



## Biomedical foams for tissue engineering applications /

Netti, Paulo,  
editor

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Monografía

Biomedical foams are a new class of materials, which are increasingly being used for tissue engineering applications. Biomedical Foams for Tissue Engineering Applications provides a comprehensive review of this new class of materials, whose structure can be engineered to meet the requirements of nutrient trafficking and cell and tissue invasion, and to tune the degradation rate and mechanical stability on the specific tissue to be repaired. Part one explores the fundamentals, properties, and modification of biomedical foams, including the optimal design and manufacture of biomedical foam pore structure for tissue engineering applications, biodegradable biomedical foam scaffolds, tailoring the pore structure of foam scaffolds for nerve regeneration, and tailoring properties of polymeric biomedical foams. Chapters in part two focus on tissue engineering applications of biomedical foams, including the use of bioactive glass foams for tissue engineering applications, bioactive glass and glass-ceramic foam scaffolds for bone tissue restoration, composite biomedical foams for engineering bone tissue, injectable biomedical foams for bone regeneration, polylactic acid (PLA) biomedical foams for tissue engineering, porous hydrogel biomedical foam scaffolds for tissue repair, and titanium biomedical foams for osseointegration. Biomedical Foams for Tissue Engineering Applications is a technical resource for researchers and developers in the field of biomaterials, and academics and students of biomedical engineering and regenerative medicine. Explores the fundamentals, properties, and modification of biomedical foamsIncludes intense focus on tissue engineering applications of biomedical foamsA technical resource for researchers and developers in the field of biomaterials, and academics and students of biomedical engineering and regenerative medicine

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Materials for fabricating biomedical foams; 1.4 Manufacturing processes for biomedical foams and scaffolds; 1.5 Scaffolds for in vitro cell culture; 1.6 Scaffolds for in vivo tissue-induced regeneration; 1.7 Platforms for the controlled delivery of bioactive agents 1.8 Microscaffolds for in situ cell delivery and tissue fabrication 1.9 Three-dimensional tumour models; 1.10 Conclusion; 1.11 References; 2 Properties of biomedical foams for tissue engineering applications; 2.1 Introduction; 2.2 Metals for biomedical foam fabrication; 2.3 Ceramics and glass for biomedical foam fabrication; 2.4 Degradable polymers for biomedical foam fabrication; 2.5 Polymer-based composites for biomedical foam fabrication; 2.6 Conclusions and future trends; 2.7 References; 3 Optimal design and manufacture of biomedical foam pore structure for tissue engineering applications 3.1 Introduction 3.2 Micro-structure of biomedical foams and processing techniques; 3.3 Improving control of scaffold pore structure by combined approaches; 3.4 Pore structure versus in vitro cell culture; 3.5 Pore structure vs. in vivo new tissue regeneration; 3.6 Conclusion; 3.7 References; 4 Tailoring the pore structure of foam scaffolds for nerve regeneration; 4.1 Introduction; 4.2 Materials for foam scaffold fabrication; 4.3 Design and fabrication of foam scaffolds for nerve regeneration; 4.4 Methods of assessing nerve regeneration and overview of porous scaffolds; 4.5 Future trends 4.6 Conclusion 4.7 References; 5 Tailoring properties of polymeric biomedical foams; 5.1 Introduction; 5.2 Aliphatic polyesters used for porous scaffold fabrication; 5.3 Polyurethanes for biomedical foam production; 5.4 Tyrosine-derived polymers; 5.5 Processing techniques for fabricating porous scaffolds; 5.6 Characterization of polymeric foams; 5.7 In vitro and in vivo testing; 5.8 Applications of polymeric foams in tissue engineering; 5.9 Future trends; 5.10 Sources of further information and advice; 5.11 References; 6 Biodegradable biomedical foam scaffolds; 6.1 Introduction 6.2 Foaming techniques and properties of expanding polymer/gas solutions 6.3 Biofoams based on natural polymers; 6.4 Biofoams based on biodegradable polyesters; 6.5 References; Part II Tissue engineering applications of biomedical foams; 7 Bioactive glass foams for tissue engineering applications; 7.1 Introduction; 7.2 Processing 'foam-like' bioactive glass-based scaffolds; 7.3 In vitro and in vivo studies of bioactive glass-based biomedical foams; 7.4 Conclusions and future trends; 7.5 References; 8 Bioactive glass and glass-ceramic foam scaffolds for bone tissue restoration; 8.1 Introduction

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## Baratz Innovación Documental

- Gran Vía, 59 28013 Madrid
- (+34) 91 456 03 60
- [informa@baratz.es](mailto:informa@baratz.es)