



# Table of Contents

<b>1 Basic Principles .....</b>	1
<b>Basic Principles of MRI .....</b>	2
<i>H. E. Moeller</i>	
Principle of Nuclear Magnetic Resonance .....	3
MR Imaging .....	10
Components of an MR Imaging System .....	21
<b>MRI Contrast Agents .....</b>	25
<i>B. Tombach</i>	
Principles of Contrast Enhancement .....	25
Classes of Contrast Agents and Biodistribution .....	26
<b>2 Head and Neck .....</b>	43
<i>H. Stimmer</i>	
Nasal Cavity, Paranasal Sinuses, and Midface .....	44
Oral Cavity and Oropharynx .....	51
Hypopharynx and Larynx .....	55
Salivary Glands .....	58
Cervical Soft Tissues and Thyroid Gland .....	60
Summary .....	66
<b>3 Chest .....</b>	67
<b>Heart .....</b>	68
<i>K. U. Juergens, M. G. Lentschig, and D. C. Maintz</i>	
Basic Principles of Cardiac MRI .....	68
Congenital Anomalies .....	83
Diseases of the Myocardium .....	92
Diseases of the Pericardium .....	100
Cardiac and Pericardial Masses .....	103
Acquired Valvular Heart Diseases .....	110
Coronary Heart Disease .....	114
<b>Mediastinum, Pleura, and Chest Wall .....</b>	126
<i>S. Diederich</i>	
Mediastinum .....	127
Pleura .....	139
Chest Wall .....	143
<b>Lung and Tracheobronchial System .....</b>	146
<i>S. Diederich</i>	
<b>4 The Female Breast .....</b>	153
<b>Breast .....</b>	154
<i>U. Bick</i>	
<b>Breast Implants .....</b>	174
<i>B. Pfleiderer and W. Heindel</i>	
<b>5 Abdomen .....</b>	179
<b>Liver .....</b>	180
<i>T. Helmberger, H. E. Daldrup-Link, and E. J. Rummey</i>	
Anomalies .....	187
Benign Tumors .....	189
Malignant Tumors .....	196
Inflammatory and Parasitic Lesions .....	209
Diffuse Liver Diseases .....	211
Vascular Diseases .....	216
Hepatic Tumors in Children .....	217
<b>Pancreas .....</b>	224
<i>P. Reimer</i>	
Anomalies .....	227
Tumors .....	228
Pancreatitis .....	239

Diffuse Pancreatic Diseases .....	244	<b>Kidney and Urinary Tract</b> .....	279
Trauma and Postoperative Changes .....	245	Kidneys .....	279
<b>Biliary Tract</b> .....	248	<i>B. Kreft</i>	
<i>K. Hellerhoff</i>		MR Urography .....	293
Biliary Tract .....	251	<i>B. Kreft</i>	
Gallbladder .....	263	<b>Adrenal Glands</b> .....	299
Sphincter Complex .....	265	<i>W. Heindel and B. Buerke</i>	
<b>Spleen</b> .....	268	Functional Adrenal Diseases .....	301
<i>E. J. Rummeny and T. Helmberger</i>		Nonfunctioning Adrenal Masses .....	307
Congenital Anomalies and Normal Variants ..	270	<b>Gastrointestinal Tract</b> .....	313
Infectious Diseases .....	270	Esophagus and Stomach .....	318
Cystic Lesions .....	271	<i>J. Wessling</i>	
Vascular Diseases .....	272	Small Intestine .....	322
Nonneoplastic, Noninfectious Diseases and Changes .....	273	<i>J. Wessling</i>	
Tumors .....	275	Large Intestine .....	328
Traumatic Lesions .....	278	<i>B. Saar</i>	
		Summary .....	337
 <b>6 Pelvis</b> .....	341		
<b>Urinary Bladder</b> .....	342	Cervix .....	365
<i>T. M. Bernhardt</i>		Uterus .....	368
Malformations .....	344	Ovary and Adnexa .....	374
Inflammation and Hemorrhage .....	345	Obstetric Indications .....	380
Benign Tumors .....	345	<b>Male Pelvis</b> .....	383
Malignant Tumors .....	345	Prostate and Seminal Vesicles .....	383
<b>Pelvic Floor and Fistulas</b> .....	351	<i>G. U. Mueller-Lisse, U. L. Mueller-Lisse, and M. Scherr</i>	
<i>D. Caurette and A. Lienemann</i>		Testis and Epididymis .....	393
Pelvic Floor Dysfunction .....	351	<i>C. Czipull and M. Asmussen</i>	
Fistulas .....	357	Penis .....	400
<b>Female Pelvis</b> .....	360	<i>M. Asmussen and C. Czipull</i>	
<i>M. Unterweger and R. A. Kubik-Huch</i>		Vagina and Vulva .....	363
 <b>7 Lymph Nodes</b> .....	401		
<i>M. Taupitz</i>			
<b>Normal Lymph Nodes</b> .....	415	<b>Abnormal Lymph Nodes</b> .....	416

