

---

# Index

## A

- Absorption spectra, 195–218
- Actinomycin, 2, 24–28, 32, 34–39, 53, 61, 82, 269
- Adenine N3, 147
- Adozelesin, 117, 122
- Adriamycin, 96, 195
  - crosslinks, 108, 109
- Aggregation constant, 262
- Alkaline elution, 107
- Alkylation, 118, 147–156
- Anthracyclines, 195
- Antibodies, 181
- Antigene oligonucleotide, 228
- Antisense oligonucleotide, 228
- Antitriplex antibodies, 189
- Association constant, *see* binding constant
- AT-tracts, 3, 43
- Autoimmune antibodies, 181
- Autoradiography, 12, 13, 24, 101, 102, 135
- Azoniacyclophane, 228

## B

- Base pairing free energy, 222
- Base stacking, 242
- Bathochromic shift, 195, 199
- Beer-Lambert law, 196, 233
- Benzopyridoindole, *see* BePI
- BePI, 53, 61, 68, 70, 71
- Berenil, 208, 228, 264
- Bidirectional transcription footprinting, 128, 136
- Binding constant, 28–34, 36, 38–41, 195–218, 225, 229, 261
  - effect of salt, 203
  - isotherm, 201
  - relative, 182
- Binding assay, 101
- Binding stoichiometry, 195, 203
- Bis*-intercalation, 61
- Bleomycin, 53, 61
- BSU-1069, 197, 206
- Bulged base, 61

## C

- Calicheamicin, 152
- Calorimetric techniques, 259–268
  - analysis for  $\Delta H$ , 261
  - heat-pulse analysis, 261
- Carrier DNA, 17, 30, 31, 33, 36
- CC-1065, 147
- Chain termination, 117
- Chloroethyl-nitrosourea, 147, 152, 153
- Chromatin, 81, 82, 220
- Chromomycin, 269
- Chromosomes, 181, 189–193
  - preparation, 190
- Cis*-platinum, 53, 127, 152, 175
- Cleavage rate constant, 31
- Cleavage assay, 147–156
- Colcemid, 190
- Combilexin, 205
- Competition dialysis, 207
- Contact energy transfer, 207
- Continuous variation analysis, 202, 203, 211
- Cooperative binding, 34, 65, 200, 201, 223
- Copper-phenanthroline, 2
- Crosslinking, 107–115, 127
- Cyanomorpholinoadriamycin, 133, 134
- Cytotoxic lesions, 107, 157

## D

- DAPI, 228
- Daunomycin, 2, 195
- DEPC, 51–79
  - effect of pH, 54
  - reaction with purines, 53, 54
- Denaturation, 120
- Densitometry, 32, 65, 91, 112, 165
- Deoxyribonuclease I, *see* DNase I
- Detergent sequestration, 269
- Dichroism,
  - amplitude, 242
  - decay time constant, 244
  - fluorescence detected, 257
  - stationary dichroism, 250
  - transients, 251

