Karma Kup

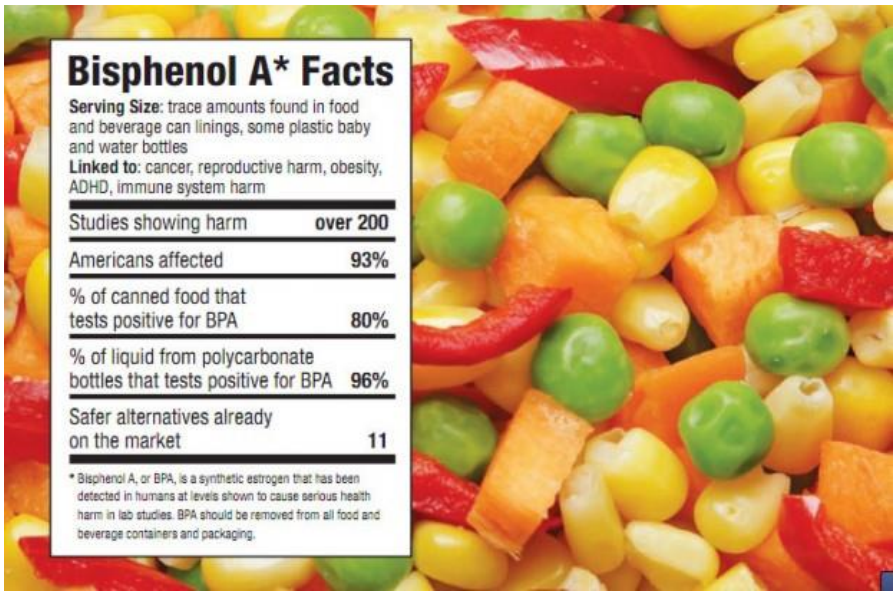
DID YOU KNOW?

Every day, thousands of disposable coffee cups are thrown in the rubbish bin. One hot drink every day is estimated to create 10.5 kg of waste each year into our landfills. And of the 18% of rubbish we produce that is comprised of disposable containers, hot beverage cups represent a significant part of this.

We all enjoy our daily ritual of a good cup of coffee, but most disposable cups are not recyclable. They are often impregnated with toxic dyes and have a polyethylene coating which makes them hard to recycle.

The Karma Kup has been designed and developed to address these problems.

THE DANGERS OF BPA'S



BPA or Bisphenol-A is a chemical used to make plastic and other products, and there is an abundance of evidence that it is toxic for humans and animals. BPA is an estrogenic, meaning it mimics estrogen in the body and binds to estrogen hormone receptors. When it is ingested, BPA can influences endocrine response—essentially, it alters hormone levels in both women and men. And, if you know anything about hormones, you probably know they affect just about everything, including brain function (concentration), nervous system activity (sleep and energy levels), sexual function (sex drive and ability to reproduce), metabolism (insulin health and fat burning), and organ function (heart and liver health). Indeed, research has linked BPA exposure to weight gain and obesity, disruption of the neurological system, cancer, problems with sexual health and reproduction, and cardiovascular disease.

Exposure to BPA is particularly bad for infants and young children, and a new widely publicized study links BPA exposure during gestation to behaviour problems in young girls. Researchers have called BPA "a serious public health problem because of its widely detected presence in the human body." In 2010, the U.S. FDA even reversed its classification of BPA as safe, noting that it has significant concerns about health risks. Never an organization to move quickly, the FDA's current position is that there is"concern about the potential effects of BPA on the brain, behaviour, and prostate gland in foetuses, infants, and young children." The FDA has funded a number of research studies since their January 2010 stand on BPA, and is shifting to "reduce human exposure to BPA in the food supply" because of the "substantial uncertainties" regarding the effect BPA has on human health. Indeed, BPA is clearly a toxic chemical for animals, and although research on humans is still emerging, it doesn't take much common sense to know that it should be avoided.

