

Index

A

- Acute leukemia (AL)
 - acute myeloid leukemia, 35–39
 - B-acute lymphoblastic leukemia, 25–27
 - blastic plasmacytoid dendritic cell tumor, 41
 - clinical features, 22
 - diagnosis, 22–23
 - Down syndrome, 40–41
 - evaluation of (*see* Pediatric acute leukemia, evaluation)
 - genetic abnormalities, 25–27
 - hereditary disorders with predisposition, 41–42
 - immunophenotype, 23–24
 - morphology, 23, 24
 - numerical chromosomal aberrations, 28
 - precursor T-cell leukemia/lymphoma, 34–35
 - prognosis, 25
 - risk-stratification, 22
 - structural aberrations
 - t(4;11)(q21;q23)/AFF1/MLL (AF4/MLL), 31, 32
 - t(9;22)(q34;q11)/BCR-ABL1 translocation/Philadelphia chromosome, 28–31
 - t(12;21)(q21;q22)/ETV6-RUNX1 (TEL/AML1), 33
 - t(8;14)(q24;q32)/MYC-IGH, 33–34
 - t(1;19)(q23;p13)/TCF3-PBX1 (E2/PBX1), 32–33
 - therapy-related myeloid neoplasms (t-MN), 40
- Acute lymphoblastic leukemia (ALL), 21, 22. *See also* Acute leukemia (AL)
- Down syndrome, 92
- GWAS, 13
 - vs.* lymphoblastic lymphomas, 112
 - microarray profiling, 63–66
 - T cell leukemia, 62
 - with triple trisomies, 29
- Acute megakaryoblastic leukemia (AMkL), 36, 40, 41, 89
- Acute myeloid leukemia (AML), 84
 - Down syndrome, 89–92
 - genetic aberrations, 35–39
- Acute promyelocytic leukemia (APL), 24
- Adenomatous polyposis coli (*APC*) gene mutation, 202, 247
- Affymetrix assay, 11
- Aggressive NK-cell leukemia, 113
- AL. *See* Acute leukemia (AL)
- ALCL. *See* Anaplastic large cell lymphoma (ALCL)
- ALL. *See* Acute lymphoblastic leukemia (ALL)
- Alveolar rhabdomyosarcoma, 183–185
- Anaplastic large cell lymphoma (ALCL), 108–111
 - anaplastic lymphoma kinase (ALK) translocation
 - diffuse cytoplasmic and nuclear staining, 110
 - FISH, 111
 - diagnosis, 111–112
 - hallmark cells, 109
 - immunohistochemistry, CD30 positive cells, 110
 - sinusoidal growth pattern, 109
- Anaplastic/large cell medulloblastomas, 127, 131
- Anaplastic lymphoma kinase (ALK), 109, 110, 174
 - gene rearrangement, inflammatory myofibroblastic tumor, 211–213

