

# Fish

PHYSICIANS COMMITTEE FOR RESPONSIBLE MEDICINE

5100 WISCONSIN AVE., N.W., SUITE 400 • WASHINGTON, DC 20016  
PHONE (202) 686-2210 • FAX (202) 686-2216 • PCRM@PCRM.ORG • WWW.PCRM.ORG

Few food products are as controversial as fish. A leading source of heavy metals and other contaminants, fish is frequently the subject of government health-risk advisories. However, some people promote fish as a source of omega-3 fatty acids. Let's look at the issues.

## Understanding Mercury

Mercury accumulates in aquatic life, concentrating especially in large predatory fish. Of the potential sources of mercury contamination, the consumption of fish and shellfish contributes most to the mercury concentration in humans.<sup>1</sup>

Nearly all fish contain traces of mercury. Some fish and shellfish tend to contain higher levels, either because they live in more contaminated waters or because they are larger carnivores consuming many contaminated smaller fish. Because mercury is eliminated slowly from the body, it may build to very high levels in the systems of animals—including humans—that consume it.

Levels of contamination vary widely from place to place and even among individual fish. Therefore, even well-informed consumers have no way of knowing whether the fish they have purchased has a high or low level of mercury contamination. Even modest consumption of moderately contaminated and commonly eaten fish can put consumers at risk very quickly.<sup>2</sup>

## Effects of Mercury Contamination

Mercury exposure has been linked to a wide variety of ills, including acute and chronic effects on the cardiovascular and central nervous systems. Also, the Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC) have designated mercury as a possible human carcinogen.<sup>1</sup>

## Mercury and the Heart

Mercury accumulates in the heart, as well as other tissues, and has been associated with increased blood pressure, irregular and increased heart rate, and increased rates of death from cardiovascular disease in at least 12 scientific studies.<sup>1</sup>

Consumption of fish and omega-3 fatty acids, including docosahexaenoic acid and eicosapentaenoic acid, has been associated with decreased risk of heart attack in individuals consuming a Western-style diet.<sup>3,4</sup> However, three recent

studies have shown that mercury exposure may have the opposite effect. In one study, mercury levels were 15 percent higher among those patients who had suffered a first heart attack.<sup>5</sup> A second study showed increased risk of cardiovascular mortality with increasing mercury exposure.<sup>6</sup> The third study found that a high content of mercury in hair may be a risk factor for acute coronary events, cardiovascular disease, coronary heart disease, and all-cause mortality in middle-aged men. This study also found that mercury may negate the purported protective effects of fish on heart health.<sup>7</sup>

## Other Pollutants in Fish

There are several other pollutants that accumulate in fish and shellfish. Taken together, polychlorinated biphenyls (PCBs), dioxin, chlordane, DDT, and mercury account for 98 percent of all fish advisories issued in 2004.<sup>8</sup> Many other toxins, including other heavy metals and organochlorine pesticides, find their way into water and aquatic life as well.

These pollutants are toxic to humans, fish, and other animals that consume and bioaccumulate them. Many of these chemicals are especially problematic because they are not readily cleared from the body and accumulate over a lifetime. Thus, even if exposure is limited to a discrete period of time, the potential risks persist.

According to the EPA, PCBs are known carcinogens in some species and probable carcinogens in humans. PCBs also have been shown to disrupt immune function, cause learning disabilities, and disrupt neurological development; they may have endocrine effects as well.

Dioxins, too, are known carcinogens and have also been shown to cause liver damage, weight loss, skin rashes, and reductions in immune function.<sup>9</sup> They are especially dangerous during fetal development and early childhood.<sup>10</sup>

Chlordane and DDT, an organochlorine, are pesticides that have been banned from use in the United States. Nonetheless, appreciable levels of these highly toxic chemicals remain in waterways and bioaccumulate in fish.<sup>11</sup>

## Nutrient Composition of Fish

Like other meats, fish are especially dense in animal protein (15 to 20 grams in a three-ounce cooked portion). People in the United States already consume well above the daily value for protein (50 to 65 grams). Protein intake averages about 15 percent of total calories, for a mean intake of approximately

100 grams per day for men and 70 grams per day for women.<sup>12</sup> Much of this protein comes from animal sources.

