

INDEX

A

Activin A 138, 140
 Adenocarcinoma 137, 156
 Algorithm 77–93, 124, 260, 268
 Alleles 70, 77, 83, 88, 90–94, 181, 248
 Ammonium bisulfite 241–243
 Anesthesia 69, 71, 72, 75,
 171, 172, 184–187, 189, 194
 Animal models 68, 109, 157–159, 163
 Antibodies 20, 43–46, 48,
 49, 51, 55–57, 61, 98, 99, 102, 104, 132, 142,
 276, 294, 302, 309, 310, 321–325, 327, 330,
 331, 351, 352, 354, 355
 Apolipoprotein B mRNA editing enzyme catalytic
 subunit 3 (APOBEC3) 97–105
 Aromatic amines 30, 31, 78, 156
 Array-CGH 4, 9, 15, 16
 Arylamines 78
 ATP 125, 152, 153,
 293, 298, 304, 305, 313, 338, 340, 344
 Automated evaluation 77, 88

B

Basal cell 61, 62, 122–124, 126
 Basal/SCC-like subtype 59, 62, 63
 BBN (N-butyl-N-(4-hydroxybutyl)-
 nitrosamine) 159–163, 180, 183, 193, 195
 BCA assay 102, 312, 324, 326, 327, 329
 Bioengineering 137, 138
 Bioinformatics 260
 Biomarker 31, 169, 177,
 202, 227–229, 239, 252–266, 268, 320, 338
 Bisulfite 240–244, 246–248
 Bladder 3, 29, 31, 44,
 67–75, 98, 123, 137, 147, 155–157, 170, 177,
 202, 252, 280, 320, 335–347
 Bladder cancer 6, 7, 29, 44,
 67, 98, 123, 137, 155–157, 170, 177, 202, 252,
 320, 335
 Bladder wall 67–69,
 71–73, 131, 178, 179, 186, 190–192, 194
 Blood 15, 21, 22, 36, 122, 138,
 145, 160, 162, 227, 239, 241, 242, 244, 246,
 262, 266, 275–278, 280–286, 321, 351
 Body fluids 228, 239

Bovine serum albumin (BSA) 33, 36,
 38, 51, 79, 82, 83, 87, 92, 104, 111, 112,
 300–302, 309, 312, 313, 352
 Bradford Assay 112
 BTA test 252, 262

C

Cancer cell 98, 99, 101,
 103, 104, 121–127, 129–132, 134, 145–147,
 258, 262, 263, 275
 Cancer stem cells 121, 122, 124,
 125, 129, 131, 134
 Cancer tissue originated spheroid (CTOS) 145–147
 Carcinogen 30, 31, 67, 78, 109,
 157, 159–163, 178–180, 193
 Carcinoma in situ (CIS) 30, 54, 156,
 157, 163, 180, 181, 251, 252
 Caspase 146, 293–295, 299,
 304, 307, 311, 313, 342
 CCND1 (Cyclin D1) 56, 59–61
 CD44 44, 124–126
 CDKN2A 11, 56, 59, 60, 62
 cDNA pre-amplification 229, 233, 236
 Cell culture 5, 9, 99, 110, 111,
 129, 132, 133, 138, 146, 263, 276, 279,
 296–300, 302, 303, 305–307, 312, 343
 Cell cycle 290, 293, 294, 299, 306, 313, 343
 Cell lines 31, 54, 98, 99,
 101, 103–105, 125–127, 129, 131, 134, 137,
 145, 146, 169, 177–179, 183, 186, 193, 263,
 292, 296, 300, 302, 303, 306, 311–313, 337,
 338, 340, 341, 343, 344, 346, 351, 356
 Chemical carcinogenesis 30, 163, 179
 Chemical carcinogens 159, 160
 Chromatography 260, 322, 325
 Chromogen 43, 46–48, 51, 55
 Chromosome 4, 9–11, 16, 19, 77, 78, 123, 262
 Chromosome alterations 3–4
 Circulating cell-free DNA (ccfDNA) 239,
 240, 246, 248
 Circulating tumor cells 351
 Cisplatin 157, 320, 342, 353, 355, 356
 Classification 44, 53–55, 57–60, 63, 254, 260
 Colony 127, 129, 132, 133,
 140, 142, 143, 293, 298, 304–306, 311, 313

