

The Weston A. Price Foundation

Cod Liver Oil: The Number One Superfood

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Several visitors to our website have noted inconsistencies in various statements about vitamin A, vitamin D and cod liver oil. These issues revolve around questions of dosage and safety. Please see [Vitamin A, Vitamin D and Cod Liver Oil: Some Clarifications](#).

Doctor Price was right, as usual. Cod liver oil is very good for you, more than you ever knew. Research studies ranging from 1918-2001 give cod liver oil an A+ rating. This marvelous golden oil contains large amounts of elongated omega-3 fatty acids, preformed vitamin A and the sunlight vitamin D, essential nutrients that are hard to obtain in sufficient amounts in the modern diet. Samples may also naturally contain small amounts of the important bone- and blood-maintainer vitamin K.

There is hardly a disease in the books that does not respond well to treatment that includes cod liver oil, and not just infectious diseases but also chronic modern diseases like heart disease and cancer. Cod liver oil provides vitamin D that helps build strong bones in children and helps prevent osteoporosis in adults. The fatty acids in cod liver oil are also very important for the development of the brain and nervous system. "If you want to prevent learning disabilities in your children," said David Horrobin, distinguished medical and biochemical researcher, "feed them cod liver oil."

Cod liver oil contains more vitamin A and more vitamin D per unit weight than any other common food. One hundred grams of regular cod liver oil provides 100,000 IU of vitamin A, almost three times more than beef liver, the next richest source; and 10,000 IU vitamin D, almost four times more than lard, the next richest source. Of course, cod liver oil is only

consumed in small amounts, but even a tablespoon (about 15 grams) provides well over the recommended daily allowance for both nutrients.

In addition, cod liveroil contains 7 percent each of the elongated omega-3 fatty acids EPA and DHA. EPA is the precursor of important prostaglandins, localized tissue hormones that help the body deal with inflammation; and DHA is extremely important for the development and function of the brain and nervous system. So it's no surprise that in numerous studies cod liver oil has proven to be a powerhouse in fighting disease.

Good for What Ails You

Cod liver oil greatly improves heart function to prevent heart disease and to treat it even in advanced stages, after a heart attack and after heart surgery. Cod liver oil alters the linings of the arteries in such a way as to improve healing after damage. This is attributed to the omega-3 fatty acids but vitamin A, D and K all have important roles to play in facilitating mineral absorption, improving muscle function and supporting elasticity of the blood vessels. The inflammation-reducing prostaglandins made from EPA help mediate the inflammatory response in the arteries. In other studies the heart-protective effect was associated with changes in the muscle response to serotonin, increasing the heart's ability to "relax."¹⁻¹⁵ In a study with rats, treatment with cod liver oil actually caused artery-blocking atheromas to become smaller and blood vessel diameter to enlarge.⁵⁵ Weston Price noted that heart attack deaths increased during periods when the vitamin A content of the diet was low. Cod liver oil can provide vitamin A on a continuous basis throughout the year.

Many of the conditions addressed by cod liver oil are considered related under the title Syndrome X. These include obesity, hypertension, insulin resistance, adult onset diabetes and stroke. Evidence is accumulating that these diseases of civilization are the result of high levels of omega-6 fatty acids and low levels of omega-3 fatty acids along with deficiencies of fat-soluble vitamins. We may be paying a very high price for our rejection of parental wisdom to take our cod liver oil.

In numerous studies, the elongated omega-3 fats found in cod liver oil have been shown to improve brain function, memory, stress response, immune response, allergies, asthma, learning and behavioral disorders, including bipolar syndrome and manic-depression.

Cod liver oil is most famous for contributing to bone health, preventing and reversing rickets in children and osteomalacia in adults.^{16, 17} Before the discovery of cod liver oil as a source of vitamin D, many children suffered greatly with deformed bones. Osteoporosis responds to vitamin D and to cod liver oil. Sufficient elongated omega-3 oils found in cod liver oil are one of the keys to keeping and rebuilding bone.^{18, 19} In women, higher levels of vitamin D from cod liver oil improve bone mineral density.²⁰

Two of the symptoms of low levels of vitamin D are bone pain and muscle pain. This may manifest as pain in the legs, muscle weakness and difficulty climbing stairs. Numerous studies have shown improvement in muscle pain, muscle strength and bone pain scores with cod liver oil.^{40, 41}

Cod liver oil is effective in treating arthritis as well. Researchers funded by Great Britain's Arthritis Research Campaign found that the elongated omega-3 fatty acids in cod liver oil reduce both pain and damage in inflamed joints.⁵⁶

