

# Contents

<b>Chapter 1</b>	<b>Introduction and Basic Techniques of Fine Needle Aspiration Cytology</b>	<b>1</b>
	<ul style="list-style-type: none"><li>• <b>History</b> 1<ul style="list-style-type: none"><li>Advantages 1</li></ul></li><li>• <b>Limitations</b> 2</li><li>• <b>Complications</b> 2</li><li>• <b>Needle Tract Seedling</b> 2</li><li>• <b>Contraindications</b> 3</li><li>• <b>Equipment</b> 3<ul style="list-style-type: none"><li>Fine Needle Aspiration Cytology Clinic 3</li></ul></li><li>• <b>Fine Needle Aspiration Technique</b> 4<ul style="list-style-type: none"><li>Clinical History 4</li><li>Preparation of the Patient 4</li><li>Aspiration Proper 4</li><li>Smear Preparation 6</li><li>Labeling 6</li></ul></li><li>• <b>Post-FNAC Care</b> 7<ul style="list-style-type: none"><li>Operator of FNAC: Who should Do it? 7</li></ul></li><li>• <b>Staining of the Smear</b> 8<ul style="list-style-type: none"><li>Fixation 8</li><li>Air Drying 8</li><li>Staining 8</li><li>Diff-Quick Stain 8</li><li>Steps 9</li><li>The Essential Components of Papanicolaou's Stain 9</li><li>Principle of Papanicolaou's Stain 9</li><li>Hematoxylin and Eosin Stain 9</li><li>Ancillary Techniques 9</li><li>Suboptimal Material 10</li></ul></li><li>• <b>Safety</b> 10</li></ul>	
<b>Chapter 2</b>	<b>FNAC of Deep-seated Lesions</b>	<b>12</b>
	<ul style="list-style-type: none"><li>• <b>Fluoroscopy-guided FNAC</b> 13</li><li>• <b>USG guidance</b> 13</li><li>• <b>Computed tomographic scan-guided FNAC</b> 14</li><li>• <b>Endoscopy-guided FNAC</b> 15</li><li>• <b>Magnetic resonance image guidance</b> 15</li><li>• <b>Mammography-guided FNAC</b> 15</li><li>• <b>Complications of guided FNAC in Deep-seated Lesions</b> 16</li><li>• <b>Transrectal FNAC of the Prostate</b> 16</li></ul>	
<b>Chapter 3</b>	<b>Evaluation of Aspiration Cytology Smears</b>	<b>18</b>
	<ul style="list-style-type: none"><li>• <b>Evaluation of FNAC Smear</b> 18</li><li>• <b>Cell Morphology</b> 20</li><li>• <b>Cytoplasm</b> 20</li><li>• <b>Nucleus</b> 23</li><li>• <b>Background of the Smear</b> 24</li><li>• <b>Diagnostic Difficulties</b> 30</li><li>• <b>Diagnostic Performance Measurement</b> 31</li><li>• <b>Medicolegal Aspects</b> 32</li><li>• <b>What to Do in Legal Case?</b> 32</li></ul>	
<b>Chapter 4</b>	<b>Ancillary Techniques in Aspiration Cytology</b>	<b>34</b>
	<ul style="list-style-type: none"><li>• <b>Immunocytochemistry</b> 34<ul style="list-style-type: none"><li>Samples Immunocytochemistry 34</li><li>Different Cell Specific Markers 35</li><li>Mesothelial Markers 37</li><li>Practical Diagnostic Problems 38</li><li>Receptors for Therapy 41</li><li>Antibodies Directed to Anti-infective Agent 41</li></ul></li><li>• <b>Flow Cytometry</b> 41<ul style="list-style-type: none"><li>Applications 42</li><li>Immunophenotyping 42</li></ul></li><li>• <b>Molecular Genetics</b> 42<ul style="list-style-type: none"><li>Fluorescent In Situ Hybridization 42</li><li>Polymerase Chain Reaction 43</li></ul></li><li>• <b>Electron Microscopy</b> 44<ul style="list-style-type: none"><li>Application 44</li></ul></li></ul>	
<b>Chapter 5</b>	<b>Head, Neck, and Orbital Lesion</b>	<b>48</b>
	<ul style="list-style-type: none"><li>• <b>Cystic Lesions of Head and Neck Regions</b> 48<ul style="list-style-type: none"><li>Branchial Cyst 48</li><li>Thyroglossal Cysts 50</li><li>Epidermal Inclusion Cyst 50</li><li>Cystic Hygroma 51</li><li>Mucocele 51</li><li>Lymphadenopathy 51</li><li>Paravertebral Lesion 52</li><li>Base of the Skull 53</li><li>Paraganglioma 53</li></ul></li></ul>	

