KILLER FISH

HOW EATING AQUATIC LIFE ENDANGERS YOUR HEALTH

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INTRODUCTION

What Do You Really Know About Fish?

Chances are, you or someone you know has fallen for the argument that fish offers a healthful alternative to red meat and dairy foods because of its omega-3 fatty acid content. But is aquatic life really safe to eat? If you think the answer is yes, be prepared for a rude awakening as you read this book. In these pages, you'll find startling evidence that you probably have not yet encountered.

The messages and information in this book could not have come at a more critical time: people the world over are eating more fish than ever before. According to the US Department of Agriculture (USDA), fish consumption in North America alone has increased by at least 50 percent since 1980.[1] Salmon, for one, has achieved newfound popularity because mainstream medicine has trumpeted praise for its omega-3 fatty acid content. Chapter 5 reveals why this praise is undeserved and will point you to the best sources of omega-3 fatty acids.

Authorities have known for some time that people who eat fish are putting their health at risk. An article in a December 2004 issue of the medical journal *Annals of Internal Medicine* stated: "But Americans have heard less about, and perhaps paid less attention to, various health warnings associated with fish consumption. Studies have linked overconsumption of certain fish (particularly popular ones such as swordfish, tuna steaks, Chilean sea bass, and

some kinds of salmon) to neurologic deficits, cancer, autoimmune and endocrine disorders, and even some heart disease."[2] Chapter 2 introduces the human health risks related to fish consumption, chapter 3 highlights the dangers of eating raw fish and sushi, and chapter 4 describes how hormone-disrupting chemicals that are found in prescription drugs and personal care products are warping the reproductive life of fish and accumulating in humans.

The risks to human health are directly linked to the increasing contamination of fish and other aquatic species by industrial and consumer pollutants. This book shines the spotlight on many of these toxins, particularly mercury and polychlorinated biphenyls (PCBs). These and other dangerous substances are poisoning both wild and farmed fish, and anyone who eats fish also consumes these poisons. Chapter 1 describes the pollutants in fish and how their habitats have become tainted, and chapter 6 refutes the misconception that farmed fish are a safe choice.

You won't find much help from government agencies, or from the food and grocery industries either, in uncovering the health problems associated with fish consumption. While urging consumers to eat more salmon for its omega-3 fatty acid content, agencies such as the USDA and the US Food and Drug Administration (FDA) fail to sufficiently warn people that salmon contains high levels of PCBs and other toxins.

Nor do grocery stores place meaningful warning labels on fish that are known to harbor dangerous chemicals, leaving consumers blissfully ignorant of their health risks. When was the last time you saw a store post a prominent sign alerting consumers that tuna contains levels of mercury that are unsafe, especially for pregnant women? You've probably never seen such a sign, yet, as you will learn, the documented dangers of mercury contamination are a real and escalating threat to human health.

But human health is not all that is at risk. Chapters 7 and 8 focus on how human actions and fish consumption threaten envi-

ronmental health. In fact, some experts predict that sea life will perish in our lifetime.

No book about the killing and eating of aquatic animals would be complete without a discussion of the ethical aspects of human conduct and cruelty toward other life forms. There is not only the question of cruel treatment, though that is justification enough to refuse to participate in the business of animal agriculture. In addition, there exists a whole other dimension to consider, which is the extent to which an animal's intelligence should determine its use as a food source. The smarter and more socially advanced the life form is relative to human intelligence, the argument goes, the less likely it is to be served at the dinner table.

For example, unless you live in China or Southeast Asia, or unless you were starving, you probably haven't considered eating a dog, because that species is viewed as an intelligent and useful human companion in most parts of the world. However, some people who refuse to eat land creatures in recognition of their social versatility and ability to reason, or the cruelty inflicted while raising them, don't think twice about eating or mistreating fish. It's as though these creatures are too lowly to warrant compassion.

