

PREFACE

Epigenetics refers to changes in gene expression that occur without alteration in DNA base sequences. Epigenetic modifications activate or deactivate parts of the genome at strategic times and in specific locations. Epigenetic regulations are central to many cellular processes such as imprinting, X chromosome inactivation, DNA damage response, cellular reprogramming and senescence. Although all cells in one individual have the same DNA sequence, epigenetic regulation occurs at the specific gene loci in specific cells to yield specific cellular phenotypes. Epigenetic dysregulations have been linked to pathogenesis of various diseases such as cancer, diabetes, obesity, infertility, cardiovascular diseases, neurodegenerative disorders and chronic inflammatory diseases. Epigenetic modifications are acquired throughout life and influenced by environmental factors. They are reversible and inheritable. The interaction between diet and the epigenome is well documented. Manipulation of epigenetic mechanisms by nutrients may affect the vulnerability of cells to degeneration that is responsible for various diseases. The underlying pathological mechanisms are established early in life in diseases such as cancer and Alzheimer's disease. In this context, a diet containing nutritional components that are essential for proper epigenetic regulations may be protective against these diseases. On the other hand, epigenetic modifications are potential targets for novel therapeutic strategies due to their reversibility. A good understanding of epigenetic dysregulations underlying various pathologies may provide important information to prevent the onset and progression of diseases. This book is intended to provide an overview for the influence of early life nutrition on the epigenome and the role of epigenetic dysregulations in the pathogenesis of Alzheimer's disease, cancer, cardiovascular disorders, inflammation, obesity and infertility. The author hopes it is useful for students and clinicians who are curious about this field and/or intend to find careers in related subjects.

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