

## Study:

### Nalgene plastic may be harmful

*Many Americans carry Nalgene water bottles to help hydrate themselves during everyday activities. However, the very bottles used by health-conscious people may cause more harm than good.*

By Brenna Doheny  
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(U-WIRE) CORVALLIS, Ore. - From outdoor enthusiasts, to athletes, to students at Oregon State University, the hydration method of choice is a colorful Nalgene water bottle.

While these durable, lightweight and undeniably trendy bottles seem like the perfect choice for the health-conscious consumer, scientific evidence indicates that the very plastic which makes the bottles so ideal may pose serious health hazards.

The durability and beauty of the Nalgene bottle comes from the material it is made of, Lexan polycarbonate resin. This plastic polymer was developed by General Electric Plastics in 1953, when, according to GE's Web site, Dr. Daniel W. Fox was developing a polymer for wire insulation material.

Fox accidentally created a polymer that was unbreakable when it hardened in a beaker, and patented this revolutionary material. Lexan has been used over the years in a vast array of products, including space helmet visors, bulletproof windows, compact discs and DVDs, mobile phones, computers, baby bottles and, of course, water bottles.

The Lexan bottles are marketed by a division of the Nalgene company known as Nalgene Outdoor Products. Nalgene was founded in 1949, and the company soon cornered the market on plastic laboratory equipment.

The outdoor products division was created in the 1970's after the underground use of Nalgene products by outdoor enthusiasts was made public.

Lexan was an ideal material for the water bottles both for its durability and because the material neither holds odors nor flavors nor imparts any taste to fluids stored in it.

Nalgene has marketed its original gray

Lexan water bottles for many years, but sales increased dramatically in 2002 when a color assortment made possible by GE's VISUALfx Lexan finishes was launched.

The April 2003 volume of "Current Biology" published a study that cast suspicion on all polycarbonate plastics, including Lexan.

The principle author, Dr. Patricia Hunt of Case Western Reserve University in Cleveland, has spent many years researching developmental abnormalities leading to miscarriage and birth defects in mice.

In 1998, her lab documented a sudden, inexplicable increase in a defect known as aneuploidy, which is an abnormal loss or gain of chromosomes. In humans, aneuploidy usually leads to miscarriage or to disorders like Down syndrome, which occurs when an embryo ends up with three copies of chromosome 21, instead of the normal two copies.

In Hunt's lab, the spontaneous increase in mouse aneuploidy was eventually traced to a lab worker using a harsh detergent to clean the polycarbonate mice cages and water bottles.

The detergent caused the plastic to leach one of its constituent chemicals, bisphenol A (BPA), which has been shown in other studies to mimic the female hormone estrogen. The researchers duplicated the detergent accident, with the same end results.

They then conducted another experiment in which female mice were given a daily dose of pure BPA, again with the same end result, and they concluded that low doses of BPA had significant effects.

The polycarbonate industry has criticized the Hunt study, saying that data from experiments on mice may not be transferable to humans. The industry has also conducted its own studies with rats, modeled on the Hunt study, which did not find the same results.

In a November/December 2003 article for Sierra Magazine, Hunt countered that the industry studies did not look at the effects of BPA on eggs and embryos.

*"The [plastics] industry says this is just ro-*

*dent studies," she said, "but we know that the human egg is more fragile than the mouse egg. If we wait for really hard evidence in humans, it will be too late."*

A University of Missouri study in the July 2003 issue of Environmental Health Perspectives further confirmed the Hunt study's conclusions.

In addition to determining that used, or discolored, polycarbonate plastics leach high amounts of BPA at room temperature, this study found that detectable levels of BPA leach from brand-new polycarbonate plastics at room temperature.

In other studies, BPA has been implicated in more than just chromosomal disorders, and it is just one of many chemicals known to be environmental endocrine disruptors -- synthetic chemicals that interfere with hormonal messages that are central to important body processes like growth and development.

According to the Web site for the 1996 book Our Stolen Future, which introduced the field of endocrine disruption to the public, BPA at levels *"far beneath the levels currently deemed safe by regulatory authorities"* has been shown to have adverse effects on prostate development and tumors, breast tissue development and sperm count.

A 2002 study even linked low levels of BPA to the creation and enlargement of fat cells in the body, suggesting that exposure to BPA may be a cause of obesity.

The Nalgene Outdoor Products Web site now features a response to concerns about BPA leaching, stating with confidence that their product is safe.

*"Polycarbonate like that used in Nalgene bottles has been studied, tested and safely used for more than 40 years in products for human consumption,"* the site states.

Scientists studying endocrine disruption, however, suggest limiting potential exposure to BPA as much as possible. In a presentation last month in Eugene sponsored by the Oregon Environmental Council, Our Stolen Future co-author Dr. John P. Meyers addressed the issue.

*"I personally recommend avoiding polycarbonate plastics -- don't let them come into contact with your food or water,"* Meyers said. *"I think the science is strong enough to justify precautionary*

*measures today."*

He added that despite industry assurances to the safety of polycarbonate, baby bottles made from the material have *"quietly disappeared from the market."*

Many studies have shown that the effects of endocrine disrupting chemicals are most devastating during early development, so babies are highly at risk.

Polycarbonate plastics are still used in a variety of products, including plastic resins lining some food storage cans, dental sealants, and the Nalgene Lexan bottles.

Polycarbonate products can be identified by the symbol "#7 PC" on their recycling logos.

According to the Sierra Magazine article, plastics that are safer to use for storing food and beverages include polypropylene, designated "#5 PP," high-density polyethylene, designated "#2 HDPE" and low-density polyethylene designated "#4 LDPE," none of which are known to leach harmful substances.

Nalgene makes a HDPE bottle identical in size and shape to the more popular Lexan model.

Single-use water bottles (the type bottled water is sold in) made from polyethylene terephthalate, "#1 PET" or "PETE" are not recommended for repeat use, as a study found they might leach a carcinogenic substance known as DEHA.

The Sierra Magazine article suggests other hydration options, including using only very mild detergents and warm water to wash polycarbonate bottles, and discarding them as soon as they show signs of discoloring; or avoiding plastics altogether in favor of glass or lightweight stainless steel containers. ■