

CONTENTS

FOREWORD	ix
PREFACE	xi
ACKNOWLEDGEMENTS	xv
LIST OF CONTRIBUTORS	xvii
ABOUT THE EDITORS	xxi

PART 1

IMMUNOASSAY FUNDAMENTALS

1.1	HOW TO USE THIS BOOK	3
	David Wild	
1.2	IMMUNOASSAY FOR BEGINNERS	7
	David Wild	
1.3	IMMUNOASSAY PERFORMANCE MEASURES	11
	Chris Davies	

PART 2

IMMUNOASSAY CONFIGURATIONS

2.1	PRINCIPLES OF COMPETITIVE AND IMMUNOMETRIC ASSAYS (INCLUDING ELISA)	29
	Chris Davies	
2.2	NON-COMPETITIVE IMMUNOASSAYS FOR SMALL MOLECULES—THE ANTI-COMPLEX AND SELECTIVE ANTIBODY SYSTEMS	61
	Colin H. Self, Stephen Thompson, Theresa Street, Kelly J. Lamb, Gordon Duffin, John L. Dessi, Maggie Turnbull	
2.3	HOMOGENEOUS IMMUNOASSAYS	67
	Edwin F. Ullman	
2.4	LATERAL FLOW IMMUNOASSAY SYSTEMS: EVOLUTION FROM THE CURRENT STATE OF THE ART TO THE NEXT GENERATION OF HIGHLY SENSITIVE, QUANTITATIVE RAPID ASSAYS	89
	Brendan O'Farrell	
2.5	AMBIENT ANALYTE ASSAY	109
	Roger Ekins	
2.6	FREE ANALYTE IMMUNOASSAY	123
	Nic D. Christofides	
2.7	QUALITATIVE IMMUNOASSAY—FEATURES AND DESIGN	139
	Jianwen He, Simon Parker	
2.8	DETECTION OF ANTIBODIES RELEVANT TO INFECTIOUS DISEASE	149
	Steven Binder, Jennifer A. Isler	
2.9	MICROSPHERE-BASED MULTIPLEX IMMUNOASSAYS: DEVELOPMENT AND APPLICATIONS USING LUMINEX® XMAP® TECHNOLOGY	157
	Sherry A. Dunbar, Michaela R. Hoffmeyer	

2.10	LAB-ON-A-CHIP, MICRO- AND NANOSCALE IMMUNOASSAY SYSTEMS, AND MICROARRAYS	175
	Simon Rattle, Oliver Hofmann, Christopher P. Price, Larry J. Kricka, David Wild	
2.11	IMMUNOLOGICAL BIOSENSORS	203
	Jason Reed, James K. Gimzewski	
2.12	SURFACE PLASMON RESONANCE IN BINDING SITE, KINETIC, AND CONCENTRATION ANALYSES	209
	Robert Karlsson	
2.13	MEASUREMENT OF SINGLE PROTEIN MOLECULES USING DIGITAL ELISA	223
	David M. Rissin, David H. Wilson, David C. Duffy	

PART 3

IMMUNOASSAY COMPONENTS

3.1	ANTIBODIES	245
	Eryl Liddell	
3.2	SIGNAL GENERATION AND DETECTION SYSTEMS (EXCLUDING HOMOGENEOUS ASSAYS)	267
	Ian Weeks, Larry J. Kricka, David Wild	
3.3	SEPARATION SYSTEMS	287
	David Wild, Wlad Kusnezow	
3.4	CONJUGATION METHODS	301
	Alastair H. Dent	
3.5	STANDARDIZATION AND CALIBRATION	315
	David Wild, Chris Sheehan	
3.6	CALIBRATION CURVE FITTING	323
	John Dunn, David Wild	

PART 4

RELATED TECHNIQUES

4.1	THE FOUNDATIONS OF IMMUNOCHEMISTRY	339
	Robert F. Ritchie	
4.2	IMMUNOHISTOCHEMISTRY AND IMMUNOCYTOCHEMISTRY	357
	Simon Renshaw	

PART 5

IMMUNOASSAY DEVELOPMENT

5.1	PRACTICAL GUIDE TO ELISA DEVELOPMENT	381
	Jianwen He	

- 5.2 METHOD EVALUATION—A PRACTICAL GUIDE 395
Chris Sheehan, Jianwen He, Mari Smith
- 5.3 INTERFERENCES IN IMMUNOASSAY 403
Jason Y. Park, Larry J. Kricka
- 5.4 IMMUNOASSAY DEVELOPMENT IN THE *IN VITRO* DIAGNOSTIC INDUSTRY 417
Doug Brandt, Steve Figard

PART 6

IMMUNOASSAY IMPLEMENTATION

- 6.1 SAMPLE COLLECTION, INCLUDING PARTICIPANT PREPARATION AND SAMPLE HANDLING 427
Colin Wilde, Dorothée Out, Sara Johnson, Douglas A. Granger
- 6.2 QUALITY ASSURANCE 441
Catharine M. Sturgeon
- 6.3 POINT-OF-CARE TESTING 455
James H. Nichols
- 6.4 CHOOSING AN AUTOMATED IMMUNOASSAY SYSTEM 465
Lori J. Sokoll
Daniel W. Chan
- 6.5 IMMUNOASSAY TROUBLESHOOTING GUIDE 469
David Wild, Jianwen He

