

Preface

Acknowledgments

Editors

Contributors

Chapter 1 Introduction to 3D Test Systems

Karen J. L. Burg, Didier Dréau, and Timothy C. Burg

Section I Biofabrication Considerations

Chapter 2 Biofabrication

Jordon Gilmore and Timothy Burg

Chapter 3 Bioreactor Instrumentation and Control for 3D Cellular and

Tissue Systems

Maria Yanez, Scott Collins, and Thomas Boland

Chapter 4 Control of 3D Environment: Redesign of the Flow Loop

Bioreactor to Control Mitral Valve Regurgitation

Jorge I. Rodríguez-Dévora, Christopher Moody, Aesha Desai,

Karen J.L. Burg, and Delphine Dean

Chapter 5 Nipple and Breast Construction: *In Vitro* and *In Vivo* Assessment

Steve Warren

Chapter 6 3D Cancer Spheroid Biofabrication Using Thermal Inkjet-Based

Bioprinting for Rapid Screening

Patrick S. Connell, Dragoslava P. Vekilov, and

K. Jane Grande-Allen

Section II Materials Considerations

Chapter 7 Control Testing and Effect of Manufacturing Parameters on
the Biocompatibility of Polypropylene Mesh Implants

Ahmed El-Ghannam

Chapter 8 Scaffolds for 3D Model Systems in Bone Regenerative
Engineering

Keshia Ashe, Seth Malinowski, Yusuf Khan, and Cato T. Laurencin

Chapter 9 Engineered Composites for 3D Mammary Tissue Systems

Cheryl T. Gomillion, Chih-Chao Yang, Didier Dréau, and

Karen J.L. Burg

Chapter 10 Mineralized 3D Culture Systems for Studying Bone Metastatic
Breast Cancer

Frank He, Siyoung Choi, Lara A. Estroff, and Claudia Fischbach

Chapter 11 Design Considerations for 3D Cardiovascular Tissue Scaffolds

Scott Cooper, Christopher Moraes, and Richard L. Leask

Section III Biological Considerations

Chapter 12 Pro- and Anti-Inflammatory Cytokine Signaling within 3D
Tissue Models

Stephen L. Rego, Tian McCann, and Didier Dréau

Chapter 13 Cell–Cell Communications through Gap Junctions and Cancer
in 3D Systems

Stephanie Nicole Shishido and Thu Annelise Nguyen

Chapter 14 Advances in Breast Stem Cell Knowledge through 3D Systems

Justin McMahan, Rachel Hybart, and C. LaShan Simpson

Chapter 15 Shape Matters: Understanding the Breast through 3D

Tissue Culture Models

Kerri W. Kwist and Brian W. Booth

Chapter 16 Cells and Tissue Structures in Cardiovascular 3D Tissue Systems

Meghan Logun, Steven Stice, and Lohitash Karumbaiah

Chapter 17 Signaling and Architectural Cues Necessary for 3D Diabetic

Tissue Models

Rosalyn D. Abbott and David L. Kaplan

Chapter 18 Optimizing 3D Models of Engineered Skeletal Muscle

Megan E. Kondash, Brittany N. J. Davis, and George A. Truskey

Chapter 19 Recapitulating the Microenvironment of Glioblastoma

Multiforme Using 3D Tissue Culture Models

Lucia Speroni, Ana M. Soto, and Carlos Sonnenschein

Section IV Business Considerations

Chapter 20 Bringing Regenerative Medicine to Patients: The Coverage,

Coding, and Reimbursement Processes

Khin-Kyemon Aung, Scott Levy, and Sujata K. Bhatia

Index