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Aequorin Luminescence; 1.4.7 Recombinant Aequorin; 1.4.8 Semi-synthetic Aequorins; 1.4.8.1 e-Aequorins; References; 2 Luminous Marine Organisms; 2.1 Introduction; 2.1.1 Non-luminous Taxa 2.1.2 Luminous Taxa 2.2 Taxonomic Distribution of Bioluminescence; 2.2.1 Bacterial Luminescence; 2.2.2 Dinoflagellate Luciferin; 2.2.3 Cypridina (Vargula) Luciferin; 2.2.4 Coelenterazine; 2.2.5 Other Luciferins: Known and Unknown; 2.3 Functions; 2.3.1 Startle or Distract; 2.3.2 Burglar Alarm; 2.3.3 Counterillumination; 2.3.4 Mating Displays; 2.3.5 Prey Attraction; References; 3 Beetle Luciferases: Colorful Lights on Biological Processes and Diseases; 3.1 Introduction; 3.2 Beetle Luciferases; 3.3 Bioanalytical Assays of ATP; 3.3.1 Biomass Estimation and Microbiological Contamination 3.3.2 Cytotoxicity and Cell Viability Tests 3.3.3 Enzymatic Assays; 3.4 Luciferases as Reporter Genes; 3.4.1 Dual and Multiple Reporter Assays; 3.5 Biophotonic Imaging in Animals: A Living Light on Diseases; 3.5.1 Pathogen Infection in Living Models; 3.5.2 Drug Screening; 3.5.3 Tumor Proliferation and Regression Studies; 3.5.4 Gene Delivery and Gene Therapy; 3.5.5 Luciferase as Biomarkers for Cell Trafficking Studies; 3.5.6 Immunoassays; 3.6 Biophotonic Imaging in Plants; 3.7 Biosensors: Sensing the Environment; 3.8 Novel Luciferases: Different Colors for Different Occasions; References 4 Split Luciferase Systems for Detecting Protein-Protein Interactions in Mammalian Cells Based on Protein Splicing and Protein Complementation 4.1 Introduction; 4.2 Protein Splicing-based Split Firefly Luciferase System [23]; 4.2.1 Split Luciferase Works as a Probe for Protein Interaction; 4.3 Split Renilla Luciferase Complementation System [33]; 4.3.1 Time Course of the Interaction Between Y941 and SH2n; 4.3.2 Location of the Interaction Between Y941 and SH2n; References; 5 Photoproteins in Nucleic Acid Analysis; 5.1 Hybridization Assays; 5.2 Quantitative Polymerase Chain Reaction 5.3 Genotyping of Single-nucleotide Polymorphisms

Sommario/riassunto

The use of light-emitting proteins for the detection of biomolecules provides fast and sensitive methods which overcome the disadvantages of radioactive labels and the high cost of fluorescent dyes. This reference work summarizes modern advanced techniques and their applications and includes practical examples of assays based on photoproteins. The book presents contemporary key topics like luminescent marine organisms, DNA probes, reporter gene assays and photoproteins, ratiometric sensing, use of photoproteins for in vivo functional imaging and luminescent proteins in binding assays, to na