1. Record Nr. UNINA9910876887003321

Titolo	The aptamer handbook : functional oligonucleotides and their applications / / edited by Sven Klussmann
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2006
ISBN	1-280-72339-4 9786610723393 3-527-60819-2 3-527-60791-9
Descrizione fisica	1 online resource (520 p.)
Altri autori (Persone)	KlussmannSven
Disciplina	572.8/5
Soggetti	Oligonucleotides
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	The Aptamer Handbook; Contents; Preface; Foreword; List of Contributors; Part 1 History and Theoretical Background; 1 In Vitro Selection of Functional Oligonucleotides and the Origins of Biochemical Activity; 1.1 Introduction; 1.2 A Brief History of In Vitro Selection; 1.3 Lessons from the Aptamers, Ribozymes, Deoxyribozymes Generated by In Vitro Selection; 1.4 Synthetic Approaches to Understanding the Natural Origins of Function; 1.5 Recent Technological Developments and Future Directions; 1.6 Conclusion; Acknowledgments; References 2 Mathematical Models on RNA Evolution, Simulations In Silico, and Concepts for In Vitro Selection2.1 From Early Experiments and Theories to the Concept of Neutral Networks; 2.1.1 Evolution in the Test Tube; 2.1.2 Kinetic Theory of the Evolution of Molecules; 2.1.3 Sequence Space and Shape Space; 2.2 RNA Structures, Thermodynamics and Kinetic Folding; 2.2.1 Secondary Structures of Minimum Free Energies; 2.2.2 Inverse Folding; 2.2.3 Suboptimal Conformations and Kinetic Folding; 2.2.4 Cofolding and DNA Parameters; 2.3 Neutral Networks and In Silico Evolution of Molecules 2.3.1 Neutral Networks in Sequence Space2.3.2 RNA Evolution In Silico; 2.3.3 Lessons from Evolution In Silico; 2.4 Designed and Natural RNA Switches; 2.5 Outlook on Future Problems in RNA Design; Acknowledgments; References; 3 Fitness Landscapes, Error Thresholds,

and Cofactors in Aptamer Evolution; 3.1 Introduction; 3.2 Functionality Landscapes Inferred from Examples; 3.2.1 Fitness Landscape; 3.2.2 Damage Selection Experiments with Ribozymes; 3.2.3 Construction of the Fitness Landscape; 3.2.3.1 Compatible Structure; 3.2.3.2 Mispairs; 3.2.3.3 Critical Sites; 3.2.3.4 Predicted Structure
3.2.4 Case Study: The Fitness Landscape of the Neurospora VS Ribozyme3.2.4.1 Compatible Structure of the VS Ribozyme; 3.2.4.2 Allowed Mispairs in the VS Ribozyme; 3.2.4.3 Critical Sites in the VS Ribozyme; 3.2.4.4 Predicted Structure for the VS Ribozyme; 3.2.4.5 Properties of the Estimated Fitness Landscape for the VS Ribozyme; 3.3 Error Thresholds Inferred from Functional Landscapes: The "Realistic" Error Threshold of the Neurospora VS Ribozyme; 3.4 Looking for Catalytic Partners: Cofactors and Aptamers; 3.4.1 Co-ribozymes (cofactor-assisted ribozymes); 3.4.2 Aptazymes
3.5 The Use of Coenzymes: From the RNA World to the Protein World via Translation and the Genetic Code3.6 Outlook; Acknowledgments; References; Part 2 In Vitro Selection of Target-binding Oligonucleotides; 4 Aptamers to Small Molecules; 4.1 Introduction; 4.2 Aptamers to Nucleotides/Nucleosides/Nucleobases; 4.3 Aptamers to Cofactors; 4.4 Aptamers to Amino Acids; 4.5 Aptamers to Carbohydrates; 4.6 Aptamers to Natural Products; 4.7 Aptamers to Organic or Fluorescent Dyes; 4.8 The Chimeric Approach for Aptamer Selection; 4.9 Conclusion; Acknowledgments; References; 5 Aptamers to Antibiotics
5.1 Introduction

Sommario/riassunto

In The Aptamer Handbook, leading scientists from academia as well as biotech and pharma companies introduce the revolutionary concept of designing RNA and DNA oligonucleotides with novel functions by in vitro selection. These functions comprise high affinity binding (aptamers), catalytic activity (ribozymes and deoxyribozymes) or combinations of binding and catalytic properties (aptazymes).Basic concepts and technologies describing in detail how these functional oligonucleotides can be identified are presented. Numerous examples demonstrate the versatility of in vitro selected oligonucleot