

Junqueira's Basic Histology TEXT & ATLAS

Anthony L. MESCHER



CD-ROM INCLUDED

616-0181975.8) M 55

The McGraw-Hill Companies



Junqueira's Basic Histology, Thirteenth Edition

Copyright © 2013 by The McGraw-Hill Companies, Inc. All rights reserved. Printed in China. Except as permitted under the United States copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

234567890 CTP/CTP 181716151413

Set ISBN 978-0-07-178033-9; Set MHID 0-07-178033-5 Book ISBN 978-0-07-180798-2; Book MHID 0-07-180798-5 CD ISBN 978-0-07-180797-5; CD MHID 0-07-180797-7 ISSN 0891-2106

Notice

Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required. The author and the publisher of this work have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication. However, in view of the possibility of human error or changes in medical sciences, neither the author nor the publisher nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they disclaim all responsibility for any errors or omissions or for the results obtained from use of the information contained in this work. Readers are encouraged to confirm the information contained herein with other sources. For example and in particular, readers are advised to check the product information sheet included in the package of each drug they plan to administer to be certain that the information contained in this work is accurate and that changes have not been made in the recommended dose or in the contraindications for administration. This recommendation is of particular importance in connection with new or infrequently used drugs.

This book was set in Minion Pro by Cenveo Publisher Services.

The editors were Michael Weitz and Brian Kearns.

The production supervisor was Catherine H. Saggese.

Project management was provided by Anupriya Tyagi, Cenveo Publisher Services.

The illustration manager was Armen Ovsepyan.

The artwork was done by Electronic Publishing Services, Inc.

The book designer was Elise Lansdon.

The cover design was by Perhsson Design.

China Translation & Printing Services, Ltd. was the printer and binder.

"південноукраїнський національний педагогічний університет імені к.д. ушинського. БІБЛІОТЕКА

544342

This book is printed on acid-free paper.

The Figure Credit section for this book begins on page 515 and is considered an extension of the copyright page.

McGraw-Hill books are available at special quantity discounts to use as premiums and sales promotions, or for use in corporate training programs. To contact a representative please e-mail us at bulksales@mcgraw-hill.com.

Contents

KEY FEATURES VI | PREFACE IX | ACKNOWLEDGMENTS XI

1 Histology & Its Methods of Study 1

Preparation of Tissues for Study 1
Light Microscopy 5
Electron Microscopy 8
Autoradiography 10
Cell & Tissue Culture 10
Enzyme Histochemistry 11
Visualizing Specific Molecules 12
Interpretation of Structures in Tissue Sections 16
Summary of Key Points 17

2 The Cytoplasm 18

Cell Differentiation 18
Cytoplasmic Organelles 18
The Cytoskeleton 41
Inclusions 49
Summary of Key Points 53

3 The Nucleus 55

Components of the Nucleus 55
The Cell Cycle 60
Mitosis 63
Stem Cells & Tissue Renewal 65
Meiosis 67
Apoptosis 69
Summary of Key Points 71

4 Epithelial Tissue 73

Characteristic Features of Epithelial Cells 73
Specializations of the Apical Cell Surface 78
Types of Epithelia 81
Transport Across Epithelia 90
Renewal of Epithelial Cells 91
Summary of Key Points 93

5 Connective Tissue 98

Cells of Connective Tissue 98
Fibers 105
Ground Substance 113
Types of Connective Tissue 117
Summary of Key Points 122

6 Adipose Tissue 124

White Adipose Tissue 124 Brown Adipose Tissue 128 Summary of Key Points 129

7 Cartilage 130

Hyaline Cartilage 130
Elastic Cartilage 134
Fibrocartilage 134
Cartilage Formation, Growth,
& Repair 135
Summary of Key Points 137

8 Bone 138

Bone Cells 138
Bone Matrix 143
Periosteum & Endosteum 143
Types of Bone 145
Osteogenesis 148
Bone Growth, Remodeling,
& Repair 152
Metabolic Role of Bone 154
Joints 155
Summary of Key Points 158

9 Nerve Tissue & the Nervous System 160

Development of Nerve Tissue 160
Neurons 161
Glial Cells & Neuronal Activity 167
Central Nervous System 174
Peripheral Nervous System 180
Neural Plasticity & Regeneration 185
Summary of Key Points 187

10 Muscle Tissue 191

Skeletal Muscle 191 Cardiac Muscle 205 Smooth Muscle 207 Regeneration of Muscle Tissue 210 Summary of Key Points 211

11 The Circulatory System 212

Heart 212

Tissues of the Vascular Wall 216

Vasculature 217

Lymphatic Vascular System 228

Summary of Key Points 232

12 Blood 234

Composition of Plasma 234

Blood Cells 235

Summary of Key Points 249

13 Hemopoiesis 250

Stem Cells, Growth Factors, & Differentiation 250

Bone Marrow 251

Maturation of Erythrocytes 254

Maturation of Granulocytes 256

Maturation of Agranulocytes 258

Origin of Platelets 259

Summary of Key Points 261

14 The Immune System & Lymphoid Organs 262

Innate & Adaptive Immunity 262

Cytokines 264

Antigens & Antibodies 265

Antigen Presentation 266

Cells of Adaptive Immunity 268

Thymus 272

Mucosa-Associated Lymphoid Tissue 276

Lymph Nodes 276

Spleen 281

Summary of Key Points 288

15 Digestive Tract 289

General Structure of the Digestive Tract 289

Oral Cavity 292

Esophagus 299

Stomach 301

Small Intestine 309

Large Intestine 316

Summary of Key Points 319

16 Organs Associated with the Digestive Tract 323

Salivary Glands 323

Pancreas 326

Liver 329

Biliary Tract & Gallbladder 339

Summary of Key Points 340

17 The Respiratory System 343

Nasal Cavities 343

Nasopharynx 346

Larynx 346

Trachea 348

Bronchial Tree & Lung 348

Lung Vasculature & Nerves 360

Pleural Membranes 362

Respiratory Movements 362

Summary of Key Points 363

18 Skin 364

Epidermis 365

Dermis 371

Subcutaneous Tissue 373

Sensory Receptors 373

Hair 374

Nails 377

Skin Glands 378

Skin Repair 383

Summary of Key Points 384

19 The Urinary System 385

Kidneys 385

Blood Circulation 386

Renal Function: Filtration.

Secretion, & Reabsorption 387

Ureters, Bladder, & Urethra 398

Summary of Key Points 403

20 Endocrine Glands 404

Pituitary Gland (Hypophysis) 404

Adrenal Glands 414

Pancreatic Islets 418

Diffuse Neuroendocrine

System 420

Thyroid Gland 420

Parathyroid Glands 423

Pineal Gland 425

Summary of Key Points 426

21 The Male Reproductive System 429

Testes 429

Intratesticular Ducts 439

Excretory Genital Ducts 439

Accessory Glands 441

Penis 445

Summary of Key Points 447

22 The Female Reproductive System 449

Ovaries 449
Uterine Tubes 459
Major Events of Fertilization 460
Uterus 462
Embryonic Implantation,
Decidua, & the Placenta 467
Cervix 470
Vagina 471
External Genitalia 471
Mammary Glands 472
Summary of Key Points 477

23 The Eye & Ear: Special Sense Organs 479

Eyes: The Photoreceptor System 479 Ears: The Vestibuloauditory System 497 Summary of Key Points 510

APPENDIX 513
FIGURE CREDITS 515
INDEX 517