- Apoptosis mechanism abnormalities,
 in osteosarcoma
 bax and cytochrome C, 150
 livin and survivin, 150
- Array comparative genomic hybridization
 (aCGH), 8, 88
- Astrocytomas
 description, 132
 infiltrating astrocytomas, 135–137
 pilocytic astrocytomas, 134–135
 preexisting neurons, entrapment of, 133
 Rosenthal fibers, 132
 WHO classification, 132
- B**
- Bacterial artificial chromosomes (BACs), 4
- B-acute lymphoblastic leukemia (B-ALL),
 25–27
- BARD1* gene, 13
- Bax protein, 150
- Beckwith–Wiedemann syndrome (BWS),
 226, 228
- Bednar tumor, 206, 207
- Billings, S.D., 207
- BL. *See* Burkitt lymphoma (BL)
- Blastic plasmacytoid dendritic cell tumor
 (BPDCN), 41
- Bloom syndrome, 86
- Bone marrow failure syndromes, MDS/AML,
 84
- Bone tumor
 cartilage tumors
 chondroblastoma, 157–158
 chondromyxoid fibroma, 160–161
 mesenchymal chondrosarcoma,
 162–163
 osteochondroma, 154–156
 subungual exostosis, 158–159
 incidence, 141
 osteogenic tumors
 osteblastoma, 144–145
 osteoid osteoma, 142–145
 osteosarcoma, 145–148
- Boveri, T., 2, 16
- BRAF, 134, 135
- Breakpoint cluster region gene (*BCR*) gene,
 3, 28
- Burkitt lymphoma (BL)
 vs. diffuse large B-cell lymphoma,
 102–104
 EBER, in-situ hybridization, 105, 113
 epidemiologic variants, 102
 FISH, 103, 111
- IGH* gene, 103
- immunohistochemistry, 105, 110
- morphological and immunophenotypic
 features, 106
- MYC* translocation, 103
- touch imprint (Giemsa), 104
- C**
- Cadherin-associated protein beta (CTNNB1),
 230
- cAMP-responsive element-binding protein 3-like
 protein 2 (*CREB3L2*) gene, 209
- Cancer stem cell (CSC) and hepatoblastoma,
 251–252
- Cario, S., 247, 251
- Cartilage tumors
 chondroblastoma
 carbonic anhydrase-related protein X
 (CA-RP X), 158
 chicken-wire calcification, 157
 clinicopathological characteristics, 157
 molecular pathology, 158
 proliferating-cell nuclear antigen
 (PCNA), 158
 steroid 5- α -reductase 1 (*SRD5A1*),
 158
- chondromyxoid fibroma
 clinicopathological characteristics,
 160–161
 molecular pathology, 161
- mesenchymal chondrosarcoma
 clinicopathological characteristics,
 162–163
 molecular pathology, 163
 small blue round cell tumors, 162
- osteochondroma
 chondrosarcomas, 155
 clinicopathological characteristics,
 154–157
 contiguous gene-deletion syndrome,
 155–156
 exophytic growth and hypocellular
 cartilaginous cap, 155
 exostosis, 156
 molecular pathology, 156
 near-haploidy, 156
 sporadic solitary osteochondromas, 156
- subungual exostosis
 clinicopathological characteristics,
 158–159
 fibrocartilaginous areas, 159
 molecular pathology, 160
 t(X;6), 160

- β -Catenin
 Gardner fibroma, mutations, 202
 mutations, 247, 248
 nuclear expression, in desmoid-type fibromatosis, 203, 204
- Cell cycle regulation abnormalities, in osteosarcoma, 148
- Central nervous system (CNS) tumors
 astrocytomas, 132–137 (*see also* Astrocytomas)
 issues, 126
 medulloblastomas, 126–132 (*see also* Medulloblastomas)
- Childhood lymphoma. *See* Lymphoma
- Chondroblastoma, 157–158
- Chondromyxoid fibroma, 160–161
- Chronic myelogenous leukemia (CML), 75, 81
- Classical Hodgkin lymphoma (cHL), 108
- Clear cell sarcoma of kidney (CCSK), 223, 225, 234, 238
- CML. *See* Chronic myelogenous leukemia (CML)
- c-Myc abnormalities, in osteosarcoma, 151
- Coffin, C.M., 201, 210
- COL12A1* gene, 160, 161
- Colony forming units-granulocytic, monocytic (CFU-GM), hematopoietic growth factor dose-response curves for, 77
- Comparative genomic hybridization (CGH), 7–9, 57–59, 87–89
- Congenital fibrosarcoma, 199, 200
- Congenital mesoblastic nephroma (CMN), 223, 225, 237–239
- Conventional G-banded karyotyping, 53–55
- Crick, F., 6
- Cyclin-dependent kinase inhibitor 2A (*CDKN2A*), 149
- Cytochrome c protein, 150
- D**
- DEFECT-11 (Potocki-Shaffer) syndrome, 156
- Dermatofibrosarcoma protuberans (DFSP), 205–207
- Desmoid-type fibromatosis
 β -catenin nuclear expression, 203, 204
 histologic features, 202, 203
 matrix metalloproteinase-7 (MMP-7), 204
- Desmoplastic small round cell tumor (DSRCT), 238
 epidermal growth factor receptor (EGFR), 182
 equilibrative nucleoside transporter 4 gene (ENT4), 182
EWS-related translocation, 181–182
 histological features, 180
 immunohistochemistry, 180–181
 platelet derived growth factor alpha (PDGFA), 182
 translocation, 181–182
 WT1 nuclear expression, 181
- Diffuse large B-cell lymphoma (DLBCL), 9, 104–107
- Down syndrome (DS)
 acute leukemia, 40–41
 transient myeloproliferation and acute leukemia, 89–92
- DSRCT. *See* Desmoplastic small round cell tumor (DSRCT)
- E**
- Eggert, A., 175
- Embryonal rhabdomyosarcoma, 183
- Enzinger, F.M., 183
- Ephithelial growth factor 2 (ErbB2) abnormalities, in osteosarcoma, 152
- Epigenomics, 14
- Epstein-Barr virus (EBV), 114
- E26 transformation-specific (*ETS*) gene, 178–179
- Evans, W., 13
- Ewing sarcoma
 alternative translocations, 178–179
 CD99 immunostaining, 176, 177
 cytogenetic abnormalities, 179
 FISH analysis, 176
 Fli-1 immunostaining, 177
 pathological diagnosis, 176
- Ewing sarcoma breakpoint region 1 (*EWSR1*) gene, 178
- Exostosis. *See* Osteochondroma
- Extranodal NK/T cell lymphoma, nasal type, 113
- F**
- Fanconi anemia, 83, 86, 87
- Fernandez Navarro, J.M., 227
- FLT3* mutations, acute myeloid leukemia, 35–36
- Fluorescence in situ hybridization (FISH)
 for anaplastic lymphoma kinase (*ALK*) gene, 109, 212
 Burkitt lymphoma, 102–104
 centromeric probes, 56, 57
 vs. conventional cytogenetics, 56
 dual-color dual-fusion probe, 56, 57