It's difficult to limit exposure to BPA because it is used in making food and beverage containers (plastic bottles and metal cans), carbonless receipts, medical equipment, the coating of CDs and DVDs, cars, sports equipment, and dental sealants, to name a few products. BPA molecules will leach out of the plastic when exposed to high temperatures or acid/base substances, and are present in our everyday environment in enormous quantities. Most individuals are exposed to BPA by ingesting it in contaminated food or drinks, but you also may come in contact with it from handling BPA-containing products, such as receipt paper from places as ubiquitous as the gas station and the grocery store.

Three Simple Things To Limit BPA Exposure:

1) Drink from a BPA-free water bottle. Stainless steel water bottles are a good choice—make sure it is lead free as well. Sigg bottles are one option as is the Poliquin bottle.

2) Don't eat out of plastic containers (even BPA-free ones because there's concern with toxicity from all plastics). NEVER microwave a plastic container because under high temperatures is when BPA is most easily transferred from plastic to food. Use glass containers.

3) Don't take receipts unless necessary. Almost half of paper receipts contain BPA and there's evidence that cashiers have very high BPA levels. Say "no thanks" to receipts.

BPA is Everywhere

You may think you are doing a good job of avoiding BPA, but the Center for Disease Control and Prevention reported in 2009 that out of 2,517 people aged six and older, nearly all of them had BPA in their urine. Further, in the new Paediatrics study, "Impact of Early-Lift Bisphenol A Exposure on Behaviour and Executive Function in Children," which included 244 women in the Cincinnati area, 97 percent had BPA in their urine, and all of their children showed some BPA exposure. The children's urinary BPA concentrations at ages 1, 2, and 3 years of age were higher than concentrations reported for the adults, but were slightly lower than those reported in previous studies of older children aged, 6 to 11. This is likely from increased food consumption per unit of body mass as children get older or to how the children's bodies processed the substances they were exposed to.

Paediatrics Study Links Gestational BPA Exposure to Hyperactivity

The Paediatrics study found that the young girls in the study who were exposed to BPA in the womb exhibited increased hyperactivity and worse behaviour scores, while boys who were BPA-exposed didn't have altered behaviour, and in some cases showed decreased hyperactive behaviour. Also, the greater the BPA concentration that the girls were exposed to, the worse their behaviour. With each 10-fold increase in maternal BPA concentrations, the girls scored more poorly in cognitive behavioural tests. As mentioned above, BPA is an estrogenic that affects the hormone response in the body, and this is likely the reason that BPA exposure negatively affected girls' behaviour and not boys. Researchers note that there's extensive evidence that BPA exposure

significantly alters cognitive behaviour in animals, and they suggest that exposure to it during gestation impedes the brain transmitter pathways, while disrupting sexual differentiation of the brain, leading to hyperactive behaviour. They highlight the negative effect of BPA on girls, dismissing the effect on boys. But, BPA exposure in either gender is sure to be bad because additional evidence shows even very low doses of BPA interfere rapidly with insulin health and androgen response.

BPA Exposure Leads to Low Testosterone in Men

It makes sense that BPA will lower testosterone levels in men since it mimics estrogen's effect in the body. Toxins that alter endocrine function usually elevate estrogen in women and lower testosterone in men, and although the evidence is just emerging on the toxic effects of BPA in humans, there's no reason not to limit your exposure to this contaminant. A new study in the journal Toxicology Letters looked at the effect of BPA on androgens in both humans and rats. Researchers found that BPA exposure led to lower testosterone production in rats, and the inhibition was dose dependent, meaning that the greater the BPA levels, the lower the testosterone.

BPA exposure was shown to inhibit androstenedione—a hormone from which androgens are produced in both men and women. In the case of men, lower androstenedione will result in lower testosterone. Take note that in human males, some of the enzymes required to make testosterone were more sensitive to BPA than in the rats, indicating that the dangers of BPA may be greater for humans than animals.

