

## Fish...Is it Good for Us?

This is one of the most frequent questions that I am asked. To help you make an educated decision that is in the best interest of you and your family, I've compiled what the current research has to say. I apologize up front for the length of the article and the length of the words. Neither could be shortened without compromising the accuracy of the article.

We've all heard it. Fish contains mercury. We've heard it so much that I think we are inclined to ignore it. If the mercury was *that* bad, no one would be eating fish. People would be dying from it. It would be headline news. Unfortunately, fish isn't just contaminated with mercury, but let's start with the effects of methyl mercury first.

All fish contain small amounts of methyl mercury, the most toxic form of mercury. Fish consumption is the main source of it in our diets. In a recent study, 55% of all tuna examined was above the EPA safety level for human consumption and it appears to be getting worse over time. Current data suggests that EPA safety levels should be cut in half. Already, current regulations in the U.S. allow up to ten times as much mercury in fish as the EPA limit allows, so our fish is currently allowed to have twenty times more mercury than may be considered safe.

- Studies on children of the neurobehavioral toxicity of mercury suggest that *no* level of mercury exposure can truly be considered safe for anyone, not just unsafe for pregnant women and children.
- It is thought that attention span is particularly vulnerable to developmental methyl mercury exposure, probably due to damage to the frontal lobes of the brain.
- Methyl mercury is a known neurotoxin. Severe exposure can cause overt structural brain abnormalities like microcephaly, which is a shrunken brain disorder.
- For most of 33 fish species tested, the detrimental effect on IQ scores of the mercury exposure exceeded the brain development boost, also measured in IQ scores, of the DHA.
- The methyl mercury in fish is a cardiac toxin, creates free radicals, and causes inflammation, blood clots, and muscle dysfunction of the blood vessel walls.
- In fact, methyl mercury toxicity was found to contribute an additional \$5 billion in lost economic productivity every year.

Many other contaminants are found in fish.

- Flame retardant chemicals are endocrine disrupting pollutants associated with the early onset of puberty in girls. The largest and most toxic source in the American diet is fish.
- Endocrine disrupting xenoestrogens, from manmade chemicals and radioactive polonium, both found in fish, may interfere with male fertility.
- Tuna and sardines were found to have the highest levels of the carcinogenic compound putrescine.
- The highest levels of DDT and PCBs were found in those who consume fish. PCB-contaminated fish has raised concerns about increased cancer risk. Organochlorine pesticides and hexachlorobenzene exposure were also found to be from fish.

- Toxicologically significant PCNs are chlorinated polycyclic aromatic hydrocarbons of human origin that can bestow a dioxin-like mode of toxic action. They are found in highest toxicity in fish.
- Perfluorochemical exposure, recently linked to thyroid disease, was found overwhelmingly to be coming from meat and fish consumption.
- Most of human exposure to radioactive polonium comes from fish and shellfish. The majority of radioactive fallout from the Fukushima nuclear power plant tragedy was absorbed by the Pacific Ocean. There is unequivocal evidence that Pacific blue fin tuna transported Fukushima-derived radionuclides across the entire North Pacific Ocean. Fukushima aside, fish already contain radioactivity due to thermonuclear weapons tests, sunken nuclear subs, and radioactive elements found naturally in the earth's crust. They bioaccumulate up the food chain in the fat of the fish.
- Meat and fish are contaminated with arsenic, lead, mercury, cadmium, polycyclic aromatic hydrocarbons, preservatives, and antibiotic residue. The greatest risk of exposure to cadmium and lead resides in the consumption of certain types of fish.
- Earlier this year, researchers at Johns Hopkins School of Public Health found levels of arsenic in chicken feather meal up to 100 times that found in apple juice by Dr. Oz last year and 10 times that found recently in rice. Feather meal is made from the billion pounds of feathers plucked from chicken carcasses annually, sometimes with heads, guts, manure, and feet thrown in to increase protein and mineral content. It is fed to agricultural animals including farmed fish. Farmed fish are also fed by-products from cows and can therefore transmit mad cow disease. Fish farmers often feed cheap fish meal which contains palm, linseed, and canola oil, which can inflame the arteries and result in more heart attacks and strokes.
- Many of the drugs we take can end up in our urine, which can end up polluting our waterways. Personal care products, nicotine, caffeine, and hormones were also found. There is a concern that they can bioaccumulate in the flesh of fish.
- Industrial chemical pollutants that can disrupt our metabolism and predispose us to obesity are referred to as obesogens. The focus has been on organotin compounds. Basically, they turn preadipocytes, pre-fat cells, into fat cells. The number one dietary source is fish.
- We've so polluted our planet that it is now just coming down in the rain and then progressing up the food chain. The best we can do to avoid these chemicals is to eat as low on the food chain as possible, preferably organic.

