Dietary dioxins not associated with increased breast cancer risk

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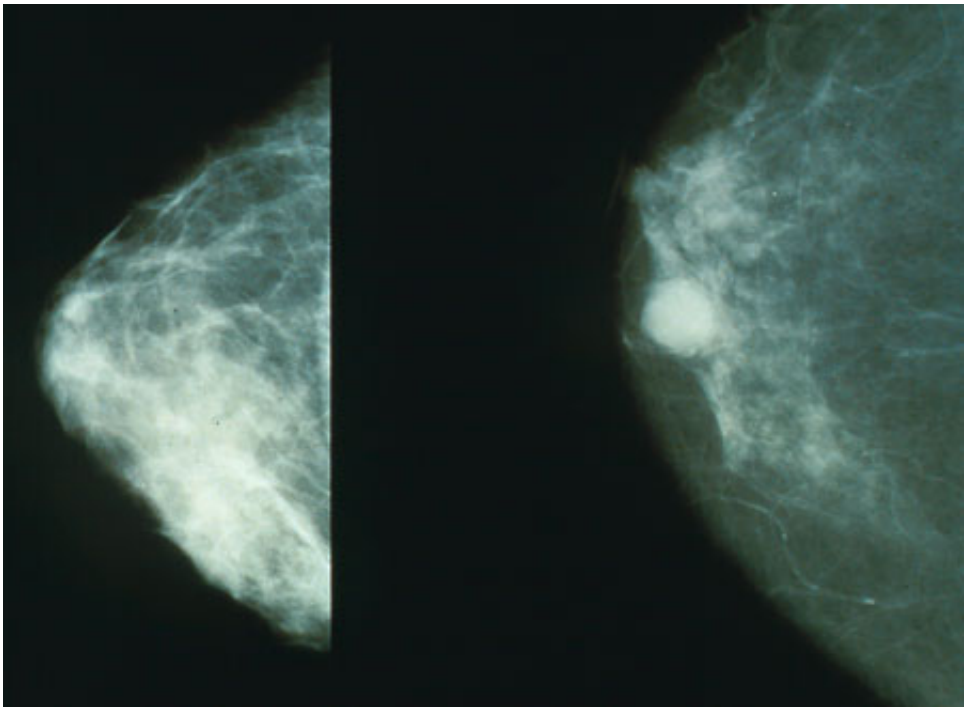

Mammograms showing a normal breast (left) and a breast with cancer (right). Credit: Public Domain

Estimated exposure to dioxins through dietary intake is not associated with an increased risk of developing a breast cancer among low exposed women, according to a large cohort study published in open access journal *Breast Cancer Research*. This contradicts a popular belief held by many about the effect of dioxins.

Dioxins are toxic chemicals that are the by-product of industrial processes such as waste incineration, smelting and refinement of metals and the bleaching of pulp and paper. Dioxins have been linked to multiple cancers, although for breast cancer, current evidence is conflicting. Previous studies into breast cancer and dioxin exposure have looked at environmental contact with these chemicals.

In the general population, diet is considered one of the main sources of exposure to dioxins, which are primarily found in foods of animal origin that are rich in fat such as dairy products and meat. This is the first study to investigate estimated dietary exposure to dioxins and breast cancer risk.

Beatrice Fervers, senior researcher on the study, says: "There are a variety of challenges and methodological limitations in existing studies of breast cancer and exposure to dioxins, which has contributed to conflicting findings. Previous studies have not looked into multiple routes of exposure; no study to date has looked into dietary dioxin exposure, although this is considered one of the main dioxin exposure routes. Our study draws from a national cohort with detailed data on individual risk factors and a detailed dietary/food frequency assessment."

Researchers from the Leon Berard Cancer Center and the Universite Claude Bernard Lyon 1 estimated dietary dioxin exposure based on the dietary habits of 63,830 women who participated in the E3N cohort study, a French national teacher cohort that begun in 1990 and followed for an average of 25 years. This study on dioxin exposure and breast cancer risk was conducted from 1993 to 2008. Half of the women who participated in the study had gone through menopause at the start of the study.

The participants were surveyed about the frequency of consumption and

portion size for 208 food items. Their dietary exposure to dioxins was then estimated by combining the records on the women's consumption with data on the level of dioxin contamination in food published by the French High Council for Public Health and that were based on samples collected from 1996 to 1998, which falls within the study period.

The most consumed food in the women was fruit and vegetables, followed by cereal products. The foods that contributed most to dioxin exposure were dairy products, followed by fruit and vegetables, then meat. Based on total food consumption the researchers estimated that the average daily dietary exposure to dioxins was 1.3 picogram TEQ (toxic equivalency) per kg of body weight per day, which is below the WHO toxicity threshold of 2.3 picogram TEQ per kg of body weight per day for dioxins. Only 2.7% of women of the study had exposure estimates above that threshold.

From 1993 to 2008, 3,465 women involved in the study developed breast cancer. The researchers did not observe any increase of breast cancer risk associated with estimated dietary dioxin exposure. The results also suggested a decreased risk of hormone-independent breast cancer among post-menopausal women with the highest dioxin intake.

The researchers note that these results cannot be extrapolated to other populations. They also say their study does not take into account women living in areas where dioxins are emitted and eating food grown in this area, they may consume more contaminated food than average.

Beatrice Fervers says: "While our study results seem to suggest absence of breast cancer risk associated with dietary exposure to dioxins in low-exposed post-menopausal women, we cannot rule out risk in high-exposed populations, risk associated with early-life exposure or pregnancy period and risk associated with combined dietary and environmental exposures. Further studies on these risks and the

decreased risk of hormone-independent breast cancer are required."

More information: Estimated dietary dioxin exposure and breast cancer risk among women from the French E3N prospective cohort , Aureilie M N Danjou, Beatrice Fervers, Marie-Christine Boutron-Ruault, Thierry Philip, Francoise Clavel-Chapelon and Laure Dossus , *Breast Cancer Research* , DOI: 10.1186/s13058-015-0536-9

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