

## 6. Index

### A

“A <sub>0</sub> ” cells .....	49
Acridine orange .....	49
Alkaline elution analysis of DNA .....	30
Annexin V	
-Alexa 568 .....	44
assays for .....	45
binding of phosphatidylserine .....	43
-Biotin .....	47
-FLUOS .....	44
-FLUOS Staining Kit .....	44
Anti-	
BrdU .....	105
DNA .....	15
PARP .....	27
Antibody to, see <i>Anti-Apopain</i> .....	123
Apoptosis	
assays for cell populations .....	10
assays for individual cells .....	32
biochemical characteristics of .....	2
definition of .....	2
difference between cytotoxicity and .....	58
difference between necrosis and .....	3
hallmark of .....	10
inducers of .....	11
morphological characteristics of .....	3
overview of .....	2
pathways .....	5
proteases, role of .....	18
simultaneous detection of necrosis and .....	15
surface morphology changes during .....	5
Apoptotic DNA Ladder Kit .....	13
Aspartate at proteolysis site .....	18

### B

<i>bad</i> gene .....	123
bax .....	123
BCIP .....	42
<i>bcl-2</i> gene .....	123
<i>bcl-x<sub>L</sub></i> gene .....	123
<i>bcl-x<sub>S</sub></i> gene .....	123
“Beads on a string” .....	11
Bisbenzimidazole dye, see <i>Hoechst dye</i>	
5'-Bromo-2'-deoxy-uridine	
Labeling and Detection Kit I .....	101
Labeling and Detection Kit II .....	101
Labeling and Detection Kit III .....	91
labeling of DNA .....	100
incorporation assay .....	100
release assay .....	74
Bromo-deoxy-uridine, see <i>5'-Bromo-2'-deoxy-uridine</i>	

### C

CAM, see <i>Camptothecin</i>	
Camptothecin .....	15, 46, 48
Caspases .....	18
Caspase 3 Activity Assay .....	22
Ced-3 .....	123
<i>ced-9</i> gene .....	123
Cell cycle, overview of .....	75
Cell death	
accidental .....	2
and cytotoxicity .....	2
programmed .....	2
Cell Death Detection ELISA <sup>PLUS</sup> .....	15
Cell-mediated cytotoxicity .....	58
Cell proliferation	
assays for cell populations .....	82
assays for individual cells .....	100
assays that use tetrazolium salts .....	82
ELISA, BrdU (chemiluminescent) .....	94
ELISA, BrdU (colorimetric) .....	94
Kit I (MTT) .....	85
Kit II (XTT) .....	86
overview of .....	74
Reagent WST-1 .....	87
Cell viability assays, see <i>Cell proliferation assays</i>	
Cellular	
DNA Fragmentation ELISA .....	64
Ceramide, role in apoptosis .....	123
Chemiluminescent cell proliferation ELISA .....	94
Chromatin aggregation .....	3
<i>c-jun</i> gene .....	123
<i>c-myc</i> gene .....	123
Colorimetric assays	
for cytotoxicity .....	61, 64
for proliferation .....	94
CPP32 .....	123
Crn A .....	123
Cr release assay, radioactive .....	74
Cyclin .....	75
Cysteine proteases .....	6
Cytotoxic T cells .....	2
Cytotoxicity	
assays .....	61, 64
cell-mediated .....	58
definition of .....	58
Detection Kit (LDH) .....	61
effectors of .....	58
overview of .....	58

