

Reducing the Risk of PCB-associated Type 2 Diabetes with Fruit and Vegetable Consumption

Adults with high levels of polychlorinated biphenyls (PCBs) in their bodies, which may increase the risk of developing type 2 diabetes, can reduce that risk by eating more fruits and vegetables, according to researchers from the University of Kentucky Superfund Research Program (UK SRP).

Recent studies show that exposure to PCBs is associated with type 2 diabetes. PCBs are a class of compounds used for decades in many industrial applications, such as electrical equipment. Although commercial production of PCBs was banned in most countries including the United States in 1979, PCBs persist in the environment because of their stable chemical structure. Found in air, water, soil, and sediments, PCBs easily enter the food chain and, after consumption, accumulate in the fatty tissues of people and animals. A primary route for PCB exposure today is from eating contaminated foods, primarily fish, meats, and dairy.



UK SRP's research adds to the wealth of information supporting a diet high in fruits and vegetables.

The study, led by Lisa Gaetke, Ph.D., who is also a Registered Dietitian, demonstrates for the first time a relationship between particular dietary nutrients and disease vulnerability from PCB exposure in US adults, supporting the overall UK SRP research goals to use healthy nutrition to lessen the toxic effects of environmental contaminants.

Linking Nutrition to Reducing PCB-associated Type 2 Diabetes

Diabetes is now estimated to affect 25.8 million Americans and 346 million people worldwide and has been shown to occur in response to both genetic influences and environmental factors such as food intake, sedentary lifestyle, and body mass index. Good nutrition can help prevent and manage type 2 diabetes. Diets rich in fruits and vegetables, which contain antioxidant and anti-inflammatory nutrients, have also been shown to lessen some of the toxic effects of PCBs.

Because of these correlations, UK SRP researchers used physiological and lifestyle data from the U.S. Centers for Disease Control and Prevention database, National Health and Nutrition Examination Survey (NHANES) 2003-2004, to determine the relationship between serum (blood) carotenoid concentrations, a nutrition biological marker that shows fruit and vegetable intake, and the risk of developing type 2 diabetes in adults with serum PCB concentrations. NHANES is considered representative of the U.S. population.

Carotenoids are a class of more than 600 naturally occurring pigments found in plants. They give fruits and vegetables their color, ranging from pale yellow to deep red. Plant foods provide most of the carotenoids in the human diet. Dietary carotenoids are a type of micronutrient, in addition to vitamins and minerals that are essential for optimal health, development, and growth. While the authors do not recommend nutritional supplementation of individual carotenoids, they do encourage eating whole foods with an excellent source of a wide variety of carotenoids.

Researchers from the UK SRP analyzed information from adult NHANES participants with serum concentrations

of three forms of PCBs, which are designated by the numbers 118, 126, and 153. They examined the carotenoid concentrations in serum and other factors related to demographics and lifestyle factors.

Lowering Disease Risk through Nutrition

All three PCBs studied were associated with an increased probability of developing type 2 diabetes. But when serum carotenoid concentrations were higher, the risk of developing type 2 diabetes was lower for two of the three PCB types studied. Serum carotenoids at any concentration did not affect the probability of developing type 2 diabetes in the people exposed to PCB 153.

According to the authors, this is the first study to investigate associations between serum carotenoids, serum concentrations of PCBs, and the probability of developing type 2 diabetes in a representative sample of U.S. adults. Results are based on samples from clinical visits and nutritional examination to assess health status and are therefore considered to reflect true environmental risk ratios. From this study, it is not possible to determine the time or extent of original PCB exposures, only concentrations that remain in the blood. The authors suggest that further studies are needed to better understand other metabolic or chemical exposure factors that may compromise the health of people exposed to PCBs.

According to the authors, regularly eating fruits and vegetables, which are naturally low in fat content, high in essential micronutrients including carotenoids, and also high in protective bioactive compounds called polyphenols, not only protects against disease but also may reduce exposure to PCBs. Carotenoid-containing foods, linked to decreased risk for other diseases in addition to type 2 diabetes, may provide a dynamic barrier against the chemical, physical, and biological stressors encountered daily by people everywhere.

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For more information, please refer to the following source:

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