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Metal-Specific Fluorophores; 3.1.1 Metal-Binding Equilibria; 3.1.2 Other Considerations; 3.1.3 Exogenous Fluorophores; 3.1.4 Endogenous Fluorophores; 3.2 Two-Photon Excitation; 3.3 Examples
4 Intrinsic X-Ray Fluorescence4.1 Particle Excitation; 4.2 X-ray Excitation; 4.3 Examples; 4.3.1 Metal Speciation; 5 Concluding Remarks and Future Directions; Abbreviations and Definitions; References; Chapter 3: Sodium/Potassium Homeostasis in the Cell; 1 Introduction; 2 Sodium and Potassium as Enzymatic Cofactors; 2.1 Ionic Properties; 2.2 Sodium- and Potassium-Dependent Enzymes; 3 The Membrane Potential; 3.1 The Action Potential; 4 Na + and K + Gradients and Secondary Transporters; 4.1 Uptake of Amino Acids, Sugars, and Transmitters; 4.2 Co-transporters in Cell Volume and Ion Balances 4.2.1 Cell Volume4.2.2 Inhibitory or Excitatory Action of g -Aminobutyric Acid; 4.2.3 Re-uptake of Inorganic Solutes; 5 Homeostasis of the Na + and K + Gradients by the Na +,K + -ATPase; 5.1 The Subunits of the Na +,K + -ATPase; 5.2 The Structure of the Na +,K + -ATPase; 5.3 The Mechanism of the Na +,K + -ATPase; 5.4 Regulation of the Na +,K + -ATPase; 5.4.1 Posttranslational Modifications; 5.4.2 Cellular Interactions; 5.5 Na +,K + -ATPase Toxins; 5.5.1 Cardiotonic Glycosides; 5.5.2 Palytoxin; 6 Pathophysiology of Na +,K + -ATPase Disturbance; 7 Concluding Remarks and Future Directions
AbbreviationsReferences; Chapter 4: Magnesium Homeostasis in Mammalian Cells; 1 Introduction; 2 Cellular Mg 2+ Distribution; 3 Mg 2+ Transport Mechanisms; 3.1 Channels; 3.1.1 TRPM Channels; 3.1.1.1 TRPM7:; 3.1.1.2 TRPM6:; 3.1.2 Claudins; 3.1.3 MagT1; 3.1.4 Mrs2; 3.1.5 MMgTs; 3.2 Exchangers; 3.2.1 Na + -Dependent Exchanger (Na + /Mg 2+ Exchanger); 3.2.2 Na + -Independent Exchanger; 3.2.3 Mg 2+ /H + Exchange; 3.3 Carriers; 3.3.1 SLC41 (Solute Carrier Family 41); 3.3.2 ACDP2; 3.3.3 NIPA; 3.3.4 Huntingtin; 3.4 Mg 2+ Transport in Purified Plasma Membrane Vesicles
4 Regulation of Mg 2+ Transport and Homeostasis

Sommario/riassunto

Metallomics and the Cell provides in an authoritative and timely manner in 16 stimulating chapters, written by 37 internationally recognized experts from 9 nations, and supported by more than 3000 references, several tables, and 110 illustrations, mostly in color, a most up-to-date view of the "metallomes" which, as defined in the "omics" world, describe the entire set of biomolecules that interact with or are affected by each metal ion. The most relevant tools for visualizing metal ions in the cell and the most suitable bioinformatic tools for browsing genomes to identify metal-binding proteins are also presented. Thus, this book is of relevance for structural and systems biology, inorganic biological chemistry, genetics, medicine, diagnostics, as well as teaching, etc. Lucia Banci is a bioinorganic chemist and a structural biologist who is studying, among various topics, metal transport and metal homeostasis processes. She is aiming towards a cellular perspective in the spirit of mechanistic systems biology, with the goal of describing functional processes with atomic resolution in a cellular context.