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| Nota di contenuto | Bioelectrochemistry Fundamentals, Experimental Techniques and Applications; Contents; List of Contributors; Preface; 1 Bioenergetics and Biological Electron Transport; 1.1 Introduction; 1.2 Biological Cells; 1.3 Chemiosmosis; 1.3.1 The Proton Motive Force; 1.3.2 The Synthesis of ATP; 1.4 Electron Transport Chains; 1.4.1 The Mitochondrion; 1.4.2 The NADH-CoQ Reductase Complex; 1.4.3 The Succinate-CoQ Reductase Complex; 1.4.4 The CoQH 2 -Cytc Reductase Complex; 1.4.5 The Cytc Oxidase Complex; 1.4.6 Electron Transport Chains in Bacteria; 1.4.7 Electron Transfer in Photosynthesis<br>1.4.8 Photosystem II1.4.9 Cytochromebf Complex; 1.4.10 Photosystem I; 1.4.11 Bacterial Photosynthesis; 1.5 Redox Components; 1.5.1 Quinones; 1.5.2 Flavins; 1.5.3 NAD(P)H; 1.5.4 Hemes; 1.5.5 Iron-Sulfur Clusters; 1.5.6 Copper Centres; 1.6 Governing Principles; 1.6.1 Spatial Separation; 1.6.2 Energetics: Redox Potentials; 1.6.3 Kinetics: Electron Transfer Rate Constants; 1.6.4 Size of Proteins; 1.6.5 One-Electron and Two-Electron Couples; 1.7 ATP Synthase; 1.8 Conclusion; References; 2 Electrochemistry of Redox Enzymes; 2.1 Introduction; 2.1.1 Historical Perspective<br>2.1.2 Examples of Soluble Mediators2.1.3 Development of Protein-Film |

Voltammetry and Direct Enzyme Electrochemistry; 2.2 Mediated Enzyme Electrochemistry; 2.2.1 Electron Mediation; 2.2.2 Wiring with Redox Metallopolymer Hydrogels; 2.2.3 Wiring with Conducting Polymers; 2.2.4 NAD(P) /NAD(P)H Dependent Enzymes; 2.2.5 Regeneration of NAD(P)H from NAD(P); 2.2.6 Regeneration of NAD(P) from NAD(P)H; 2.3 Direct Electron Transfer between Electrodes and Enzymes; 2.3.1 Enzymes in Solution; 2.3.2 Enzyme-Film Voltammetry: Basic Theory; 2.3.3 Adsorbed and Coadsorbed Enzyme Monolayers
2.3.4 Self-Assembled Monolayers and Covalently Attached Enzymes2. 3.5 Enzymes on Carbon Nanotube Electrodes; 2.3.6 Enzymes in Lipid Bilayer Films; 2.3.7 Polyion Films and Layer-by-Layer Methods; 2.4 Outlook for the Future; Acknowledgements; References; 3 Biological Membranes and Membrane Mimics; 3.1 Introduction; 3.2 Membrane Structure and Composition; 3.2.1 Membrane Structure; 3.2.2 Membrane Lipids; 3.2.3 Membrane Proteins; 3.3 Models of Membrane Structure; 3.3.1 Lipid Monolayers; 3.3.2 Bilayer Lipid Membranes (BLM); 3.3.3 Supported Bilayer Lipid Membranes; 3.3.4 Liposomes
3.4 Ordering, Conformation and Molecular Dynamics of Lipid Bilayers3. 4.1 Structural Parameters of Lipid Bilayers Measured by X-ray Diffraction; 3.4.2 Interactions between Bilayers; 3.4.3 Dynamics and Order Parameters of Bilayers Determined by EPR and NMR Spectroscopy and by Optical Spectroscopy Methods; 3.5 Phase Transitions of Lipid Bilayers; 3.5.1 Lyotropic and Thermotropic Transitions; 3.5.2 Thermodynamics of Phase Transitions; 3.5.3 Trans-Gauche Isomerization; 3.5.4 Order Parameter; 3.5.5 Cooperativity of Transition; 3.5.6 Theory of Phase Transitions
3.6 Mechanical Properties of Lipid Bilayers

Sommario/riassunto

Bioelectrochemistry: Fundamentals, Experimental Techniques and Application, covers the fundamental aspects of the chemistry, physics and biology which underlie this subject area. It describes some of the different experimental techniques that can be used to study bioelectrochemical problems and it describes various applications of biolelectrochemisty including amperometric biosensors, immunoassays, electrochemistry of DNA, biofuel cells, whole cell biosensors, in vivo applications and bioelectrosynthesis.  By bringing together these different aspects, this work provides a uniqu