

Contents

Preface	v
Contributors	xiii
Technical Notes	xvii
1 Isolation of Mutagen-Sensitive Chinese Hamster Cell Lines by Replica Plating <i>Malgorzata Z. Zdzienicka</i>	1
2 Complementation Assays Adapted for DNA Repair-Deficient Keratinocytes <i>Mathilde Fréchet, Valérie Bergoglio, Odile Chevallier-Lagente, Alain Sarasin, and Thierry Magnaldo</i>	9
3 Cytogenetic Challenge Assays for Assessment of DNA Repair Capacities <i>William W. Au and Salama A. Salama</i>	25
4 Evaluating the Delayed Effects of Cellular Exposure to Ionizing Radiation <i>Shruti Nagar, James J. Corcoran, and William F. Morgan</i>	43
5 Inhibition of DNA Synthesis by Ionizing Radiation: A Marker for an S-Phase Checkpoint <i>Nicolaas G. J. Jaspers and Malgorzata Z. Zdzienicka</i>	51
6 Analysis of Inhibition of DNA Replication in Irradiated Cells Using the SV40-Based In Vitro Assay of DNA Replication <i>George Iliakis, Ya Wang, and Hong Yan Wang</i>	61
7 Cytometric Assessment of Histone H2AX Phosphorylation: A Reporter of DNA Damage <i>Xuan Huang and Zbigniew Darzynkiewicz</i>	73
8 Detection of DNA Strand Breaks by Flow and Laser Scanning Cytometry in Studies of Apoptosis and Cell Proliferation (DNA Replication) <i>Zbigniew Darzynkiewicz, Xuan Huang, and Masaki Okafuji</i>	81
9 In Vitro Rejoining of Double-Strand Breaks in Genomic DNA <i>George Iliakis and Nge Cheong</i>	95
10 Detection of DNA Double-Strand Breaks and Chromosome Translocations Using Ligation-Mediated PCR and Inverse PCR <i>Michael J. Villalobos, Christopher J. Betti, and Andrew T. M. Vaughan</i>	109

- 11 Plasmid-Based Assays for DNA End-Joining In Vitro
*George Iliakis, Bustanur Rosidi, Minli Wang,
and Huichen Wang* 123
- 12 Use of Gene Targeting to Study Recombination
in Mammalian Cell DNA Repair Mutants
Rodney S. Nairn and Gerald M. Adair 133
- 13 Gene-Specific and Mitochondrial Repair
of Oxidative DNA Damage
R. Michael Anson, Penelope A. Mason, and Vilhelm A. Bohr 155
- 14 Quantitative PCR-Based Measurement of Nuclear
and Mitochondrial DNA Damage
and Repair in Mammalian Cells
*Janine H. Santos, Joel N. Meyer, Bhaskar S. Mandavilli,
and Bennett Van Houten* 183
- 15 Measuring the Formation and Repair of DNA Damage
by Ligation-Mediated PCR
Gerd P. Pfeifer 201
- 16 Immunochemical Detection of UV-Induced DNA
Damage and Repair
Marcus S. Cooke and Alistair Robson 215
- 17 A Dot-Blot Immunoassay for Measuring Repair
of Ultraviolet Photoproducts
Shirley McCready 229
- 18 Quantification of Photoproducts in Mammalian Cell DNA Using
Radioimmunoassay
David L. Mitchell 239
- 19 DNA Damage Quantitation by Alkaline Gel Electrophoresis
*Betsy M. Sutherland, Paula V. Bennett,
and John C. Sutherland* 251
- 20 The Comet Assay: A Sensitive Genotoxicity Test
for the Detection of DNA Damage and Repair
Günter Speit and Andreas Hartmann 275
- 21 Fast Micromethod DNA Single-Strand-Break Assay
*Heinz C. Schröder, Renato Batel, Heiko Schwertner,
Oleksandra Boreiko, and Werner E. G. Müller* 287
- 22 ³²P-Postlabeling DNA Damage Assays: PAGE, TLC, and HPLC
Shinya Shibutani, Sung Yeon Kim, and Naomi Suzuki 307
- 23 Electrophoretic Mobility Shift Assays to Study Protein Binding
to Damaged DNA
Vaughn Smider, Byung Joon Hwang, and Gilbert Chu 323

24	Construction of MMR Plasmid Substrates and Analysis of MMR Error Correction and Excision Huixian Wang and John B. Hays	345
25	Characterization of Enzymes that Initiate Base Excision Repair at Abasic Sites Walter A. Deutsch and Vijay Hegde	355
26	Base Excision Repair in Mammalian Cells Yoshihiro Matsumoto	365
27	In Vitro Base Excision Repair Assay Using Mammalian Cell Extracts Guido Frosina, Enrico Cappelli, Monica Ropolo, Paola Fortini, Barbara Pascucci, and Eugenia Dogliotti	377
28	Biochemical Assays for the Characterization of DNA Helicases Robert M. Brosh, Jr. and Sudha Sharma	397
29	Repair Synthesis Assay for Nucleotide Excision Repair Activity Using Fractionated Cell Extracts and UV-Damaged Plasmid DNA Maureen Biggerstaff and Richard D. Wood	417
30	Assaying for the Dual Incisions of Nucleotide Excision Repair Using DNA with a Lesion at a Specific Site Mahmud K. K. Shivji, Jonathan G. Moggs, Isao Kuraoka, and Richard D. Wood	435
31	Analysis of Proliferating Cell Nuclear Antigen (PCNA) Associated with DNA Excision Repair Sites in Mammalian Cells A. Ivana Scovassi and Ennio Prosperi	457
32	Analysis of DNA Repair and Chromatin Assembly In Vitro Using Immobilized Damaged DNA Substrates Jill A. Mello, Jonathan G. Moggs, and Geneviève Almouzni	477
	Index	489

Nik Chinna • Department of Pathology, Clinical Research Centre, National
University of Singapore, Singapore

Denis Chevillon-Lagard • Laboratory of Genetic Instability and Cancer,
Institut Gustave Roussy, Villejuif, France

Geoffrey Cox • Department of Medicine and Pathology, Stanford University
Medical Center, Stanford, CA

Marcel S. Cooke • Genome Instability Group, Department of Cancer

Studies and Molecular Medicine, University of Leicester, Leicester, UK

James I. Crisp • Radiation Oncology Research Laboratory, University
of Maryland, Baltimore, MD