

Contents

Contributors	xi
Series Preface	xix
Volume Preface	xxi
PART 1: INTRODUCTION	1
Mechanisms Controlling the Cellular Metal Economy	3
<i>Benjamin A. Gilston and Thomas V. O'Halloran</i>	
PART 2: PROBING METALS AND CROSS TALK IN THE METALLOME	15
The Metallome	17
<i>Vadim N. Gladyshev and Yan Zhang</i>	
Cyanobacterial Models that Address Cross-Talk in Metal Homeostasis	39
<i>Carl J. Patterson, Rafael Pernil, Andrew W. Foster and Nigel J. Robinson</i>	
Sparing and Salvaging Metals in Chloroplasts	51
<i>Crysten E. Blaby-Haas and Sabeeha S. Merchant</i>	
Fluorescent Probes for Monovalent Copper	65
<i>M. Thomas Morgan, Pritha Bagchi and Christoph J. Fahrni</i>	
Fluorescent Zinc Sensors	85
<i>Amy E. Palmer, Jose G. Miranda and Kyle P. Carter</i>	
X-Ray Fluorescence Microscopy	99
<i>James E. Penner-Hahn</i>	
PART 3: MOVING METALS IN CELLS	111
Iron and Heme Transport and Trafficking	113
<i>Yvette Y. Yien and Barry H. Paw</i>	
Iron in Plants	131
<i>Jessica B. Weng and Mary Lou Guerinot</i>	

Transport of Nickel and Cobalt in Prokaryotes <i>Thomas Eitinger</i>	145
Transport Mechanism and Cellular Functions of Bacterial Cu(I)-ATPases <i>José M. Argüello, Teresita Padilla-Benavides and Jessica M. Collins</i>	155
Copper Transport in Fungi <i>Simon Labbé, Jude Beaudoin and Raphaël Ioannoni</i>	163
Structural Biology of Copper Transport <i>Adrian G. Flores, Christopher R. Pope and Vinzenz M. Unger</i>	175
Zinc Transporters and Trafficking in Yeast <i>Yi-Hsuan Wu and David J. Eide</i>	183
Cadmium Transport in Eukaryotes <i>Nathan Smith, Wenzhong Wei and Jaekwon Lee</i>	195
PART 4: METALS IN REGULATION	207
Metal Specificity of Metallosensors <i>Khadine A. Higgins and David P. Giedroc</i>	209
Metal Homeostasis and Oxidative Stress in <i>Bacillus subtilis</i> <i>Zhen Ma and John D. Helmann</i>	225
Regulation of Manganese and Iron Homeostasis in the Rhizobia and Related α-Proteobacteria <i>Mark R. O'Brian</i>	237
The Iron Starvation Response in <i>Saccharomyces cerevisiae</i> <i>Caroline C. Philpott and Pamela M. Smith</i>	249
Hepcidin Regulation of Iron Homeostasis <i>Clara Camaschella and Laura Silvestri</i>	265
NikR: Mechanism and Function in Nickel Homeostasis <i>Michael D. Jones, Andrew M. Sydor and Deborah B. Zamble</i>	277
Regulation of Copper Homeostasis in Plants <i>Marinus Pilon and Wiebke Tapken</i>	289
Regulation of Zinc Transport <i>Taiho Kambe</i>	301

Selenoproteins—Regulation	311
<i>Lucia A. Seale and Marla J. Berry</i>	
 PART 5: METALS IN CELLULAR DAMAGE AND DISEASE	321
 Metals in Bacterial Pathogenicity and Immunity	323
<i>Jennifer S. Cavet</i>	
 Manganese in Neurodegeneration	335
<i>Daiana Silva Avila, Robson Luiz Puntel, Felix Antunes Soares, Joao Batista Teixeira da Rocha and Michael Aschner</i>	
 Iron Sequestration in Immunity	349
<i>Colin Correnti and Roland K. Strong</i>	
 Molecular Basis of Hemochromatosis	361
<i>Paul J. Schmidt</i>	
 Copper in Brain and Neurodegeneration	373
<i>Jeffrey R. Liddell, Ashley I. Bush and Anthony R. White</i>	
 Copper Transporting ATPases in Mammalian Cells	395
<i>Nan Yang and Svetlana Lutsenko</i>	
 Copper in Immune Cells	409
<i>Karrera Y. Djoko, Maud E.S. Achard and Alastair G. McEwan</i>	
 Selenoenzymes and Selenium Trafficking: An Emerging Target for Therapeutics	421
<i>William Self and Sarah Rosario</i>	
 Resistance Pathways for Metalloids and Toxic Metals	429
<i>Zijuan Liu, Christopher Rensing and Barry P. Rosen</i>	
 PART 6: COFACTOR ASSEMBLY	443
 Fe-S Cluster Biogenesis in Archaea and Bacteria	445
<i>Harsimranjit K. Chahal, Jeff M. Boyd and F. Wayne Outten</i>	
 Mitochondrial Iron Metabolism and the Synthesis of Iron-Sulfur Clusters	473
<i>Andrew Dancis and Paul A. Lindahl</i>	
 [FeFe]-Hydrogenase Cofactor Assembly	491
<i>Eric M. Shepard, Amanda S. Byer, Eric S. Boyd, Kevin D. Swanson, John W. Peters and Joan B. Broderick</i>	
 [NiFe]-Hydrogenase Cofactor Assembly	507
<i>Basem Soboh and R. Gary Sawers</i>	

Copper in Mitochondria <i>Katherine E. Vest and Paul A. Cobine</i>	517
Mo Cofactor Biosynthesis and Crosstalk with FeS <i>Florian Bittner and Ralf R. Mendel</i>	529
Nitrogenase Cofactor Assembly <i>Jared A. Wiig, Chi Chung Lee, Markus W. Ribbe and Yilin Hu</i>	543
Index	555