In addition to the pollutants found in fish, there are significant health reasons one should abstain from eating fish:

- Fish has significantly more cholesterol than beef and chicken.
- Gut bacteria and our liver can turn the choline in shellfish and fish into the toxic substance trimethylamine oxide, which may increase the risk of a build-up of cholesterol in the inflammatory cells in the atherosclerotic plaques in our arteries.
- Fish contain high levels of methionine, which encourages cancer cell growth in animals and is toxic to the bowel. Many human cancers, including leukemia and some tumors of the colon, breast, ovary, prostate, and skin, have what is called absolute methionine dependency. They generate gaseous sulphur-containing compounds with it. Methionine is found particularly in chicken and fish.

- The omega-3 fatty acids found in fish oil pills may increase men’s risk of developing prostate cancer and make them more likely to develop a high-grade form of the disease.
- A higher rate of cancer deaths among those that handle and process meat is attributed to infection with zoonotic viruses and antigenic stimulation through chronic exposure to animal proteins. In fact, cancer-causing virus exposure could help explain why those who eat meat have higher cancer rates. There's even a retrovirus associated with cancerous fish tumors which was speculated as a cause for increased cancer rates in American seafood workers.
- An isolated chemical from tarragon that is used as a flavoring agent in items like alcoholic beverages, canned fish, fats, and oils may act as a carcinogen and damage DNA.
- The purported role arachidonic acid plays in brain inflammation could explain why eliminating chicken, fish, and eggs may improve symptoms of mood disturbance, depression, anxiety, and stress within two weeks.
- Per the Framingham Heart Study, the consumption of dark fish, such as salmon, swordfish, bluefish, mackerel, and sardines, may increase one’s risk of atrial fibrillation, an irregular heart beat rhythm associated with stroke, dementia, heart failure, and a shortened lifespan.
- Meat, cheese, fish, and animal protein intake in general have been associated with an increased risk of inflammatory bowel disease. In the meantime, a plant-based lifestyle may not only help to prevent such conditions, but treat them as well, resulting in the longest recorded remission rates for Crohn's disease.
- Fish and shellfish are highly acidic foods that create an acidic environment in our blood and body tissues when we consume them. Our body is constantly striving to maintain a slightly alkaline environment and must leach calcium from our bones to buffer this acid. This can leave us in a negative calcium balance that could ultimately result in osteoporosis.
- Shellfish and fish are two of the six leading causes of food allergies.
- Each of us has 46 chromosomes. At the end of each chromosome are caps called telomeres which keep our chromosomes from unraveling and fraying and protect our DNA. Every time our cells divide, a bit of that cap is lost. When the cap is completely gone, our cells either stop dividing or die. If we can slow down this shortening, we should be able to slow down aging and live longer. Smoking eats away at our protective telomeres more than anything, followed by processed meats, which ages DNA by 14 years, and non-fried fish, which ages DNA by 6 years.
- There are also natural toxins that can bioaccumulate up the aquatic food chain. For example, there’s a rare toxin called domoic acid that can turn up in tuna and other seafood and cause anterograde amnesia, the loss of the ability to form short-term memories due to damage done to the hippocampus.

People consume fish and fish oil for a variety of health reasons. Unfortunately, the best research available does not support many of the purported benefits.

- Many people eat fish to obtain their essential fatty acids, fats that are essential to our health and must be included in our diet. What they don't realize is that on average only 30% of the fat in fish is essential Omega 3 fat. The other 70% of fish fat is saturated fat. There are healthy ways to consume essential fats without having to consume their unhealthy “baggage”.

Women following vegan diets have plenty of omega-3 essential fatty acids in their blood, compared with fish-eaters, meat-eaters, and ovo-lacto vegetarians. Levels in vegan men were not quite as high as in vegan women. Despite zero intake of long-chain omega-3s eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and substantially lower intake of their plant-derived precursor alpha-linolenic acid (ALA), vegan study participants converted robust amounts of shorter-chain fatty acids into these long-chain fatty acids.

Fish convert the ALA they ingest from algae into DHA & EPA. Those that say we must consume pre-formed DHA (aka fish) are misinformed. The body takes alpha linolenic acid from plants and converts it to EPA and DHA. Now it only converts a small percentage, but that is all we need. Any more just adds to our fat consumption.

