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Polychlorinated Biphenyls and Metabolic Diseases on St. Lawrence Island, Alaska

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ABSTRACT

Polychlorinated Biphenyls (PCBs) are industrial chemicals that were used from 1929 until 1979 as a plasticizer in paints, plastics, and rubber products. However, PCBs continue to persist in the Arctic. They enter the Arctic environment through air and ocean currents. Sunlight and weathering help break down chemicals, so the Arctic's lack of sunlight and precipitation during the winter allows PCBs to more readily accumulate. These chemicals settle either on organic films or water and are consequently absorbed by the Arctic food web. PCBs then bioaccumulate in fatty tissues like omega-3 fatty acids. The higher the animal is in the food web, the greater the accumulation of PCBs in its fatty tissue.

The Yupik people of St. Lawrence Island, Alaska rely on a diet that largely consists of bowhead whales, walruses, and seals, all of which are high in omega-3 fatty acids and are near the top of the Arctic food web. Humans occupy the top of the food web and so therefore accumulate the highest concentration of PCBs in their omega-3 fatty acids. Research has shown that high intake of omega-3 fatty acids should promote a healthy endocrine system, therefore protecting against metabolic diseases. However, in recent years, St. Lawrence Island residents have seen a predominate increase in metabolic diseases.

A great number of recent scientific evidence suggests a link between exposure to PCBs and endocrine disruption. We hypothesize that consumption of subsistence foods contaminated with PCBs puts these residents at an uncommonly high risk for metabolic diseases.

Key Words: PCBs, omega-3 fatty acids, metabolic diseases

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