

1. Record Nr.	UNINA9910595035303321
Titolo	Application of nanoparticles in tissue engineering // edited by Sarah Afaq, Arshi Malik, Mohammed Tarique
Pubbl/distr/stampa	Singapore : , : Springer, , [2022] ©2022
ISBN	981-16-6198-7
Descrizione fisica	1 online resource (134 pages)
Disciplina	730
Soggetti	Nanoparticles Nanopartícules Enginyeria de teixits Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Contents -- 1: Nanoparticles for Tissue Engineering: Type, Properties, and Characterization -- 1.1 Introduction -- 1.2 History of Nanoparticles -- 1.3 Types of Nanoparticles -- 1.3.1 Organic Nanoparticles -- 1.3.1.1 Liposomes -- 1.3.1.2 Polymeric Nanoparticles -- 1.3.2 Dendrimers -- 1.3.3 Inorganic Nanoparticles -- 1.3.3.1 Silica Nanoparticles -- 1.3.3.2 Metallic Nanoparticles -- Gold Nanoparticle -- 1.3.4 Magnetic Nanoparticle -- 1.3.4.1 Bio-ceramics and Bioactive Glass Nanoparticles -- 1.3.4.2 Carbon Nanotubes -- 1.4 Physiochemical Properties of Nanoparticles -- 1.4.1 Electronic and Optical Properties -- 1.4.2 Mechanical Properties -- 1.4.3 Magnetic Properties -- 1.4.4 Thermal Properties -- 1.5 Characterization of Nanoparticles -- 1.5.1 Particle Size -- 1.5.2 Surface Charge -- 1.5.3 Hydrophobicity -- 1.5.4 Drug Release -- 1.6 Application of Nanoparticles -- 1.6.1 Biological Property Enhancement -- 1.6.2 Mechanical Property Enhancement -- 1.6.3 3D Tissue Construction -- 1.6.4 Antibacterial Applications -- 1.6.5 Cells Stimulation for Mechano-transduction -- 1.6.6 Gene Delivery -- 1.7 Challenges and Future Perspective -- 1.8 Conclusion -- References -- 2: Nanoparticles and Bioceramics Used in Hard Tissue Engineering -- 2.1 Introduction

-- 2.2 Nanoparticles Used in Hard Tissue Engineering -- 2.2.1 Organic Nanoparticles -- 2.2.1.1 Liposomes -- 2.2.1.2 Polymeric Nanoparticles -- 2.2.2 Inorganic Nanoparticles -- 2.2.2.1 Silica NPs -- 2.2.2.2 Metallic NPs -- 2.2.2.3 Bioactive Glass -- 2.2.2.4 Carbon Nanotubes -- 2.2.2.5 Quantum Dots -- 2.3 Bioceramics Used in Tissue Engineering -- 2.3.1 Classification Based on Origin -- 2.3.2 Classification Based on Tissue Response -- 2.3.3 Classification Based on Composition -- 2.3.3.1 Zirconium-Based Bioceramics -- 2.3.3.2 Alumina-Based Bioceramics -- 2.3.3.3 Carbon-Based Bioceramics. 2.4 Properties of Nanoparticles and Bioceramic Materials -- 2.5 Current Challenges and Future Perspective -- 2.6 Conclusion -- References --

3: Application of Nanoparticles in Soft Tissue Engineering -- 3.1 Introduction -- 3.2 Nanofibers for Soft Tissue Engineering -- 3.2.1 Nature-Derived Nanofibers -- 3.2.2 Synthetic Nanofibers -- 3.3 Inorganic Nanoparticles -- 3.3.1 Silver Nanoparticles -- 3.3.2 Gold Nanoparticles -- 3.3.3 Iron Nanoparticles -- 3.3.4 Aluminum Nanoparticles -- 3.3.5 Zinc Nanomaterial -- 3.3.6 Magnesium Nanoparticles -- 3.3.7 Titanium -- 3.4 Nanomaterial Applications in Specific Areas of Tissue Engineering -- 3.4.1 Application of Nanomaterials for Soft Tissue Engineering in Dentistry -- 3.4.2 Applications of Nanomaterials for Soft Tissue Engineering in Stem Cells -- 3.4.3 Application of Nanomaterials for Soft Tissue Engineering in Osteology -- 3.4.4 Application of Nanomaterials for Soft Tissue Engineering in Cardiac Muscles -- 3.4.5 Application of Nanomaterials for Soft Tissue Engineering in Neurology -- 3.5 Future Directions in Soft Tissue Engineering -- 3.6 Conclusion -- References --

