

Bisphenol A linked to metabolic syndrome in human tissue

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New research from the University of Cincinnati (UC) implicates the primary chemical used to produce hard plastics—bisphenol A (BPA)—as a risk factor for metabolic syndrome and its consequences.

In a laboratory study, using fresh human fat tissues, the UC team found that BPA suppresses a key hormone, adiponectin, which is responsible for regulating insulin sensitivity in the body and puts people at a substantially higher risk for metabolic syndrome.

Metabolic syndrome is a combination of risk factors that include lower responsiveness to insulin and higher blood levels of sugar and lipids. According to the American Heart Association, about 25 percent of Americans have metabolic syndrome. Left untreated, the disorder can lead to life-threatening health problems such as coronary artery disease, stroke and type 2 diabetes.

Nira Ben-Jonathan, PhD, and her team are the first to report scientific evidence on the health effects of BPA at environmentally relevant doses equal to "average" human exposure. Previous studies have primarily focused on animal studies and high doses of BPA.

They report their findings in the Aug. 14, 2008, online edition of the journal *Environmental Health Perspectives*. This scientific data comes just before a key Federal Drug Administration meeting about the safety of the chemical in consumer products scheduled for Sept. 16, 2008.

"People have serious concerns about the potential health effects of BPA. As the scientific evidence continues to mount against the chemical, it should be given serious attention to minimize future harm," says Ben-Jonathan, a professor of cancer and cell biology at UC who has studied BPA for more than 10 years.

"Experimenting with human tissue is the closest we can come to testing the effects of BPA in humans. It's a very exciting breakthrough because epidemiological studies looking at BPA effects on humans are difficult since most people have already been exposed to it," she adds.

Scientists estimate that over 80 percent of people tested have measurable BPA in their bloodstream. The UC study was designed to mimic a realistic human exposure (between 0.1 and 10 nanomolar) so that a more direct correlation between human exposure and health effects could be drawn.

To conduct this study, the UC team collected fresh fat tissue from Cincinnati patients undergoing several types of breast or abdominal surgery. These samples included three types of fat tissue: breast, subcutaneous and visceral (around the organs).

Tissue was immediately taken to the laboratory and incubated with different concentrations of BPA or estrogen for six hours to observe how the varied amounts of BPA affected adiponectin levels. The effects of BPA were then compared to those of estradiol, a natural form of human estrogen.

They found that exposing human tissues to BPA levels within the range of common human exposure resulted in suppression of a hormone that protects people from metabolic syndrome.

"These results are especially powerful because we didn't use a single

patient, a single tissue source or a single occurrence," she adds. "We used different fat tissues from multiple patients and got the same negative response to BPA."

Source: University of Cincinnati

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