- Fluorescence in situ hybridization (FISH) (*cont.*)
 Ewing sarcoma/PNET, 176, 178
 genome-wide analyses, 6–7
 limitations, 57
 locus-specific probes, 56, 57
 myelodysplasia, 85, 86
- Follicular and marginal zone lymphomas, 114
- Folpe, A.L., 207
- Fos/Jun abnormalities, in osteosarcoma,
 151–152
- FOXO1* gene, 184, 186
- French–American–British (FAB) classification
 of acute leukemia, 23, 24
- Fused in sarcoma (*FUS*) gene, 209
- G**
- Gall, J.G., 6
- Gardner fibroma, 201–202
- Gardner syndrome, 201
- GATA1* mutations, 40, 91, 92
- G-banded karyotyping, pediatric acute
 leukemia evaluation, 53–54
- GBMs, 135, 136
- Gene expression profiling (GEP), 9
- Genome wide association studies (GWAS), 11
- Genome-wide strategies
 cytogenetics, 7
 fluorescence in-situ hybridization (FISH), 6
 genomics, 1
 karyotyping, 5–6
 limitations, 15
 microarray technologies
 comparative genomic hybridization, 7–9
 epigenomics, 14
 expression profiling, 9–10
 hybridization, 7
 microRNAs, 14
 proteomics, 15
 SNP arrays, 11
 molecular diagnostics, 3
 post-genome era, 1
 pre-genome era, history of
 chromosomal abnormality, 2
 daughter cells, chromosome
 distribution, 2
 hereditary and sporadic forms, in
 retinoblastoma, 3
 mutations, 2, 3
 risk-adapted therapy, 4
 translocation, BCR-ABL tyrosine
 kinase, 3
- Gerald, W.L., 179
- Giant cell fibroblastoma, 205–207
- Glioblastomas, 135, 136
- Gorlin's syndrome, 129
- Grosveld, G., 3
- GWAS. *See* Genome wide association studies
 (GWAS)
- H**
- HapMap project, 5
- Hartmann, W., 249
- Hattinger, C.M., 179
- Heat shock proteins (HSP), in osteosarcoma, 154
- Hedgehog signaling pathway, hepatoblastoma,
 250
- Hepatoblastoma, biology of
 and cancer stem cell (CSC), 251–252
 cell of origin, 252
 chromosomal abnormalities, 244
 pathology and genetics, 243–244
 profiling, 250–251
 prognosis, 244
 signaling pathways
 embryonal tumors, 244
 genes, epigenetic abnormalities and
 micro RNAs, 245–246
 hepatocyte growth factor/cMET
 signaling, 249
 IGF signaling pathway (IGF/PI3K/
 AKT pathway), 248–249
 Notch, 250
 PI3K/AKT pathway, 249
 Sonic Hedgehog, 250
 Wnt pathway, 247–248
 therapy, 243, 244
- Hepatocellular carcinoma (HCC), 251, 252
- Hepatocyte growth factor/cMET signaling,
 hepatoblastoma, 249
- Hepatosplenic gamma-delta T-cell lymphoma,
 113
- High-grade gliomas (HGG), 132
- High hyperdiploidy (HeH) cells, 28
- HIPK2, pilocytic astrocytomas, 135
- Hodgkin lymphoma (HL)
 classical (cHL), 114
 diagnosis, 115–117
 nodular lymphocyte predominant HL
 (NLPHL), 114–115
 Reed–Sternberg cells, 116
 types of, 114
- Honda, S., 249
- Human Genome Project, 4, 5
- Hungerford, D., 2
- Hyalinizing spindle cell tumor with giant
 rosettes (HSTGR), 207, 208