Nasopharyngeal Carcinoma 55  
 Ameloblastoma 57  
 Parathyroid Tumors 57  
 Interpretation and Diagnostic Problems 59  
 Meningioma 59  
 Olfactory Neuroblastoma 60  
 Cytology 61

- **Orbital Lesions 61**
  - Techniques 61
  - Complications 62
  - Eyelid Lesion 62
  - Malignant Neoplasm of Eyelid 62
  - Lesions of Lacrimal Gland 62
- **Intraorbital Tumors 64**
  - Retinoblastoma 64
  - Rhabdomyosarcoma 65
  - Malignant Melanoma 65
  - Lymphoma 66
  - Optic Glioma 66
  - Metastatic Malignancy 66

## Chapter 6 Salivary Gland 70

- **Indications of FNAC of the Salivary Glands 70**
- **Contraindications of Salivary Gland FNAC 70**
- **Complications Salivary Gland FNAC 71**
- **Anatomy and Histology of the Salivary Gland 71**
  - Histology 72
  - Normal Salivary Gland Cells 72
- **FNAC of Salivary Gland: Technical Consideration 73**
  - Clinical Consideration 73
  - Diagnostic Accuracy 74
  - Overview of the Diagnostic Challenges 74
- **Salivary Gland Lesions 77**
  - Non-neoplastic Conditions 77
- **Cystic Lesions of the Salivary Gland 77**
  - Sialadenosis 78
- **Sialolithiasis 79**
  - Lipoma in Salivary Gland 79
  - Sialadenitis 79
  - Neoplastic Lesions 82
- **Benign Neoplasm 83**
  - Pleomorphic Adenoma 83
  - Adenoid Cystic Carcinoma (ADCC) 93
  - Acinic Cell Carcinoma 95
  - Mucoepidermoid Carcinoma 97
  - Polymorphous Low-grade Adenocarcinoma (PLGA) 99
  - Epithelial–myoepithelial Carcinoma 100
  - Carcinoma Ex-pleomorphic Adenoma 102
  - Myoepithelial Carcinoma 102
  - Salivary Duct Carcinoma 102
  - Cytology 102

Adenocarcinoma not Otherwise Specified 102  
 Lymphoma of the Salivary Gland 103

- **Metastatic Carcinoma 104**

## Chapter 7 Thyroid 109

- **Evaluation of Clinical History and Other Investigations Before FNAC 109**
  - Clinical History and Physical Examination 109
  - Physical Examination 110
  - Other Investigations 110
- **Techniques 111**
  - FNAC-induced Artifact 112
  - Ultrasound-guided FNAC 112
  - Post-FNAC Care 112
  - Complications 112
  - Optimal Material 113
  - Diagnostic Accuracy 113
  - Anatomy and Histology 114
  - Approach to the Analysis of FNAC Smear of Thyroid 114
  - Microscopic Examination 114
  - Terminology 117
- **Diseases of Thyroid 118**
- **Non-neoplastic Lesions 118**
  - Colloid Goiter 118
  - Diffuse Toxic Goiter (Graves' Disease) 120
- **Thyroiditis 121**
  - Acute Thyroiditis 121
  - Granulomatous Thyroiditis 121
  - Chronic Lymphocytic Thyroiditis (Hashimoto's Thyroiditis) 122
  - Riedel's Thyroiditis 125
- **Neoplastic Lesions 125**
  - Follicular Neoplasm (FN) 125
- **Variants of Follicular Adenoma 127**
  - Hurthle Cell Neoplasm 127
  - Hyalinizing Trabecular Adenoma 130
  - Papillary Thyroid Carcinoma 131
  - Medullary Carcinoma 139
  - Anaplastic Carcinoma 142
  - Insular Carcinoma 144
  - Lymphomas 145
  - Metastatic Malignant Tumors 146
  - Rare Tumor of Thyroid 148
- **Ancillary Techniques 148**
  - Different Ancillary Tests in Thyroid 148
- **Management of Post-FNAC Diagnosis of Thyroid Lesion 150**

