

Epigenetic Modifications and Lifestyle

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Genetic variations can be caused by mutations in hereditary material of DNA and usually lead to the undesirable phenotypes such as diseases. Genetic variations are stable and inherited from cell to cell or passed down through generations. Nonetheless, in some cases the expression pattern of a gene and consequently the function of its product is changed similar to the outcome of mutation without any alteration in the underlying DNA sequences. These heritable epigenetic modifications arising from chemical modifications of DNA and proteins that help to package the DNA within the cell nucleus. They are reversible and dynamics of this process is affected by environmental stimuli. Hence, natural selection can act on these modifications and affect the rate of adaptation over time. In this review, the concept of epigenetic modifications will be introduced first and then the mechanisms of their establishment, maintenance and erasure as well as their roles will be discussed. Afterwards, the effects of lifestyle on the pattern of epigenetic modifications, their reversibility, the effects of ancestral lifestyle on the epigenome profile of their descendant and the possibility of genetic alteration via epigenetic modifications will be discussed.

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