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Autore	Uchiyama Seiichi
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Nota di contenuto	Intro -- Intracellular Thermometry with Fluorescent Molecular Thermometers -- Preface -- Contents -- 1 Temperature for Living

Things -- 1.1 Temperature of Individuals -- 1.2 Responses to Temperature Variation at the Cellular Level -- 1.3 Significance of Intracellular Thermometry -- References -- 2 Fluorescent Molecular Thermometers -- 2.1 The Basics of Fluorescence -- 2.2 Responses of Fluorescent Molecular Thermometers -- 2.3 Small Organic Molecules Involving Intersystem Crossing -- 2.4 Small Organic Molecules with a Rotating Substituent Group -- 2.5 Reactive Small Organic Molecules -- 2.6 Viscosity-Sensitive Small Organic Molecules -- 2.7 Other Small Organic Molecules -- 2.8 Organometallic Complexes -- 2.9 Excimers and Exciplexes -- 2.10 Host-guest Interactions -- 2.11 Synthetic Polymers -- 2.12 Nucleic Acids (DNA and RNA) -- 2.13 Peptides -- 2.14 Fluorescent Proteins -- 2.15 Non-covalent Systems Based on Thermo-responsive Self-assembly and an Environment-sensitive Fluorophore -- 2.16 Inorganic Nanomaterials -- 2.17 Hybrid Nanomaterials -- References -- 3 Intracellular Thermometry with Fluorescent Molecular Thermometers -- 3.1 Early Attempts for Cellular Thermometry -- 3.2 Introduction of Fluorescent Molecular Thermometers into a Living Cell -- 3.3 Cytotoxicity Assessment -- 3.4 Practice of Intracellular Thermometry with Fluorescent Molecular Thermometers -- 3.5 Intracellular Thermometry with Organelle-targeted Fluorescent Molecular Thermometers -- 3.6 Intracellular Thermometry of Brown Adipocytes -- 3.7 Application of Intracellular Thermometry in Various Biological Fields -- References -- 4 Cellular Thermometry Based on Non-fluorometric Principles -- 4.1 Infrared Thermometry -- 4.2 Photoacoustic Thermometry -- 4.3 Raman Thermometry -- 4.4 Use of Transmission Spectroscopy -- 4.5 Thermocouple -- 4.6 Resonant Thermal Sensor.

4.7 Bimaterial Microcantilever -- 4.8 Thermistor -- References -- 5 Reliability Issue in Intracellular Thermometry -- 5.1 Sensitivity and Temperature Resolution -- 5.2 Functional Independency of Fluorescent Molecular Thermometers -- 5.3 Preparation of a Calibration Curve of Fluorescent Molecular Thermometers -- 5.4 Objection to Endogenous Thermogenesis -- 5.5 Possible Artifacts in Near-infrared Luminescent Thermometry and Proposal for Reliable Thermometry -- References -- 6 Applications of Intracellular Thermometry -- 6.1 Creation of New Biological Concepts -- 6.2 In vivo Temperature Measurements -- 6.3 Thermal Medicine at a Single-cell Level -- 6.4 Utilization of Nanoheater/Fluorescent Thermometer Hybrids in Biotechnology -- 6.5 Accurate Measurements of Absolute Intracellular Temperature -- 6.6 Simultaneous Monitoring of Intracellular Temperature and the Concentration of a Chemical Species Related to a Temperature Variation Inside a Living Cell -- 6.7 Intracellular Thermometry of Plant Cells -- References -- Appendix 1 Review and Feature Articles on Fluorescent Molecular Thermometers and Intracellular Thermometry in General -- Appendix 2 Comprehensive Collection of Fluorescent Polymeric Thermometers Based on the Combination of a Thermoresponsive Polymer and an Environment-sensitive Fluorophore -- Appendix 3 Comprehensive Collection of Fluorescent Nanogel Thermometers Based on the Combination of a Thermo-responsive Polymer and an Environment-sensitive Fluorophore -- Appendix 4 Comprehensive Collection of Non-covalent Fluorescent Temperature Sensing Systems Based on the Combination of a Thermo-responsive Polymer and an Environment-sensitive Fluorescent Compound -- Appendix 5 Comprehensive Collection of Fluorescent Polymeric Logic Gates Based on the Combination of a Thermo-responsive Polymer and an Environment-sensitive Fluorophore.

Appendix 6 Solid Inorganic Nanostructures Showing Temperature-dependent Emission Properties -- Appendix 7 Tips for

Sommario/riassunto

This book, written by Dr. Seiichi Uchiyama, explores the advanced field of intracellular thermometry using fluorescent molecular thermometers. It delves into the principles of temperature measurement within living cells, highlighting the significance and applications of such measurements in biology, medicine, and biotechnology. The text covers a wide range of topics, including the chemical and photophysical properties of fluorescent molecules, various techniques for temperature sensing, and the integration of these thermometers into biological systems. Uchiyama aims to bridge the gap between chemistry and biology, providing detailed chemical insights alongside general biological and medical applications. The book is tailored for researchers and practitioners in the fields of analytical chemistry, cell biology, and thermal medicine, presenting a comprehensive overview of the current state and future potential of intracellular thermometry.