

---

# Contents

<i>Preface</i> .....	<i>v</i>
<i>Contributors</i> .....	<i>xiii</i>

## PART I. INTRODUCTION

1. DNA Methylation: An Introduction to the Biology and the Disease-Associated Changes of a Promising Biomarker <i>Jörg Tost</i> .....	3
---	---

## PART II. GLOBAL METHYLATION LEVELS

2. Quantification of Global DNA Methylation by Capillary Electrophoresis and Mass Spectrometry <i>María Berdasco, Mario F. Fraga, and Manel Esteller</i> .....	23
3. Methyl Group Acceptance Assay for the Determination of Global DNA Methylation Levels <i>Kenneth P. Nephew, Curt Balch, and David G. Skalnik</i> .....	35

## PART III. METHODS FOR WHOLE GENOME ANALYSIS OF DNA METHYLATION PATTERNS

4. Immunodetection Array <i>Johannes Pröll, Christian Wechselberger, Mathilde Födermayr, Otto Zach, and Dieter Lutz</i> .....	45
5. Methylated DNA Immunoprecipitation (MeDIP) <i>Fabio Mohn, Michael Weber, Dirk Schübeler, and Tim-Christoph Roloff</i> .....	55
6. The MIRA Method for DNA Methylation Analysis <i>Tibor A. Rauch and Gerd P. Pfeifer</i> .....	65
7. The HELP Assay <i>Mayumi Oda and John M. Greally</i> .....	77
8. Differential Methylation Hybridization: Profiling DNA Methylation with a High-Density CpG Island Microarray <i>Pearlly S. Yan, Dustin Potter, Daniel E. Deatherage, Shili Lin, and Tim H.-M. Huang</i> .....	89
9. Analysis of DNA Methylation by Amplification of Intermethylated Sites (AIMS) <i>Mireia Jordà, Jairo Rodriguez, Jordi Frigola, and Miguel A. Peinado</i> .....	107
10. Methylation-Sensitive Representational Difference Analysis (MS-RDA) <i>Toshikazu Ushijima and Satoshi Yamashita</i> .....	117

11. Restriction Landmark Genomic Scanning: Analysis of CpG Islands in Genomes by 2D Gel Electrophoresis <i>Joseph F. Costello, Dominic J. Smiraglia, Chibo Hong, and Christoph Plass</i> .....	131
12. GoldenGate® Assay for DNA Methylation Profiling <i>Marina Bibikova and Jian-Bing Fan</i> .....	149
13. 5'-Azacytidine Expression Arrays <i>Paul Cairns</i> .....	165
PART IV. GENE-SPECIFIC METHYLATION ANALYSIS	
14. DNA Methylation Analysis by Bisulfite Conversion, Cloning, and Sequencing of Individual Clones <i>Yingying Zhang, Christian Rohde, Sascha Tierling, Heinrich Stamerjohanns, Richard Reinhardt, Jörn Walter, and Albert Jeltsch</i> .....	177
15. Identification and Quantification of Differentially Methylated Loci by the Pyrosequencing™ Technology <i>Emelyne Dejeux, Hafida El abdalaoui, Ivo Glynne Gut, and Jörg Tost</i> .....	189
16. Mass Spectrometric Analysis of Cytosine Methylation by Base-Specific Cleavage and Primer Extension Methods <i>Dirk van den Boom and Mathias Elbrich</i> .....	207
17. Melting Curve Assays for DNA Methylation Analysis <i>Tomasz K. Wojdacz and Alexander Dobrovic</i> .....	229
18. Methylation SNaPshot: A Method for the Quantification of Site-Specific DNA Methylation Levels <i>Zachary Kaminsky and Arturas Petronis</i> .....	241
19. Bio-COBRA: Absolute Quantification of DNA Methylation in Electrofluidics Chips <i>Romulo Martin Brena and Christoph Plass</i> .....	257
20. Restriction Digestion and Real-Time PCR (qAMP) <i>Christopher C. Oakes, Sophie La Salle, Jacquetta M. Trasler, and Bernard Robaire</i> .....	271
21. MethylQuant: A Real-Time PCR-Based Method to Quantify DNA Methylation at Single Specific Cytosines <i>Claire Dugast-Darzacq and Thierry Grange</i> .....	281
22. Methylation-Specific PCR <i>Julien D. F. Licchesi and James G. Herman</i> .....	305
23. MethyLight <i>Mihaela Campan, Daniel J. Weisenberger, Binh Trinh, and Peter W. Laird</i> .....	325
24. Quantification of Methylated DNA by HeavyMethyl Duplex PCR <i>Jürgen Distler</i> .....	339

## PART V. SPECIAL APPLICATIONS

25	Analysis of Methylated Circulating DNA in Cancer Patients' Blood <i>Eiji Sunami, Anh-Thu Vu, Sandy L. Nguyen, and Dave S. B. Hoon</i> .....	349
26	Prevention of PCR Cross-Contamination by UNG Treatment of Bisulfite-Treated DNA <i>Reimo Tetzner</i> .....	357
27	Profiling DNA Methylation from Small Amounts of Genomic DNA Starting Material: Efficient Sodium Bisulfite Conversion and Subsequent Whole-Genome Amplification <i>Jonathan Mill and Arturas Petronis</i> .....	371
	<i>Index</i> .....	383



<http://www.springer.com/978-1-934115-61-9>

DNA Methylation

Methods and Protocols

Tost, J. (Ed.)

2009, XVI, 392 p., Hardcover

ISBN: 978-1-934115-61-9

A product of Humana Press