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Epigenome and Environment: effects of a PCB exposure on epigenome during early development in the rat

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Introduction: Epigenetic represents the genome programming to express appropriate set of genes in a temporal and spatial way during life. Epigenetic signature is dynamic and responsive to environment, especially in critical periods of development. Deregulation of epigenetic mechanisms may be responsible for incorrect transcription patterns, resulting in stable modifications of key physiological processes. Exposure to PCBs (polychlorinated biphenyls) during gestation and lactation, modifies the gene expression of important mediators of sex steroid action and of their receptors. Androgen receptor (AR) could also act as co-regulator of histone modifications enzymes.

Aim: to evaluate whether prenatal administration of a reconstituted PCB mixture is able to influence epigenome

Results: PCBs reduce histone post-translational modifications (H3K4me3 and H4K16Ac) in a dimorphic way, possibly as the result of a decreased expression of the histone modification enzymes, Jarid1b and SirtT1. AR gene and protein expression is also reduced, especially in females. ChIP performed against H3K4me3 shows a correlation between the expression of some genes involved in embryonic differentiation (e.g., TSHR and GabaRr3) and histone post-translational gene modifications.

Conclusion: the influence of PCB exposure during differentiation on epigenome is dimorphic and affects chromatin packaging, probably through an impairment of interaction between androgen receptor and histone modification enzymes.


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