

# Preface

Achieving healthy longevity is an innate desire of humans and the ultimate goal of aging research endeavors. Aging intervention, popularly called “anti-aging” refers to slowing down the progress of aging and the accompanying disease processes. Many modern antiaging studies have attempted to uncover clues into the underlying mechanisms of aging or a means by which to manipulate genes and gene regulation of experimental organisms in effort to modulate the aging process.

The past several decades’ work has made clear that searches for any genetic or gene manipulation or for aging genes, in particular, have produced disappointing results. This failure is neither unexpected nor surprising in view of our limited understanding of the precise functional genomic involvement in aging processes.

Investigations of various other means of aging interventions, like dietary supplements, antioxidants, hormones, and pharmacologic agents, have also produced only limited and discouraging outcomes. In most cases, the efficacy of these interventions was shown mainly in disease incidence, not necessarily on the aging process itself. As we all are aware by now, the most effective aging intervention requires both the retardation of the aging process and the suppression of accompanying diseases, as has been proven by epigenetic calorie restriction (CR) and physical exercise. One intriguing aspect yet to be answered about these two paradigms is their similar efficiencies, despite their vastly different *modus operandi*. Discernible answers are likely to come from epigenetic analysis showing age-related modifications to histone, chromatin, and chromosomes, all which are the targets of differentially modifying calorie restriction or by physical exercise.

The major thrust of this book is to expose epigenetic modifications of the aging process that can be attributed to two well-established antiaging modifiers, CR, and physical exercise. At present, no other book covering similar topics is available as a resource book. The majority of the book’s 11 chapters discusses how age-related epigenetic imprints such as DNA methylation and histone acetylation are modified by these two interventions. Chapter topics were selected to provide the reader not only insightful mechanistic clues into the ability of CR and exercise to exert beneficial effects in specific pathophysiological systems, but also to offer information

on salient aging research topics, including nutritional epigenetics, chronic inflammation, CR mimetics, and nonhuman primate CR studies.

For the completion of this book, I want express my personal thanks to all the chapter contributors who spent substantial effort and their valuable time to make this publication possible. I am also thankful to Dr. Suresh Rattan, Editor-in-Chief, *Healthy Ageing and Longevity* Book series, who invited me to be the editor of this book. Finally, my thanks go out to Ms. Corinne Price who helped me with her excellent editorial assistance.

One remarkable possibility for the future of epigenetic aging intervention is that modified histone imprints could become inheritable by passing onto following generations through the transgenerational inheritance process. Advancement of our knowledge on transgenerational epigenetic inheritance raises hope for new opportunities in achieving a healthy aging status for future generations without further interventions.

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Nutrition, Exercise and Epigenetics: Ageing  
Interventions

Yu, B.P. (Ed.)

2015, VIII, 278 p. 23 illus., 13 illus. in color., Hardcover

ISBN: 978-3-319-14829-8