LEVELS OF POLYCYCLIC AROMATIC HYDROCARBONS IN AMNIOTIC FLUID SAMPLES FROM SMOKERS AND NONSMOKERS

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Previous studies from this laboratory have focused on the characterization of blood protein adducts formed in utero as a result of maternal smoking during pregnancy. These biological samples, obtained during the third trimester of pregnancy, at delivery, have clearly shown a correlation between maternal smoking and exposure of the fetus to tobacco smoke carcinogens, including 4-aminobiphenyl and benzo(a)pyrene. In the present study, we examined exposure of the fetus during the first trimester of development to various environmental carcinogens, particularly those found in tobacco smoke. Amniotic fluid samples were obtained from women undergoing routine amniocentesis at between 16 and 20 weeks gestational age. Amniotic fluid, produced by the fetal lungs and kidneys, is an important part of pregnancy and fetal development and this fluid surrounds the fetus throughout pregnancy. In these studies, samples of amniotic fluid were obtained from nonsmokers as well as 0.5 pk/da smokers through >2pk/da smokers. Amniotic fluid samples were extracted and analyzed by HPLC and GC/MS for the presence of polycyclic aromatic hydrocarbons (PAHs). Amniotic fluid levels of PAHs were found in almost all samples analyzed. However, there was a clear correlation between levels of maternal smoking and PAHs in the amniotic fluid. 1-hydroxypyrene levels ranged from 1.54 0.12 g/ L in nonsmokers to 11.72 0.67 g/L in women smoking >2 pks/da, indicating approximately a 10X increase over nonsmokers. Similar results were found with more widely established carcinogens, including hydroxylated benzo(a)pyrene derivatives, which ranged from 1.41 0.13 g/L in nonsmokers to 11.56 0.59 g/L in >2pk/da smokers. These results indicate that exposure to harmful environmental carcinogens can occur during early gestational periods and may place the fetus at a risk of genotoxic as well as teratogenic events.