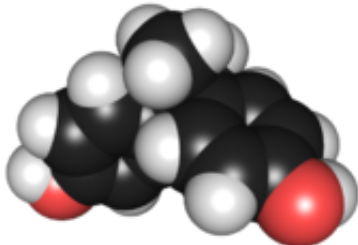


BPA from thermal paper receipts passes through the skin

5 November 2010, by Lin Edwards



BPA. Image: Wiki Commons

Bisphenol A, or BPA, is a chemical found in the thermal paper widely used in receipts from cash registers and in some plastics and resins, and has now been shown to pass through human skin.

Three recent studies have shown the chemical BPA is absorbed through the skin, and that people who routinely have contact with receipts laden with BPA have higher than average levels of BPA in their bodies.

Animal studies have shown high doses of BPA are harmful, and because the chemical is known to mimic the effects of [estrogen](#), some scientists advise that [pregnant women](#) and babies should minimize their exposure to BPA, which is commonly found in babies' bottles.

BPA forms part of a complex polymer used in polycarbonate [plastics](#) destined for food or drink containers, and the linings of canned foods and drinks. It is found as a more readily absorbed free monomer in thermal paper, such as that used in cash register receipts.

In the first of the studies, published online in *Chemosphere*, scientists from the National Institute for Agricultural Research (INRA) in Paris, France, led by toxicologist Daniel Zalko, demonstrated that free BPA is readily absorbed through the skin.

They first exposed sections of fresh ear skin from pigs (which is often used as a model for human skin) to a culture containing radioactive-labeled BPA, and then repeated the experiments with small samples of excised but still living human skin.

The results showed that after three days 65 percent of the BPA was absorbed through the pig ear skin, and 46 percent diffused through human skin. Zalko said the human skin results may be conservative because the samples were not as fresh, and therefore as porous, as the pig skin samples (which were collected from an abattoir around five minutes after the pigs had been slaughtered). Both pig and human skin were able to metabolize the chemical into forms assumed to be less harmful, but the amount metabolized in the pig skin was far greater.

Their findings may explain why the levels of BPA in the general population are higher than they theoretically should be from food and drink sources. Zalko said the findings suggest it "would be smart" for people, especially pregnant women, to avoid touching thermal papers used in receipts or to wash their hands after handling them.

In a second study, carried out by epidemiologists at Harvard University in the US, team leader Joe Braun and colleagues measured BPA levels in urine samples from 389 pregnant women and then correlated the data with the occupation of the women.

The results were that cashiers had the highest concentrations of BPA (2.8 µg/g), while teachers and industrial workers had much lower levels (1.8 and 1.2 respectively). Since cashiers handle far more receipts than the general population, Braun said he was "pretty confident" BPA from the receipts was being absorbed through the skin in those women.

A similar study was also carried out on 400 pregnant women in and around Cincinnati, in the

US. Leader of the research team, Frederick von Saal of the University of Missouri-Columbia said the results were unequivocal in showing BPA can go through human [skin](#). Like the French study, the highest levels were found in women who worked as cashiers.

The levels found in the pregnant women were much lower than those identified in a 2009 study of factory workers exposed to BPA in Mexico, in which levels over 460 µg/g were found, and these high levels were linked to reduced sexual function in the men.

Braun said for people handling only a few receipts [BPA](#) absorption is unlikely to be a problem, but he suggested pregnant women working as cashiers should be careful and err on the side of caution.

More information:

-- Viable skin efficiently absorbs and metabolizes bisphenol A, Daniel Zalko et al., *Chemosphere*, Article in Press, [doi:10.1016/j.chemosphere.2010.09.058](https://doi.org/10.1016/j.chemosphere.2010.09.058)

-- Variability and Predictors of Urinary Bisphenol A Concentrations during Pregnancy, Joe M. Braun et al., *Environ Health Perspect*, [doi:10.1289/ehp.1002366](https://doi.org/10.1289/ehp.1002366)

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