I

- IDH mutations, infiltrating astrocytomas, 136
- Imatinib, 3
- Immunodeficiency associated
 - lymphoproliferative disorders, 102
- Immunoglobulin heavy chain gene (*IGH*)
 - gene, 103
 - rearrangement, 62–63
- Immunohistochemistry
 - anaplastic large cell lymphoma, CD30
 - positive cells, 108–109
 - Burkitt lymphoma, 102–104
- Immunophenotype, acute leukemia,
 - 23–24
- Infantile/congenital fibrosarcoma,
 - 199–201
- Infiltrating astrocytomas
 - glioblastomas, 135, 136
 - IDH mutations, 136
 - MGMT, 136
 - molecular alterations, comparison of, 136
 - PDGFRA, 135
- Inflammatory myofibroblastic tumor (IMT)
 - anaplastic lymphoma kinase (*ALK*) gene
 - rearrangement, 211–213
 - with extensive stromal hyalinization,
 - 210
 - histologic subtypes, 209–210
 - karyotype, chromosome 2 inversion,
 - 211
- Insulin-like growth factor (IGF) signaling
 - pathway (IGF/PI3K/AKT pathway),
 - hepatoblastoma, 248–249
- International System for Human Cytogenetics
 - Nomenclature (ISCN), 54

J

- Janoueix-Lerosey, I., 173
- Juvenile myelomonocytic leukemia (JMML)
 - diagnosis of
 - criteria for, 79
 - culture assays, 80
 - molecular analyses, 80
 - peripheral blood and BM morphology,
 - 79–80
 - molecular pathogenesis
 - CFU-GM, hematopoietic growth factor
 - dose-response curves for, 77
 - genetic pathways in, 78
 - neurofibromatosis type 1 (NF1), 76
 - Noonan syndrome, 76, 77
 - RAS signaling pathway, 76
- Juvenile pilocytic astrocytomas (JPAs), 9

K

- Karyogram
 - hyperdiploidy, t(1;22)(p13;q13)/RBM15/
 - MKL1 translocation, 36
 - partial, acute leukemia, 24
 - of peripheral blood lymphocyte, 91
 - t(4;11)(q21;q23), 32
- Karyotyping, 5–6
 - ALK* gene, 211
- Kidney tumors. *See* Renal tumors
- Knudson, A., 3, 16

L

- Langer-Giedion syndrome, 155
- LBL. *See* Lymphoblastic lymphomas (LBL)
- Liver tumors. *See* Hepatoblastoma, biology of
- Loss of heterozygosity (LOH), 87, 90
- Low-grade astrocytomas (LGA), 132
- Low-grade fibromyxoid sarcoma (LGFMS)
 - cAMP-responsive element-binding protein
 - 3-like protein 2 (*CREB3L2*) gene,
 - 209
 - chromosomes 7 and 16, rearrangement
 - t(7;16)(q33;p11.2), 208, 209
 - cytology, 208
 - fused in sarcoma (*FUS*) gene, 209
 - hyalinizing spindle cell tumor with giant
 - rosettes (HSTGR), 207, 208
- Low-grade gliomas (LGG), 132
- Luo, J.H., 250, 252
- Lymphoblastic lymphomas (LBL), 112
- Lymphoma
 - aggressive NK-cell leukemia, 113
 - anaplastic large cell lymphoma, 108–112
 - array-based technologies, 118
 - Burkitt lymphoma, 102–104
 - diffuse large B-cell lymphoma, 104–107
 - extranodal NK/T cell lymphoma, nasal
 - type, 113
 - follicular and marginal zone lymphomas,
 - 114
 - hepatosplenic gamma-delta T-cell
 - lymphoma, 113
 - Hodgkin lymphoma, 114–117
 - lymphoblastic lymphomas (LBL), 112
 - lymphoproliferative disorders, 113–114
 - molecular diagnostic techniques
 - pitfalls of, 117–118
 - role of, 117
 - non-Hodgkin lymphoma, 101–102
 - primary mediastinal B-cell lymphoma,
 - 107–108
- Lymphoproliferative disorders (LPD), 113–114