## Chapter 8 Breast 156

- **Indications of FNAC of Breast 156**
  - Indications for Image-guided FNAC of Breast 156
  - Contraindications and Complications 157
- **Diagnostic Accuracy 157**

- **Limitations of FNAC 157**
- **Diagnostic Pitfalls 158**
  - False-negative Diagnosis 158
  - False-positive Diagnosis 158
  - Clinical History 159
  - Triple Test 159
  - Core Needle Biopsy versus FNAC 160
  - Mammography 161
  - Adequacy of the Sample 161
  - Histology of Breast 162
  - Normal Cytology of Breast 163
  - Approach to FNAC of Breast Lesions 164
  - Reporting of Breast FNAC 164
- **Benign Lesions of Breast 166**
  - Mastitis 166
  - Granulomatous Mastitis 167
  - Interpretation and Diagnostic Problems 167
  - Idiopathic Granulomatous Mastitis 167
  - Chronic Subareolar Abscess 168
  - Silicone Mastitis 168
  - Fat Necrosis 168
  - Radiation-induced Changes 169
  - Collagenous Spherulosis 170
  - Lipoma 170
  - Galactocele 170
  - Lactating Adenoma and Lactational Breast 170
  - Mucocele of Breast 171
  - Pseudoangiomas of Stromal Hyperplasia 171
  - Fibroadenoma 171
  - Fibrocystic Diseases 175
  - Proliferative Breast Disease 176
  - Proliferative Breast Disease with Atypia 177
- **Malignant Lesions of Breast 179**
  - Ductal Carcinoma In Situ 179
  - Phylloides Tumor 181
  - Papillary Neoplasm 183
  - Inflammatory Myofibroblastic Tumor 184
  - Interpretation and Diagnostic Problems 185
  - Carcinoma of Breast 185
  - Infiltrating Duct Carcinoma 186
  - Medullary Carcinoma 189
  - Mucinous Carcinoma (Colloid Carcinoma) 190
  - Apocrine Carcinoma 192
  - Tubular Carcinoma 193
  - Metaplastic Carcinoma 193
  - Cytology 194
  - Invasive Lobular Carcinoma 194
  - Paget's Disease 196
  - Inflammatory Carcinoma 196
- **Other Uncommon Malignancies 197**
  - Adenoid Cystic Carcinoma of Breast 197
  - Signet Ring Carcinoma 197
  - Squamous Cell Carcinoma of Breast 197
  - Non-Hodgkin's Lymphoma 199
  - Sarcoma of Breast 199

Accessory Breast 199  
 Male Breast Lesions 200  
 Carcinoma in Male Breast 200

- **Ancillary Investigations on Breast**
  - Aspiration Material 200**
  - Hormone Receptor Status 201
  - Nipple Discharge 201

## Chapter 9 Lymph Node 210

- **Contraindication 210**
- **Complications 211**
- **Limitations 211**
- **Approach to Lymph Node FNAC 211**
  - Clinical History 211
  - Physical Findings 211
  - Techniques 212
  - Diagnostic Accuracy 212
  - Ancillary Tests in Lymph Node 213
  - Genetic Abnormalities 214
- **Normal Anatomy and Histology of the Lymph Node 216**
- **Lymphoid Cells 217**
  - Normal Component of a Lymph Node 218
  - Reactive Lymphoid Hyperplasia 218
  - Acute Lymphadenitis 220
  - Granulomatous Lymphadenitis 221
  - Tuberculosis 221
  - Sarcoidosis 224
  - Lepromatous Lymphadenitis 224
  - Leishmania Lymphadenitis 225
  - Filarial Lymphadenitis 225
  - Toxoplasma Lymphadenitis 226
  - Cat Scratch Disease 226
  - Infectious Mononucleosis 227
  - Rosai-Dorfman Disease 228
  - Kimura's Disease 229
  - Kikuchi's Disease 229
  - HIV Lymphadenopathy 230
  - Kaposi's Sarcoma 231
  - Post-transplant Lymphoproliferative Disorders (PTLD) 232
  - Dermatopathic Lymphadenitis 232
  - Interpretation and Diagnostic Problems 232
  - Castleman's Disease 232
  - Metastatic Malignancy 233
  - Others 236
  - Lymphomas 237
  - Reporting Lymph Nodal Neoplasm 237
  - Lymphoma Classification 237
  - B Cell Small Lymphocytic Lymphoma (SLL) 239
  - Mantle Cell Lymphoma 242
  - Follicular Lymphoma (FL) 243
  - Lymphoplasmacytic Lymphoma 244
  - Marginal Zone Lymphoma 245
  - Hairy Cell Leukemia 246
  - Approach to Small B Cell Lymphomas 246

