Gestational Exposure to Inhaled Vapors of Ethanol and Gasoline-Ethanol Blends in Rats

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The US automotive fleet is powered primarily by gasoline-ethanol fuel blends containing up to 10% ethanol (E10). Uncertainties regarding the health risks associated with exposure to E10 prompted assessment of the effects of prenatal exposure to inhaled vapors of gasoline-ethanol blends containing greater amounts of ethanol. Pregnant Long-Evans rats were exposed to fuel vapors, 6.5 hr/day, on days 9–20 of gestation, and their offspring were assessed using a variety of tests for clinical, physical, immunological and neurodevelopmental effects. Results of tests of cognitive function are reported in other abstracts. This report compares effects of inhaled ethanol (E100) at concentrations of 0, 5000, 10000, or 21000 ppm with effects of vapors of gasoline lacking (E0) or containing 15% ethanol (E15) at concentrations of 0, 3,000, 6,000, or 9,000 ppm. Maximum concentrations were limited by the lower explosive limits of the vapors. None of the vapors caused overt maternal toxicity, changes in litter size or weight, or altered the weight gain of the pups. With E100, motor activity and a few measures of a functional observational battery (hindlimb grip strength, excitability) were altered, but not in a dose-related manner. No such changes were observed with E0 or E15. With one exception, no dose-related changes were observed for any agent on any clinical, developmental, or immunological endpoint. Urinary protein concentrations suggesting potential kidney dysfunction, measured in the offspring at 3 and 6 months of age, increased across dose and age after E15 exposure; increases not related to dose were seen after exposure to E0. However, the highest measured protein concentration (300 mg/dL) was lower than concentrations associated with kidney damage in this strain of rats (400 – 2500 mg/dL). Thus, even at these high concentrations, inhalation of these vapors does not appear to pose a serious public health hazard. This abstract does not represent EPA policy.