PART 7

IMMUNOASSAY PRODUCT TECHNOLOGY

- 7.1 INTRODUCTION TO IMMUNOASSAY PRODUCT TECHNOLOGY IN CLINICAL DIAGNOSTIC TESTING 509
David Wild, Chris Sheehan, Steve Binder
- 7.2 MARKET TRENDS 517
David Huckle
- 7.3 LATERAL FLOW AND CONSUMER DIAGNOSTICS 533
Sarah Tiplady
- 7.4 CONSUMER DIAGNOSTICS—CLEARBLUE PREGNANCY AND FERTILITY TESTING 537
Sarah Tiplady
- 7.5 THE TRIAGE® SYSTEM 541
Thomas I. Koshy, Kenneth F. Buechler
- 7.6 STRATUS® CS ACUTE CARE™ STAT FLUOROMETRIC ANALYZER 545
Amy Sarli, W.N. McLellan
- 7.7 IMX® 549
Kent Ford
- 7.8 AXSYM® 555
Theresa Donahoe
- 7.9 ABBOTT ARCHITECT® FAMILY OF ANALYZERS 561
Frank A. Quinn, David A. Armbruster

- 7.10 ADVIA CENTAUR® XP 567
Jean Metzgar
- 7.11 IMMULITE® AND IMMULITE 1000 571
Arthur L. Babson
- 7.12 IMMULITE® 2000 AND IMMULITE 2000 XPI 575
Arthur L. Babson
- 7.13 VITROS® ECIQ IMMUNODIAGNOSTIC SYSTEM, VITROS® 3600 IMMUNODIAGNOSTIC SYSTEM, AND VITROS® 5600 INTEGRATED SYSTEM 579
John W. Backus, David Wild
- 7.14 VITROS® IMMUNO-RATE AND MICROTIPTM ASSAYS 585
John W. Backus, Susan J. Danielson, David A. Hilborn
- 7.15 ACCESS 2 589
Katherine M. Leith
- 7.16 DXI 600 AND DXI 800 597
Katherine M. Leith
- 7.17 ELECSYS® IMMUNOASSAY SYSTEMS 603
Mary Beth Myers
- 7.18 PRISM™ 609
Dinesh Shah, Jim Stewart
- 7.19 PHADIA LABORATORY SYSTEMS 617
Angela Gore, Gareth Evans, Mats Rilvén

PART 8

IMMUNOASSAY APPLICATIONS OTHER THAN CLINICAL CHEMISTRY

- 8.1 IMMUNOASSAY APPLICATIONS IN VETERINARY DIAGNOSTICS 623
Thomas P. O'Connor, Jr., John Lawrence, Philip Andersen, Valerie Leathers, Erwin Workman
- 8.2 LIGAND BINDING ASSAYS IN DRUG DEVELOPMENT 647
Jeffrey M. Sailstad, Ronald R. Bowsher, Omar F. Laterza, William Nowatzke

PART 9

IMMUNOASSAY CLINICAL APPLICATIONS (HUMAN)

- 9.1 CLINICAL CONCEPTS 661
Chris Davies
- 9.2 THYROID 673
Rhys John, Nic Christofides, Carole A. Spencer, David Wild
- 9.3 THE ADRENAL CORTEX 695
Les Perry, Sami Medbak
- 9.4 BONE AND CALCIUM METABOLISM 705
William D. Fraser, Kay W. Colston, John C. Stevenson
- 9.5 INFERTILITY 721
Michael J. Wheeler
- 9.6 *IN VITRO* FERTILIZATION AND EMBRYO TRANSFER (IVF-ET) 735
Richard Fleming, Sherry Faye

- 9.7 HIRSUTISM AND VIRILIZATION IN THE FEMALE 745
Michael J. Wheeler
- 9.8 PREGNANCY 757
Kevin Spencer, Tim Chard
- 9.9 GROWTH AND GROWTH HORMONE DEFICIENCY 777
Gill Rumsby, Peter Hindmarsh, Michael Preece, Jane Pringle
- 9.10 DIABETES MELLITUS 783
Penny Clark, Tim McDonald
- 9.11 HEMATOLOGY 795
Katy Evans, Zane Amenhotep, Derek Dawson, Harry Waters, John Ardern
- 9.12 CARDIAC MARKERS 817
Deborah French, Alan H.B. Wu
- 9.13 CANCER MARKERS 833
Hoon H. Sunwoo, Mavanur R. Suresh
- 9.14 ALLERGY 857
Marcos Alcocer, Lars Yman
- 9.15 AUTOIMMUNE DISEASE 869
David F. Keren
- 9.16 GASTROINTESTINAL TRACT 891
Arne Røseth, Richard Chapman, Radra Ramachandran, Chris Sheehan
- 9.17 HEPATITIS 901
Ravi Kaul
- 9.18 HIV-1 AND HIV-2: CAUSATIVE AGENTS OF AIDS 913
Catherine A. Brennan, Sushil G. Devare
- 9.19 VIRAL DISEASES 919
Carey-Ann D. Burnham, Christopher Doern, Steven R Binder
- 9.20 BACTERIAL DISEASES 929
Carey-Ann D. Burnham, Christopher Doern, Steven R. Binder
- 9.21 PARASITES AND FUNGI 939
Steven R. Binder, Patrice D. Sarfati
- 9.22 THERAPEUTIC DRUG MONITORING (TDM) 945
Philip A. Routledge, Alun D. Hutchings
- 9.23 DRUGS OF ABUSE 963
Alun D. Hutchings, Brian Widdop
- INDEX 989

Color version of figures in this book can be found at www.immunoassayhandbook.com