

Contents

PART I. Sample Preparation

- Chapter 1 Applications of Pressure Cycling Technology (PCT) in Proteomics 3

*Feng Tao, James Behnke, Chunqin Li,
Calvin Saravis, Richard T. Schumacher, and
Nathan P. Lawrence*

- Chapter 2** Applications of Ion-Exchange (IEX) Chromatography to Reduce Sample Complexity Prior to Two-Dimensional Gel Electrophoresis (2DE) 19

Malcolm G. Pluskal, Eva Golenko, and Mary F. Lopez

- Chapter 3** Separations in Proteomics: Use of Camelid Antibody Fragments in the Depletion and Enrichment of Human Plasma Proteins for Proteomics Applications 29

Mark ten Haaf, Pim Hermans, and Bruce Dawson

- | | | |
|------------------|--|----|
| Chapter 4 | Novel Plasma Protein Separation Strategy Using Multiple Avian IgY Antibodies for Proteomic Analysis | 41 |
|------------------|--|----|

*Sun W. Tam, Lei Huang, Douglas Hinerfeld,
David Innamorati, Xiangming Fang,
Wei-Wei Zhang, John Pirro, and Jerald S. Feitelson*

- Chapter 5 Immunoaffinity Depletion of High-Abundant Proteins for Proteomic Sample Preparation 63

*Nina Zolotarjova, Barry Boyes, James Martosella,
Liang-Sheng Yang, Gordon Nicol, Kelly Zhang,
Cory Szafranski, and Jerome Bailey*

- Chapter 6** Isolation of Plasma Membrane Proteins for Proteomic Analysis 81

Catherine Fenselau and Amir Rahbar

- Chapter 7** New Ultrafiltration and Solid Phase Extraction Techniques Improve Serum Peptide Detection 89

*Elena Chernokalskaya, Sara Gutierrez,
Aldo M. Pitt, Alexander V. Lazarev, and Jack T. Leonard*

PART II Sample Prefractionation and Analysis

- Chapter 8** Tools for Sample Preparation and Prefractionation in Two-Dimensional (2D) Gel Electrophoresis 107

Anton Posch, Aran Paulus, and Mary Grace Brubacher

- Chapter 9** Optic Nerve Fractionation for Proteomics 135

*Sanjoy K. Bhattacharya, John S. Crabb,
Suresh P. Annangudi, Karen A. West, Xiaorong Gu,
Jian Sun, Vera L. Bonilha, Gary B. Smejkal,
Karen Shadrach, Joe G. Hollyfield, and John W. Crabb*

- Chapter 10** Fractionation of Retina for Proteomic Analyses 157

*Sanjoy K. Bhattacharya, Karen A. West,
Xiaorong Gu, John S. Crabb, Kutralanathan Renganathan,
Zhiping Wu, Jian Sun, and John W. Crabb*

- Chapter 11** Reducing Protein Sample Complexity with Free Flow Electrophoresis (FFE) 187

Askar Kuchumov, Gerhard Weber, and Christoph Eckerskorn

PART III Applications of Electrophoresis in Proteomics

- Chapter 12** Destreaking Strategies for Two-Dimensional Electrophoresis 207

Fengju Bai, Sheng Liu, and Frank A. Witzmann

- Chapter 13** Proteomic Approaches to the Study of Rheumatoid Arthritis 219

*Mikaela Antonovici, Kumar Dasuri, Hani El-Gabalawy,
and John A. Wilkins*

Chapter 14	Immunoglobulin Patterns in Health and Disease	235
	<i>Ingrid Miller and Marcia Goldfarb</i>	
Chapter 15	Difference Gel Electrophoresis (DIGE)	269
	<i>Mustafa Ünlü and Jonathan Minden</i>	
Chapter 16	Principles and Challenges of Basic Protein Separation by Two-Dimensional (2D) Electrophoresis	287
	<i>Anton Posch, Aran Paulus, and Mary Grace Brubacher</i>	
Chapter 17	Multidimensional Separation of Membrane Proteins	301
	<i>Susan Francis-McIntyre and Simon J. Gaskell</i>	
Chapter 18	Structural Approaches in Glycoproteomics	321
	<i>Heidi Geiser, Cristina Silvescu, and Vernon Reinhold</i>	
Chapter 19	Enrichment and Analysis of Glycoproteins in the Proteome	345
	<i>Nicole L. Wilson, Niclas G. Karlsson, and Nicolle H. Packer</i>	

PART IV *Applications of High-Performance Liquid Chromatography*

Chapter 20	Proteomic Analyses Using High-Efficiency Separations and Accurate Mass Measurements	363
	<i>Jon M. Jacobs and Richard D. Smith</i>	
Chapter 21	Middle-Out Proteomics: Incorporating Multidimensional Protein Fractionation and Intact Protein Mass Analysis as Elements of a Proteomic Workflow	387
	<i>Scott J. Berger, Kevin M. Millea, Ira S. Krull, and Steven A. Cohen</i>	
Chapter 22	Polymeric Monolithic Capillary Columns in Proteomics	419
	<i>Alexander R. Ivanov</i>	

PART V **Related Techniques**

- Chapter 23** Proteins Staining in Polyacrylamide Gels 439
Gary B. Smejkal
- Chapter 24** Multiplexed Proteomics: Fluorescent Detection of Proteins,
Glycoproteins, and Phosphoproteins in Two-Dimensional
(2D) Gels 453
Birte Aggeler-Schulenberg
- Chapter 25** Glyoxyl Agarose and Its Composite Gels: Advantageous
Alternatives to Polyacrylamide Gel Electrophoresis for
Very Large and Small Proteins and Peptides and
All Sizes in Between 461
John R. Shainoff
- Chapter 26** Nuclear Magnetic Resonance-Driven Chemical Proteomics:
The Functional and Mechanistic Complement to Proteomics 467
Phani Kumar Pullela and Daniel S. Sem
- Chapter 27** Electrophoretic Nuclear Magnetic Resonance in Proteomics:
Toward High-Throughput Structural Characterization of
Biological Signaling Processes 489
QiuHong He and Xiangjin Song
- Index 505