

An epigenetic approach to modulating aging with nutrition and exercise

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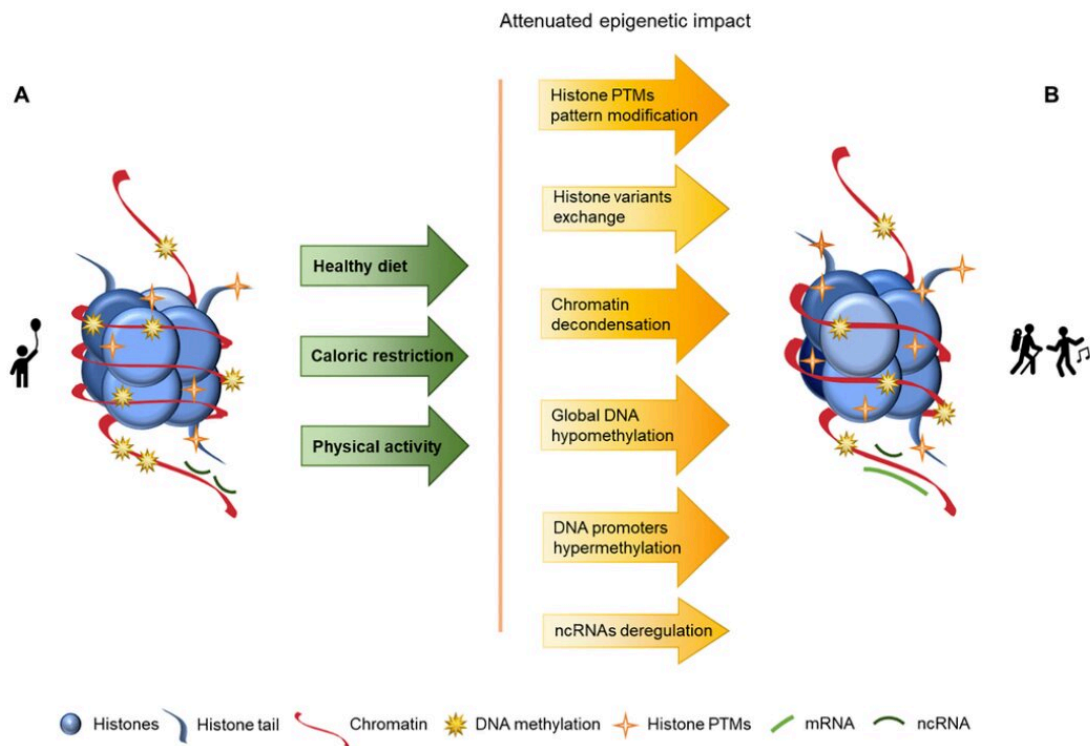


Figure 2. Representation of age-associated epigenetic changes after following a healthy lifestyle. Credit: *Aging* (2023). DOI: 10.18632/aging.204668

A new review paper, titled "How can we modulate aging through nutrition and physical exercise? An epigenetic approach," has been published in *Aging*.

The World Health Organization predicts that by 2050, 2.1 billion people worldwide will be over 60 years old, a drastic increase from only 1 billion in 2019. Considering these numbers, strategies to ensure an extended "healthspan" or healthy longevity are urgently needed.

In this new review, researchers from the ALFA Score Consortium, University of Algarve Campus Gambelas, William Osler Health System, and Champalimaud Centre for the Unknown discuss their present study that approaches the promotion of healthspan from an epigenetic perspective. Epigenetic phenomena are modifiable in response to an individual's environmental exposures, and therefore link an individual's environment to their [gene expression](#) pattern. Epigenetic studies demonstrate that aging is associated with decondensation of the chromatin, leading to an altered heterochromatin structure, which promotes the accumulation of errors.

"In this article we explore aging and its associated epigenetic changes as well as how these changes may be delayed or reversed through nutrition, caloric restriction and sustained physical activity, as schematized in Figure 2," the researchers write.

Canonical histones are replaced by histone variants, concomitant with an increase in histone post-translational modifications (PTMs). A slight increase in DNA methylation at promoters has been observed, which represses transcription of previously active genes, in parallel with global genome hypomethylation. Aging is also associated with deregulation of gene expression—usually provided by non-coding RNAs—leading to both the repression of previously transcribed genes and to the transcription of previously repressed genes.

"Age-associated epigenetic events are less common in individuals with a healthy lifestyle, including balanced nutrition, caloric restriction and physical exercise. Healthy aging is associated with more tightly

condensed chromatin, fewer PTMs and greater regulation by ncRNAs," the researchers conclude.

More information: Ana Teresa Rajado et al, How can we modulate aging through nutrition and physical exercise? An epigenetic approach, *Aging* (2023). [DOI: 10.18632/aging.204668](https://doi.org/10.18632/aging.204668)

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