Comparative genomic hybridization..... 4, 9, 15
 Computer program.....83, 88
 Counterstain.....6–8, 47, 48, 50, 51, 57, 310, 354
 Cre recombinase..... 68–70, 181
 CTCs.....257
 Cultivation..... 276, 279
 CXCL1 257, 258
 Cytidine deaminases.....97
 Cytogenetic 4, 5, 9–12, 30, 122, 124, 156, 252
 Cytokeratins 122, 124, 156

D

Dichloro-dihydro-fluorescein diacetate (DCFH)110,
 111, 113–116
 Deamination assay.....98–102
 Definitive endoderm 138, 140
 Dehydration 50
 Diagnosis 30, 146, 229, 251, 252, 259
 Diaminobenzidine (DAB) 46, 47, 50, 51
 2,4-Dinitrophenylhydrazin (DNPH) 110–115
 DNA4, 29–39, 97,
 125, 156, 179, 207, 229, 239–248, 253, 277,
 290, 345, 351
 adducts..... 156
 copy number variations 290
 isolation 21, 22, 36, 280, 281
 methylation.....29, 239, 290
 Drug sensitivity 146, 147
 Drug testing 173

E

E-cadherin61, 147, 156
 Electrophoresis 79, 80, 85–88,
 100, 103, 215, 323, 325, 329
 Embryonic stem cells..... 138
 Enzyme-linked immunosorbent assay (ELISA)111,
 258–260, 263, 264, 322–324, 326, 328, 329
 Epidermal growth factor receptor (EGFR)..... 46, 62,
 181, 263, 319, 320
 Epigenetic.....30, 31, 109, 239, 240, 289–314
 Epithelial cell adhesion molecule
 (EpcAM).....263, 266, 268, 356
 Erb-B2 receptor tyrosine kinase 2
 (ERBB2)56, 59, 60, 62, 319, 320
 Erb-B2 receptor tyrosine kinase 3 (ErbB3) 319–332
 Everolimus..... 289, 338
 Exosomes..... 202–204, 206,
 209–212, 214, 221–223, 229, 240

F

FANFT (N-[4-(5-nitro-2-furyl)-2-thiazolyl]-
 formamide) 159, 160
 Fast red47, 51

Fibroblast growth factor receptor 3(FGFR3)19–21,
 23–25, 56, 59, 60, 62, 156, 252, 337
 Fibroblasts44, 62, 124, 127, 131, 138, 156, 296
 Flow cytometry (FACS) 124, 125, 130, 132, 133,
 140–142, 293, 299, 304, 306, 307
 Fluorescence in situ hybridization (FISH)3, 4,
 13, 15, 252, 253
 Formalin fixed paraffin embedded (FFPE).....4, 8,
 14–17, 21, 22, 24, 43, 44, 55, 56
 Fresh biopsies 3

G

Gene expression30, 61, 124,
 126, 169, 173, 220, 229, 230, 233, 234, 236,
 260, 275, 277, 290
 Genetic manipulation.....31, 338, 343, 345
 Genomically unstable subtype 54, 57–60
 Genotyping.....77, 131, 156, 174
 I grade (tumor)..... 16, 19, 29, 53,
 58, 73, 135, 161, 168, 170, 180, 202, 251, 253,
 258, 265–267, 317

H

Hamsters..... 69, 71, 75, 159
 Haplotype77, 78, 88–91, 93, 94, 98
 Hematuria..... 11, 21, 180, 193, 252, 254, 262
 Histone290, 292,
 293, 295, 300, 301, 303, 304, 308, 309, 312, 313
 Histone deacetylases290

