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Developmental programming of aging trajectory

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Highlights

- Aging trajectory may vary depending on developmental settings.
- Persistent change in epigenetic regulation is an important contributing mechanism.
- Birth weight is a potential proxy to predict aging phenotype.

Abstract

There is accumulating evidence that aging phenotype and longevity may be developmentally programmed. Main mechanisms linking developmental conditions to later-life health outcomes include persistent changes in epigenetic regulation, (re)programming of major endocrine axes such as growth hormone/insulin-like growth factor axis and hypothalamic-pituitary-adrenal axis and also early-life immune maturation. Recently, evidence has also been generated on the role of telomere biology in developmental programming of aging trajectory. In addition, persisting changes of intestinal microbiota appears to be crucially involved in these processes. In this review, experimental and epidemiological evidence on the role of early-life conditions in programming of aging phenotypes are presented and mechanisms potentially underlying these associations are discussed.

Abbreviation: ER, endoplasmic reticulum. [Fig. 2 and its legend is reproduced from Symonds *et al.* (2009) with permission from Springer Nature].

Keywords: Aging; age-related pathology; longevity; developmental programming; epigenetics.

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