

Bisphenol A linked to chemotherapy resistance

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Exposure to bisphenol A (BPA) may reduce the effectiveness of chemotherapy treatments, say University of Cincinnati (UC) scientists.

The research study, led by UC's Nira Ben-Jonathan, PhD, says that BPA—a man-made chemical found in a number of plastic products, including drinking bottles and the lining of food cans—actually induces a group of proteins that protect cancer cells from the toxic effects of chemotherapy.

The findings are reported in the journal *Environmental Health Perspectives* and appear online Oct. 8, 2008, ahead of print.

"Resistance to chemotherapy is a major problem for cancer patients, especially those with advanced or metastatic disease," says Ben-Jonathan, a professor of cancer and cell biology at UC who has studied BPA for more than 10 years. "Finding out what contributes to that resistance can give us an idea of what to target in order to make chemotherapy as effective as possible."

Researchers have suspected that BPA could play a role in cancer because of the chemical's structural similarities to a cancer-promoting compound called diethylstilbestrol (DES). But Ben-Jonathan's team found that BPA isn't exactly mimicking the action of DES.

"BPA does not increase cancer cell proliferation like DES does," she says. "It's actually acting by protecting existing cancer cells from dying

in response to anti-cancer drugs, making chemotherapy significantly less effective."

Ben-Jonathan's team studied human breast cancer cells, subjecting them to low levels of BPA consistent with levels found in the blood of human adults. The team found that BPA is acting in cancer cells similar to the way estrogen does—by inducing proteins that protect the cells from chemotherapy agents.

Estrogen's protein-inducing action has been previously linked to chemotherapy resistance, but researchers have been unable to explain why such resistance still occurs in certain patients with less estrogen. Ben-Jonathan says her team's research has important implications for this subgroup of patients.

"Patients with less circulating estrogen—post-menopausal women, for example—can also suffer from chemotherapy resistance," she says. "Linking BPA to this problem gives us one more avenue to explore in terms of preventing chemotherapy resistance."

"These data," study authors write, "provide considerable support to the accumulating evidence that BPA is hazardous to human health."

Coauthors include Elizabeth LaPensee, Sejal Fox and Traci Tuttle.

Source: University of Cincinnati

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