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CHRONIC EXPOSURE TO HEAVY METALS DECLINES SPERM QUALITY, DAMAGES TISSUE ARCHITECTURE AND ALTERS EXPRESSION OF STRESS PROTEINS

Sujata De Chaudhuri[1] and **Dyutiman Mukhopadhyay**[2]

[1]Barrackpore Rastraguru Surendranath College, India
[2]University of Calcutta, India

Exposure to Cadmium or Lead is generally considered as an occupational health hazard while; contaminated ground water is the major route for human exposure to arsenic. An early and chronic exposure of these heavy metals may result in reduced or impaired fertility at later stages of life. This study aims to assess and compare the toxic effects of Sodium Arsenite, Cadmium Chloride and Lead Acetate in both reproductive (testes) and non-reproductive tissues (liver) of juvenile and adult rats. Triplicate sets of male juvenile and adult Wistar rats were supplied drinking water having heavy metal salts of dose 100 times higher than Maximum Contamination Limit, for three months and simultaneously, age-matched controls were taken. Effects of heavy metals were assessed by studying total sperm count and defective sperm and by histological examinations. Semi-quantitative RT-PCR was done in order to assess the expression level of stress proteins mRNAs i.e. Heat Shock Protein 70 (HSP70) and Metallothioneins (MT1 and MT2) in testes and liver of all treated and control rats. Results showed that heavy metal exposure (except arsenic) caused a significant decrease in healthy sperm count ($p<0.05$) and tissue integrity. The expression of HSP70 and MT1 were found higher in treated tissues (significantly in juveniles) compared to controls ($p<0.05$). Furthermore, higher expression of MT1 mRNA can make this gene a good biomarker to assess heavy metal toxicity. This study showed that juveniles are showing more severe effects compared to adults justifying the vulnerability of early chronic exposure to heavy metals.

sujata7j@gmail.com