- D**
- DAB substrate ..... 42
  - Damage/leakage of plasma membrane, assays for . 49
  - DAPI ..... 49
  - Deoxynucleotidyltransferase, terminal ..... 33
  - Dexamethasone ..... 35
  - DNA cleavage, see *DNA fragmentation*
  - DNA fragmentation
    - during apoptosis ..... 6, 10
  - DNA fragments, histone-associated ..... 12
  - DNA end labeling ..... 33
  - DNA ladder
    - appearance of ..... 11
    - assay for ..... 13
    - size of fragments ..... 11
  - DNA polymerase ..... 32
  - DNA synthesis
    - assays ..... 89
  - Dye
    - exclusion assays ..... 49
    - uptake ..... 50
- E**
- Effector cells for inducing cell death ..... 66
  - ELISA
    - kits ..... 15, 91, 94
  - End labeling of DNA ..... 33
  - Epidermis tissue, *in vivo* labeling of ..... 104
  - Ethidium bromide ..... 49
  - Exclusion assays, see *Dye exclusion assays*
- F**
- FADD ..... 124
  - False positive, TUNEL ..... 114
  - Fast red ..... 42
  - FIENA ..... 22
  - FixDenat ..... 94
  - Fluorochrome staining assays for measuring
    - DNA loss ..... 49
  - Flow cytometric techniques, kits for, see
    - Annexin V-FLUOS Staining Kit* ..... 44
    - In situ* Cell Death Detection Kit, Fluorescein ... 36
    - In situ* Cell Proliferation Kit, FLUOS ..... 102
  - Flow cytometric measurement
    - of Annexin V-stained cells ..... 44
    - of apoptosis ..... 32
    - of BrdU label ..... 103
    - of cell cycle position ..... 107
    - of ISNT method ..... 33
    - of normal and apoptotic cells ..... 46, 49
    - of peripheral blood lymphocytes ..... 34
    - of total DNA ..... 103
    - of TUNEL method ..... 38
  - Flow cytometry
    - assays for apoptotic cells ..... 36, 44
  - Formazan
    - insoluble ..... 84
    - soluble ..... 84
  - fos* gene ..... 125
  - Fragmentation of DNA ..... 30
- G**
- Glucocorticoid receptor ..... 125
  - Granzyme ..... 125
- H**
- Hallmark of apoptosis ..... 10
  - HeLa cells ..... 103
  - Histone-associated DNA fragments ..... 12
  - Hoechst dye ..... 49
  - Homeostasis, loss during cell death ..... 3
  - Homogeneous Caspases Assay ..... 25
- I**
- ICE ..... 6
  - ICH-I ..... 127
  - INT ..... 61
  - Interleukin converting enzyme (ICE) ..... 6
  - In situ* Cell Death Detection Kit
    - AP ..... 39
    - POD ..... 39
    - Fluorescein ..... 36
  - In situ* Cell Proliferation Kit
    - FLUOS ..... 102
  - In situ* nick translation ..... 33
  - ISNT method ..... 33
- J**
- JAM test ..... 30
- L**
- Lactate dehydrogenase, see *LDH*
  - LDH
    - Cytotoxicity Detection Kit ..... 61
    - release assay ..... 74
  - Leakage/damage of plasma membrane, assays for 49
  - LMW DNA ..... 12
  - Lymphokine-activated killer cells ..... 58

**M**

- M30 CytoDEATH ..... 19
- M30 CytoDEATH, Fluorescein ..... 19
- Mch2, Mch3, Mch4 ..... 127
- MCL-1 ..... 125
- Membrane symmetry during apoptosis ..... 43
- Method selection guide
  - for apoptosis assay ..... 8, 9
  - for cell proliferation assay ..... 80, 81
- Microwave pretreatment for TUNEL ..... 116
- Mononucleosomes ..... 11
- MORT-1 ..... 125
- M-phase ..... 76
- MTT
  - assay kit ..... 85
  - biochemical basis for reduction of ..... 82
  - cellular basis for reduction of ..... 82
  - comparison with other tetrazolium salts ..... 84
  - effect of superoxide dismutase on ..... 121
  - structure of ..... 83
  - use in cell proliferation assay ..... 82
  - use in cytotoxicity assay ..... 59

**N**

- Natural killer cells ..... 2, 58
- NBT ..... 42
- Necrosis
  - definition of ..... 2
  - difference between apoptosis and ..... 3
  - difference between cytotoxicity and ..... 58
  - inducers of ..... 3
  - inflammation during ..... 3
  - overview of ..... 3
  - secondary ..... 3
- NEDD ..... 125
- NF-kappa B ..... 125
- Nick translation ..... 33
- Nonradioactive assays
  - for apoptosis ..... 30
  - for cell proliferation ..... 98
  - for DNA fragmentation ..... 30
- Nucleosome quantification ELISA ..... 30

