

1. Record Nr.	UNINA9910143964503321
Titolo	Charge transfer in DNA [[electronic resource]] : from mechanism to application // edited by Hans-Achim Wagenknecht
Pubbl/distr/stampa	Weinheim, Germany, : Wiley-VCH, c2005
ISBN	1-280-52120-1 9786610521203 3-527-60662-9 3-527-60690-4
Descrizione fisica	1 online resource (247 p.)
Altri autori (Persone)	WagenknechtHans-Achim
Disciplina	572.86
Soggetti	Charge transfer in biology DNA 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	Charge Transfer in DNA; Foreword; Preface; Contents; List of Contributors; 1 Principles and Mechanisms of Photoinduced Charge Injection, Transport, and Trapping in DNA; 1.1 Introduction; 1.2 Synthetic DNA-Donor-Acceptor Systems; 1.3 Photoinduced Oxidative Hole Transfer vs. Reductive Electron Transfer in DNA; 1.4 Hole Transfer and Hole Hopping in DNA; 1.4.1 Spectroscopic Studies and Mechanisms of Hole Transfer in DNA; 1.4.2 Biochemical and Chemical Hole Trapping in DNA; 1.4.3 Modulation of DNA-mediated Hole Transfer; 1.5 Reductive Electron Transfer in DNA 1.5.1 Mechanisms of Electron Transfer in DNA 1.5.2 Outlook: Electron Transfer in DNA Chip Technology; 1.6 Conclusions; References; 2 Sequence-dependent DNA Dynamics: The Regulator of DNA-mediated Charge Transport; 2.1 Introduction; 2.2 Experimental Approaches to Studies of DNA-mediated Charge Transport Over Varied Energetic and Time Regimes; 2.2.1 Metallointercalators, Organic Intercalators, and Modified Bases as Probes; 2.2.1.1 Metallointercalators; 2.2.1.2 Organic Intercalators; 2.2.1.3 Modified Bases; 2.2.2 Spectroscopic, Biochemical, and Electrochemical Approaches

2.3 Understanding the Fundamental Parameters Governing DNA-mediated Charge Transport
2.3.1 The Base Pair -Stack of Double-helical DNA Regulates Charge Transport; 2.3.1.1 Spectroscopic Investigations of Charge Transport through DNA; 2.3.1.2 Biochemical Investigations of Long-range Oxidative Damage; 2.3.2 The Role of the Oxidant in DNA-mediated Charge Transport: Energetics, Coupling, Lifetimes, and Back Electron Transfer; 2.3.2.1 Rate Constants and Net Yields of Charge Injection; 2.3.2.2 Long-range Oxidative Damage; 2.3.3 Conformational Dynamics of the DNA Bases
2.3.4 Charge Delocalization and Participation of All DNA Bases
2.3.5 Transport of Holes Versus "Excess Electrons"; 2.4 A Mechanistic Model for DNA-mediated Charge Transport: Beyond Superexchange and Incoherent Hopping; 2.5 DNA-mediated Charge Transport in Biology; 2.6 Conclusions and Outlook; References; 3 Excess Electron Transfer in DNA Probed with Flavin- and Thymine Dimer-modified Oligonucleotides; 3.1 Introduction; 3.2 Excess Electron Transfer-driven DNA Repair by DNA Photolyases; 3.3 Excess Electron Transfer in DNA; 3.3.1 Distance Dependence; 3.3.2 Directional Dependence
3.3.3 Sequence Dependence
3.4 The Catalytic Electron? Or, Can One Electron Repair More Than One Dimer Lesion?; 3.5 Future Directions; References; 4 Dynamics of Photoinduced Hole and Electron Injection in Duplex DNA; 4.1 Introduction; 4.2 DNA Hairpin Synthesis, Structure, and Energetics; 4.2.1 Hairpin Synthesis and Structure; 4.2.2 Electron Transfer Energetics; 4.2.3 Electron Transfer Dynamics; 4.3 Hole Injection; 4.3.1 Distance Dependence; 4.3.2 Electron Donor-Acceptor End-capped Hairpins; 4.3.3 Variation of the Tunneling Energy Gap; 4.3.4 Driving Force Dependence
4.3.5 GG and GGG as Hole Acceptors

Sommario/riassunto

The past few years have witnessed intense research in this fascinating field as well as many controversial discussions. Now the time is ripe for a comprehensive book covering not only theoretical aspects, but also such mechanistic topics as principles and mechanisms of photoinduced charge injection, transport and trapping in DNA, sequence-dependent DNA dynamics, spectroscopic investigations of hole transport and much more. From the contents: * Principles and Mechanisms of Photoinduced Charge Injection, Transport and Trapping in DNA* Sequence-Dependent DNA Dynamics: The Regulator