4: 3D and 4D Nanoprinting for Tissue Regeneration -- 4.1 Introduction -- 4.2 Bioprinting Techniques Using Biopolymers and Biomaterials -- 4.3 Advances in 3D and 4D Nanoprinting Methods -- 4.3.1 Traditional Methods of 3D Scaffold Synthesis -- 4.3.1.1 Gas Foaming -- 4.3.1.2 Freeze-Drying -- 4.3.1.3 Particle Leaching -- 4.3.1.4 Fiber Bonding -- 4.3.1.5 Phase Separation -- 4.3.2 Advanced Nanoprinting Methods for Scaffold Synthesis -- 4.3.2.1 Rapid Prototyping -- 4.3.2.2 Two-Photon Absorption -- 4.3.2.3 Controlled Electrospinning -- 4.3.2.4 Charged Aerosol Jet -- 4.4 Advances in Nanoprinting of Cells, Tissues, and Organs -- 4.4.1 Skin -- 4.4.2 Bone and Cartilage -- 4.4.3 Retina -- 4.4.4 Neural. 4.5 Major Challenges Influencing the Bio-nanoprinting for Tissue Engineering -- 4.5.1 Factors Influencing Bio-nanoprinting for Tissue Engineering -- 4.6 Future Perspectives -- References --

5: Strategies to Improve Delivery of Bioactive Agents -- 5.1 Introduction -- 5.2 Strategies for Improving Delivery of Bioactive Agents -- 5.3 Improvements in Nanoparticles for Enhanced Permeability and Retention (EPR) Effects for Delivery of Bioactive Agents -- 5.3.1 Nanoparticle Improvements for Permeating Cell-Cell Barriers -- 5.3.2 Nanoparticle Improvements to Overcome Blood-Brain Barrier (BBB) -- 5.3.3 Nanoparticle Improvements to Overcome Macrophage-Mediated Immune Clearance -- 5.4 Strategic Improvement of Drug Delivery Systems -- 5.4.1 Liposome-Based Drug Delivery -- 5.4.2 Virosome-Based Drug Delivery -- 5.4.3 Solid Lipid Nanoparticles Based Drug Delivery -- 5.4.4 Dendrimer-Based Drug Delivery -- 5.4.5 Nano-emulsion-Based Drug Delivery -- 5.4.6 Mesoporous Silica Nanoparticles (MSNP) Based Drug Delivery -- 5.5 Conclusion -- References --

6: Nanotechnology and Its Applications in Molecular Detection -- 6.1 Nanotechnology and Molecular Detection: Importance of Nanotechnology in Molecular Detection -- 6.2 Applications -- 6.2.1 Nanotechnology on a Chip -- 6.2.1.1 Microfluidic Chips for Nanolitre Volumes: Nanochip -- 6.2.1.2 Optical Readout of Nanoparticle Labels

-- 6.2.1.3 Nanoarrays -- 6.2.1.4 Protein Nanoarrays -- 6.2.2
Nanoparticle Technology -- 6.2.2.1 Gold Particles -- Introduction --
Synthesis of AuNps -- Properties of AuNPs -- Applications of AuNPs --
6.2.2.2 Nanoparticle Probes -- 6.2.2.3 Nanobarcodes -- 6.2.2.4
Magnetic Nanoparticles: Ferrofluid -- 6.2.2.5 Quantum Dot Technology
-- 6.2.3 Other Nanoparticles -- 6.2.3.1 Nanowires -- 6.2.3.2
Cantilever Arrays -- 6.2.3.3 DNA Nanomachines for Molecular
Detection -- 6.2.3.4 Nanopore Technology.
6.2.3.5 Nanosensors -- 6.2.3.6 Resonance Light Scattering (RLS)
Technology -- 6.3 Conclusion -- References -- 7: Challenges and
Future Prospect of Nanoparticles in Tissue Engineering -- 7.1
Nanobiomaterials and Tissue Engineering -- 7.2 Challenges with
Nanoparticles for Biomaterials in Tissue Engineering -- 7.3 Bone Tissue
Engineering -- 7.4 Orthopedic Implants -- 7.5 Challenges in Surface
Modification of Orthopedic Implants Using Nanobiomaterials and
Tissue Engineering -- 7.6 Nanobiomaterials for Orthopedic and Dental
Implants -- 7.7 Nano-bioceramic Coating Methods for Tissue
Engineering Applications -- 7.8 Future Aspects of Tissue Engineering
-- References.