Pregnant women using cod liver oil have infants with a lower risk for juvenile type 1 diabetes.²¹ This effect was found only in mothers taking cod liver oil, not in mothers taking multivitamin supplements. Cod liver oil taken by nursing mothers improves the fatty acid profile in breast milk to promote optimal brain development and also increases levels of vitamin A to prevent infections. Interestingly, cod liver oil does not provide increased vitamin D in breast milk.^{23,24}

Cod liver oil given to infants after birth and during the first year had no protective effect against type 1 diabetes but it nevertheless is an important source of nutrients for optimal infant health.²² In more than forty trials, vitamin A has been shown to reduce morbidity and mortality of children.²⁵ Cod liver oil was the supplement of choice in many of these trials. Books on feeding infants published in the 1930s and 1940s routinely recommended cod liver oil, starting with 1 teaspoon at the age of three weeks. It was Dr. Spock who threw this

wisdom out the window by recommending vaccinations instead of the powerful nutritional support of cod liver oil. Few modern books on infant care mention the importance of the fat-soluble nutrients in this wonderful superfood.

As for treating diabetes in adults, cod liver oil has been used in a number of trials with both insulin-dependent and non-insulin-dependent diabetes. In both conditions cod liver oil improved glucose response and other markers of the disease.²⁶⁻³¹ Vitamin A in cod liver oil helps promote healing and protects the retina, both problem areas in the diabetic patient.

Cod liver oil has lowered blood pressure induced by stress-elevated levels of cortisol.³²⁻³⁵ Cod liver oil given to rats reduced intraocular pressure suggesting a use in prevention and treatment of glaucoma.³⁶ Vitamin D in cod liver oil promotes absorption of calcium and magnesium, thereby lowering blood pressure.

Colitis responds more effectively to the type of omega-3 fatty acids in cod liver oil than to medication.³⁷⁻³⁸ Cod liver oil should be the first protocol for this condition as well as irritable bowel syndrome and Crohn's disease.

Topically applied, cod liver oil contributes to faster wound healing and improvement in skin quality.³⁹ An excellent treatment for diaper rash and other skin conditions is cod liver oil mixed with zinc oxide. And cod liver oil taken orally helps maintain soft skin and minimize wrinkles.

And what about cancer? All the nutrients in cod liver oil help prevent cancer. Vitamin A has been part of every successful alternative cancer therapy so far. In a study in China, use of cod liver oil was found to be protective against childhood leukemia.⁵⁷ In a study of Norwegian men and women, consumption of cod liver oil was found to protect against lung cancer.⁵⁸

Practical Aspects

Eating fish will not provide the levels of nutrients that are found in cod liver oil. Even in heavy fish-eating populations, the addition of cod liver oil improves health.⁴²⁻⁴³ And taking fish oils is not the same as taking cod liver oil. One tablespoon of regular cod liver oil and one-half tablespoon of high-vitamin cod liver oil provide the amount of elongated omega-3 fatty acids found in twelve 1,000 mg fish oil capsules.

As for vitamin D, body oils of fish can be good sources as long as you are willing to eat a lot of them. One-half pound of fatty herring or sardines gives a dose of vitamin D equal to that of about one tablespoon of cod liver oil. But salmon oil has one-fifth the potency of cod liver oil.

One concern about taking cod liver oil is the presence of contaminants—heavy metals (such as mercury, cadmium and lead), PCBs and so forth. Fortunately, consumers need not worry when it comes to cod liver oil. All cod liver oils in the US must be tested according to protocols of the Association of Analytical Communities (AOAC) and approved free of detectable levels of 32 contaminants before they can be imported into this country. Furthermore, mercury is water soluble. It may be present in the flesh of fish, but it is not present in the oil.

Another concern is rancidity. Cod liver oil can become rancid if improperly handled. In a 1988 study, peroxide values (indicating rancidity) ranged from a low of 2 to a high of 44.7.44 Nevertheless, properly handled cod liver oil is relatively stable. It contains 21 percent saturated fatty acids and 57 percent monounsaturated fatty acids, which provide stability. The fishy smell of cod liver oil is due to the presence of small amounts of fish protein and is not a sign of rancidity. To ensure that your cod liver oil is fresh, avoid buying the large economy size or the end-of-season sale item. Buy cod liver oil in small dark bottles and keep them in a cool dark place. Cod liver oil need not be refrigerated after opening if it is used up quickly—within two months.

