

Information regarding Meeker et al study

Cross-sectional study with acknowledged limitations does not establish cause-effect relationship between exposure to Bisphenol A and sperm quality

Recently, media reported about a new study* that examined statistical associations between Bisphenol A (BPA) biomonitoring levels and sperm quality parameters. Although the reported associations were weak, and the authors themselves noted several limitations of their study, alarmistic headlines have portrayed another picture and may have concerned the readers.

The study collected urine samples (for BPA biomonitoring) and sperm samples (for sperm quality) from 190 men from a fertility clinic. The samples were both taken at the same time. Such so called „cross-sectional studies“ can examine statistical associations between the parameters measured, but they have no capability to determine cause-effect relationships. The most obvious explanation is given by the authors themselves: “BPA is metabolized and excreted from the body rapidly, and a single urinary measure likely reflects an individual’s exposure in the hours to days leading up to urine sample collection”. In contrast, **sperm cells develop over several months. BPA measurements at the same time as semen collection therefore do not indicate exposure during the time when the sperm cells were developing.**

The weight of evidence from many animal studies does not support the hypothesis that low doses of BPA cause effects on sperm. In particular, several high quality multi-generation studies have found no effects of low doses of BPA on sperm parameters or on fertility. None of the authorities responsible for consumer health that have comprehensively reviewed the data have concluded that BPA causes effects on sperm or fertility. The biological plausibility of the reported statistical associations is further weakened by the known metabolism of BPA in humans. As noted by the authors above, BPA is efficiently converted to a biologically inactive metabolite and quickly excreted.

Another recently published literature study** found no confirmation of the common claim of decreasing male fertility: „...The claims that population fecundity is declining and that environmental pollutants are involved, can neither be confirmed nor rejected, in our opinion.....” One of the authors, Prof. Dr. Eberhard Nieschlag, Centre for Reproductive Medicine and Andrology in Münster/Germany, stated in a recent interview: „The postulated decrease of male fertility is based on wrong statistics, (...) missing measuring standards and unacceptable mixing of groups and methods. (...) we have clear signs that men’s sperm quality has not changed.“ (NZZ Switzerland, 1.8.2010)

*Meeker JD, Ehrlich S, Toth TL, Wright DL, Calafat AM, Trisini AT, Ye X, Hauser R, Semen Quality and Sperm DNA Damage in Relation to Urinary Bisphenol A among Men from an Infertility Clinic, *Reproductive Toxicology* (2010), doi:10.1016/j.reprotox.2010.07.005

** Egbert te Velde, Alex Burdorf, Eberhard Nieschlag, René Eijkemans, Jan A.M. Kremer, Nel Roeleveld and Dik Habbema. Is human fecundity declining in Western countries? *Human Reproduction* 2010 25(6):1348-1353; doi:10.1093/humrep/deq085

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Additional information:

Limitations of the Meeker et al study as noted by the authors themselves include:

- *“We found that repeated urine samples collected from the same man weeks to months apart from one another were weakly correlated. Thus, another limitation in the present study is the likelihood of exposure measurement error due to the high within-individual temporal variability in BPA exposure...”*
- *“(...) the reliability of a single semen sample to represent semen quality over a longer period of time is not well characterized.”*
- *“Another limitation of our study is its cross-sectional design due to the availability of only a single semen sample from each participant, as well as the availability of only a single urine sample from over half of the men.”*
- *Overall, statistical associations were relatively weak and generally not consistent between techniques: „Due to some inconsistencies in our results between statistical and exposure assessment approaches, these relationships need to be assessed in other large and appropriately designed human epidemiologic studies that measure BPA in multiple urine samples across the exposure window of interest.”*
- *“Since the present study was conducted among men recruited through an infertility clinic it may limit our ability to generalize the results to the general population.”*