td>
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<td>Autism Spectrum disorder</td>
<td>Infertility</td>
</tr>
<tr>
<td>Alzheimer’s disease</td>
<td>Inflammatory conditions</td>
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<td>Asthma</td>
<td>Insomnia</td>
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<tr>
<td>Acne</td>
<td>Lupus erythematosus</td>
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<td>Aching, sore joints</td>
<td>Learning difficulties</td>
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<tr>
<td>Arteriosclerosis</td>
<td>Low metabolism</td>
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<td>Bipolar disorder</td>
<td>Macular degeneration</td>
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<td>Breast pain and tenderness</td>
<td>Migraine</td>
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<tr>
<td>Breast cysts</td>
<td>Multiple sclerosis</td>
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<tr>
<td>Blood clotting (easy)</td>
<td>Menopause</td>
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<tr>
<td>Cystic fibrosis</td>
<td>Menstrual pain/pre menstrual syndrome</td>
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<tr>
<td>Constipation</td>
<td>Mood swings</td>
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<tr>
<td>Cracked nails</td>
<td>Neurological disorders</td>
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<tr>
<td>Cardiovascular disease</td>
<td>Obesity</td>
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<tr>
<td>Cancer- breast, prostate, colon</td>
<td>Osteoarthritis</td>
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<tr>
<td>Dry skin/hair</td>
<td>Pregnant (DHA esp is important for fetal brain development)</td>
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<tr>
<td>Dermatitis</td>
<td>Pooe digestion</td>
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<td>Dry mucus membranes</td>
<td>Psoriasis</td>
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<tr>
<td>Dementia</td>
<td>Poor vision</td>
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<td>Parkinson’s disease</td>
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<td>Depression</td>
<td>Reyes syndrome</td>
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<tr>
<td>Eczema</td>
<td>Raynaud’s syndrome</td>
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<tr>
<td>Fatigue</td>
<td>Sterility</td>
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<tr>
<td>Fatty liver</td>
<td>Schizophrenia</td>
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<tr>
<td>Frequent colds and infections</td>
<td>Sepsis</td>
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<tr>
<td>Heart disease</td>
<td>Sepsis</td>
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<tr>
<td></td>
<td>Tingling arms/feet</td>
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What are possible Omega 6 deficiency conditions and symptoms?
- Allergies
- ADHD
- Autism
- Diabetic neuropathy
- High Blood Pressure
- Pre Menstrual Syndrome (PMS)
- Mastalgia (breast pain)
- Multiple Sclerosis
- Osteoporosis

What are possible Omega 3 excess symptoms?
No side effects have been identified even on mega dose regimens.

What interacts with Omega 3 essential fatty acids?

Blood-thinners: anticoagulants and antiplatelet medication: warfarin (Coumadin), clopidogrel (Plavix), and aspirin: EPA in fish oil supplements may increase the bleeding time, so fish oil could make the effects of these drugs stronger. That does not seem to be true of DHA by itself.

Diabetes medications: fish oil supplements may lower blood sugar levels and could make augment the effects of diabetes drugs. If you have diabetes, talk to your doctor before taking fish oil.

Aspirin: fish oil could help treat some forms of heart disease but combined with aspirin they may also increase the risk of bleeding. Talk to your doctor to see if this combination is right for you.

Cyclosporine: Omega-3 fatty acids may reduce some of the side effects of cyclosporine, a drug used to stop rejection after an organ transplant. Talk to your doctor before adding any supplements to the medication you already take.

What tests can be used to assess essential fatty acid levels?
- Serum blood levels
- Red blood cell level
- Red-cell Stearic/Oleic index
What foods are rich in Omega 3 (DHA and EPA) and Omega 6 essential fatty acids?

TOP 10 ESSENTIAL FATTY ACIDS (OMEGA 3 EPA AND DHA) RICH FOODS ARE:

1. **Walnuts**  
   9,079mg/100g

2. **Caviar**  
   6,789mg/100g

3. **Mackerel**  
   4,584mg/100g

4. **Salmon**  
   2,425mg/100g

5. **Herring**  
   2,100mg/100g

6. **Sardine**  
   1,396mg/100g

7. **Beef**  
   670mg/100g

8. **Basil**  
   315mg/100g

9. **Brussels sprouts**  
   173mg/100g

10. **Cauliflower**  
    210mg/100g

**RECOMMENDED DAILY INTAKE**  
None established

**OPTIMAL DAILY ALLOWANCE**  
350mg EPA and 350mg DHA
What foods are rich in Omega 6 essential fatty acids?

**TOP 10 ESSENTIAL FATTY ACID (OMEGA 6) RICH FOODS ARE:**

1. **Walnuts**  
   3,660mg/100g
2. **Sunflower seeds**  
   3,660mg/100g
3. **Sesame seeds**  
   2,130mg/100g
4. **Pumpkin seeds**  
   2,060mg/100g
5. **Pecans**  
   2,060mg/100g
6. **Brazil nuts**  
   2,060mg/100g
7. **Pistachio nuts**  
   1,365mg/100g
8. **Chicken (roast)**  
   900mg/100g
9. **Salmon**  
   800mg/100g
10. **Turkey (roast)**  
    700mg/100g

**RECOMMENDED DAILY INTAKE** None established  
**OPTIMAL DAILY ALLOWANCE** 150mg/Day

What are the best Omega 3 products?

Fish oils such as cod liver oil.

Flaxseed oil: If from a certified organic manufacturer, extracted at temperatures lower than 98 degrees Fahrenheit and contained in a light resistant amber colored bottle and preferably refrigerated to offer protection against prolonged ambient temperature.

**REFERENCES**

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Eicosapentaenoic acid (EPA) | University of Maryland Medical Center [http://umm.edu/health/medical/altmed/supplement/eicosapentaenoic-acid-epa#ixzz3CS7DcPMF](http://umm.edu/health/medical/altmed/supplement/eicosapentaenoic-acid-epa#ixzz3CS7DcPMF)

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All the statements, including product labels, supporting literature and/or product manufacturers websites have not been evaluated by FDA. These products are not intended to diagnose, treat, cure or prevent any disease.
Fats and Essential Fatty Acids (EFAs)

What are the very best Fats and Essential Fatty Acids products to buy?

**ProThera Eicosamax**
Our highest-potency ultra-pure fish oil containing over 70% omega-3 fatty acid content. This exceptional omega-3 fatty acid supplement supplies extra-strength amounts of both EPA and DHA to allow for maximum intake of omega …

**ProThera Eicosamax Liquid**
Our highest-potency ultra-pure fish oil containing over 70% omega-3 fatty acid content. This exceptional omega-3 fatty acid supplement supplies extra-strength amounts of both EPA and DHA to allow for maximum intake of omega …

**PRL Lecithin**
This granular product is made with premier quality lecithin (97% phosphatides) which has been tested by QRA™. Premier Lecithin Granules contains key unsaturated fatty acid phosphatidyl complexes for optimal brain and nerve …

**PRL Coconut Oil**
Unrefined coconut oil is one of the most versatile, healthiest oils in the world. Due to its high smoke point, it is excellent for cooking and sauteing and also blends well with other oils. Our oil is 100% raw, unrefined, non–GMO, virgin coconut oil …

**Pure Caps Krillplex**
Omega-3 and omega-6 fatty acids are both needed for optimal health, as are antioxidants and phospholipids. They may support a healthy brain and good cognitive functioning, healthy skin, heart health, and joint comfort. For the female …

**Pure Caps Mens Pure Pack**
Regardless of your walk of life, all men need to ensure that they get enough of an array of important nutrients. However, who wants to spend their time picking out supplements for a daily …
Fats and Essential Fatty Acids (EFAs)

What are the very best Fats and Essential Fatty Acids products to buy?

**Pure Caps Women's Pure Pack**
Women's Supplement to Support Bone and Heart Health. Now With Metafolin® L-5-MTHF. Sizes Available 30 packets. Each packet contains 6 different supplements, including …

**ProThera Phosphatydil Serine**
Supports brain and nerve cell function. This natural, lecithin-derived phospholipid helps maintain function of brain and nerve cell membranes and activates neurotransmitters involved in learning and memory functions …

**Barlean’s Omega Ultra High Potency Swirl Fish Oil - Lime**
Omega Swirl is an Omega-3 Sensation with the taste and texture of a fruit smoothie! Now everyone can enjoy the benefits of Omega-3 without the oily taste and texture of liquids or having to swallow large capsules. Rich in …

**Barlean’s Omega Swirl Fish Oil - Lemon**
Omega Swirl is an Omega-3 Sensation with the taste and texture of a fruit smoothie! Now everyone can enjoy the benefits of Omega-3 without the oily taste and texture of liquids or having to swallow large capsules. Rich in …