Diets containing excessive protein are associated with increased risk of impaired renal function,<sup>13</sup> osteoporosis,<sup>14</sup> and complications of diabetes.<sup>15</sup> Promotion of fish products may increase protein intake and aggravate these risks.

Furthermore, increasing fish intake would likely increase total fat and saturated fat intake. Although some of the fat in fish is in the omega-3 form, much of the remaining fat is saturated. Chinook salmon, for example, derives 52 percent of its calories from fat, and swordfish derives 30 percent. About one-quarter of the fat in both types of fish is saturated. Fish and shellfish are also significant sources of cholesterol. Three ounces of shrimp have 166 milligrams of cholesterol, while the same amount of bass has about 80 milligrams; in comparison, a 3-ounce steak has about 80 milligrams.<sup>16</sup>

### Other Health Risks

There may be specific risks to fish consumption as well. For example, a 2004 study looked at diet and prostate cancer in Japanese men. It showed that a high consumption of fish was significantly associated with prostate cancer risk.<sup>17</sup>

In a comprehensive review, the Center for Science in the Public Interest determined that fish and shellfish dishes caused more foodborne illness outbreaks than any other food between 1990 and 2003.<sup>18</sup> Such outbreaks can result from bacterial or viral contamination or from naturally occurring toxins. These naturally occurring toxins are not destroyed by cooking.<sup>19</sup>

### A Healthier Way to Beat Heart Disease

Fish is often touted for its possible benefits relating to heart disease. However, it is already known that vegetarian diets help prevent, and even reverse, heart disease. Animal products are the main source of saturated fat and the only source of cholesterol in the diet. Vegetarians avoid these risky products. Additionally, fiber helps reduce cholesterol levels<sup>20</sup> and animal products contain no fiber. When individuals switch to a high-fiber, low-fat diet, their serum cholesterol levels often drop dramatically.<sup>21,22</sup> Studies have demonstrated that a low-fat, high-fiber, vegetarian or vegan diet combined with stress reduction techniques, smoking cessation, and exercise, or combined with prudent drug intervention, could actually reverse atherosclerosis—hardening of the arteries.<sup>23,24</sup>

### Safer Sources of Omega-3 Fatty Acids

High levels of toxins, fat, and cholesterol and a lack of fiber make fish a poor dietary choice. Fish oils have been popularized as a panacea against everything from heart problems to arthritis. In fact, fish oil supplementation may increase the risk of cardiac arrhythmias in some patients, specifically those who require a pacemaker for this problem.<sup>25</sup> Research has shown that omega-3s are found in a more stable form in vegetables, fruits, and beans.<sup>26,27</sup>

Alpha-linolenic acid, the only essential omega-3 fatty acid, is found in many vegetables, beans, nuts, seeds, and fruits. It is concentrated in flaxseeds and flaxseed oil and also found in oils such as canola, soybean, walnut, and wheat germ. Omega-3 fatty acids can be found in nuts, seeds, and soy products, as well as beans, vegetables, and whole grains.<sup>28,29</sup> Corn, safflower, sunflower, and cottonseed oils are generally low in omega-3s. Fish consumption is by no means the only way to ensure adequate intake of omega-3 fatty acids.

### Conclusion

Given the clear evidence that fish are commonly contaminated with toxins that have well-known and irreversible damaging effects on children and adults, the consumption of fish should not be encouraged. The risks are known and, especially for infants and women of childbearing age, significant. The other risks associated with the consumption of fish and shellfish, which are high in animal protein and often saturated fat and cholesterol, are also considerable. It is best to avoid the consumption of fish and shellfish. Other, more healthful foods from plant sources offer the full range of essential nutrients without the toxins and other health risks in fish.

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