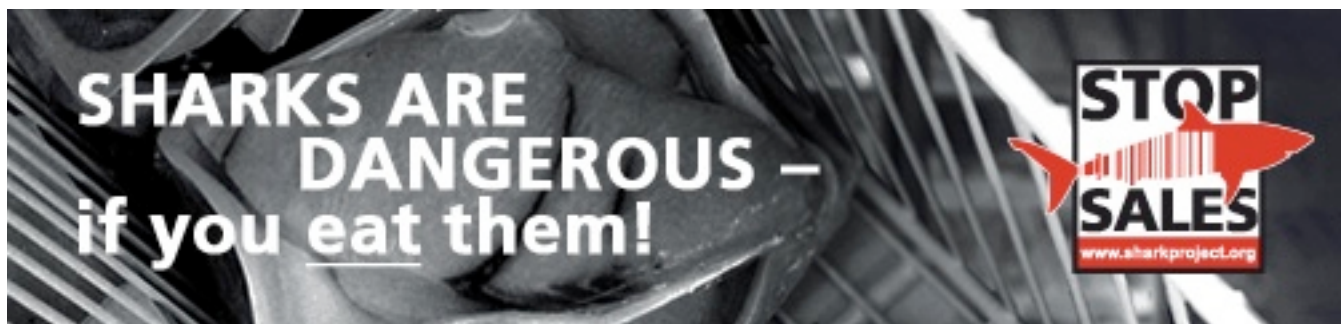

Methyl Mercury

The danger from the sea

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SHARK MEAT CONTAINS HIGH LEVELS OF METHYL MERCURY: A DANGEROUS NEUROTOXIN

In the marine ecosystem sharks are on top of the food chain. Sharks eat other contaminated fish and accumulate all of the toxins that they've absorbed or ingested during their lifetimes. Since mercury is a persistent toxin, the levels keep building at every increasing concentrations on the way up the food chain. For this reason sharks can have levels of mercury in their bodies that are 10,000 times higher than their surrounding environment.

Many predatory species seem to manage high doses of toxic substances quite well. This is not the case, however, with humans on whom heavy metal contamination takes a large toll. Sharks at the top end of the marine food chain are the final depots of all the poisons of the seas. And Methyl Mercury is one of the biologically most active and most dangerous poisons to humans.

Numerous scientific publications have implicated methyl mercury as a highly dangerous poison. Warnings from health organizations to children and pregnant women to refrain from eating shark and other large predatory fish, however, have simply not been sufficient, since this "toxic food-information" is rarely provided at the point of purchase.

Which Fish Have the Highest Levels of Methyl Mercury?

Predatory fish with the highest levels of Methyl Mercury include Shark, King Mackerel, Tilefish and Swordfish. Be aware that shark is sold under various other names, such as Flake, Rock Salmon, Cream Horn, Smoked Fish Strips, Dried cod/stockfish, Pearl Fillets, Lemonfish, Verdesca (Blue Shark), Smeriglio (Porbeagle Shark), Palombo (Smoothound), Spinarolo (Spiny Dogfish), and as an ingredient of Fish & Chips or imitation crab meat. Thresher, Mako and Dogfish are all species of shark, so beware of these names on menus and at fish counters as well. **Note: Ask questions about the seafood you buy. If the server can't tell you what species it is and where it came from, don't order it!**

How does the mercury make its way into the shark?

Inorganic Mercury occurs to a small extent naturally in the environment. Industrial pollution from coal-fired power plants and chlorine chemical plants are the primary sources of man-made mercury contamination.

Methyl Mercury is formed from inorganic mercury by microorganisms that live in all oceans, lakes and streams. Methyl Mercury is one thousand times more toxic than inorganic mercury. This highly toxic substance accumulates in the food chain in the tissues of fish at ever increasing concentrations. In the tissues of big and long-lived

aquatic predators enormous amounts of this toxin are accumulated [1]. This process is called bio-accumulation.

Why should I be concerned about Methyl Mercury?

The danger to humans from eating shark products is enormous. Even small quantities of shark meat can contain large amounts of poisonous methyl mercury.

The human body assimilates close to 100% of ingested methyl mercury. It passes the blood-brain barrier easily and reaches the brain at full, undiluted strength, something other toxic substances cannot do. The mechanism that separates the mother's bloodstream from the embryo (diaplacental barrier) is also bypassed without any problem. So even Mother Nature's built-in protection for the unborn baby provides no defense from Methyl Mercury. Subsequently the accumulation of Methyl Mercury in the developing brain and other vital organs of the fetus cannot be prevented. Massive developmental disorders of the brain and the peripheral nervous system, severe damage to kidneys and mutations can be the result. The fact that high doses of Methyl Mercury over a short time period can cause more severe, and sometimes irreversible, damage than lower doses over a long period of time makes this problem even more serious. Some documented facts:

- Health agencies in the US, Canada and the EU have published warnings to pregnant women and those of child-bearing age to avoid eating shark meat. [2]
- The National Academy of Science in the US estimates that in the US alone more than 60,000 children are born each year with neurological damage caused by Methyl Mercury exposure during pregnancy. [3]
- It has been scientifically documented that ingestion of Methyl Mercury contributes to **mutations, cancer and neurological damage to adults** as well as to children.[4]
- In 1998 scientists Dr. Dickman and Dr. Leung found that consumption of shark meat was the main source of methyl mercury which caused **a massive reduction in male fertility** [5].
- These results were corroborated in 2002 by a group of scientists working with Dr. Choi of the Prince of Wales Hospital and Chinese University. During routine examinations ordinary couples in Hong Kong were tested for Methyl Mercury. A large number of men were found to have high levels of Methyl Mercury and were diagnosed as having abnormal spermatozoa mobility and spermatozoa mutations [6].
- **Another fact that makes the exposure to Methyl Mercury even more frightening: Even if you are aware of the poison's presence – the damage to the central nervous system can't be reversed [7].**

According to Dr. Jane Hightower, the leading health expert in the field of Methyl Mercury toxicity:

“No safe level has ever been found for chronic exposure. The main health concerns include a possible increase in coronary artery disease and heart attack or stroke, neuropsychiatric damage, autoimmune antibodies, immune dysfunction, infertility, and type 2 diabetes. At this time, it appears that there is genetic susceptibility at play, which is why there is such a wide variability in tolerance between individuals.” [10]

What are the allowable limits for Mercury in Seafood?

- The maximum mercury intake that the Environmental Protection Agency considers to be safe is 0.1 micrograms per kilogram of body weight per day.
- The maximum mercury intake the JEFCA (Joint FAO/WHO Expert Committee on Food) allows 0.23 µg/kg of body weight.
- In the EU up to 1000 µg MeHg/kg of meat is allowable in seafood. Yet the EU’s recommendation for food made from animals (other than fish apparently) is not to exceed a MeHg concentration of 20 µg/kg.

How is it measured?

1. µg is the symbol for Microgram, which is one millionth of a gram
2. kg is abbreviation for kilogram, which is one thousand grams or 2.2. pounds.
3. MeHg is the symbol for Methyl Mercury
4. Methyl mercury (MeHg) is measured in micrograms per kilo meat; one thousand micrograms equals one milligram.
5. Tolerable amounts for human consumption of MeHg are indicated in micrograms per kilo of body weight per day or week.

Examination of Shark Meat

Examination of three different shark products purchased in German markets by SHARKPROJECT International in May 2005 revealed shocking results.

Blue Shark, European Conger and Cream Horn (all shark meat marketed under different names) were analyzed at the Institute for Inorganic and Analytical Chemistry of the Johannes Gutenberg University in Mainz, Germany by Prof. Dr. Klaus Heumann and Dr. Nataliya Poperechna [8]. The Blue Shark steaks contained 1400 µg/kg (+/- 0.13) Methyl Mercury, European Conger had 830 µg/kg (--±0,02) and Cream Horn 550 µg/kg (+/- 0.01).

A study ordered by the German Federal Ministry of Food, Agriculture and Consumer Protection [9] confirmed these results and had similar measured values. The top value for one shark was over 4mg MeHg/kg shark meat (= 4000 µg/kg). (Dr. R.Kruse and Dr. E. Bartelt “Exposure to Methyl Mercury by fish consumption“, Cuxhaven February 2008)

In the example above in which the Blue Shark steak tested contained 4000 µg/kg of Methyl Mercury, this means that a 4 oz serving of this shark steak contains 455 µg of Methyl Mercury. If you weigh 150 pounds (68 kilos), and eat this 4 oz shark steak, your

mercury intake from that serving is about 6.7 µg per kilogram of body weight. **This is 67 times (6700%) the EPA limit! And a 4 oz serving is probably about half of a typical restaurant serving.**

Even in light of these shocking results, no action was ever taken to protect consumers or even to inform them of these dangers. Statistics were manipulated to water down the results of the study and the matter was dropped. The following quote from Dr. Jane Hightower, Author of “Diagnosis: Mercury - Money, Politics and Poison”, gives some insight as to why such atrocities are allowed to take place:

“Wherever mercury has been, there has been an incredible amount of money to be made or lost. Coal fired power plants are currently the largest polluters of mercury today. Other polluters have also weighed in on the issue and lobbied for lax controls, no regulation, and no warnings to the people. The fisheries industry has fought long and hard to sell their products despite the mercury content. The FDA has had to sort through flawed research provided by industry funded scientists, and bad data out of a poisoning that occurred in Iraq that set our current standards for mercury in fish. This has resulted in a murky advisory, and little or no testing of the mercury content of the suspect large predatory fish that are in our markets.” [10]

Allowing lobbyists for the chemical and seafood industries to determine acceptable levels of Methyl Mercury for human health is just wrong. Medical risks cannot be lowered by changing statistical methods! Mercury toxicity on this large scale can potentially have profound consequences on Public Health.

The other tragedy is that many shark species are on the brink of extinction. And these animals are absolutely vital to the health of the oceans on which all life on earth depends!

Steps towards effective consumer protection as well as strategic protection of our marine ecosystems must be taken. We can start by educating ourselves and everyone we know. As consumers we have the power to effect change, and remember that we vote three times a day!

Sources:

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