

Perinatal Exposure to Low Doses of Dioxin Can Permanently Impair Human Semen Quality

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ABSTRACT

Background: In recent decades, young men in some industrialized areas have reportedly experienced a decrease in semen quality.

Objective: We examined effects of perinatal dioxin exposure on sperm quality and reproductive hormones.

Methods: We investigated sperm quality and hormone concentrations in 39 sons (mean age, 22.5 years) born between 1977 and 1984 to mothers exposed to dioxin after the accident in Seveso, Italy (1976), and 58 comparisons (mean age, 24.6 years) born to mothers exposed only to background dioxin. Maternal dioxin levels at conception were extrapolated from the concentrations measured in 1976 serum samples.

Results: The 21 breast-fed sons whose exposed mothers had a median serum dioxin concentration as low as 19 ppt at conception had lower sperm concentration (36.3 vs. 86.3 million/mL; $p = 0.002$), total count (116.9 vs. 231.1; $p = 0.02$), progressive motility (35.8 vs. 44.2%; $p = 0.03$), and total motile count (38.7 vs. 98 million; $p = 0.01$) than did the 36 breast-fed comparisons. The 18 formula-fed exposed and the 22 formula-fed and 36 breast-fed comparisons (maternal dioxin background 10 ppt at conception) had no sperm-related differences. Follicle-stimulating hormone was higher in the breast-fed exposed group than in the breast-fed comparisons (4.1 vs. 2.63 IU/L; $p = 0.03$) or the formula-fed exposed (4.1 vs. 2.6 IU/L; $p = 0.04$), and inhibin B was lower (breast-fed exposed group, 70.2; breast-fed comparisons, 101.8 pg/mL, $p = 0.01$; formula-fed exposed, 99.9 pg/mL, $p = 0.02$).

Conclusions: *In utero* and lactational exposure of children to relatively low dioxin doses can permanently reduce sperm quality.

Key words: breast-feeding, dioxin, environmental endocrine disrupters, human sperm impairment, human sperm quality, perinatal exposure, reproductive hormones, TCDD.