Virtually all cod liver oil imported into the US comes from Norway, and while all of it is safe, there are different grades, depending on vitamin levels. The lighter oil from the “top of the barrel” has a lower molecular weight, goes rancid more quickly and has lower levels of vitamins, while the heavier oil, which sinks, is richer in vitamins. The heavier oil is what Dr. Price referred to as high-vitamin cod liver oil. It contains double the amounts of vitamin A and D as regular cod liver oil. Virtually all cod liver oil imported into the US is the lighter, “top of the barrel” variety. The Norwegians keep the best for themselves!

Whenever taking cod liver oil, remember the findings of Dr. Price. He noted that he did not get good results from cod liver oil unless he gave it concurrently with high-vitamin butter. Just why this is so is a matter of speculation, but we do know that the very unsaturated fatty acids found in cod liver oil cannot be effectively assimilated and stored in the tissues without the presence of adequate saturated fatty acids, the kind that would be provided by butter. This means that even regular butter would help support cod liver oil therapy; but Price found that the combination of cod liver oil with high-vitamin butter, from cows eating rapidly growing green grass, was nothing short of miraculous, reversing tooth decay and bringing patients back from the brink of death.

I do not find it hard to take Carlson's cod liver oil on a spoon, but for many, the big challenge is how to get this oily substance down. One technique is to add cod liver oil to a small amount of water or fresh juice, stir and then quickly send it down the hatch. If you can't bring yourself to take cod liver oil on a spoon or in water, then use the capsules. For babies and small children, use an eye dropper.

Old Research Brought to Light

In researching this article, I had the great fortune to stumble upon a book published in the 1930s—it is truly exciting to come upon material found and lost and found again. *Ultraviolet Light and Vitamin D in Nutrition*, by Katharine Blunt and Ruth Cowan, published by the University of Chicago, contains fascinating material, including a chapter on the research of Mrs. May Mellanby published in 1918 in *The Lancet* II, page 767.

The book describes the work of scientists E. M. Honeywell, A. F. Hess and C. E. Bills (after which the Bills's Scale for determining antirachitic value for vitamin D is named) who studied all aspects of fish oil potency, production and seasonal distribution. Early in their research they discovered that oil extracted from cod when the fish were fat in the summer contained much lower amounts of vitamin D. Summer oil scored 100 on the Bills scale but winter oil scored above 1,000 and some oils scored 20,000. Their conclusion: "For a fish of a given size, antirachitic potency varies inversely with the amount of fat or oil in the liver." In other words, the less oil in the fish, the more concentrated it was.

In one fascinating study, they found that fish kept in darkened aquariums and fed on trimmed raw veal muscle had the same amount of vitamin D as free-swimming fish exposed to sunlight. So how the fish obtain vitamin D remains a mystery. Perhaps they are able to extract it from microscopic plankton and algae.

It is important to note that the amount of vitamin A in cod liver oil does not have any consistent relation with the amount of vitamin D. In numerous samples, oils rich in vitamin A were poor in vitamin D, and oils rich in vitamin D were poor in vitamin A.

According to the book, in 1922 the US imported about 1.8 million gallons of cod oil and cod liver oil. By 1927 this amount grew to almost 5 million gallons based on data from the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce. Cod oil is rancid oil used in the tanning industry, not for human consumption. The figures don't distinguish the difference, but most of the increase was in the edible cod liver oil due to research showing its benefit in preventing rickets. According to the Commerce Yearbook of 1928, "Medicinal oil production has increased greatly, and the advance in its price has lessened the supply of common cod oil for tanning."

In 2000, America imported only about one tenth that amount (less than half a million gallons), indicating a huge decline in use.

In 1930, when the book was compiled, the technology was just being developed to determine vitamin D potency. The accepted value as of August 31, 1929 was "one rat unit of vitamin D," defined as "that amount of vitamin D which, when uniformly distributed into the standard vitamin D deficient diet-ration, will produce a narrow and continuous line of calcium deposits on the metaphyses of the distal end of the radii and ulnae of standard rachitic rats." "Potent cod liver oil" is defined as that containing one of these rat units per 0.75 mg. The International Units started out as rat units!

Testing of 18 oils in use at that time showed great variations in potency. Luckily today we have methods of standardization and much better methods of transportation and storage to improve the amount of vitamin D and freshness of our cod liver oil.

Eat Your Eggs

In 1929, researchers tested a variety of foods for vitamin D content and found the second most potent source of vitamin D was egg yolk. The book describes studies in which Hess both cured and prevented rickets in rats by giving them egg yolks. He also gave prophylactic treatment to 12 infants to forestall development of rickets in the winter months, which his experience had taught him to expect in the great majority of bottle-fed infants. He gave them

one egg yolk added to their regular formula starting in December. None of the 12 developed rickets in March as expected and, unlike prior years, blood phosphates remained stable at summer values.

