Chemical Contaminants Found in Fish & Risk of Cardiovascular Disease

Chemicals in fish build up in the body and contribute to risk of certain diseases. See evidence below for the chemicals' link to cardiovascular disease.

This information is from published epidemiology studies. As with any set of epidemiology data, some studies find no link between cardiovascular disease and chemical contaminants, while others do. Below is information from studies that link these chemicals and cardiovascular disease.

Health Benefits of Fish Consumption

Your patients with cardiovascular disease can incorporate fish into a regular healthy diet. In fact, fish low in contaminants can provide several nutrients that promote health in individuals with cardiovascular disease.

- Reduce blood pressure – fish are a source of potassium[1]
- Encourage weight management – fish are a lean source of protein[2]
- Lower triglycerides – certain fish are high in polyunsaturated fats[3]

Risk of Having Cardiovascular Disease

- Higher mercury exposure has been associated with greater risk of cardiovascular disease and heart attacks in men.[4-7]
- Increased risk of having cardiovascular disease was associated with higher blood concentrations of certain organochlorine pesticides (chlordane and metabolites), dioxin-like polychlorinated biphenyls (PCBs), and non-dioxin-like PCBs in women.[8]
- Frequent consumption of store purchased fish had a significant reduction in the risk of mortality from coronary heart disease. However, this benefit was not observed among frequent consumers of Great Lakes fish. The authors noted possible reasons for the findings; ocean fish may have higher concentrations of beneficial nutrients, such as Omega-3 fatty acids, compared to Great Lakes fish or the benefits of the fish may be modified by chemical contaminants.[9]

Links Between Chemicals and Cardiovascular Disease Risk Factors

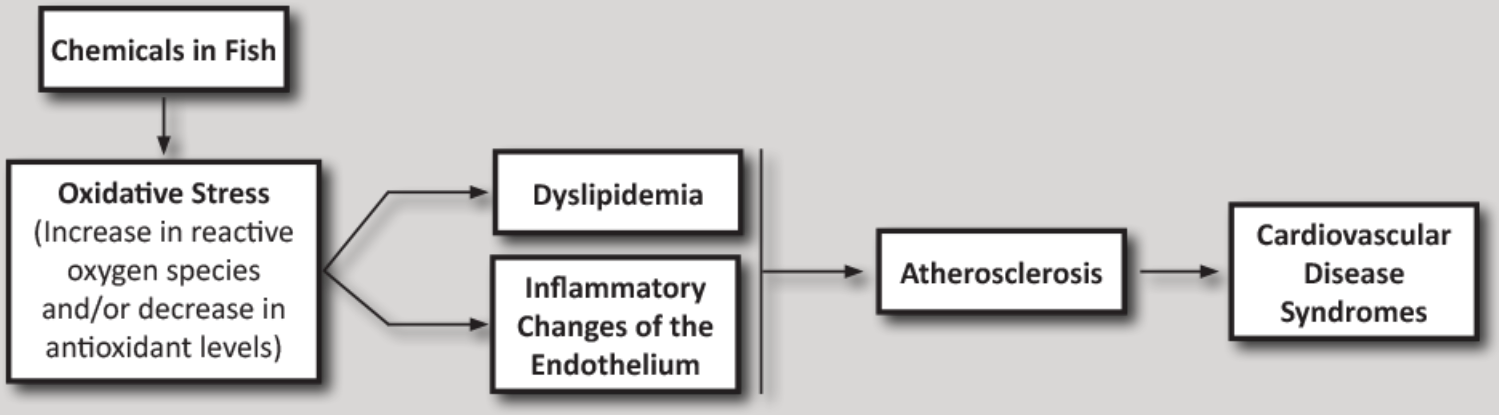
- Japanese adults who ate one 8 ounce meal of high mercury fish (bigeye tuna or shark) each week for 14 weeks had alterations in heart rate variability measures when compared to both their baseline measurements and to adults on their normal diet.[10]
- A significant positive association between blood dioxin levels and the Framingham risk score for cardiovascular disease was identified in adults (30-45 years old) who had no history of cardiovascular disease.[11]
- Increased mercury, PCBs, p,p'-diphenyldichloroethene (DDE), or dioxin blood levels were associated with hypertension in South Korean adults[12], younger Inuit adults[13], United States adults[14], older Swedish adults[15], and Japanese adults[16].
- In 70-year old Swedish men and women, DDE, dioxin, and certain PCB congener levels were correlated to existence or development of abdominal obesity.[17] Those same chemical levels in the same study participants were positively related to abdominal visceral adipose tissue and subcutaneous adipose tissue.[18]

Frequent fish consumers can use the *Eat Safe Fish* and *Buy Safe Fish* brochures to limit their exposures to chemical contaminants.

Order free from Michigan Department of Health and Human Services (MDHHS) by phone or online order form. Call 1-800-648-6942 or visit www.michigan.gov/eatsafefish for more information!

eat safe fish

Cellular Changes Leading to Symptoms



Humans can be exposed to toxic chemicals while eating contaminated fish. Once ingested, chemicals can be absorbed and distributed to different parts of the body. At the cellular level, these chemicals cause oxidative stress. Oxidative stress is an increase in reactive oxygen species and/or a decrease in antioxidant levels. The oxidative stress leads to inflammation of the endothelium and dyslipidemia. Dyslipidemia along with inflammatory changes in the endothelium can lead to atherosclerosis. Atherosclerosis can be followed by manifestation of various cardiovascular anomalies such as hypertension and stroke.[19-22]

Looking for More Information?

Cosselman, KE, Navas-Aclen, A., Kaufman, JD. (2015). Environmental factors in cardiovascular disease. Nature Reviews Cardiology 12: 627-642.

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