- **Lymphomas of Large Cells 246**
  - Diffuse Large B Cell Lymphoma 246
  - Immunophenotype of DLBCL 249
  - Mediastinal Large B Cell Lymphoma 249
  - B Lymphoblastic Lymphoma 250
  - Burkitt's Lymphoma 251
  - T Cell Lymphoma 251
  - T Lymphoblastic Lymphoma 251
  - Anaplastic Large Cell Lymphoma 252
  - Peripheral T Cell Lymphoma,
    - Unspecified 254
  - Angioimmunoblastic T Cell Lymphoma 254
  - Mycosis Fungoides and Sezary
    - Syndrome 255
  - Hodgkin's Lymphoma 256
  - Nodular Lymphocytic Predominant
    - HL (NLPHL) 259
  - Histiocytic and Dendritic Neoplasms 260
  - Langerhans' Cell Histiocytosis (LCH) 261
  - Interpretation and Diagnostic Difficulties 261
  - Leukemic Infiltration 262

## Chapter 10 Lung 271

- **Techniques 271**
- **Contraindications 272**
- **Complications 272**
- **Diagnostic Accuracy and Pitfalls 273**
  - Ancillary Tests 276
  - Immunocytochemistry 276
  - Molecular Genetics 277
- **Normal Anatomy and Histology of Lungs 277**
  - Normal and Benign Cells 278
- **Lung Lesions 280**
  - Inflammatory Lesions 280
  - Specific Infections 281
  - Interpretation and Diagnostic Difficulties 282
  - Fungal Infections 283
  - Parasite 287
- **Benign Noninfective Condition of Lung 287**
  - Pulmonary Hamartoma 287
  - Endobronchial Papilloma 288
  - Myofibroblastic Tumor 288
  - Pulmonary Amyloidosis 289
  - Wegner's Granulomatosis 289
- **Lung Carcinomas 289**
  - Classification of Lung Cancer 290
  - Squamous Cell Carcinoma 290
  - Adenocarcinoma 292
  - Bronchioloalveolar Carcinoma (BAC) 294
  - Small Cell Carcinoma 296
  - Undifferentiated Large Cell Carcinoma 298
  - Carcinoid 300
- **Rare and Uncommon Tumors of Lung 301**
  - Adenoid Cystic Carcinoma 301
  - Mucoepidermoid Carcinoma 301

- Pulmonary Blastoma 302
- Sarcoma 303
- Lymphomas 304
- **Metastatic Malignancies 304**
  - Mesothelioma in Pleura 304

## Chapter 11 Mediastinum 312

- **Anatomy of the Mediastinum and General Considerations 312**
- **Clinical History 312**
- **Radiological Localization 312**
- **Techniques 312**
- **Contraindication 313**
- **Complications 313**
- **Lesions 313**
  - Mediastinal Cystic Lesions 313
  - Thymoma 314
- **Malignant Thymoma 317**
  - Thymic Carcinoma 317
  - Thymic Carcinoid 318
  - Atypical Carcinoid 318
- **Germ Cell Tumors 319**
  - Mature Cystic Teratoma 319
  - Immature Teratoma 319
  - Germinomas 319
  - Embryonal Carcinoma 320
  - Endodermal Sinus Tumor 320
- **Lymphomas 321**
  - Non-Hodgkin's Lymphoma 321
  - Large Cell NHL 321
  - Lymphoblastic Lymphoma 321
  - Anaplastic Large Cell Lymphomas 322
  - Hodgkin's Lymphoma 322
  - Diagnostic Difficulty 323
  - Neurogenic Tumor 323
  - Neuroblastoma 323
  - Ganglioneuroblastoma 323
  - Peripheral Nerve Sheath Tumor 324
  - Malignant Peripheral Nerve Sheath Tumors 324
  - Paraganglioma 325
  - Metastatic Carcinoma 325
  - Approach to the Diagnosis of Mediastinal Tumors 326