BPA Exposure Impairs Fertility in Female Animals

BPA exposure alters hormone response from the hypothalamic-pituitary-ovarian axis in female rats, meaning that it can decrease fertility by unbalancing reproductive hormones. It's also been shown to alter the developing ovary and increase sensitivity to estrogen, which will trick the female body into thinking it's already ovulated in a similar way as the birth control pill. BPA exposure alters mammary gland development also and promotes the development of precancerous lesions in female rodents.

Negative Effect of BPA on Male Sex Drive and Reproductive Tract Development

BPA exposure has been linked to decreased sexual activity in human males, including lower sexual desire, erectile dysfunction, and overall dissatisfaction with sex life. A recent study published in the Journal of Andrology looked at how BPA exposure affected sexual health in Chinese men. Some of the men were exposed to BPA in their work, while others had no occupational exposure to BPA.

Workers who were exposed to BPA naturally had higher levels of BPA in their urine, as did smokers. The men who had higher levels of BPA had progressively lower sexual function (sexual desire, erectile function, orgasmic function, overall satisfaction with sex life). Take note that among the men who weren't exposed to BPA at work, BPA levels spanned a moderate range and those with higher levels had the expected dose-dependent decrease in sexual function.

These study results go beyond concerns that BPA alters endocrine function or lowers testosterone to show that in a dose-dependent manner, BPA exposure can cause a decrease in male sexual and reproductive health. Research into BPA exposure in animals has shown altered development of the reproductive tract in males due to lower neonatal testosterone. Postnatal animal exposure to BPA has resulted in lower sperm count and decreased adult sexual function.

BPA Affects Pancreas, Decreasing Insulin Sensitivity and Causing Diabetes

Short-term BPA exposure alters pancreas function, rapidly hindering insulin sensitivity. In mice, four days of exposure to an amount of BPA that was just slightly above the U.S. EPA allowed amount resulted in chronically elevated insulin and altered glucose tolerance. And, a new study of almost 4,000 subjects published in the Journal of Clinical Endocrinology and Metabolism gathered data on BPA levels in urine and the rate of diabetes. Researchers found that the higher the BPA level, the greater the chance participants would have diabetes, and this connection was independent from all other risk factors such as age, body mass index, gender, or high cholesterol levels.

Researchers suggest elevated BPA impedes insulin health and causes diabetes because it alters thyroid hormone function, which plays a primary role in metabolism. That BPA exposure also alters androgen function by unbalancing the sex hormones also influences metabolism. Further, elevated BPA increases insulin release from the pancreas. Although, these results should convince you to avoid BPA at all costs, it should be noted that this is an observational study, making it impossible to draw conclusive cause and effect connections.

BPA Shown to Cause Arrhythmias in Females

A new study performed on rats found that BPA exposure resulted in the development of arrhythmias in female rats. Males weren't affected. BPA exposure for women is particularly concerning during pregnancy because arrhythmias naturally increase during this time due to elevated estrogen. Combined with high BPA exposure, the risk of impaired maternal heart health becomes even higher.

BPA Impairs Memory and Messes with Neurotransmitter Function

A new study performed on rats published in Behavioural Neuroscience found that acute (meaning one time) BPA exposure significantly impaired both visual and spatial memory. It also resulted in decreased "dendritic spine density" in the frontal cortex, meaning it decreased the production of neurotransmitters. The acute dose was below the U.S. EPA safe daily limit for BPA exposure. This is the first study to investigate the effect of a single dose of BPA on the brain, and there was evidence that BPA inhibited the formation of new memories and negatively influences neurotransmitter production. This is likely because the estrogenic and androgenic sex hormones are involved in brain function and can directly influence memory.

Researchers suggest extreme caution in relation to continued exposure to BPA, and note that it has been banned in the production of baby products in Canada and Europe. It hasn't been banned in the U.S., but many producers of baby products have eliminated BPA from packaging—a good first step—but there is now evidence that even BPA-free plastics can leach chemicals that disrupt endocrine function!