M

- Makishima, H., 87
 Maris, J., 13
 Matono, H., 204
 Matrilin-2 expression, 135
 Matrix metalloproteinase-7 (MMP-7),
 desmoid-type fibromatosis, 204
 MDS. *See* Myelodysplasia (MDS)
 Medulloblastomas, 126–132
 chromosome 17, 130, 131
 heterogeneity, 127–130
 anaplastic/large cell medulloblastomas,
 127, 131
 development, 128
 with extensive nodularity, 127
 familial syndromes, 129
 histology, 128–129
 lower rhombic lip (LRL), 128
 molecular alterations, 129
 molecular features, 129–130
 high risk disease, criteria of, 126
 implications, patient management, 131
 metastatic stages, 126
 MYC/MYCN amplification, 130, 131
 PNETs, central and peripheral, 132
 Sonic Hedgehog pathway, 130
 subgroups of, 130–131
 upper rhombic lip (URL), 128
 Merlin, 149
 Mesenchymal chondrosarcoma, 162–163
 Mesenchymal epithelial transition factor
 (MET) abnormalities, in
 osteosarcoma, 152
 Metaphase G-banded karyotyping,
 myelodysplasia, 86
 O6-Methylguanine-DNA methyltransferase
 (MGMT), 136
 Microarray
 genome-wide analyses
 comparative genomic hybridization
 (CGH), 7
 epigenomics, 14
 expression profiling, 9–10
 microRNAs, 14
 proteomics, 15
 SNP arrays, 11
 profiling
 CGH, 63
 for leukemias classification, 65–66
 SNP, 63–64
 tumor suppressor genes, 63
 Microarray innovations in leukemia (MILE
 study), 65–66
 MicroRNAs, 14
 Minimal residual disease (MRD) detection,
 61–62
 Mixed phenotype acute leukemia (MPAL), 23,
 24
MLL gene, 31
 Muller, H.J., 2, 16
 Multiplex FISH (M-FISH), 56
 Murine Double Minute 2 (*MDM2*) gene, 149
MYC translocation, Burkitt lymphoma, 102, 103
 Myelodysplasia (MDS)
 in adult, 75
 apoptosis, 83
 bone marrow failure syndromes, with
 predisposition, 84
 chronic myelogenous leukemia, 75
 cytogenetic abnormalities, 83, 85
 definitions of, 81
 diagnosis of, 82–83
 genetic testing
 comparative genomic hybridization and
 SNP arrays, 87–90
 fluorescent in situ hybridization, 86–87
 metaphase G-banded karyotyping, 86
 megakaryocytic dyspoiesis, 83
 ringed sideroblasts, 82, 83
 uniparental disomy, 87
 Myelodysplastic syndromes. *See* Juvenile
 myelomonocytic leukemia (JMML)
- N**
 Nagata, T., 250
 National Wilms Tumor Study Group (NWTS),
 231–233
 Neuroblastoma
 ALK gene, 174
 CD44 expression, 171
 differentiation, 170–171
 DNA ploidy tumor classification, 172
 ganglionic cell differentiation, 171
 gene amplifications, 172–174
 GWAS, 13
 histological features, 170
 NMYC amplification, 171–172
 prognosis, 173
 tyrosine kinase receptors, 175
 Neurofibromatosis type 1 (NF1), 76
 Neurofibromin 2 (*NF2*) gene, 149
 NHL. *See* Non-Hodgkin lymphoma (NHL)
 Nodular desmoplastic medulloblastomas, 130
 Nodular lymphocyte predominant HL
 (NLPHL), 114