I

Imaging..... 102, 104, 127,
 131, 179, 182, 183, 185, 187, 188, 191, 194,
 251, 265
 Immunocytochemistry..... 140–142
 Immunofluorescence 45, 293,
 295–297, 303, 304, 343
 Immunohistochemistry (IHC).....43–53, 55,
 57, 98, 174
 In vitro 98, 100, 102,
 137–143, 145, 146, 276, 341
 In vivo 129, 132, 133,
 157, 158, 160, 171, 173, 177, 180, 182
 Induced pluripotent stem cells..... 138
 Injection 67, 177, 179,
 183, 185, 186, 191, 192, 194, 217
 Intramural injection 177, 190, 191
 Intravesical instillation 161, 177, 178
 iTRAQ 258

K

Keratin46, 58, 62
 Ki67 44

L

Lactate dehydrogenase (LDH) 293, 300,
302–304, 307, 308, 312
Liquid biopsy 228
Luciferase 131, 179, 183, 188
Luminescence 179, 194, 293,
298–300, 305, 307, 311, 346

M

3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium
bromide (MTT) 298
Magnetic beads 37, 240–246
Mass spectrometry (MS) 258, 260, 343
Matrigel 131–133, 148, 149, 153,
171, 172, 182, 188, 191
Matrix metalloproteinase (MMP) 263, 265,
266, 268
Matrix 17, 148, 171, 208,
214, 262, 263, 265, 266
MBD 31, 32, 36, 38
Medium 4, 9, 10, 33, 34, 36,
47, 50, 55, 57, 99, 104, 111, 130–134, 138–143,
148–150, 152, 170–172, 174, 182, 183, 185,
276, 279, 281, 296–300, 302–308, 310, 311,
313, 353, 357
Mesenchymal-like subtype 59, 60, 296
Metastases 157, 262, 266, 320
Methylated CpG Island Recovery Assay
(MIRA) 31–38
Methyl-binding domain proteins 31, 32
Methylcytosine 240
Microplate reader 111, 112, 298,
300, 301, 305, 307–309
MicroRNAs 201–224
Microvesicles 222, 240
Molecular subtype 53–64, 263
Monoclonal antibodies 20, 43, 320, 351, 352
Mounting 47, 50, 55, 57,
302, 310, 314, 352, 354, 357
Mouse 68–74, 99,
104, 123, 124, 127, 131, 133, 134, 138, 141,
155–163, 171–174, 177–194, 302, 310, 351
mTOR 289, 335
Muscle-invasive bladder cancer (MIBC) 19, 123–126,
252, 262, 263, 266, 268, 320
Mutation analyses 21, 23–27, 174
Mutation 19–27, 30, 88, 92,
95, 98, 105, 109, 121, 123, 124, 156, 158,
160, 170, 174, 252, 275, 290, 336, 338,
340–343, 347
N-methyl-N-nitrosourea (MNU) 159, 160

N

N-Acetyltransferase 2 (NAT2) 77
Necrosis 19, 21, 194, 239, 252,
259, 262, 263, 265, 268, 293, 300, 302, 304,
307, 320
Non-muscle invasive bladder cancer
(NMIBC) 123, 125, 126
NMP22 252, 253, 262–264, 268

O

Orthotopic tumor models 177
Oxidative stress 109–116

P

p53 (TP53) 54, 68–70, 72, 156–158, 180, 181
p63 (TP63) 56, 57, 59, 63, 122, 123, 146, 147
Patient-derived xenograft (PDX) 146, 169,
170, 178
P-cadherin 59–61
PCR 34, 98, 204, 227, 240, 294
Peroxidase 43, 45, 48, 49, 51, 325
Phenotype 54, 58–60, 125, 180, 293, 296, 345
Phosphorylation 335, 338,
339, 341, 342, 344
Phosphatidylinositol-4,5-bisphosphate
3-kinase (PI3K) 335
PI3K/AKT pathway 335
PIK3CA 19, 20, 25, 26, 336, 338, 340
Plasma 61, 62, 227, 239, 241,
242, 244, 246, 248, 265, 321, 325
Polymer 43, 45, 46, 48, 49, 240
Primary cell culture 145
Prognosis 3, 29, 126, 156, 157,
202, 229, 265, 266, 275
Prostate cancer 228, 275, 281, 282
Protein carbonyls 109
Phosphatase and tensin homolog
(PTEN) 157, 181, 335, 336, 338, 340, 341

