

EIGHTH EDITION

TIETZ FUNDAMENTALS OF

CLINICAL CHEMISTRY and MOLECULAR DIAGNOSTICS

Nader Rifai
Andrea Rita Horvath
Carl T. Wittwer

ELSEVIER



EVOLVE STUDY RESOURCES
FREE WITH TEXTBOOK PURCHASE
EVOLVE.ELSEVIER.COM

PART I Principles of Laboratory Medicine

- 1 Clinical Chemistry and Molecular Diagnostics, 1**
Nader Rifai, Andrea Rita Horvath, and Carl T. Wittwer
- 2 Analytical and Clinical Evaluation of Methods, 7**
Kristian Linnet, Karel G.M. Moons, and James C. Boyd
- 3 Preanalytical Variation, 38**
Ana-Maria Simundic
- 4 Biological Variation, 51**
Sverre Sandberg, Thomas Røraas, Aasne K. Aarsand, and Callum G. Fraser
- 5 Establishment and Use of Reference Values, 64**
Gary L. Horowitz and Graham R.D. Jones
- 6 Specimen Collection, Processing, and Other Preanalytical Variables, 77**
Doris M. Haverstick and Patricia M. Jones
- 7 Quality Management, 90**
W. Greg Miller and Sverre Sandberg
- 8 Principles of Basic Techniques and Laboratory Safety, 108**
Stanley Lo

PART II Analytical Techniques and Instrumentation

- 9 Optical Techniques, 127**
Larry J. Kricka and Jason Y. Park
- 10 Electrochemistry and Chemical Sensors, 145**
Paul D'Orazio
- 11 Electrophoresis, 167**
Lindsay A.L. Bazydlo and James P. Landers
- 12 Chromatography, 180**
David S. Hage
- 13 Mass Spectrometry, 201**
Mark M. Kushnir, Nigel J. Clarke, and Alan L. Rockwood
- 14 Enzyme and Rate Analyses, 215**
Renze Bais and Mauro Panteghini
- 15 Immunochemical Techniques, 236**
Larry J. Kricka and Jason Y. Park
- 16 Automation, 251**
Charles D. Hawker, Jonathan R. Genzen, and Carl T. Wittwer
- 17 Point-of-Care Testing, 273**
Andrew St. John, Maurice O'Kane, and Christopher P. Price

PART III Analytes

- 18 Amino Acids, Peptides, and Proteins, 288**
Dennis J. Dietzen
- 19 Serum Enzymes, 313**
Mauro Panteghini and Renze Bais
- 20 Tumor Markers, 331**
Catharine Sturgeon

- 21 Kidney Function Tests, 359**
Edmund J. Lamb and Graham R.D. Jones
- 22 Carbohydrates, 377**
David B. Sacks
- 23 Lipids, Lipoproteins, Apolipoproteins, and Other Cardiac Risk Factors, 391**
Sridevi Devaraj and Alan T. Remaley
- 24 Electrolytes and Blood Gases, 419**
Mark A. Cervinski, Mark D. Kellogg, and Mitchell G. Scott
- 25 Hormones, 440**
Timothy James Cole
- 26 Catecholamines and Serotonin, 450**
Graeme Eisenhofer, Thomas Rosano, and Ronald J. Whitley
- 27 Vitamins and Trace Elements, 466**
Ravinder Sodi and Andrew Taylor
- 28 Hemoglobin, Iron, and Bilirubin, 499**
Christina Ellervik, Maria Domenica Cappellini, Stanley Lo, and Dorine W. Swinkels
- 29 Porphyrins and Porphyrins, 524**
Michael N. Badminton, Sharon D. Whatley, and Aasne K. Aarsand
- 30 Therapeutic Drug Monitoring, 541**
Michael C. Milone and Leslie M. Shaw
- 31 Clinical Toxicology, 562**
Loralie Langman, Laura K. Bechtel, and Christopher P. Holstege
- 32 Toxic Elements, 590**
Frederick G. Strathmann and Lee M. Blum

PART IV Pathophysiology

- 33 Diabetes Mellitus, 603**
David B. Sacks
- 34 Cardiovascular Disease, 629**
Fred S. Apple, Jens Peter Goetze, and Allan S. Jaffe
- 35 Kidney Disease, 651**
Michael P. Delaney and Edmund J. Lamb
- 36 Physiology and Disorders of Water, Electrolyte, and Acid-Base Metabolism, 679**
Mark A. Cervinski, Christopher McCudden, Marc Berg, and Mitchell G. Scott
- 37 Liver Disease, 699**
William Rosenberg, Tony Badrick, and Sudeep Tanwar
- 38 Gastric, Pancreatic, and Intestinal Function, 723**
Roy A. Sherwood, Natalie E. Walsham, and Ingvar Bjarnason
- 39 Bone and Mineral Metabolism, 744**
William D. Fraser
- 40 Disorders of the Pituitary Gland, 773**
Neil S. Harris, William E. Winter, Ann McCormack, and Roger L. Bertholf
- 41 Adrenal Cortex, 787**
Roger L. Bertholf, Mark Cooper, and William E. Winter
- 42 Thyroid Disorders, 811**
Danielle B. Freedman, David Halsall, William J. Marshall, and Christina Ellervik

- 43 Reproduction-Related Disorders, 834**
Robert D. Nerenz, Emily Jungheim, and Ann Gronowski
- 44 Pregnancy and Prenatal Testing, 861**
Melanie L. Yarbrough and Ann Gronowski
- 45 Newborn Screening and Inborn Errors of Metabolism, 882**
Marzia Pasquali and Nicola Longo
- 46 Pharmacogenetics, 898**
Gwendolyn A. McMillin, Mia Wadelius, and Victoria M. Pratt

PART V Molecular Diagnostics

- 47 Molecular Principles, 914**
John Greg Howe, Elaine R. Mardis, Jason Y. Park, and Carl T. Wittwer
- 48 Molecular Techniques, 936**
Carl T. Wittwer and G. Mike Makrigiorgos
- 49 Molecular Applications, 961**
Frederick S. Nolte, D. Hunter Best, Todd William Kelley, Jay L. Patel, Evi Lianidou, Dave S.B. Hoon, Rossa W.K. Chiu, and Y.M. Dennis Lo

Appendix, 988

Index, 1029