
Contents

Preface v

Contributors *xiii*

Color Plates *xvii*

PART I. LABELING DNA BREAKS USING TERMINAL TRANSFERASE (TUNEL ASSAY)

1 Labeling DNA Damage with Terminal Transferase:
Applicability, Specificity, and Limitations
**P. Roy Walker, Christine Carson, Julie Leblanc,
and Marianna Sikorska** 3

2 TUNEL Assay: *An Overview of Techniques*
Deryk T. Loo 21

3 Electron Microscopic Detection of DNA Damage Labeled by TUNEL
Antonio Migheli 31

4 Quantitative Differentiation of Both Free 3' OH and 5' OH DNA Ends
Using Terminal Transferase-Based Labeling Combined
with Transmission Electron Microscopy
Yoshinori Otsuki and Yuko Ito 41

5 Determination of Three-Dimensional Distribution of Apoptotic DNA
Damage by Combination of TUNEL and Quick-Freezing
and Deep-Etching Techniques
**Shinichi Ohno, Takeshi Baba, Nobuo Terada,
and Yasuhisa Fujii** 55

6 *In Situ* Detection of DNA Strand Breaks in Analysis of Apoptosis
by Flow- and Laser-Scanning Cytometry
**Zbigniew Darzynkiewicz, Elzbieta Bedner,
and Piotr Smolewski** 69

PART II. LABELING DNA BREAKS USING DNA POLYMERASE I
OR ITS KLENOW FRAGMENT

7 DNA Damage Detection Using DNA Polymerase I
or its Klenow Fragment: *Applicability, Specificity, Limitations*
Jan Hein van Dierendonck 81

8 Labeling DNA Breaks *In Situ* by Klenow Enzyme
Katherine A. Wood 109

9	<i>In Situ</i> Nick Translation at the Electron Microscopic Level Marc Thiry	121
PART III. LABELING DNA BREAKS USING LIGASE		
10	<i>In Situ</i> DNA Ligation as a Method for Labeling Apoptotic Cells in Tissue Sections: <i>An Overview</i> Peter J. Hornsby and Vladimir V. Didenko	133
11	Detection of Specific Double-Strand DNA Breaks and Apoptosis <i>In Situ</i> Using T4 DNA Ligase Vladimir V. Didenko	143
12	<i>In Situ</i> Detection of Double-Strand DNA Breaks with Terminal 5'OH Groups Vladimir V. Didenko, Hop Ngo, and David S. Baskin	153
PART IV. DETECTION OF DNA BREAKS IN AGAROSE TRAPPED CELLS: <i>COMET ASSAY AND RELATED TECHNIQUES</i>		
13	The Comet Assay: <i>Principles, Applications, and Limitations</i> Andrew R. Collins	163
14	The Comet Assay: <i>An Overview of Techniques</i> Peggy L. Olive	179
15	Ultrasensitive Detection of DNA Damage by the Combination of the Comet and TUNEL Assays Andrei L. Kindzelskii and Howard R. Petty	195
16	Application of FISH to Detect DNA Damage: <i>DNA Breakage Detection-FISH (DBD-FISH)</i> José Luis Fernández and Jaime Gosálvez	203
PART V. DETECTION OF MODIFIED BASES AND AP SITES IN DNA		
17	Simultaneous <i>In Situ</i> Detection of DNA Fragmentation and RNA/DNA Oxidative Damage Using TUNEL Assay and Immunohistochemical Labeling for 8-Hydroxy-2'-Deoxyguanosine (8-OHdG) Alexander E. Kalyuzhny	219
18	The <i>In Situ</i> Detection of Apurinic/Apyrimidinic Sites and DNA Breaks Bearing Extension Blocking Termini Philip K. Liu, Jiankun Cui, Niki Moore, and Dongya Huang	235
PART VI. INDIRECT AND GENERAL MARKERS OF DNA DAMAGE		
19	Markers of Poly (ADP-Ribose) Polymerase Activity as Correlates of DNA Damage Yinong Zhou, Shi Liang, and Lawrence R. Williams	247

20	Ultrasound Imaging of Apoptosis: <i>DNA-Damage Effects Visualized</i> Gregory J. Czarnota, Michael C. Kolios, John W. Hunt, and Michael D. Sherar	257
21	p53 Induction as an Indicator of DNA Damage Galina Selivanova	279
22	Detection of Caspases Activation <i>In Situ</i> by Fluorochrome-Labeled Inhibitors of Caspases (FLICA) Zbigniew Darzynkiewicz, Elzbieta Bedner, Piotr Smolewski, Brian W. Lee, and Gary L. Johnson	289
	Index	301

<http://www.springer.com/978-0-89603-952-0>

In Situ Detection of DNA Damage

Methods and Protocols

Didenko, V.V. (Ed.)

2002, XVII, 313 p. 164 illus., 31 illus. in color.,

Hardcover

ISBN: 978-0-89603-952-0

A product of Humana Press