<b>8 Peripheral Skeletal System .....</b>	425
<b>Bone and Soft-Tissue Tumors .....</b>	426
<i>K. Woertler</i>	
Benign Bone Tumors and Tumor-Like Lesions	427
Malignant Bone Tumors	436
Benign Soft-Tissue Tumors	443
Malignant Soft-Tissue Tumors	445
<b>Rheumatic Diseases .....</b>	451
<i>T. M. Link</i>	
<b>Infectious Diseases of the Bone and Soft Tissues .....</b>	456
<i>T. M. Link</i>	
<b>Avascular Necrosis .....</b>	460
<i>T. M. Link</i>	
<b>Osteoporosis .....</b>	463
<i>T. M. Link</i>	
<b>Trauma .....</b>	466
<i>T. M. Link</i>	
<b>Joints .....</b>	470
Shoulder Joint	470
<i>T. M. Link</i>	
Elbow Joint	481
<i>S. Waldt</i>	
Hand	492
<i>T. M. Link</i>	
Hip Joint	501
<i>T. M. Link</i>	
Knee Joint	512
<i>K. Wörtler</i>	
Foot	530
<i>S. Waldt</i>	
<b>Bone Marrow .....</b>	543
<i>H. E. Daldrup-Link</i>	
Normal Bone Marrow	544
Abnormal Bone Marrow	547
Storage Diseases	557
<b>9 Vessels .....</b>	563
<b>Technique of Vascular Imaging .....</b>	564
<i>G. Bongartz and M. Braendli</i>	
Technique of MRA	564
<b>Cervical Vessels .....</b>	568
<i>M. Braendli and G. Bongartz</i>	
Hemangiomas	573
Stenoses and Occlusions	573
Arterial Dissections	575
<b>Thoracic Vessels .....</b>	579
<i>M. Braendli and G. Bongartz</i>	
Aorta and its Branches	581
Pulmonary Vessels	589
<b>Abdominal Vessels .....</b>	598
<i>P. Reimer and R. Vosshenrich</i>	
Abdominal Aorta	600
Visceral and Renal Arteries	604
Portal Circulation	607
Inferior Vena Cava	608
<b>Peripheral Vessels .....</b>	612
<i>P. Reimer and R. Vosshenrich</i>	
Pelvic and Lower Extremity Arteries	616
Arteries of the Shoulder and Upper Arm	626
Arteries of the Forearm and Hand	627
Pedal Arteries	627
Limitations, Practical Tips, and Outlook	629
<b>10 Whole-Body MRI and MRA, High-Field MRI .....</b>	633
<b>Whole-Body MRI .....</b>	634
<i>J. Gaa</i>	
Applications	637
<b>Whole-Body MRA .....</b>	640
<i>B. Tombach</i>	
<b>High-Field MRI at 3 T .....</b>	644
<i>R. Bachmann and H. Kugel</i>	
<b>Index .....</b>	651