INFLUENCE OF INHALED BENZO(a)PYRENE ON INTRATESTICULAR FUNCTION IN F-344 RATS

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Abstract: The objective of this study was to evaluate the reproductive risk associated with exposure of adult male Fisher-344 rats to inhaled benzo(a)pyrene (BaP), a ubiquitous environmental toxicant present in cigarette smoke, automobile exhaust fumes and industrial emissions. Rats were assigned randomly to a treatment or control group. Treatment consisted of sub-chronic exposure of rats via inhalation to 75μg BaP/m³, 4 hours daily for 60 days, while control animals were unexposed (UNC). Blood samples were collected immediately after the cessation of exposures (time 0) and subsequently at 24, 48, and 72 hours, to assess the effect of bioavailable BaP on plasma testosterone and luteinizing hormone (LH) concentrations by RIA. Rats were sacrificed after the last blood collection following which, testes were harvested and weighed. The left testes were fixed for histology and morphometric analyses while the right testes were homogenized and used for the quantitation of sonication-resistant spermatid nuclei and intra-testicular testosterone and estradiol 17-β (E₂). BaP exposure reduced testis weights compared with UNC (2.01 ± 0.11 vs. 3.04 ± 0.16 g; P < 0.025), and total weight of tubules and total tubular length per paired testes were reduced 27% and 39%, respectively in BaP-exposed rats (P < 0.01) compared with UNC rats. The number of sonication-resistant spermatids was significantly reduced in BaP-exposed versus UNC rats. BaP exposure significantly decreased plasma testosterone and intra-testicular testosterone and E₂ concentrations compared with those of UNC rats. The decrease in circulating plasma testosterone was accompanied by a concomitant increase in plasma LH concentrations in BaP-exposed versus control rats (P < 0.05). These data suggest that sub-chronic exposure to inhaled BaP contribute to reduced testicular endocrine and spermatogenic functions in exposed rats.

Keywords: Benzo(a)pyrene, inhalation, testis, luteinizing hormone, testosterone, estrogen, sperm production.

Acknowledgements: This research was supported in part by the National Institutes of Health grants, G12RRO3032 (AEA, AR); 1U54HD0431501-09, RO1 HD020419-19S1 (AEA); U50ATU3989-48-06 (Meharry); ES012168 and S11ES014156-01 (AR).