Scientific research affirms that fish are highly evolved creatures. In his thought-provoking book *Eating Animals,* Jonathan Safran Foer points out that since the 1990s, more than five hundred published papers have dramatically expanded our knowledge about the surprising sophistication of fish intelligence. "Fish build complex nests, form monogamous relationships, hunt cooperatively with other species, and use tools," Foer writes. "They recognize one another as individuals (and keep track of who is to be trusted and who is not). They make decisions individually, monitor social prestige, and vie for better positions. (To quote from the peer-reviewed journal *Fish and Fisheries:* they use 'Machiavellian strategies of manipulation, punishment, and reconciliation.') They have significant long-term memories, are skilled in passing knowl-

edge to one another through social networks, and can also pass on information generationally. They even have what the scientific literature calls 'long-standing cultural traditions for particular pathways to feeding, schooling, resting, or mating sites.'"[3]

People who care about the well-being of animals, including fish, are also more inclined to care about the well-being of other human beings. History will judge our culture for how civilized and humane we have been in our treatment of all life forms. As you read this book and absorb its message, please keep in mind that your eating habits and buying decisions help determine not only your own health but also the fate of entire species and the ecosystems on which they depend. Our awareness can constantly motivate us to change our actions and, ultimately, change the human relationship to food, nutrition, and the planet's ecological health . . . one bite at a time.

TRIPLE-HEADER

Fish Farm Facts

• Aquaculture has rapidly become such a profitable industry over the past three decades—averaging an 8 percent growth in the number of farmed fish every year over that period—that it now threatens to displace all traditional forms of fishing in the wild.[7]

• The fish species that are now predominantly raised on fish farms include salmon, bigeye tuna, carp, tilapia, catfish, and cod.[8]

• By 2009, more than half of all fish consumed globally was raised on fish farms.[9]

• According to a report by the National Oceanic and Atmospheric Administration, the United States imports 86 percent of its seafood from other countries, and half of that volume comes from fish farms.[10]

• China produces more than 70 percent of all fish raised in world aquacultures.[11]

• About 90 percent of all shrimp consumed in the United States is farm raised and imported.[12]

• Salmon, which is aquafarmed in great numbers, also is being genetically modified for even faster growth and higher profits.[13]

More Research Focuses on Farmed Salmon and Health Risks

In earlier chapters, the topic of heavy metal contamination, especially from mercury, in wild-caught fish is frequently discussed. Mercury contamination is a concern in farmed fish as well. A team of nine medical researchers from the University of Texas Medical

Branch examined the aquaculture industry and released their findings in the July 2009 issue of the *International Journal of Hygiene and Environmental Health*: "Although mercury contamination levels are no higher in farmed fish than in wild fish, their interactive toxic effects with coexisting man-made contaminants are not known. . . . From various estimates, consumption of these farmed fish can raise risks to health consequences, such as cancer. Such health risks may overshadow the cardiovascular benefits from the consumption of certain farmed fish [such as salmon]."[14]

Other metals are also found in the tissues of farmed fish. A study published in a 2004 edition of *Environmental Toxicology and Chemistry* revealed that concentrations of nine metals were found in farmed Atlantic salmon (*Salmo salar*) and two species of wild-caught salmon (chum and coho). Of the nine metals, organic arsenic was significantly higher in farmed than in wild salmon, whereas cobalt, copper, and cadmium were significantly higher in wild salmon.[15]

When it comes to other types of industrial toxins, there is increasing evidence that farmed fish may contain greater amounts than wild fish. Researchers analyzed samples of farmed Atlantic salmon from Maine and eastern Canada, organically farmed Norwegian salmon, and wild Alaskan chinook salmon for the presence of PCBs, dioxin-like PCBs, polychlorinated dibenzodioxins and dibenzofurans, and chlorinated pesticides. The researchers concluded: "Total PCB concentrations in the farmed salmon were significantly higher than those in the wild Alaskan chinook samples. Organically farmed Norwegian salmon had the highest concentrations of PCBs; their TEQ [toxic equivalent] values are in the higher range of those reported in farmed salmon from around the world. Skin removal does not protect the consumer from health risks associated with consumption of farmed salmon."[16]

The University of Texas Medical Branch researchers who commented about mercury content in farmed fish also commented

about other toxins: "Farmed fish, although presumably safer from contamination than wild fish, have, in fact, higher body burden of certain toxic chemicals that may present health concerns to unsuspecting consumers."[17] Examples of man-made contaminants found at high levels in farmed fish include PBDEs, PCBs, pesticides, brominated flame retardants, dioxins, and antibiotics.