About this same time, Johns Hopkins University investigators cured seven African-American children of rickets, in most cases severe, by adding one or two eggs daily to their diet of milk and cereal.

Like the vitamin D in cod liver oil, the amount of vitamin D in egg yolks also varies. Researchers in Kansas looked at four groups of hens: one group got sunlight in the yard plus 30 minutes under a quartz mercury vapor lamp producing UV-B light; another got sunlight through glass plus 30 minutes under the lamp; the third group got sunlight alone; and the fourth group got sunlight under glass alone. Eggs from hens under glass produced rickets in rats. Those with considerable UV-B prevented rickets completely and those with less (no lamp) caused the development of slight rickets. Only the sunlight plus lamp completely prevented rickets, showing that the natural UV-B in Kansas did not provide sufficient light for optimal vitamin D. Giving cod liver oil to the chickens had the same effect as exposure to UV-B light. Cod liver oil as two percent of the ration increased levels of vitamin D in the egg yolks fivefold.

The surprising conclusion is that chickens should either be given sunlamp treatment or cod liver oil. Poultrymen and consumers alike need to recognize that the axiom “an egg is an egg” is a mistaken one. Rather, “an inadequate ration may yield impoverished eggs as well as animals.” The authors suggest that eggs be graded by vitamin content. What a concept! Too bad no one listened. What would they think of our so-called “organic” eggs from hens raised in barns, never exposed to light and given “all-vegetarian” feed?

Meet Mrs. Mellanby

The most fascinating part of this little book is the chapter describing the experiments done in England by a Mrs. May Mellanby. Her husband, Dr. E. Mellanby, was the author of over 400 studies and the first to control rickets with diet. Cod liver oil had been used for centuries as a remedy but the specific application to rickets was first demonstrated by Dr. Mellanby. (Control of rickets using UV-B light was demonstrated almost simultaneously by investigators at Columbia and Johns Hopkins University in 1921.) In his research into rickets in dogs, he discovered the mineral-blocking effect of phytic acid in grains and legumes. Dr. Mellanby demonstrated that diets containing high levels of cereals, especially oatmeal, and lacking vitamin D, are the most effective producers of rickets. If vitamin D is inadequate there is poor tooth development, but Mrs. Mellanby then went on to prove that no matter how much cereal

is fed, if vitamin D is adequate tooth formation is normal. Mrs. Mellanby believed that as cereals increase in the diet, vitamin D must also be increased to offset their anticalcifying effects—think of the implications of this research on today's baby-feeding habits, where infants are given cereals as their first food but denied egg yolks until they are one year old!

Mrs. Mellanby also determined that vitamin D must be present from conception in order for proper tooth formation to occur. If vitamin D is absent during the early gestational period, the enamel cannot form properly, and it cannot be repaired by giving vitamin D later.

In her initial studies Mrs. Mellanby used dogs as the source of data but she later examined more than one thousand “baby” teeth from children. She divided these teeth into four categories—normal, hypoplastic (slightly underdeveloped), moderately underdeveloped and grossly underdeveloped. Only 149, or about 14 percent, of the total 1,036 were sound. About one-quarter were slightly underdeveloped, but nearly two-thirds were moderately or grossly underdeveloped.

It is more difficult to examine teeth in place, but of 266 adult teeth examined by Mrs. Mellanby, not one was sound. The teeth were extracted only for purposes of straightening the teeth, which means that they were erupting in a jaw that was underdeveloped. Thus, children with narrow faces most likely have underdeveloped teeth. Tooth structure and later decay are directly related. Prevention of cavities must start in the womb.

Curing Cavities

A final plum from this most fruitful book regards secondary dentine. Secondary dentine, a less well-organized form of tubular dentine, is produced throughout life as a patching material where cavities have begun, where the overlying enamel has been worn away, and within the pulp chamber as part of the aging process. Sometimes when cavities occur, production of secondary dentine can “heal” the decayed spot or rebuild portions of the tooth that have worn away. If vitamin D is adequate, secondary dentine will be well calcified. If vitamin D is lacking, dentine will be of poor quality or not present at all.

There is some evidence that the mineralization of dentine may depend on calcium derived from saliva rather than blood; in other words, it is deposited from the exterior rather than the interior of the tooth. The book describes studies by Dr. C. L. Pattison who, working with Mrs. Mellanby, determined that the calcium content of saliva doubled or even tripled when the diet

contained adequate vitamin D from cod liver oil.