Q

Quality control 234, 235
Quantitative image analysis 351
Quantitative PCR 205, 218, 230, 234–236, 260

R

RAS (*H-RAS*, *KRAS*, *NRAS*) 20, 25,
180, 181, 337, 338, 340
RB1 56, 57, 59, 62, 156, 157, 180, 181
Real time PCR 31, 38, 205, 221, 227
Renal 160, 170, 178, 227, 337

Restriction enzyme..... 78, 79, 81–83,
85–87, 92, 93, 95, 98–101, 103, 105
Reverse transcription..... 97, 202, 203,
205, 207, 209, 212, 216, 218, 220, 229, 232, 236
RIPA buffer 111, 112, 115
RNA..... 97, 201, 227, 253, 277, 292, 336
RNA isolation..... 203, 204, 206,
207, 209–212, 221, 223, 231, 236, 294
ROS 109–111, 113–116

S

S-adenosylmethionine 110
Schistosoma haematobium..... 67, 69, 71, 73–75, 156
Schistosomiasis 67
SDS-PAGE 36, 99, 102, 105, 312, 314
Serum..... 4, 33, 45, 51, 79,
82, 83, 92, 99, 111, 115, 139, 142, 146, 148,
182, 183, 239, 241, 242, 246, 265, 276, 296,
297, 300, 302, 303, 312, 321–326, 329
Short hairpin RNA (shRNA)..... 338–340,
343, 345, 347
Side population 125
Single cell analysis 351
Single nucleotide polymorphism
(SNP) 77, 78, 88, 89, 91
Small interfering RNA (siRNA) 104, 291–293,
297, 298, 303–305, 343, 345
Small-cell/neuroendocrine-like subtype..... 59
SOX..... 125, 126
Spectrophotometer 24, 38, 211, 212,
232, 324, 326, 328
Spheroid..... 145–153
Squamous cell carcinoma (SCC)..... 156
2 stage (tumor) 3, 19, 31, 40, 63, 64, 66, 73,
132, 174, 183, 184, 203, 258, 262, 265, 266, 274
STAT 125, 342

T

TaqMan 205, 216, 218–220,
229, 230, 233, 234, 236, 237, 277
Targeted therapies..... 20, 44, 170, 289
Telomere 19
TERT 19–21, 25, 26, 296, 297

Tissue microarray (TMA) 53–55
Tobacco smoke 30, 78
Transfection 99, 101, 104, 183, 297,
298, 303, 305, 343, 347
Transgenic 67–69, 72, 180, 181, 266
Transplant 131, 138, 158, 172, 173, 178
Tumor cell inoculation 177
Tumor graft 174

U

Ultrasound..... 179, 180, 182, 183, 187–194
Umbrella cell 44, 122, 123, 126, 320
Urine..... 3, 30, 31, 36, 122, 138,
146, 160, 184, 201, 227–237, 239, 252, 265, 325
Uroplakins 46, 63, 69,
122, 123, 138, 141, 143, 180
Urothelial bladder cancer 97
Urothelial cancer 44, 54, 109,
125, 126, 145–147, 177–194
Urothelial carcinoma 3, 19, 53,
97, 121–134, 156, 180, 229, 251–268, 289, 296,
320, 351
Urothelial carcinoma cells of origin 121
Urothelial carcinoma stem cell markers 121
Urothelial regeneration 124, 126
Urothelium 30, 63, 68, 70, 72,
122–124, 126, 137, 147, 160, 162, 163, 178,
180, 181, 320
Urothelium stem cells 121
UroVysion test 3, 4, 6–8, 11–15, 252, 253

V

Validation 55, 58–63, 98, 256,
259, 260, 266, 293, 343

W

Western blot 260, 264, 266,
292–295, 322, 323, 325–327, 332

X

Xenograft . 126, 158, 169–174, 177–179, 181–188, 192