

THE UNIQUE PHARMACOKINETIC CHARACTERISTICS OF BISPHENOL A IN AMNIOTIC FLUID: THE IMPLICATION OF FETAL EXPOSURE

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Background and Aims: Bisphenol A (BPA) is an estrogenic compound widely used in polycarbonate plastics and many household products. The placental β -glucuronidase may deconjugate BPA into its "free" active form, which has estrogenic, endocrine-disrupting properties. There are few data regarding BPA levels in the fetal compartment, and even sparser data regarding conjugated versus free BPA fractions. The effects of prolonged exposure of the fetus to the active form of BPA are unknown. Thus, we sought to quantify levels of conjugated and free BPA in second trimester amniotic fluid specimens to better define the role of the placenta in fetal exposure.

Methods: Liquid chromatography/mass spectrometry was used to measure BPA concentrations in 20 prospectively collected second trimester amniotic fluid specimens. Concentrations were quantified using stable-isotope BPA. The total and free BPA were measured by direct analysis of samples with and without overnight enzymatic hydrolysis, respectively. The conjugated BPA concentrations were obtained by subtracting free BPA levels from the total BPA measurements.

Results: Total BPA was detected in 17/20 samples, with levels ranging from non-detect to 0.75 ng/mL, with a median concentration of 0.44 ng/mL. Three samples contained no BPA, and 7 samples contained only conjugated BPA. Free BPA was detected in 10/20 samples, and levels ranged from non-detectable to 0.43 ng/mL, with a median concentration of 0.26 ng/mL. For those 10 amniotic fluid specimens that contained free BPA, it represented an average of 82% of the total BPA level.

Discussion: Free BPA was detected in the fetal compartment in 50% of amniotic fluid specimens, and its concentration comprised 82% of total BPA levels. Because BPA is quickly conjugated in the adult liver once absorbed, our data suggest that BPA may be deconjugated in the placenta by β -glucuronidase, which leads to increasing potential fetal exposure to the active form, or free BPA.