## Chapter 12 Liver and Spleen 330

- **Liver 330**
  - Imaging and Technical Consideration 330
  - Complications 331
  - Contraindications 331
  - Diagnostic Accuracy 331
  - Normal Anatomy and Histology 331
  - Normal Cells 332
- **Liver Lesions 332**
- **Non-neoplastic Lesions 333**
  - Diffuse Parenchymal Lesions of Liver 333
  - Cirrhosis 333
  - Chronic Hepatitis 333

- Fatty Change 333
- Inflammatory Pseudotumor of Liver 333
- **Space-occupying Benign Lesions 334**
  - Cysts 334
  - Granulomatous Reaction in Liver 334
  - Cavernous Hemangioma of Liver 335
- **Benign Lesion 335**
  - Focal Nodular Hyperplasia 336
  - Liver Cell Adenomas 336
  - Biliary Cystadenoma 337
  - Hepatic Angiomyolipoma 337
  - Mesenchymal Hamartoma of Liver 338
- **Malignant Tumor 338**
  - Hepatocellular Carcinoma (HCC) 338
  - Intrahepatic Cholangiocarcinoma 345
  - Interpretation and Diagnostic Problems 346
  - Hepatoblastoma 346
- **Primary Sarcomas 348**
  - Angiosarcoma 348
  - Epithelioid Hemangioendothelioma 348
  - Undifferentiated Sarcoma (Embryonal Sarcoma) of Liver 349
  - Metastatic Malignancies 349
  - Malignant Lymphoma 351
- **Spleen 352**
  - Normal Cytology 352
  - Non-neoplastic Process 352
  - Accumulation of Abnormal Material and Storage Disease 352
  - Neoplasm 352

## **Chapter 13 Pancreas, Gallbladder, and Gastrointestinal Tract 357**

- **Pancreas: FNAC Procedure 357**
  - Techniques 357
  - Complications and Contraindications 358
  - Diagnostic Accuracy 358
  - Normal Anatomy and Histology 358
  - Normal Cells 359
  - Cysts of Pancreas 359
  - Cytology 360
  - Pancreatic True Cyst 360
- **Pancreatitis 360**
  - Acute Pancreatitis 360
  - Chronic Pancreatitis 360
- **Neoplastic Lesion of Pancreas 361**
  - Serous Cystadenoma 361
  - Mucinous Cystic Neoplasia 361
  - Ductal Adenocarcinoma 363
  - Adenosquamous Carcinoma 366
  - Signet Ring Carcinoma 366
  - Pancreatic Acinar Carcinoma 366
- **Neuroendocrine Tumor 367**
  - Pancreatic Endocrine Tumor (Islet Cell Tumor of Pancreas) 367
  - Solid and Cystic Papillary Neoplasm (SCPN) of Pancreas 368

- **Pancreaticoblastoma 371**
  - Metastatic Tumor in Pancreas 372
  - Pancreatic Lymphoma 372
- **Gastrointestinal Tumors 372**
  - Adenocarcinoma 372
  - Signet Ring Cell Adenocarcinoma 372
  - Carcinoid Tumors of the Small Intestine 373
  - Gastrointestinal Stromal Tumor (GIST) 374
  - Primary Small Intestinal Lymphomas 375

## **Chapter 14 Kidney and Adrenal 378**

- **Technique 378**
- **Complications 378**
- **Adequacy Criteria and Diagnostic Accuracy 378**
  - Normal Cells 379
  - Renal Lesions 379
  - Interpretation and Diagnostic Difficulties 380
- **Xanthogranulomatous Inflammation 380**
  - Interpretation and Diagnostic Difficulties 380
- **Benign Tumors of Kidney 380**
  - Angiomyolipoma 380
  - Metanephric Adenoma 382
  - Papillary Adenoma (Cortical Adenoma) 382
  - Renal Oncocytoma 383
  - Renal Cell Carcinoma 383
  - Papillary Carcinoma 384
  - Nuclear Grading of RCC 387
  - Urothelial Carcinoma 388
  - Medullary Carcinoma 390
  - Metastatic Tumors of Kidney 390
  - Renal Lymphoma 390
- **Pediatric Renal Tumors 390**
  - Nephroblastoma (Wilms' Tumor) 390
  - Congenital Mesoblastic Nephroma 394
  - Rhabdoid Tumor 394
  - Clear Cell Sarcoma 395
- **Adrenal Gland 396**
  - FNAC Technique 396
  - Anatomy and Histology 396
- **Lesions of Adrenal 396**
  - Adrenal Cyst 396
  - Adrenal Myelolipoma 397
  - Adrenocortical Hyperplasia and Neoplasm 397
  - Adrenal Adenoma 397
  - Pheochromocytoma 399
  - Metastatic Tumors 401
  - Retroperitoneal Lesions 402
  - Inflammatory Lesions 402
  - Non-neoplastic Noninflammatory Lesions 402
  - Soft Tissue Tumors 403
  - Germ Cell Tumors 403
  - Lymph Node 403
  - Metastatic Tumors 403