A study published in the Environmental Health Perspectives journal found that of 455 common plastic products, many of which were BPA-free, at least 70 percent tested positive for having estrogenic activity. In fact, researchers even found that in some cases, "BPA-free products released chemicals having more estrogenic activity than did BPA-containing products." Chemical companies and individuals averse to banning BPA will likely use such data to discredit calls to find substitutes for BPAs and plastics that lead to estrogenic activity. But, researchers note that there are safer alternatives that can be produced, have no detectable estrogenic activity, and are cost effective.

Animals Prefer Non-BPA Exposed Mates

An interesting study in the Proceedings of the National Academy of the Sciences showed that in deer mice, exposure to BPA not only alters endocrine response and cognitive behaviour, but also leads females to prefer non-BPA exposed males as mates. This study looked at the effect of BPA on sexually selected traits in the mice and found that male mice who were exposed to BPA as foetuses had lower learning abilities and decreased brain function as tested by behaviour. Brain function is not sexually selected in female mice, meaning that BPA exposure in females did not influence their cognitive function. Interestingly, both BPA – exposed females and those that weren't exposed to BPA, preferred males that had not been exposed to BPA. This indicates that males with BPA in their systems were less likely to reproduce, which researchers note has "broad implications for other species, including our own"!

Backlash to Paediatrics Study that Linked Hyperactivity in Girls to BPA Exposure

There's been significant backlash from chemical advocacy organizations towards the recent Paediatrics study. It is always necessary to analyse research studies with a critical eye, but do not be fooled by claims from chemical producers that make billions off BPA and other toxic compounds that they don't pose a health risk. The North American Metal Packaging Alliance (NAMPA) issued a statement that discounts the study design because it used a spot urine analysis. They write that such a test "only tells what you were exposed to over the last few hours" and when this is compared to a "nine-month gestation period, the samples taken by the study reveal little about total exposure for mother or foetus." They're right, but the fact that the mothers repeatedly (three times) showed BPA exposure in their urine is significant and suggests that they suffer from chronic exposure.

Either way, chronic or acute BPA exposure will decrease cognitive function and hinder neurotransmitter production because of how it alters androgen levels. Throw in what we know about long-term BPA exposure (decreased sexual health, greater risk of diabetes and insulin resistance, and obesity), and avoiding BPA exposure at all ages is prudent if not imperative.

Relationship Between Blood and Urinary BPA Levels

NAMPA also cites a recent study published in Toxicological Sciences that looked at the relationship between blood and urinary BPA levels and how it is eliminated. Take note it was a small study of only 20 participants who had serum and urinary BPA levels tested following a meal that contained foods that might have BPAs in them. The purpose of the study was to compare urinary and blood BPA levels following "typical daily exposure" from food in the form of three meals that contained canned foods. Participants

had urinary BPA levels that were on average 21 percent greater than what is estimated for the general population, which researchers suggest is due to having eaten meals high in BPA-containing foods.

Blood serum BPA levels were low overall and BPA was only detected in 17 percent of the samples taken, and only in individuals who had significantly higher urine BPA levels. Researchers are trying to prove the point that BPA is processed very rapidly by the liver and eliminated, meaning it won't build up and cause negative health effects. They suggest using urinary samples to judge how much BPA the body is exposed to isn't effective, and that in the case of the Paediatrics study, analysing maternal urinary BPA levels doesn't clarify how much BPA a foetus has been exposed to. Nonetheless, this study doesn't illuminate how BPA is processed during pregnancy. In fact, it's known that BPA can cross the placenta and must then be biologically broken down in the foetus. But, Dr. Joe Braun, one of the authors of the Paediatrics study notes that xenobiotic compounds aren't processed as efficiently by a foetus as an adult, meaning that "BPA may have a longer half-life in the fatal compartment."

This information along with the evidence BPA exposure leading to hyperactivity, decreased brain function, and the numerous other concerns mentioned here are highly concerning. Another issue is the effect on the liver as it processes and eliminates foreign chemicals from the body. We know alcohol causes liver cirrhosis, which can lead to death—my bet is that BPA does not support liver function and should be avoided!

by Charles Poliquin

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