- Fish oil has no effect on heart-related death, heart attack, or stroke, according to a review of 20 studies in the Journal of the American Medical Association in 2012. Advice to eat oily fish or take fish oil to lower risk of heart disease, stroke, or mortality is no longer supported by the balance of available evidence.
- The speculative benefits from the blood-thinning effects of fish oils fail to compensate for the harmful effects of the meat- and dairy-based Western diet. Eating fish oil has serious downsides. The blood-thinning properties increase the risk of generalized bleeding; these consequences could mean death from a car accident. Fish oil suppresses the immune system. The result might be a reduction of arthritic pains, but this same suppression will accelerate cancer growth. Fish oil is 100% fat, and the fat you eat is the fat you wear. Thus, it can cause weight gain.
- Fish oil does not decrease inflammation, it increases inflammation. It is thought that the long-chain Omega 3s like DHA are anti-inflammatory, but the industrial pollutants like PCBs and insecticides are more than offsetting its effect. Even distilled fish oil contains PCBs and insecticides. Algae-based DHA is recommended instead. In a recent study, the equivalent of eating a single walnut half per day appeared to cut the risk of dying from inflammatory disease in about half, whereas fish did not appear to play a protective role.
- Fish and fish oil do not prevent and do not decrease the risk of depression.

It is very important to those that are considering getting pregnant to know that it's not just what you don't eat while you are pregnant, but also what you don't eat before you get pregnant.

- Avoid polluted fish consumption for one year prior to getting pregnant and during pregnancy. The half-life of mercury in the body is estimated to be about two months. It takes one year to clear nearly 99% of the mercury in one's body. However, it can take much longer for the other industrial pollutants in fish to detox out of our body. For example, certain dioxins, PCBs, and DDT metabolites found in fish have half-lives of ten years. To get that same 99% drop can take 120 years. These contaminants can increase one's risk of diabetes by 38 times. That's as strong a relationship as smoking and lung cancer. Persistent organic pollutants (POPs) are stored in our fat and the fatter we are, the higher the retention and toxicity may be for these diabetes-related chemicals. This suggests that obesity may be a vehicle for such chemicals or simply a marker of animal product consumption since over 90% of POPs come from animal products unless you work in a chemical factory or are exposed to toxic waste. Every serving of fish per week increases diabetes risk by 5%, which makes it 80% worse than the diabetes risk associated with red meat consumption.

- Exposure to mercury during pregnancy appears to influence fetal brain development as detected by the decreased size of a newborn's brain. It takes an extremely small amount of fish to result in what is considered to be high mercury exposure.
- Researchers also found mercury-related damage to the visual centers in the brain and an increased risk of epilepsy in children being born of mothers who consumed fish during pregnancy.
- Decades after DDT was banned, 95% of 318 samples of umbilical cord blood were found to have detectible DDT residues. Since organo-chlorine pesticides are attracted to fat, they accumulate in foods of animal origin. The mother's consumption of meat, fish, and dairy were most closely associated with the presence of DDT in umbilical cord serum.
- Many parents are concerned about mercury-containing (thimerosal-containing) vaccines. However, if the mother only ate a single serving of fish per week or less during pregnancy, the latest data shows that infants end up with substantially more mercury in their bodies than being injected with up to 6 mercury-containing vaccines.
- Consuming fish can prolong pregnancy by changing prostaglandin hormones.

Women who plan to get pregnant may want to be tested for mercury exposure by having their hair analyzed. Dietary modifications can decrease the body's mercury burden to help ensure fetal safety.

Those that are careful not to consume genetically modified organisms may be surprised that they could be sneaking onto their plates despite all of their efforts. Very few fresh fruits or vegetables are genetically engineered, although Hawaiian papayas and a variety of yellow squash are notable exceptions. No meat, poultry, or fish products, approved for direct human consumption, are bioengineered at this point, although surprisingly, most of the feed for livestock and farmed fish is derived from genetically engineered alfalfa, corn, other grains, and soybeans. Also commonly genetically modified are canola oil, sugar beets, and zucchini.

And finally, a former EPA toxicologist stated that the EPA really considers the fish industry to be their clients more so than the general public.

So despite my effort to keep the reasons to avoid fish brief, nearly five pages and a plethora of multi-syllabic words later, I hope that you will think twice when considering adding any kind of fish to your plate.

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