- Chapter 15 Gonads and Prostate 406**
- **Testis 406**
    - Anatomy and Histology of Testis 406
    - Normal Cells of Testis 406
  - **Peritesticular Lesions 407**
    - Hydrocele 407
    - Spermatocele 407
  - **Inflammation 408**
    - Acute Epididymitis 408
    - Chronic Epididymitis 408
    - Spermatocytic Granuloma 409
  - **Testicular Tumors 409**
    - Neoplasm of Testis 409
    - Seminoma 410
  - **Embryonal Carcinoma 411**
    - Yolk Sac Tumor 413
    - Choriocarcinoma 413
    - Other Tumors of Testis 413
  - **Female Genital System 414**
    - Cervical Carcinoma 414
    - Endometrial Tumors 414
  - **Ovary 414**
  - **Non-neoplastic cyst 415**
    - Follicular Cyst or Cystic Follicle 415
    - Corpus Luteal Cyst 415
  - **Endometriotic Cyst 415**
  - **Ovarian Tumor 416**
    - Serous Adenoma and Adenocarcinoma of Ovary 416
    - Serous Adenocarcinoma 416
    - Mucinous Cystadenoma and Cystadenocarcinoma 416
    - Endometrioid Carcinoma 417
    - Germ Cell Tumor 418
    - Mature Teratoma 418
    - Immature Teratoma 418
    - Carcinoid Tumors of Ovary 419
    - Dysgerminoma 419
    - Yolk Sac Tumor 419
  - **Sex Cord Stromal Tumor 420**
    - Granulosa Cell Tumor 420
    - Sertoli Cell Tumor 421
    - Fibroma and Thecoma 421
    - Metastatic Tumors of Ovary 422
  - **Prostate 422**
    - Normal Cells in Prostate FNAC 422
  - **Inflammation 422**
    - Benign Prostatic Hyperplasia 422
    - Carcinoma 423
- Chapter 16 Soft Tissue Lesions 428**
- **Introduction 428**
  - **Complications 428**
  - **Diagnostic Accuracy and Pitfalls 428**
    - FNAC Technique and Prerequisites for Interpretation of Smear 429
    - Ancillary Techniques 430
    - Diagnosis 430
    - Grading 431
    - Lipoma and its Variants 431
    - Spindle Cell Lipoma 432
    - Pleomorphic Lipoma 433
    - Interpretation and Diagnostic Problems 434
    - Angiolipoma 434
    - Hibernoma 434
    - Myelolipoma 435
    - Liposarcomas 435
    - Myxoid Liposarcoma 437
    - Pleomorphic Liposarcoma 437
    - Round Cell Liposarcoma 438
  - **Fibroblastic/Myofibroblastic Lesion 438**
    - Fibromatosis 438
    - Nodular Fasciitis 439
    - Myositis Ossificans 440
    - Solitary Fibrous Tumor 440
    - Dermatofibrosarcoma Protuberans 441
    - Infantile Myofibroblastoma 442
    - Fibrosarcoma 442
  - **So-called "Fibrohistiocytic Tumors" 442**
    - Giant Cell Tumor of Tendon Sheath 442
    - Malignant Fibrous Histiocytoma 444
    - Pleomorphic MFH 444
    - Interpretation and Diagnostic Problems 445
  - **Tumors of Nerve Sheath 445**
    - Benign Peripheral Nerve Sheath Tumor 445
    - Malignant Peripheral Nerve Sheath Tumor (MPNST) 447
  - **Tumors of Muscle Origin 448**
    - Rhabdomyoma (RM) 448
  - **Rhabdomyosarcoma 448**
    - Leiomyosarcomas 450
  - **Tumor of Vascular Origin 450**
    - Hemangiopericytoma 450
  - **Glomus Tumor 451**
    - Cytology 452
  - **Hemangioma 452**
  - **Angiosarcoma 452**
    - Cytology 452
  - **Tumor of Uncertain Histogenesis 452**
    - Synovial Sarcoma 452
    - Monophasic Synovial Cell Sarcoma 454
    - Clear Cell Sarcoma 454
    - Epithelioid Sarcoma 454
    - Alveolar Soft Part Sarcoma 455
    - Granular Cell Tumor 456
- Chapter 17 Skin 461**
- **Non-neoplastic Lesions of Skin 461**
    - Inflammation 461
    - Rare Non-neoplastic Benign Diseases of Skin 462
    - Epidermal Inclusion Cyst 463
    - Differential Diagnosis 463
  - **Neoplastic Lesions of Skin 463**
    - Benign Tumor of Skin Adnexa 463