- Dichroism ratio, 252  
 Dideoxy sequencing, 117  
 Diethylpyrocarbonate, *see* DEPC  
 Dipole moment, 243  
 Dissociation kinetics, 269–274  
   data analysis, 270  
     nonlinear least squares fit, 271  
     residual plot, 272  
   double exponential, 271  
   global analysis, 273, 274  
   multiexponential, 270, 271  
   single exponential, 271, 272  
 Dissociation rate constant, 128, 136  
 Differential scanning calorimeter, 260  
 Dimerization, 197  
 Distamycin, 13–15, 45–48, 82, 90, 91, 127, 227, 228, 253  
 DNA adducts, 95–106  
 DNA-binding antibodies, 181–188, 189–193  
 DNA-binding proteins, 95–106  
 DNA crosslinks, 107–115  
   quantification, 112  
 DNA damage, 157–180  
 DNA flexibility, 3, 34, 81  
 DNA fragments, 5, 58  
   extraction, 10  
   lacUV5 promoter, 96, 102, 128, 132, 139  
   pBR322 fragment, 5, 25, 153  
   pBS, 5, 64, 66, 70  
   pUC polylinker, 6  
   radiolabeling, 7–9, 149  
   synthetic, 6, 58  
    $\lambda$ gtT, 5, 45, 89–91  
 DNA hydrodynamic dimensions, 241  
 DNA isolation, 167  
 DNA melting curves, 219–240  
   for determining association constant, 229  
 DNA polymerase, 117, 127  
 DNA polymerase inhibition assay, 117–125  
 DNA preparation, 7  
 DNA precipitation, 9, 103  
 DNA radiolabeling,  
   3'-, 8–10, 101, 152  
   5'-, 149, 163, 174  
   by PCR, 152  
 DNA repair, 157–180  
 DNA restriction digestion, 9, 149  
 DNA–RNA duplexes, 189  
 DNA sequencing, 117, 121  
 DNA strand separation, 219  
 DNA structural change,  
   ligand induced, 15, 26, 34, 51–79  
 DNA structure,  
   unusual, 52, 61  
 DNase I, 1–22, 23–42, 81–93  
   activity, 16  
   cleavage mechanism, 3, 28, 54  
   cleavage reaction, 58, 59  
   digestion, 11, 12, 88  
   enhanced cleavage, 3, 15, 26, 32, 37, 68  
   sequence specificity, 3, 17  
   staggered cleavage, 13–15  
   storage, 24  
   structure, 3  
   uneven cleavage, 14  
 DNase II, 2, 8  
 Doxorubicin, 127  
 Duocarmycin, 117  
**E**  
 Echinomycin, 48, 53, 61, 65–68, 82  
   cooperative binding, 65  
   effect on DEPC modification of purines, 61  
 Electric anisotropy, 241, 242  
 Electric birefringence, 257  
 Electric dichroism, 241–258  
 Electrophoresis, 7, 12, 13, 89, 101, 111, 121, 151  
 Electrostatic effects, 203  
 Ellipticine, 53  
 Enhanced cleavage, 3, 17, 26, 29, 30, 32, 37  
 Enhancement constant, 29  
 Enthalpy ( $\Delta H$ ), 225, 259  
   measurement, 259–268  
 Equilibrium binding titration, 197, 209  
 Ethidium, 53, 195, 205, 207, 213, 226, 253  
 Ethidium displacement, 204, 212, 213  
 Exonuclease, 127  
 Exonuclease III, 111  
 Extinction coefficient,  
   for ds DNAs, 223  
   for ssDNA and RNA, 224  
   nearest-neighbor approximation, 235  
**F**  
 Fab fragment, 183  
 FITC IgG, 190  
 FITC-stained chromosomes, 191  
 Fluorescein, 182  
 Fluorescein-labeled oligonucleotide, 182  
 Fluorescence, 195  
 Fluorescence microscopy, 191  
 Fluorescence polarization spectroscopy, 182  
 Fluorescence polarization, 183, 185, 207  
 Fluorescence quenching, 205–207, 213

- Fluorescence titration, 201  
 Footprinting, 1–22, 23–42, 56, 57, 68, 81–93  
   plots, 26–28, 32–34, 39  
   quantitative, 23–42, 65  
   site size, 17, 28  
 Formamide, 112  
 Free energy,  $\Delta G$  222, 259  
 Furamide, 228
- G**
- Gel shift assay, 95–106  
 Guanine N3, N7, 147  
   alkylation, 152  
 Groove binders, 226
- H**
- H1 stripped chromatin, 86  
 Heat of dilution, 262, 266  
 Hoechst 33258, 189, 190, 196, 202–204, 209  
 Hoechst-stained chromosomes, 191  
 Holliday junction, 43  
 Hydroxyl radical cleavage, 2, 45, 88, 89  
 Hyperchromic effect, 195  
 Hyperchromicity, 223, 224
- I**
- Immunofluorescence, 181, 189–195  
 Immunofluorescent staining, 191  
 Intercalation, 127, 226  
 In vitro transcription, 128  
 Isosbestic point, 199
- J**
- Job plot, 202, 203, 211
- K**
- Klenow fragment, 9, 124, 152  
 Klotz plot, 186
- L**
- Lac* UV5 promoter, 96, 102, 128, 132, 139  
   interaction with RNA polymerase, 102  
 Ligand induced changes in DNA structure,  
   15, 26, 34, 51–79  
 Linear dichroism, 257  
 Linear PCR, 159  
 Lucanthone, 53  
 Lupus erythematosus, 181, 189
- M**
- Maxam-Gilbert markers, 8, 10, 11, 151  
   G-tracks, 10  
   G+A tracks, 11, 151  
 McGhee-von Hippel curve, 200–202, 211  
 Melphalan, 127
- Melting curves, 219–240  
   biphasic, 226  
   for determining association constant, 229  
   shape, 223  
 Metal binding sites, 43  
 Metaphase chromosomes, 189  
 Methidiumpropyl-EDTA, *see* MPE  
 Micrococcal nuclease, 2, 8, 84, 85, 92  
   unit definition, 85  
 Microscopy, 191  
 Minor groove binding ligand, 2, 13–15, 82  
 Minor groove width, 3, 43, 45  
 Mithramycin, 2, 48, 53, 61, 82, 269  
 Mitomycin, 127  
 Mitoxantrone, 127  
 Molecular modeling, 205  
 Molecular rotation, 241  
 MPE, 2, 66  
 Multi-site binding, 31–33
- N**
- Neighbor exclusion, 200, 202, 211  
 Netropsin, 117, 118, 227, 253  
 Nitrogen mustard, 147  
 Nogalamycin, 2, 53, 61  
 Nucleosomes, 81–93  
   DNA positioning, 81, 82  
   interaction with ligands, 82  
   integrity, 88  
   preparation, 84  
   reconstitution, 86–88  
   rotational positioning, 82, 91  
   storage, 86
- O**
- Occupancy, 128, 136  
 Octamer binding proteins, 96, 97, 100, 101  
 Oligonucleotides, 6  
   crosslinking, 107–115  
   extinction coefficient, 235  
   nearest-neighbor approximation, 235  
   purification, 110  
   radiolabeling, 111  
 Orientation functions, 243  
 Osmium tetroxide, 51–79  
   cleavage mechanism, 54, 55  
   cleavage reaction, 59  
   effect of pyridine, 54  
   hypersensitive sites, 71
- P**
- PCR, 157–180, 177, 182  
   quantitative (QPCR), 158, 159, 168–170,  
   177

