

1. Record Nr.	UNINA9910337603703321
Titolo	Tissue-Engineered Vascular Grafts [[electronic resource] /] / edited by Beat Walpoth, Helga Bergmeister, Gary Bowlin, Deling Kong, Joris Rotmans, Peter Zilla
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-319-71530-5
Collana	Tissue Engineering and Regeneration
Disciplina	610.28
Soggetti	Biomedical engineering Regenerative medicine Tissue engineering Vascular surgery Biomedical materials Biomedical Engineering and Bioengineering Regenerative Medicine/Tissue Engineering Vascular Surgery Biomaterials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	1. Clinical Aspects and Limitations of Vascular Grafts (Peter ZILLA, SA) -- 2. Synthetic Materials for Vascular Scaffolds.- 3. Mechanical Testing of Vascular Grafts (Christian GRASL and Martin STOIBER, Heinz SCHIMA, AU) -- 4. In vitro Testing of Engineered Vascular Grafts.- 5. In Vivo Testing and Animal Models for Vascular Grafts (Helga BERGMEISTER, AU, Bruno PODESSER, AU) -- 6. Decellularized Vascular Grafts for VTE (Axel HAVERICH, Sotiris KOROSSIS, Andres HILFIKER, DE) -- 7. Degradable and Non-degradable Vascular Scaffolds (Yadong WANG, William WAGNER, USA) -- 8. In Vivo Vascular Tissue Engineering - Long-term Results (Beat WALPOTH, CH) -- 9. Cell-Assembled Extracellular Matrix for Building Vascular Grafts (Nicolas L'HEUREUX, FR) -- 10. Cell-based/Seeding of Vascular Grafts (David VORP, Justin Sol WEINBAUM, Darren G HASKETT, USA) -- 11. Vascular Tissue

Engineering: the role of 3-D printing (Ali KHADEMHOSEINI, Yu Shrike ZHANG, USA) -- 12. Autologous Mandril-based VTE (Joris ROTMANS, NL) -- 13. The Role of Tropoelastin in VTE (Tony WEISS, AUS) -- 14. Vascular Grafts made of Cell Sheets.- 15. Vascular Tissue Engineering: Pathology, Mechanisms, and Translational Implications (Carlijn BOUTEN, NL, Fred SCHOEN, USA).- 16. Models to study cardiovascular calcification relevant to tissue engineering (Elena AIKAWA, USA).- 17. The incorporation and release of bioactive molecules in Vascular Grafts (Deling KONG, CN) -- 18. Functionalization/Coating of Vascular Grafts" including "cell surface interaction" (Olivier FELIX, Gero DECHER, FR, Mitsuru AKASHI, JP) -- 19. Clinical application of VTE for children (Toshi SHINOKA, Christopher BREUER, USA) -- 20. Bioengineered Human Acellular Vessels (Laura NIKLASON, Jeffrey H. LAWSON, USA).

Sommario/riassunto

Cardiovascular diseases are still the leading cause of death in developed countries. Revascularization procedures such as coronary artery and peripheral bypass grafts, as well as access surgery represent a 2\$ billion market yearly for the US alone. Despite intense research over many decades, no clinically suitable, shelf-ready, synthetic, vascular, small-caliber graft exists. There is therefore still a quest for such a clinical vascular prosthesis for surgical revascularization procedures and access surgery. Many approaches have been tried and are currently under investigation with promising results. These range from acellular and cell-based, stable or bio-degradable, synthetic scaffolds to biological or decellularized grafts, not forgetting self-assembly technologies for in vitro or in vivo VTE. All these approaches can be further enhanced by functionalization, e.g. with growth factors and drug elution. This updatable book aims to cover all the relevant aspects of Vascular Tissue Engineering (VTE) and novel alternatives to develop vascular grafts for clinical applications. The chapters in this book cover different aspects of manufacturing scaffolds with various polymers, mechanical characteristics, degradation rates, decellularization techniques, cell sheet assembly, 3-D printing and autologous mandril-based VTE. All the necessary in vitro tests such as biocompatibility and thrombogenicity are reviewed. Pre-clinical assessment of in vivo experimental models include patency, compliance, intimal hyperplasia, inflammatory reaction, cellular ingrowth and remodeling. Finally, early clinical trials will be periodically updated regarding results, regulatory aspects and post-marketing quality assessment. Furthermore, the reader should get an insight into various approaches, technologies and methods to better understand the complexity of blood surface and cell interactions in VTE. Translational research has yielded early human applications clearly showing the enormous need of research in the field to provide better solutions for our patients and this continuously updated book will hopefully become a reference in the field for life sciences.