"Human cancer risks associated with consumption of farmed salmon contaminated with PCBs, toxaphene, and dieldrin are higher than cancer risks associated with consumption of similar quantities of wild salmon," concluded a study published in the May 2005 issue of *Environmental Health Perspectives*.[18] The study also included this finding: "Many farmed Atlantic salmon contain dioxin concentrations that, when consumed at modest rates, pose elevated cancer and other health risks. However, dioxin and dioxin-like PCBs are just one suite of many organic and inorganic contaminants and contaminant classes in the tissues of farmed salmon and the cumulative health risk of exposure to these compounds via consumption of farmed salmon is likely even higher."[19] Finally, the study ended with this disturbing cautionary note to consumers: "Although both farmed and wild salmon are sold commercially within and outside the United States, the FDA has not established a tolerance or other administrative level of dioxin-like PCBs for commercially sold fish or for other foods."[20]

In 2006, another group of researchers published a study in the journal *Environmental Research*. By applying EPA methods for developing fish consumption advisories for cancer, this team of scientists determined that contaminants in farmed salmon warranted strong warnings: To avoid an elevated risk of cancer, consumers should consume no more than one meal that includes farmed salmon from northern Europe every five months. Because farmed salmon from Chile is less contaminated, the scientists advised eating no more than one or

two meals per month. They did not limit their warnings to farmed salmon: "Upon consideration of all of these organochlorine compounds as a mixture, even wild Pacific salmon triggered advisories of between one and less than five meals per month."[21]

In this study, the fish that had high levels of one of the fourteen major contaminants, such as the pesticides mirex or DDT, also were more likely to contain high levels of the other toxins. Combinations of two or more chemicals create an additional health dilemma for consumers and public health authorities. Here's what the study's authors had to say about this: "Since thirteen of the fourteen contaminants that we have reported are either known or probable human carcinogens, and since all of them have a variety of noncancerous actions, clearly if one hopes to protect against risks of cancer, noncancer effects, or both, one must deal with the fact that fish contain a chemical mixture of contaminants. Unfortunately, we have few well-developed and validated tools for evaluating health risks of chemical mixtures and inadequate information on the degree and nature of interactions among the various contaminants."[22]

When a person who eats fish is exposed to two or more of these toxins, the effects could be additive (each toxin adds to the health impacts of the other) or even synergistic (two or more toxins interact to produce effects much greater than any one can create on its own). Research evidence has found that synergies do occur between chlordane and endrin, between toxaphene and chlordane, between HCB and dioxin, and between DDE and PCBs, all of which are found in most samples of farmed salmon. Because of these powerful synergies and their potentially catastrophic effects on human health, people who consume salmon, whether farmed or wild, are taking risks with their long-term health.

Table 4. Common toxins in farmed salmon (measured in salmon samples with levels above FDA safety guidelines)

Toxin	Type	Effect
aldrin/dieldrin	pesticide	probable cancer-causing agent
dioxins	industrial chemical	probable cancer-causing agent
mirex	pesticide	probable endocrine disrupter
PBDEs	flame retardant	probable cancer-causing agent and endocrine disrupter
PCBs	industrial chemical	probable endocrine disrupter
toxaphene	pesticide	probable cancer-causing agent

Sources: [23, 24, 25]

