

Contents

Artwork – *Origins by Collin Murphy*

Preface – Frederick L. Tyson

Part I Fetal Origins of Adult Disease Susceptibility

- 1 **Epigenetics: How Genes and Environment Interact** 3
Randy L. Jirtle
- 2 **Developmental Epigenomics and Metabolic Disease** 31
Peter D. Gluckman, Felicia M. Low, and Mark A. Hanson
- 3 **Sculpting Our Future: Environmental Nudging
of the Imprintome** 51
Susan K. Murphy and Cathrine Hoyo

Part II Epigenetics and Environmental Exposures

- 4 **Complex Phenotypes: Epigenetic Manifestation
of Environmental Exposures** 77
Christopher Faulk and Dana C. Dolinoy
- 5 **Epigenetic Effects of Ionizing Radiation** 99
Olga Kovalchuk
- 6 **The Intersection of Genetics and Epigenetics:
Reactivation of Mammalian LINE-1 Retrotransposons
by Environmental Injury** 127
Kenneth S. Ramos, Ivo Teneng, Diego E. Montoya-Durango,
Pasano Bojang, Mark T. Haerberle, Irma N. Ramos, Vilius Stribinskis,
and Ted Kalbfleisch

Part III Epigenetics, Gene Regulation, and Stem Cells

- 7 Environmental Impact on Epigenetic Histone Language** 163
John M. Denu
- 8 Chromatin Structure and Gene Expression:
Function Follows Form** 189
Aleksandra B. Adomas and Paul A. Wade
- 9 Epigenetics of Pluripotency** 207
R. David Hawkins and Bing Ren

Part IV Epigenetic Transgenerational Inheritance

- 10 Transgenerational Epigenetic Inheritance in *Drosophila*** 227
Luan Wang, Xiangyi Lu, and Douglas M. Ruden
- 11 Environmental Epigenetics and Epigenetic Transgenerational
Inheritance** 245
Michael K. Skinner
- 12 The Nature of Human Transgenerational Responses** 257
Marcus E. Pembrey, Lars O. Bygren, and Jean Golding
- Biography** 273
- Glossary** 275
- Index** 297