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Epigenetic modifications associated with in utero exposure to endocrine disrupting chemicals BPA, DDT and Pb

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Abstract

Endocrine disrupting chemicals (EDCs) are xenobiotics which adversely modify the hormone system. The endocrine system is most vulnerable to assaults by endocrine disruptors during the prenatal and early development window, and effects may persist into adulthood and across generations. The prenatal stage is a period of vulnerability to environmental chemicals because the epigenome is usually reprogrammed during this period. Bisphenol A (BPA), lead (Pb), and dichlorodiphenyltrichloroethane (DDT) were chosen for critical review because they have become serious public health concerns globally, especially in Africa where they are widely used without any regulation. In this review, we introduce EDCs and describe the various modes of action of EDCs and the importance of the prenatal and developmental windows to EDC

exposure. We give a brief overview of epigenetics and describe the various epigenetic mechanisms: DNA methylation, histone modifications and non-coding RNAs, and how each of them affects gene expression. We then summarize findings from previous studies on the effects of prenatal exposure to the endocrine disruptors BPA, Pb and DDT on each of the previously described epigenetic mechanisms. We also discuss how the epigenetic alterations caused by these EDCs may be related to disease processes.

Keywords: BPA; DDT; DNA methylation; histone modification; lead; non-coding RNA

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