Chondroid Syringoma	464		
Cylindroma	465		
Eccrine Spiradenoma	465		
Hidradenoma	465		
Syringocystadenoma Papilliferum	466		
• <b>Malignant Tumors of Skin</b>	<b>466</b>		
Basal Cell Carcinoma	466		
Sebaceous Carcinoma	467		
Diagnostic Difficulty	467		
Malignant Melanoma	468		
Squamous Cell Carcinoma	469		
Malignant Sweat Gland Tumor	469		
Merkel Cell Carcinoma	469		
Metastasis	470		
Hematopoietic Maligancy	471		
<b>Chapter 18 Bone</b>		<b>474</b>	
• <b>Biopsy of Bony Lesions</b>	<b>474</b>		
Diagnostic Accuracy	474		
Complications	474		
Technique	475		
• <b>Normal Cells</b>	<b>475</b>		
• <b>Infections</b>	<b>475</b>		
Osteomyelitis	475		
• <b>Neoplastic Lesions of Bone</b>	<b>475</b>		
• <b>Bone-forming Tumor</b>	<b>476</b>		
Osteblastoma	476		
Osteoid Osteoma	476		
Osteosarcoma	477		
• <b>Cartilage-forming Tumor</b>	<b>479</b>		
Chondroma	479		
• <b>Chondroblastoma</b>	<b>479</b>		
Cytology	480		
Chondromyxoid Fibroma	480		
Chondrosarcoma	480		
• <b>Giant Cell Tumor Chordoma, and Other Tumors</b>	<b>483</b>		
Giant Cell Tumor of Bone	483		
Cytology	484		
Chordoma	485		
Ewing's Sarcoma and Peripheral Neuroectodermal Tumor	486		
Non-Hodgkin's Lymphoma	488		
Plasma Cell Neoplasm	488		
Langerhans' Cell Histiocytosis	489		
Metastatic Carcinoma	490		
• <b>Other Bone Lesions</b>	<b>492</b>		
Aneurysmal Bone Cyst	492		
Adamantinoma	492		
<b>Chapter 19 Round Cell Tumor</b>			<b>496</b>
• <b>Diagnostic Approach</b>	<b>496</b>		
Clinical Features and Imaging	496		
Cytogenetics	496		
Immunocytochemistry	497		
Electron Microscopy	498		
Cytomorphology	499		
Important Cytological Features	502		
<b>Chapter 20 Central Nervous System</b>			<b>505</b>
• <b>Cytology of Normal Brain Tissue</b>	<b>505</b>		
Neurons	505		
Glial Cells	505		
• <b>Neoplastic Lesions</b>	<b>506</b>		
Astrocytomas	506		
Oligodendroglioma	508		
Ependymoma	508		
Myxopapillary Ependymoma	508		
Medulloblastoma	508		
Pituitary Adenoma	508		
Craniopharyngioma	508		
Lymphoma	508		
Metastatic Carcinoma	509		
Infections	509		
<b>Chapter 21 Review of Cytology Cases</b>			<b>511</b>
• <b>Cases with History</b>	<b>511</b>		
• <b>Answers of the Cases</b>	<b>552</b>		
<i>Index</i>			<i>557</i>