

1. Record Nr.	UNINA9910484775403321
Titolo	Aptamers for medical applications : from diagnosis to therapeutics // Yiyang Dong, editor
Pubbl/distr/stampa	Singapore : , : Springer, , [2021] ©2021
ISBN	981-334-838-0
Descrizione fisica	1 online resource (xiii, 462 pages) : illustrations
Disciplina	572.85
Soggetti	Oligonucleotides - Biotechnology Oligonucleotides - Therapeutic use Biomedical engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Introduction -- Contents -- About the Editor -- 1 Introduction of Aptamer, SELEX, and Different SELEX Variants -- 1.1 Introduction -- 1.2 Systematic Evolution of Ligands by EXponential Enrichment (SELEX) -- 1.3 Different SELEX Variants for Selection Rationalization -- 1.3.1 Reducing Screening Rounds -- 1.3.2 Furnishing More Targets Applicability -- 1.3.3 Simplifying Operations -- 1.3.4 Improving the Specificity of the Aptamer -- 1.3.5 Introducing Evaluation into the Selection Process -- 1.3.6 Other Selection Strategies -- 1.4 Perspectives -- References -- 2 Aptamer-Based Probes for Molecular Imaging -- 2.1 Introduction -- 2.2 Nuclear Imaging -- 2.2.1 Single Photon Emission Computed Tomography (SPECT) -- 2.2.2 Positron Emission Tomography (PET) -- 2.3 Magnetic Resonance Imaging -- 2.4 Ultrasound Imaging -- 2.5 Fluorescence Imaging -- 2.6 Multimodal Imaging -- 2.7 Conclusions and Perspectives -- References -- 3 Aptamer-Based Point of Care Testing Schemes -- 3.1 Introduction -- 3.2 Aptamers as Sensing Probes in POCT -- 3.3 Aptasensors-Based POCT -- 3.3.1 Aptamer-Based Lateral Flow POCT Platforms -- 3.3.2 Interferometry -- 3.3.3 DNA Origami Nanobox -- 3.3.4 Capacitive Aptasensors -- 3.3.5 Smartphone Enabled Aptasensors -- 3.3.6 Microchannels/Microfluidics -- 3.3.7 Microbeads and Nanomaterial-Based Aptasensors -- 3.3.8 Multiple Aptasensing Platforms -- 3.4

Conclusion and Future Trends -- References -- 4 Aptamer-Based Drug Delivery Systems -- 4.1 Introduction -- 4.2 Aptamers as Therapeutic Agents -- 4.3 Aptamer-Drug Conjugates -- 4.3.1 Covalent Conjugation -- 4.3.2 Physical Intercalation -- 4.4 Aptamer-Functionalized Nanoparticle Drug Delivery Systems -- 4.4.1 Inorganic Nanomaterials -- 4.4.2 Organic Nanomaterials -- 4.4.3 Biological Nanomaterials -- 4.4.4 Others -- 4.5 Challenges -- 4.6 Future Perspectives -- 4.7 Conclusion.

References -- 5 Aptamer-Based Medical Devices -- 5.1 Introduction -- 5.2 Aptamer-Based Medical Devices for Diagnosis -- 5.2.1 Biomarker Detection -- 5.2.2 Detection of Other Substances -- 5.3 Aptamer-Based Medical Devices for Therapeutics -- 5.4 Perspectives and Insights -- 5.4.1 Strengthen Fundamental Research -- 5.4.2 Learn from Antibodies -- 5.4.3 Seize the Opportunities -- References -- 6 Aptamers for Targeted Therapy -- 6.1 Introduction -- 6.2 Aptamer for Targeted Therapy of Oculopathy -- 6.2.1 Macugen (Pegaptanib) Targeting VEGF -- 6.2.2 Fovista (E10030) Targeting PDGF -- 6.2.3 Zimura (ARC1905) Targeting Complement-5 (C5) -- 6.3 Aptamers for Targeted Therapy of Coagulation -- 6.3.1 REG1 Targeting Coagulation Factor IXa -- 6.3.2 ARC19499 Targeting TFPI -- 6.3.3 ARC1779 Targeting vWF -- 6.3.4 Aptamers Targeting Thrombin -- 6.4 Aptamers for Targeted Therapy of Inflammation -- 6.4.1 Aptamers Targeting Interleukins -- 6.4.2 Aptamers Targeting Tumor Necrosis Factor (TNF) -- 6.4.3 Aptamers Targeting Chemokines -- 6.4.4 Other Inflammatory-Associated Factors -- 6.5 Aptamers for Targeted Therapy of Cancer -- 6.5.1 Aptamer as Agonist -- 6.5.2 Aptamer as Inhibitor -- 6.6 Prospects of Aptamer-Based Targeted Therapy -- References -- 7 Aptamers for Personalized Therapeutics -- 7.1 Introduction -- 7.1.1 Advantages of Aptamer -- 7.1.2 DNA Versus RNA Aptamers -- 7.1.3 Therapeutic Aptamers -- 7.2 Aptamers as Unique Therapeutic Molecules -- 7.2.1 Discovery of Aptamers Against Different Types of Cancer -- 7.2.2 Aptamers for Therapeutic Applications of Infectious Diseases -- 7.3 Aptamer Systems for Targeted Drug Delivery -- 7.3.1 Target-Specific Delivery of siRNAs: Aptamer-siRNA Conjugates -- 7.3.2 Aptamer-Drug Conjugates for Therapies -- 7.3.3 Aptamer Liposome Conjugates -- 7.3.4 Aptamer-Nanoparticles Conjugates -- 7.3.5 Antidote Aptamer for Controlled Therapy.