Downside

Now that I have told you all this good news about cod liver oil, I need to comment on the research surrounding its possible toxicity. Over-elevated serum levels of vitamin D are a possibility if you combine summer or southern sun and cod liver oil. So if you are spending a lot of time out in the sun during the summer months, it's probably best to cut back on the dose. If you are unsure, you should test your blood levels of vitamin D.

Cod liver oil is no longer recommended in Great Britain and in the US pregnant women are advised to avoid most vitamin A and vitamin A-containing foods, including cod liver oil. Both countries have adopted this policy because of the recognized teratogenicity (may cause birth defects) of retinoic acid, a synthetic form of vitamin A. But low vitamin A also causes birth defects. In the developing countries, such as Brazil, Pakistan and India, vitamin A deficiency is widespread, afflicting millions. A 1992 survey of the US population determined that 50 percent of Americans consume 19 percent or less of the Recommended Daily Allowance (RDA) or 400 IU.

The original study showing birth defects associated with intake of mostly synthetic vitamin A exceeding 5,000 IU daily was published November 23, 1995 in the New England Journal of Medicine.⁴⁶ Other studies showing an association of birth defects with vitamin A concerned topical creams containing vitamin A derivatives such as Accutane, or extremely high doses of A used in animal studies.⁴⁷⁻⁵²

A later study, less well publicized, from the National Institute of Child Health and Human Development (NICHD), found no association with birth defects in women who took up to 10,000 IU of vitamin A during pregnancy. Because few women took more than 10,000 IU, researchers could not determine whether higher doses were a problem. Later Mills and others continued their research and determined that after serum testing and determining safe serum levels, women taking 30,000 IU of preformed vitamin A from animal foods (not beta-carotene) daily had the same blood levels of A as healthy pregnant women in the first trimester who had healthy babies. The conclusion is that a dosage over 30,000 IU vitamin A daily may be teratogenic for a certain few, but anything up to that amount is safe.⁵³⁻⁵⁴

Thus if you are or may become pregnant, limit cod liver oil intake to not more than a total vitamin A value of 30,000 IU. If using my favorite brand, Carlson Labs cod liver oil, that would equal the amount of vitamin A found in 12 teaspoons or 4 tablespoons, more than anyone would ever take. If using high-vitamin cod liver oil, the limit would be 2 tablespoons. Two tablespoons of regular cod liver oil provide 15,000 IU vitamin A, 2600 IU vitamin D and 6 grams of mixed omega-3 fatty acids, safe for pregnancy and good for mom and baby.

There is one situation in which high levels of vitamin A are not recommended and that is the condition of certain types of liver disease in which there is altered vitamin A metabolism. This is frequently the case with alcoholism. Alcoholics should not take high doses (not more than 1-1.5 tablespoons of regular cod liver oil) and what they do take should be accompanied by zinc supplements. The enzymes needed for vitamin A metabolism in the liver are zinc dependent.

The most likely culprits for production of birth defects in humans are topical and oral vitamin A analogs, not cod liver oil. Researchers have criticized the original 1995 study, from which governmental policy has been derived, for overstating the negative effect. Only 1.4 percent took supplements exceeding 10,000 IU a day, not a large enough sample from which to draw conclusions. However, it is important to never combine cod liver oil or vitamin A from supplements with oral or topical medications for acne or other skin disorders treated with retinoic acid derivatives.

If you sunbathe regularly and have found that your vitamin D levels are within the normal range, do not use cod liver oil unless you are willing to test and retest to determine that your blood levels of vitamin D have not gone too high. We do not know enough to say whether or not sunbathing and cod liver oil work synergistically or antagonistically. If you decide to get lots of sun and also use cod liver oil, please send me your vitamin D tests for my continued research. Cod liver oil use is safe in most of the US and all of Canada in winter but it should not be combined with other sources of vitamin D without careful testing and monitoring.

Price Was Right

Dr. Price was right. . . we all need to take cod liver oil (and eat plenty of good butter). For growing children, and for almost every disease condition, cod liver oil is the number one superfood, the supplement of choice.

For Vitamin D testing and monitoring information, send for the Sunlight and Vitamin D protocol from www.sunlightandvitamind.com or send \$38.50 to K. Sullivan, PO Box 961, Woodacre, CA 94973. You can wait until May 2002 for the publication of Naked at Noon–The Importance of Sunlight and Vitamin D, which will contain the sunlight and vitamin D protocols in greater detail. We are also working with DiagnosTechs laboratory to develop a saliva test for vitamin D, calcium and vitamin K. Since these are the factors regulating teeth and bone it will be an easy way to diagnose and to monitor treatment. Stay tuned.

Note: High-vitamin cod liver oil is available from Radiant Life (888) 593-8333, www.radiantlifecatalog.com.

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