Chemical Contaminants Found in Fish & Risk of Diabetes

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

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

Health Benefits of Fish Consumption

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

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

To learn more about the chemicals discussed in this fact sheet visit mi.gov/eatsafefish, and click on the Reports and Science button.

Risk of Developing Diabetes

- Great Lakes fish consumers with increased levels of serum p,p'-diphenyldichloroethene (DDE) (but not polychlorinated biphenyls [PCBs]) had an increased risk of developing (incident) diabetes.[3]
- Individuals with prenatal exposure to chemicals, such as DDE, may have an increased risk of obesity and development of type II diabetes later in life.[4]
- Young adults exposed to higher levels of mercury had a greater risk of developing diabetes later in life.[5]

Chemicals Associated with Prevalence of Diabetes

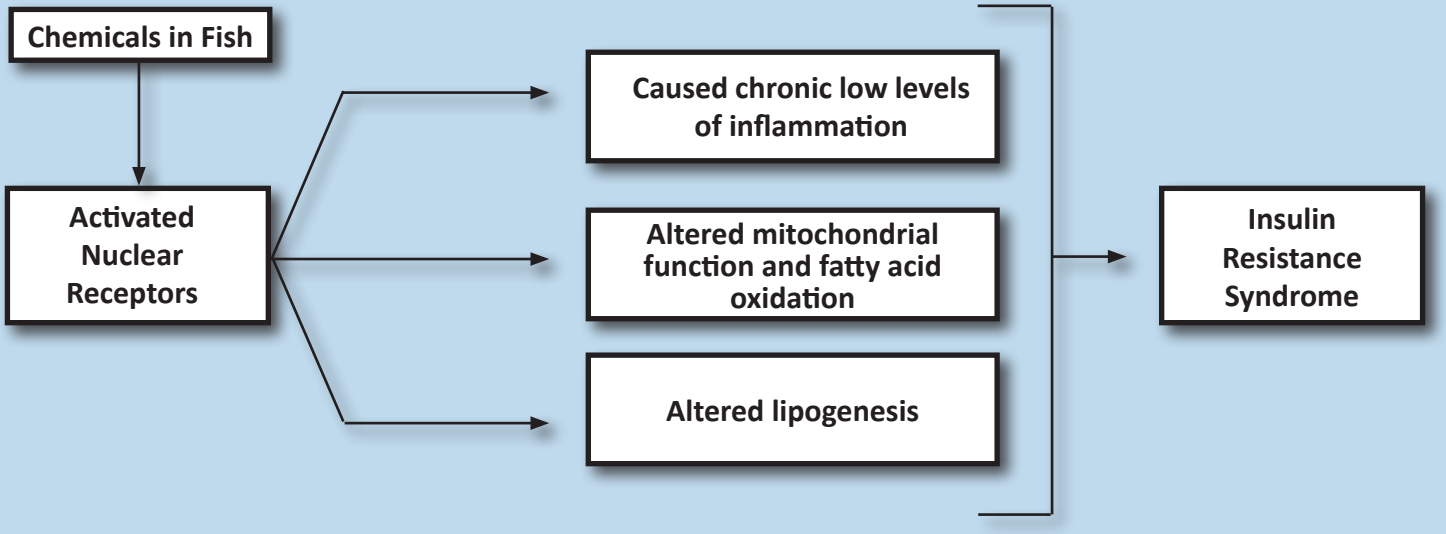
- People with diabetes had significantly higher levels of dioxins and PCBs than people without diabetes.[6]
- Individuals, including a subset of the U.S. general population, had a significantly increased risk of diabetes with elevated dioxin,[6,7] PCB,[6,7] and DDE levels.[7]
- Individuals had an increased risk of diabetes with elevated serum PCBs, DDE, and another chlorinated pesticide (hexachlorobenzene).[8]
- Individuals with increased levels of PCBs (both dioxin-like and non dioxin-like) and organochlorine pesticides were associated with increased risk of having (prevalence of) metabolic syndrome in a subset of U.S. general population[9] and dioxins were associated with increased prevalence of metabolic syndrome in a Japanese population with and without inclusion of people with diabetes.[10]

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 by phone or online order form. Call 1-800-648-6942 or go to www.michigan.gov/eatsafefish for more information!

eat safe fish

Cellular Changes Leading to Symptoms



When people eat fish with elevated chemicals, the chemicals are distributed to various parts of the body. These chemicals can then directly or indirectly trigger activation of nuclear receptors, leading to changes in gene expression or protein production. These changes in gene expression or protein production can then cause inflammation and alterations in mitochondrial function, fatty acid oxidation, or lipogenesis. These alterations on the cellular level can lead to insulin resistance syndrome in an individual.

Looking for More Information?

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