Exposure to BPA in developing prostate increases risk of later cancer

Early exposure to BPA (bisphenol A) â€“ an additive commonly found in plastic water bottles and soup can liners â€“ causes an increased cancer risk in an animal model of human prostate cancer, according to University of Illinois at Chicago researcher Gail Prins. Prins presented her findings at the ENDO 2013 meeting in San Francisco June 17.

"This is the first direct evidence that exposure to BPA during development, at the levels we see in our day-to-day environment, increases the risk for prostate cancer in human prostate tissue," said Prins, professor of physiology and director of the andrology laboratory in urology at the UIC College of Medicine.

The increased risk can be traced to prostate stem and progenitor cells which become "sensitized" to estrogen early in development through exposure to BPAâ€"which mimics estrogen in the body. Environmental exposure to compounds like BPA that mimic hormones has become common, said Prins. Prostate stem cells, which are very long-lived, pass on the increased estrogen sensitivity to the prostate tissues they produce throughout life. Because prostate cancer is fueled in part by naturally rising estrogen levels in aging men, the prostate tissue's increased sensitivity to estrogen makes the development of cancer much more likely, according to Prins.

"Studies of expectant mothers in the U.S. showed that more than 95 percent of them had BPA in their urine, which means they recently ingested these compounds, " says Prins, whose work led to banning the sale of baby bottles and cups containing BPA in Chicago in 2009. Previous studies by Prins and colleagues using rats showed that exposure to elevated estrogen or BPA during embryonic development increased the rate of prostate cancer later in life. To determine if there was a link in humans, Prins developed a new animal model using human prostate stem cells implanted into mouse "hosts."

Prins took human prostate stem cells from deceased young adult male organ donors and implanted the cells into mice, where they formed human prostate tissue. To mimic exposure to BPA during early prostate development, Prins fed the mice BPA for the first two weeks after the transplant, at doses in line with those seen in pregnant American women. The tissue was then allowed to mature for a month into a human prostate-like tissue.

Next, Prins exposed the mice to elevated estrogen levels for two to four months, to mimic the normal rise in estrogen seen in aging men. Signs of cancer developed in the human prostate tissue in a third of the mice fed BPA, as compared to only 12 percent in mice that had not been fed BPA. If the stem cells were exposed to BPA before implantation and again during development, 45 percent showed signs of cancer.

"We believe that BPA actually reprograms the stem cells to be more sensitive to estrogen throughout life, leading to a life-long increased susceptibility for diseases including cancer," Prins says.

Provided by University of Illinois at Chicago

"Exposure to BPA in developing prostate increases risk of later cancer." PHYSorg.com. 17 Jun 2013.
http://medicalxpress.com/news/2013-06-exposure-bpa-prostate-cancer.html