Non-Hodgkin lymphoma (NHL), 101–102
 Noonan syndrome, 76, 77
 Notch signaling, hepatoblastoma, 250
 Nowell, P., 2, 6
 Nucleophosmin (*NPM1*) mutations, acute myeloid leukemia, 35–36

O

Ohgaki, H., 136
 Ordonez, N.G., 180
 Osteoblastoma, 144–145
 Osteochondroma, 154–156
 Osteogenic tumors
 osteoblastoma
 clinicopathological characteristics, 144–145
 molecular pathology, 145
 nidus, 142, 143
 osteoid osteoma
 chromosomal abnormalities, 143
 clinicopathological characteristics, 142–143
 molecular pathology, 143–144
 nidus, 142
 YWHAB and PDGF- β genes, 144
 osteosarcoma
 histologic classification, 145–147
 molecular pathology, 148
 Osteoid osteoma, 142–145
 Osteosarcoma, 145–148
 cell cycle regulation abnormalities
 apoptosis mechanisms, 150
 RB1 pathway, 149–150
 SKP2, 151
 TP53 pathway, 148–149
 trastuzumab, 152
 URG4, 151
 chemotherapy resistance
 heat shock proteins (HSP), 154
 permeability glycoprotein (P-gp), 153
 histologic classification
 central (medullary) and surface (peripheral), 146
 chondroblastic, 147
 osteoblastic, 146
 telangiectatic, 147
 proto-oncogene abnormalities, 151–152
 telomere repair mechanisms, 153
 tyrosine-kinase receptor abnormalities, 152
 Wnt/ β -catenin signaling pathway abnormalities, 153

P

Pardue, M.L., 6
 Pediatric acute leukemia, evaluation
 clonal rearrangements, of IGH and TCR, 62–63
 comparative genomic hybridization, 57–59
 conventional G-banded karyotyping, 53–55
 fluorescent in-situ hybridization, 54–57
 microarray profiling, 63–66
 MRD detection, 61–62
 next generation sequencing, 66
 pharmacogenomics, 66
 polymerase chain reaction, 59–60
 rt-PCR assays, 61
 Permeability glycoprotein (P-gp), in osteosarcoma, 153
 Pharmacogenomics, for acute leukemia evaluation, 66
 Philadelphia chromosome, 2, 28–31
 Phosphatidylinositol-3'-kinase (PI3K)/AKT pathway, hepatoblastoma, 249
 Pilocytic astrocytomas
 BRAF, 134, 135
 expansile compressive growth, 133
 HIPK2, 135
 MAPK pathway, activation of, 134
 Matrillin-2 expression, 135
 PMBCL. *See* Primary mediastinal B-cell lymphoma (PMBCL)
 Polymerase chain reaction (PCR), for chromosomal translocations diagnosis, 59–61
 Primary mediastinal B-cell lymphoma (PMBCL)
 vs. classical Hodgkin lymphoma, 107–108
 IGH gene clonality assay, 108
 morphological and immunophenotypic features, 106
 Primary renal synovial sarcomas (PRSS), 237–238
 Primitive neuroectodermal tumors (PNETs), 175–179, 238
 medulloblastomas, 132
 Proteomics, 15
 Proto-oncogene abnormalities, in osteosarcoma
 c-Myc, 151
 Fos/Jun, 151–152
 MET, 152
PTPN11 gene, 77, 80

R

- RAS signaling pathway, juvenile myelomonocytic leukemia, 76
 Reed–Sternberg cells, 116
 Refractory anemia with excess blasts (RAEB), 82
 Refractory cytopenia, 82
 Relling, M., 13
 Renal cell carcinoma (RCC), 233–234
 Renal tumors
 in children and adolescents, 224
 clear cell sarcoma of kidney (CCSK), 234–236
 congenital mesoblastic nephroma (CMN), 237
 desmoplastic small round cell tumor (DSRCTs), 238
 diagnostic challenge, 223
 fusion transcripts, 236
 incidence, 223
 primitive neuroectodermal tumors (PNET), 238
 renal cell carcinoma (RCC)
 histologic subtype and age group, 224
 syndrome-associated, 234
 translocation-associated, 234
 rhabdoid tumor of kidney (RTK), 236
 synovial sarcoma, 237–238
 Wilms tumor, 225–233
 Retinoblastoma (RB1) pathway abnormalities, in osteosarcoma, 149–150
 Rhabdoid tumor of kidney (RTK), 223, 225, 236, 238
 Rhabdomyosarcoma
 alveolar
 balanced translocations, 184–185
 histologic criteria, 184
 molecular alterations, 185
 PAX3 and *PAX7*, 184–185
 CDK4 protein, 187
 diagnosis, 186–187
 embryonal, 185
 PAX3/FOXO1 fusions, 186–187
 prognosis, 187–188
 therapeutic features, 188
 Rosai, J., 179
 Rosenthal fibers, astrocytomas, 132
 Rowley, J., 2, 16

