

Breast Cancer and Parabens?

By Heidi Park for Wellesley College Blog

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Earlier this month, researchers at the Genesis Breast Cancer Prevention Center at the University Hospital of South Manchester, England, released the results of a three-year study that measured the concentrations of five parabens at four different locations across the human breast using human breast tissue collected from 40 women undergoing mastectomies for primary breast cancer (*J App Toxicol*. Jan. 12, 2012). This most recent study found one or more paraben esters in 158/160 (99 percent) of the tissue samples, and in 96/160 (60 percent) all five esters were present.

Because the 2004 study found parabens in human breast tumor tissue, a global debate has been sparked and researchers are further investigating paraben toxicity and their potential role in breast cancer. Two studies conducted in 2005 (Golden et al., 2005; Soni et al., 2005) determined parabens possess low toxicity; but since 1998, research has shown parabens possess oestrogenic properties (reviewed in Darbre and Harvey, 2008; Routledge et al., 1998), which is known to play a central role in the development, growth and progression of breast cancer (Miller, 1996). Although the source of the paraben could not be identified in the human breast tissue, it was suggested that low-level dermal absorption from personal-care products applied to the breast region over the long term might have contributed.

According to a 2010 study, exposure to environmental oestrogens occurs through diet, household products and cosmetics; but generally, their concentrations are too low to cause an oestrogenic response (*Anticancer Res.* 2010;30:815-28). The study found that, although the former is true, when exposed to enough chemicals, the small doses that accumulate in breast tissue can potentially add up to induce an oestrogenic response.. Britain is reporting a continued disproportionate incidence of breast cancer in the upper outer quadrant of the breast which is where many personal care products are applied. Interestingly, the current study reported that although the source of the paraben could not be identified, parabens were found in 7/40 patients who reported never having used underarm cosmetics in their lifetime.

"The intriguing discovery that parabens are present even in women who have never used underarm products raises the question: where have these chemicals come from?" said Lester Barr, consultant surgeon at the University Hospital of South Manchester and Chairman of the Genesis Breast Cancer Prevention Appeal, which part sponsored the recent 2012 study.

Why do parabens collect in the breast? Because of the fatty nature of human breast tissue, it's a prime target for lipophilic and hydrophilic pollutant chemicals that possess a range of endocrine-disrupting properties and genotoxic activity (*CML - Breast Cancer.* 2010;22(4):113-22). With regards to breast cancer, this is a concern because of their ability to mimic or interfere with the action of estrogen.

The difference between plant-based phytoestrogens such as soybeans, legumes, cereals and hops that have estrogenic activity is they can be consumed in relatively large amounts via diet, but they are cleared from the body relatively quickly; however, manmade POPs (persistent organochlorine pollutants) used in agriculture such as herbicides and pesticides, and PCBs (polychlorinated biphenyls) also possess estrogenic activity; but because of their lipophilic properties, they are passed up the food chain dissolved in dietary fat, and are not cleared from the body easily, causing them to accumulate in fatty tissues, according to an article, "Personal Care Products and Breast Cancer," written by Philippa D. Darbe, M.D., leader in oncology, School of Biological Sciences, Biomedical and Pharmaceutical Sciences at the University of Reading, England. The article cited classes of personal care products that are exposed to the breast area, including shaving creams, skin and sun care products, feminine hygiene, fragrances, hair care products, etc.; in addition to chemicals used in personal care products that have shown oestrogenic activity (in vitro and in vivo), including aluminum chlorhydrate, which is used in antiperspirants, a product almost everyone uses on a

daily basis. This past fall, researchers at the California Pacific Medical Center reinforced the concern bisphenol-A (BPA), and methylparaben (MP), at low concentrations, can have adverse health consequences such as an increased risk of breast cancer (*Carcinogenesis*, Sept. 1, 2011). So not only are the chemicals inside personal care products a concern, but is plastic packaging is, too.

Although there seems to be a hefty amount of research linking parabens in breast tissue, Darbe told *Inside Cosmeceuticals*: "There is no proven link with breast cancer either of parabens or any personal care product; however, absence of evidence is not evidence of absence; we simply do not know one way or the other. If these chemicals did not enter the human breast, then there would be no question. The fact that they are there needs more research to find out if they can cause any adverse effects from their presence either alone or in combination. Personally, I have always felt that the issue is bigger than parabens alone—that is not to say that I do not hypothesize that parabens play a role, but rather that the overall picture involves more than just parabens."

So the question is no longer if personal care products can be absorbed into the body (which clearly they can be, according to their measured presence), but whether or not there is a causal relationship between individual or combinations of chemicals and the development of breast cancer, which is still to be determined. I think no matter if this relationship has been confirmed or denied or explained, there is something to say about repeatedly finding parabens in breast tissues. Think about the Mortician's Mystery—it's frightening to know just how much our personal care products can affect the endocrine system, among others. As I write this, I'm having disconcerting thoughts of my aluminum-laden deodorant that I apply daily and what that may be doing to my body.