- single-strand ligation (sslig-PCR), 158, 159, 173–176, 178
- strand specific (ss-QPCR), 158–160, 170–173, 178
- Pentamidine, 227
- Permout, 191
- Phenylenediamine, 190, 193
- Phosphorimaging, 102, 112, 136
- Photocleavage, 43–49
- Piperidine, 11, 58–60, 147, 151–153
- Plasmid DNA preparation, 7
- PolydA · polydT, 228, 261
- Polymerase chain reaction, *see* PCR
- Polymerase inhibition assay (PIA), 117–125
- Polytene chromosomes, 189, 192
- Potassium permanganate, 52, 58
- POU domains, 96
- Proflavine, 206, 253
- Propamidine, 196, 206–208
- Propidium, 261–263
- PUC polylinker, 6
- Q**
- QPCR, 158, 159, 168–170, 177
- Quadruplex, 220
- Quantitative footprinting, 23–42
  - total cut plot, 25, 32, 37
- Quantitative PCR, 158
- Quenching assays, 206, 213, 214
- Quinoxaline antibiotic, 2, 61
- R**
- Renaturation, 107
- Repeating sequence DNA, 181, 183
- Restriction enzyme digestion, 9, 149
  - inhibition, 59
  - typeIIS, 39–41
- Reverse salt titration, 203, 204, 212
- Reverse transcriptase, 9
- Rotational diffusion, 254
- RNA polymerase, 96, 102, 127–144
- RNA structure, 221
- RNA transcripts, 133
- S**
- S1 nuclease, 107
- Salt effects, 203
- Scatchard equation, 200, 211
- Secondary sites, 27
- Sequence specificity, 1, 95, 117, 127, 147–156
- Serum nucleases, 189
- Single-chain variable region, 183
- Single-hit kinetics, 1, 24, 39, 57
- Sodium dodecyl sulfate, 269
- Solid phase radio-immune assay, *see* SPRIA
- SPRIA, 181–183
  - competitive, 185, 186
  - direct, 184
- Sslig-PCR, 158–163, 173–176, 178
- Ss-QPCR, 158–160, 170–173, 178
- Stopped-flow, 269, 270
- Streptavidin-coated beads, 172
- Sulfur mustard, 96, 99
- T**
- $T_m$ ,
  - concentration dependence, 222, 223
  - determination, 237
  - ionic strength dependence, 222
  - measurement, 219–240, 233–236
  - pH dependence, 222
- Tallimustine, 147
- TANDEM, 13, 53
- Taq* polymerase, 158, 165
- Tetraplex, 220
- Thermal cleavage, 151
- Tilorone, 53
- Titration curve, 25, 27
- Total cut plot, 25, 32, 37
- Transcription,
  - assay, 131
  - bidirectional, 128, 136
  - blocked transcripts, 133
  - quantification, 135
  - separation, 133
  - footprinting, 127–145
  - termination, 128
- Transcription factor, 96
- Transcription termination assay, 59
- Triplex DNA, 18, 24, 39, 52, 53, 63, 71, 181, 189, 220
  - dissociation constant, 39, 40
- Tyr*T DNA fragment, 5
- U**
- Uranyl photocleavage, 2, 43–49
  - effect of pH, 47, 48
  - hypersensitivity, 45
  - mechanism, 43
  - minor groove width, 45
- V**
- Van't Hoff equation, 225, 230
- W**
- Weak binding sites, 30, 33, 35
- Z**
- Z-DNA, 52–54, 181, 189