

Environmental signaling and evolutionary change: Can exposure of pregnant mammals to environmental estrogens lead to epigenetically induced evolutionary changes in embryos?

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DNA methylation is one of the epigenetic and hereditary mechanisms regulating genetic expression in mammalian cells. In this review, we propose how certain natural agents, through their dietary consumption, could induce changes in physiological aspects in mammalian mothers, leading to alterations in DNA methylation patterns of the developing fetus and to the emergence of new phenotypes and evolutionary change. Nevertheless, we hypothesize that this process would require (i) certain key periods in the ontogeny of the organism where the environmental stimuli could produce effects, (ii) particular environmental agents as such stimuli, and (iii) that a genomic persistent change be consequently produced in a population. Depending on the persistence of the environmental stimuli and on whether the affected genes are imprinted genes, induced changes in DNA methylation patterns could become persistent. Moreover, some fragments could be more frequently methylated than others over several generat