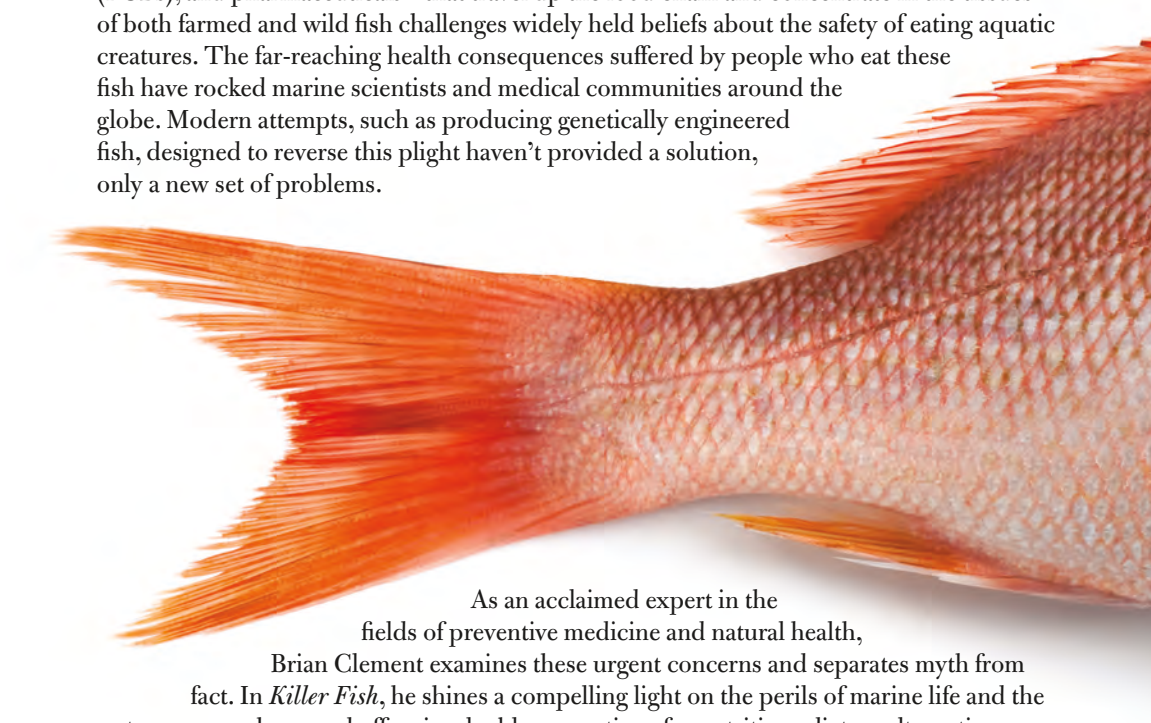
Cramped Fish Farms Breed Viruses

Overcrowding is typical in fish-farm pens, and with it comes the rapid proliferation and spread of viruses. One of the worst outbreaks in commercial aquaculture started in 2007 when infectious salmon anemia, a viral disease, invaded all of the major fish farms in southern Chile. At last report, the virus continues to spread and wreak havoc, causing salmon production to be cut by half. Chile and Norway have overlapping aquaculture industries, partly as a result of cross-ownership, so it was no surprise when biologists traced the origin of the salmon virus to salmon eggs that were shipped to Chile from Norway, which has the largest aquaculture industry in the world.

WARNING: EATING AQUATIC LIFE ENDANGERS YOUR HEALTH!

PEOPLE THE WORLD OVER are eating more fish than ever before. Despite many mainstream nutrition experts claiming that fish is a healthful alternative to red meat and dairy products because of its omega-3 fatty acid content, alarming numbers of scientific reports and government agencies dispute this common assumption. The decimation of marine ecosystems and the contamination of countless aquatic species by industrial and consumer pollutants pose increased risks to environmental and human health, resulting in escalated advisories to drastically limit our fish consumption.

Powerful evidence of deadly toxins—particularly mercury, polychlorinated biphenyls (PCBs), and pharmaceuticals—that travel up the food chain and concentrate in the tissues of both farmed and wild fish challenges widely held beliefs about the safety of eating aquatic creatures. The far-reaching health consequences suffered by people who eat these fish have rocked marine scientists and medical communities around the globe. Modern attempts, such as producing genetically engineered fish, designed to reverse this plight haven't provided a solution, only a new set of problems.



As an acclaimed expert in the fields of preventive medicine and natural health, Brian Clement examines these urgent concerns and separates myth from fact. In *Killer Fish*, he shines a compelling light on the perils of marine life and the waterways we share, and offers invaluable suggestions for nutritious dietary alternatives.

About the author

Brian Clement, PhD, NMD, LN, has spent more than four decades researching and practicing nutrition and progressive health care. Since 1980, Dr. Clement has guided the Hippocrates Health Institute in West Palm Beach, Florida.

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