S

- Sellheyer, K., 206
 Shing, D.C., 179
 Shiraki, M., 183

- Single nucleotide polymorphism (SNP) arrays, 87–90
 genome-wide association study (GWAS), 11
 pharmacogenomics, 13
 for chromosomal aberrations diagnosis, 63, 64
 tag SNPs, 5
 Small round blue cell tumors
 desmoplastic small round cell tumor, 179–182
 Ewing sarcoma/primitive neuroectodermal tumor, 175–179
 nested/lobular pattern, 170
 neuroblastoma, 170–175
 rhabdomyosarcoma, 183–188
 Societe Internationale D'oncologie Pediatrique (SIOP), 231–233
 Soft tissue tumors
 dermatofibrosarcoma protuberans (DFSP), 205–207
 desmoid-type fibromatosis, 202–204
 Gardner fibroma, 201–202
 giant cell fibroblastoma, 205–207
 infantile/congenital fibrosarcoma, 99–201
 inflammatory myofibroblastic tumor (IMT), 209–213
 low-grade fibromyxoid sarcoma (LGFMS), 207–209
 Sonic Hedgehog pathway, 130
 hepatoblastoma, 250
 Spectral karyotyping (SKY), 56, 58
 S-phase kinase-associated protein 2 (SKP2) abnormalities, in osteosarcoma, 151
 Subungual exostosis, 158–159
 Synovial sarcoma (SS), 225, 237–238

T

- T-cell acute lymphoblastic leukemia (T-ALL), 34, 35
 T cell receptor (TCR) gene rearrangement, 62–63
 Therapy-related myeloid neoplasms (t-MN), 40
 Tomizawa, M., 249
 Transient myeloproliferative disorder (TMD), Down syndrome, 89–92
 Trisomies, ALL, 29
 Trisomy 21, 91, 92
 Tumor protein p53 gene (TP53) abnormalities, in osteosarcoma, 148–150
 Tyrosine-kinase receptor (Trk), 175
 abnormalities, in osteosarcoma, 152

U

- Uniparental disomy (UPD),
87, 90
- Up-regulated gene 4 (*URG4*) abnormalities,
in osteosarcoma, 151

V

- van Doorninck, A.J., 178

W

- WAGR syndrome, 229
- Watson, J., 4, 6
- Webb, T.R., 174
- Wehrli, B.M., 201
- Williamson, 186
- Wilms tumor (WT)
 - clinical presentation, 225
 - histology
 - blastemal cells, 226
 - cystic, 226
 - focal/diffuse anaplasia, 226
 - monophasic tumors, 225
 - nephrogenic rests, 226
 - molecular studies, 225
 - recurrent genetic abnormalities
 - abdominal ultrasound, recommendation
for, 229–230

- Beckwith–Wiedemann syndrome
(BWS), 226
- CTNNB1, 230
- family with sequence similarity 123B
(FAM123B), WTX, 230
- genitourinary anomalies, 229
- isolated hemihypertrophy, 228
- non-overgrowth syndromes/ anomalies,
229
- overgrowth syndromes/ anomalies, 226
- 1p and 16q, loss of heterozygosity,
230–231
- WAGR syndrome, 229
- staging and treatment
 - correlation of stage and histology,
to survival, 232
- NWTS, 231
- percutaneous needle biopsy, 233
- recommendations, 232–233
- SIOP, 232
- survival rates for, 233
- Wilms' tumor suppressor gene (*WT1*), 181
- Wnt signaling pathway
 - abnormalities, in osteosarcoma, 153
 - hepatoblastoma, 247–248
- World Health Organization (WHO)
 - classification
 - acute leukemia, 23, 24
 - osteosarcoma, 145, 146