

1. Record Nr.	UNINA9910144002403321
Titolo	Bioelectronics [[electronic resource] ] : from theory to applications / / edited by Itamar Willner and Eugenii Katz
Pubbl/distr/stampa	Weinheim ; ; [Great Britain], : Wiley-VCH, c2005
ISBN	1-280-51958-4 9786610519583 3-527-60376-X 3-527-60418-9
Descrizione fisica	1 online resource (495 p.)
Altri autori (Persone)	WillnerItamar KatzEugenii
Disciplina	572.437
Soggetti	Bioelectronics Biology Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Bioelectronics; Contents; Preface; List of Contributors; 1 Bioelectronics - An Introduction; References; 2 Electron Transfer Through Proteins; 2.1 Electronic Energy Landscapes; 2.2 Theory of Electron Tunneling; 2.3 Tunneling Pathways; 2.4 Coupling-limited ET Rates and Tests of the Pathway Model; 2.5 Multiple Tunneling Pathway Models; 2.6 Interprotein Electron Transfer: Docking and Tunneling; 2.7 Some New Directions in Electron Transfer Theory and Experiment; 2.8 Concluding Remarks; References 3 Reconstituted Redox Enzymes on Electrodes: From Fundamental Understanding of Electron Transfer at Functionalized Electrode Interfaces to Biosensor and Biofuel Cell Applications3.1 Introduction; 3.2 Electrodes Functionalized with Reconstituted Redox Proteins; 3.2.1 Reconstituted Flavoenzyme-Electrodes Using Molecular or Polymer Relay Systems; 3.2.2 Electrical Contacting of Flavoenzymes by Reconstitution on Carbon Nanotubes and Conducting Polymer Wires; 3.2.3 Electrical Contacting of Flavoenzymes by Means of Metallic Nanoparticles

3.2.4 Integrated Electrically Contacted Electrodes Composed of Reconstituted Quinoproteins; 3.2.5 Reconstituted Electrically Contacted Hemoproteins; 3.2.6 Reconstituted de novo Hemoproteins on Electrodes; 3.3 Electrical Contacting of Redox Proteins by Cross-linking of Cofactor-Enzyme Affinity Complexes on Surfaces; 3.3.1 Integrated NAD(P)(+)-Dependent Enzyme-Electrodes; 3.3.2 Integrated Electrically Contacted Hemoprotein Electrodes; 3.4 Reconstituted Enzyme-Electrodes for Biofuel Cell Design; 3.5 Conclusions and Perspectives; References

4 Application of Electrically Contacted Enzymes for Biosensors; 4.1 Introduction; 4.2 Biosensors - Precursors of Bioelectronics; 4.3 Via Miniaturization to Sensor Arrays - The Biochip; 4.4 The Route to Electrically Contacted Enzymes in Biosensors; 4.5 Routine Applications of Enzyme Electrodes; 4.6 Research Applications of Directly Contacted Proteins; 4.6.1 Protein Electrodes for the Detection of Oxygen-derived Radicals; 4.6.2 Cytochrome P 450 - An Enzyme Family Capable of Direct Electrical Communication; 4.7 Conclusions; References; 5 Electrochemical DNA Sensors; 5.1 Introduction; 5.1.1 Indicator Electrodes; 5.1.2 Electrochemical Methods; 5.2 Natural Electroactivity and Labeling of Nucleic Acids; 5.2.1 Electroactivity of Nucleic Acid Components; 5.2.2 Analysis of Unlabeled Nucleic Acids; 5.2.3 Electroactive Labels of Nucleic Acids; 5.2.4 Signal Amplification; 5.3 Sensors for DNA and RNA Hybridization; 5.3.1 DNA Hybridization; 5.3.2 Electrochemical Detection in DNA Sensors; 5.3.3 Single-surface Techniques; 5.3.4 Double-surface Techniques; 5.3.5 Concluding Remarks to DNA Hybridization Sensors; 5.4 Sensors for DNA Damage; 5.4.1 DNA Damage; 5.4.2 Relations Between DNA Damage and its Electrochemical Features

---

## Sommario/riassunto

Medicine, chemistry, physics and engineering stand poised to benefit within the next few years from the ingenuity of complex biological structures invented and perfected by nature over millions of years. This book provides both researchers and engineers as well as students of all the natural sciences a vivid insight into the world of bioelectronics and nature's own nanotechnological treasure chamber.

---