
Contents

Preface	v
Contributors.....	xi

PART I BASE EXCISION REPAIR ASSAYS IN VITRO AND IN LIVE CELLS

- 1 Simultaneous Short- and Long-Patch Base Excision Repair (BER) Assay in Live Mammalian Cells..... *Rabindra Roy* 3
- 2 In Vitro Assay to Measure APE1 Enzymatic Activity on Ribose Monophosphate Abasic Site *Matilde Clarissa Malfatti, Giulia Antoniali, and Gianluca Tell* 21
- 3 Highly Sensitive Radioactivity-Based DNA 3'-Phosphatase Activity Assay for Polynucleotide Kinase 3'-Phosphatase *Anirban Chakraborty and Tapas K. Hazra* 39
- 4 Generation of Recombinant Nucleosomes Containing Site-Specific DNA Damage *Benjamin J. Ryan, Tyler M. Weaver, Jonah J. Spencer, and Bret D. Freudenthal* 55
- 5 A DNA Cleavage Assay Using Synthetic Oligonucleotide Containing a Single Site-Directed Lesion for In Vitro Base Excision Repair Study *Bo Hang* 77
- 6 In Vitro Reconstitutive Base Excision Repair (BER) Assay *Aruna S. Jaiswal, Elizabeth A. Williamson, Arunima S. Jaiswal, Kimi Kong, and Robert A. Hromas* 91

PART II DETECTION AND QUANTIFICATION OF BASE LESIONS, DNA DOUBLE-STAND BREAKS, DNA PROTEIN CROSS-LINKS, AND R LOOPS

- 7 Detection of Oxidatively Modified Base Lesion(s) in Defined DNA Sequences by FLARE Quantitative PCR *Lang Pan, Yaoyao Xue, Ke Wang, Xu Zheng, and Istvan Boldogh* 115
- 8 Isolation and Immunodetection of Enzymatic DNA–Protein Crosslinks by RADAR Assay *Megan Perry and Gargi Ghosal* 135
- 9 Slot Blot Assay for Detection of R Loops *Altaf H. Sarker and Priscilla K. Cooper* 149
- 10 Assays with Patient-Derived Organoids to Evaluate the Impact of Microbial Infection on Base Excision Repair (BER) Enzymes *Ibrahim M. Sayed, Anirban Chakraborty, and Soumita Das* 157

11	Characterizing the Repair of DNA Double-Strand Breaks: A Review of Surrogate Plasmid-Based Reporter Methods	173
	<i>Arijit Dutta, Joy Mitra, Pavana M. Hegde, Sankar Mitra, and Muralidhar L. Hegde</i>	
PART III INTERACTOME PROFILING AND PURIFICATION OF DNA DAMAGE REPAIR/RESPONSE PROTEINS		
12	Interactome Profiling of DNA Damage Response (DDR) Mediators with Immunoprecipitation-Mass Spectrometry	185
	<i>Henry C. -H. Law, Dragana Noe, and Nicholas T. Woods</i>	
13	Using Affinity Pulldown Assays to Study Protein-Protein Interactions of Human NEIL1 Glycosylase and the Checkpoint Protein RAD9-RAD1-HUS1 (9-1-1) Complex	199
	<i>Drew T. McDonald, Pam S. Wang, Jennifer Moitoza Johnson, and Miaw-Sheue Tsai</i>	
14	Tandem Affinity Purification and Mass-Spectrometric Analysis of FACT and Associated Proteins	209
	<i>Amala Kaja, Priyanka Barman, Shalini Guha, and Sukesh R. Bhaumik</i>	
PART IV ANALYSIS OF GENOME-WIDE BINDING OF DNA REPAIR PROTEINS AND COPY NUMBER VARIATIONS OF DNA DAMAGE RESPONSE GENE IN TUMOR		
15	Analysis of Copy Number Variation of DNA Repair/Damage Response Genes in Tumor Tissues	231
	<i>Tadahide Izumi</i>	
16	Genome-Wide Binding Analysis of DNA Repair Protein APE1 in Tumor Cells by ChIP-Seq	243
	<i>Mason Tarpley, Yingling Chen, and Kishor K. Bhakat</i>	
17	Tumorsphere Formation Assay: A Cancer Stem-Like Cell Characterization in Pediatric Brain Cancer Medulloblastoma	253
	<i>Sutapa Ray</i>	
	<i>Index</i>	261