**O**

- Oligonucleosomes ..... 11

**P**

- p53 pan ELISA ..... 56
- PARP ..... 10
- Peripheral blood lymphocytes
  - proliferation of ..... 97
  - stimulation of ..... 96
- Phagocytic cells ..... 3
- Phosphatidylserine ..... 43
- Phospholipid ..... 43
- Phospholipid-binding protein,
  - see *Annexin V* ..... 43
- Plasma membrane
  - damage during apoptosis ..... 3
  - damage during necrosis ..... 3
- Poly-(ADP-ribose) polymerase,
  - see *PARP*
- Positive, false, TUNEL ..... 114
- Proliferating cells
  - assays for ..... 85 – 87
  - increased metabolic activity in ..... 82
- Propidium iodide
  - exclusion assay ..... 44, 47
  - properties ..... 49
- Proteases in apoptosis ..... 18
- Proteinase K pretreatment for TUNEL ..... 116
- Proto-oncogene ..... 54

**Q**

- Questions frequently asked about cell death
  - assays ..... 112

**R**

- Radioactive assays
  - for apoptosis ..... 30
  - for cell proliferation ..... 98
  - for DNA fragmentation ..... 30
- Ras ..... 126
- Reduced metabolic activity, assay for ..... 68
- RIP ..... 126

- S**
- S-phase ..... 76
  - Staining of DNA ..... 52
  - Storage of samples for apoptosis assay ..... 112
  - Streptavidin conjugates ..... 48
  - “Sub-G<sub>1</sub>” peak ..... 49
  - Succinate-tetrazolium reductase ..... 82
  - Surface glycoproteins ..... 43
  - Symmetry of membranes during apoptosis ..... 43
- T**
- TdR proliferation assay ..... 98
  - TdT ..... 33
  - Terminal deoxynucleotidyl transferase ..... 33
  - Tetrazolium salt
    - See also *MTT*, *WST-1*, *XTT*
    - mitochondrial reduction and
    - use in cell proliferation assays ..... 82
  - Thymidine release assay, radioactive ..... 74
  - TRADD ..... 126
  - Transferase, terminal ..... 33
  - Trypan blue exclusion assay ..... 49
  - Two-color assay for dead and viable apoptotic cells ..... 119
  - TUNEL
    - AP ..... 42
    - definition of ..... 33
    - diminished staining during DNA counterstaining ..... 116
    - dilution buffer ..... 42
    - effect of different fixatives on ..... 115
    - effect of pretreatments on ..... 116
    - enzyme ..... 42
    - evaluation of, for *in situ* apoptotic cell identification ..... 113
    - false positives in ..... 114
    - high background in ..... 115
    - improvement of, for *in situ* apoptotic cell identification ..... 113
    - kits for ..... 36–39
    - label ..... 42
    - low labeling in ..... 116
    - nonspecific labeling in ..... 115
    - no signal in ..... 116
    - optimization of ..... 115
    - overview of ..... 32
    - POD ..... 42
    - pretreatments for ..... 116
    - protocol for tissues which tend to give false positives ..... 114
    - single reagents for ..... 42
    - special applications of ..... 119
    - specificity of ..... 33
    - tips for avoiding or eliminating potential artifacts in ..... 115
- U**
- Uptake of dyes by dead cells ..... 50
- V**
- Viable cell number ..... 78
- W**
- Water-insoluble formazan ..... 84
  - Water-soluble formazan ..... 84
  - WST-1
    - assay ..... 87
    - biochemical basis for reduction of ..... 82
    - cellular basis for reduction of ..... 82
    - comparison with other tetrazolium salts ..... 84
    - effect of reducing agents on ..... 121
    - effect of superoxide dismutase on ..... 121
    - structure of ..... 83
    - use in cell proliferation assay ..... 82
    - use in cytotoxicity assay ..... 59
- X**
- XTT
    - assay kit ..... 86
    - biochemical basis for reduction of ..... 82
    - cellular basis for reduction of ..... 82
    - comparison with other tetrazolium salts ..... 84
    - effect of reducing agents on ..... 121
    - effect of superoxide dismutase on ..... 121
    - structure of ..... 83
    - use in cell proliferation assay ..... 82
    - use in cytotoxicity assay ..... 59
- Y**
- YAMA ..... 126