7.4 Gaps-Issues to be Considered -- 7.5 Future Perspective -- References -- 8 Aptamers for the Diagnosis of Infectious Diseases -- 8.1 Introduction -- 8.2 Bacterial Infectious Diseases -- 8.2.1 Cholera -- 8.2.2 Tuberculosis -- 8.2.3 Anthrax -- 8.3 Viral Infectious Diseases -- 8.3.1 Viral Hepatitis -- 8.3.2 AIDS -- 8.3.3 Viral Encephalitis -- 8.3.4 COVID-19 -- 8.4 Parasitic Infectious Disease -- 8.4.1 Malaria -- 8.4.2 Schistosomiasis -- 8.5 Other Typical Infectious Diseases -- References -- 9 Aptamers for the Diagnosis of Malign Tumors -- 9.1 Introduction -- 9.2 Aptamers in Cancer Biomarkers Discovery -- 9.3 Protein Biomarkers Analysis -- 9.3.1 Electrochemical Aptasensors -- 9.3.2 Aptamer-Based Optical Assays -- 9.4 Tumor Cells Analysis -- 9.4.1 Electrochemical Cytosensors -- 9.4.2 Optical Aptasensors -- 9.4.3 Aptamer-Based Microfluidic Cytosensors -- 9.5 Tissue Section Imaging -- 9.6 In Vivo Molecular Imaging -- 9.6.1 Fluorescence Imaging -- 9.6.2 Magnetic Resonance Imaging (MRI) -- 9.6.3 Single-Photon Emission Computed Tomography (SPECT)/Positron-Emission Tomography (PET) -- 9.6.4 Computed Tomography (CT) -- 9.7 Exosome-Sensing Aptasensors -- 9.8 Conclusion and Perspectives -- References -- 10 Aptamers for Thrombotic Diseases -- 10.1 Introduction -- 10.2 Aptamers Against Thrombin -- 10.2.1 Anti-

thrombin DNA Aptamers -- 10.2.2 Anti-thrombin RNA Aptamers -- 10.2.3 Anti-thrombin Bimodular Aptamers -- 10.3 Aptamers Against FVII -- 10.4 Aptamers Against FIX -- 10.4.1 Preclinical Evaluation -- 10.4.2 Clinical Evaluation -- 10.5 Aptamers Against FX -- 10.6 Aptamers Against FXI -- 10.7 Aptamers Against FXII -- 10.8 Aptamers Against Kallikrein -- 10.9 Aptamers Against P-Selectin -- 10.9.1 Aptamers Against vWF -- 10.9.2 Aptamers Against PDGFR -- 10.9.3 Conclusion and Perspectives -- References -- 11 Hormone Aptamers in Endocrine-Related Diseases.

11.1 Introduction -- 11.2 Hormone-Related Aptamers -- 11.2.1 Estrogen-Related Aptamers -- 11.2.2 Progesterone-Related Aptamers -- 11.2.3 Insulin-Related Aptamers -- 11.2.4 25-HydroxyvitaminD3 Related Aptamers -- 11.2.5 Cortisol-Related Aptamers -- 11.3 Aptamer Application in Endocrine-Related Disease -- 11.3.1 Application of Aptamer in Medical Diagnosis -- 11.3.2 Application of Aptamer in Real-Time Detection -- 11.3.3 Application of Aptamer in Targeted Therapy -- 11.4 Overcome the Restrictions for Commercial Use of Aptamers -- 11.5 Discussion and Outlook -- Appendix: The Abbreviation in the Paper -- References -- 12 Aptamers for the Diagnosis and Therapy of Neurodegenerative Diseases -- 12.1 Introduction -- 12.2 The Applications of Aptamers in Neurodegenerative Diseases -- 12.2.1 The Applications of Aptamers in AD -- 12.2.2 The Applications of Aptamers in PD -- 12.2.3 The Applications of Aptamers in TSEs -- 12.2.4 The Applications of Aptamers in HD -- 12.3 Conclusions and perspectives -- References -- 13 Some Frontier Technologies for Aptamers in Medical Applications -- 13.1 Introduction -- 13.2 UVMag-SELEX -- 13.2.1 Pool Enrichment and Round Determination for UVMag-SELEX -- 13.2.2 High-Throughput Sequencing for Lead Sequences and Structural Prediction for Aptamer Candidates -- 13.2.3 UV and Microarray-Based Affinity Characterization of Aptamer Candidates for SynOP -- 13.2.4 Class-Specific Binding Ability of Practical Aptamers to Seven Organophosphorus Pesticides -- 13.3 Aptamer Biochip -- 13.3.1 Aptamer Microarray Biochip -- 13.3.2 Aptamer Microfluidic Biochip -- 13.3.3 Nanoarray and Nanofluidic Biochip -- 13.4 Native Mass Spectrometry -- 13.4.1 Native ESI-MS of Aptamer and Tetracycline Complex -- 13.4.2 Calculation of Dissociation Constants of Complexes -- 13.5 Conclusions and Perspectives -- References.

14 Perspectives of Aptamers for Medical Applications -- 14.1 Introduction -- 14.2 Merits and Demerits of Aptamer in Clinical Applications -- 14.2.1 Merits -- 14.2.2 Demerits -- 14.3 The Scenario for Aptamers in Medical Application -- 14.3.1 Point-of-Care Tests -- 14.3.2 Precision Medicine -- 14.3.3 Biomarker -- 14.4 Aptamers Application in Disease -- 14.4.1 Tumor -- 14.4.2 Non-tumor -- 14.5 Challenges for Aptamer in Medical Applications: From Bench to Bedside -- 14.5.1 Stability in Biological Media -- 14.5.2 Safety for Modified Aptamer -- 14.5.3 Adapt to the Homeostasis of the Human Body -- References.