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Titolo	The Alkali Metal Ions: Their Role for Life / / edited by Astrid Sigel, Helmut Sigel, Roland K. O. Sigel
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Collana	Metal Ions in Life Sciences, , 1559-0836 ; ; 16
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Soggetti	Biochemistry Biochemistry, general
Lingua di pubblicazione	Inglese
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Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Bioinorganic Chemistry of the Alkali Metal Ions -- Determination of Alkali Ions in Biological and Environmental Samples -- Solid State Structures of Alkali Metal Ion Complexes Formed by Low-Molecular-Weight Ligands of Biological Relevance -- Discriminating Properties of Alkali Metal Ions towards the Constituents of Proteins and Nucleic Acids. Conclusions from Gas-Phase and Theoretical Studies -- Alkali Metal Ion Complexes with Phosphates, Nucleotides, Amino Acids, and Related Ligands of Biological Relevance. Their Properties in Solution -- Sodium and Potassium Interactions with Nucleic Acids -- Role of Alkali Metal Ions in G-Quadruplex Nucleic Acid Structure and Stability -- Sodium and Potassium Ions in Proteins and Enzyme Catalysis -- Roles and Transport of Sodium and Potassium in Plants -- Potassium versus Sodium Selectivity in Monovalent Ion Channel Selectivity Filters -- Sodium as Coupling Cation in Respiratory Energy Conversion -- Sodium-Proton (Na+/H+) Antiporters: Properties and Roles in Health and Disease -- Proton-Potassium (H+/K+) ATPases: Properties and Roles in Health and Diseases -- Bioinspired Artificial Sodium and Potassium Ion Channels -- Lithium in Medicine: Mechanisms of Action -- Sodium and Potassium Relating to Parkinson's Disease and Traumatic Brain Injury.
Sommario/riassunto	MILS-16 provides an up-to-date review of the impact of alkali metal

ions on life. Their bioinorganic chemistry and analytical determination, the solid state structures of bio-ligand complexes and the properties of alkali metal ions in solution in the context of all kinds of biologically relevant ligands are covered, this includes proteins (enzymes) and nucleic acids (G-quadruplexes). Minerals containing sodium (Na^+) and potassium (K^+) are abundant in the Earth's crust, making Na^+ and K^+ easily available. In contrast, the alkali elements lithium (Li^+), rubidium, and cesium are rare and the radioactive francium occurs only in traces. Since the intra- and extracellular, as well as the compartmental concentrations of Na^+ and K^+ differ significantly, homeostasis and active transport of these ions are important; this involves transporters/carriers and pore-forming ion channel proteins. Systems like Na^+/K^+-ATPases, H^+/K^+-ATPases or Na^+/H^+ antiporters are thoroughly discussed. The role of K^+ in photosynthesis and the role of Na^+ in charging the "battery of life" are pointed out. Also, the relationships between alkali metal ions and diseases (e.g., Parkinson or traumatic brain injury) are covered and the relevance of Li^+ salts in medicine (pharmacology and mechanism) is reviewed. This and more is treated in an authoritative and timely manner in the 16 stimulating chapters of Volume 16, The Alkali Metal Ions: Their Role for Life, which are written by 44 internationally recognized experts from 12 nations. The impact of this vibrant research area is manifested in nearly 3000 references, over 30 tables and more than 150 illustrations (two thirds in color). MILS-16 also provides excellent information for teaching. Astrid Sigel, Helmut Sigel, and Roland K. O. Sigel have long-standing interests in Biological Inorganic Chemistry. Their research focuses on metal ion interactions with nucleotides and nucleic acids and on related topics. They edited previously 44 volumes in the series Metal Ions in Biological Systems.