

IFMBE Proceedings

Dössel • Schlegel (Eds.)

Volume 25/10

World Congress on Medical
Physics and Biomedical
Engineering

7–12 September 2009

Munich, Germany

Biomaterials, Cellular and Tissue
Engineering, Artificial Organs



Series Editor: R. Magjarevic

11th International
Congress of the IUPESM

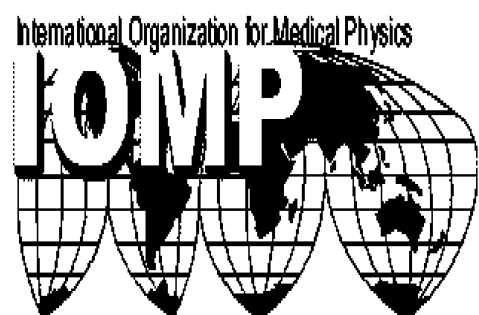
**MEDICAL
PHYSICS AND
BIOMEDICAL
ENGINEERING**

**WORLD
CONGRESS
2009**



For the benefit
of the Patient.

Sept 7–12, 2009
Munich, Germany



The International Federation for Medical and Biological Engineering, IFMBE, is a federation of national and transnational organizations representing internationally the interests of medical and biological engineering and sciences. The IFMBE is a non-profit organization fostering the creation, dissemination and application of medical and biological engineering knowledge and the management of technology for improved health and quality of life. Its activities include participation in the formulation of public policy and the dissemination of information through publications and forums. Within the field of medical, clinical, and biological engineering, IFMBE's aims are to encourage research and the application of knowledge, and to disseminate information and promote collaboration. The objectives of the IFMBE are scientific, technological, literary, and educational.

The IFMBE is a WHO accredited NGO covering the full range of biomedical and clinical engineering, healthcare, healthcare technology and management. It is representing through its 58 member societies some 120.000 professionals involved in the various issues of improved health and health care delivery.

IFMBE Officers

President: Makoto Kikuchi, Vice-President: Herbert Voigt, Former-President: Joachim H. Nagel

Treasurer: Shankar M. Krishnan, Secretary-General: Ratko Magjarevic

<http://www.ifmbe.org>

Previous Editions:

IFMBE Proceedings WC 2009, "World Congress on Medical Physics and Biomedical Engineering",
Vol. 25, 2009, Munich, Germany, CD

IFMBE Proceedings SBEC 2009, "25th Southern Biomedical Engineering Conference 2009",
Vol. 24, 2009, Miami, FL, USA, CD

IFMBE Proceedings ICBME 2008, "13th International Conference on Biomedical Engineering"
Vol. 23, 2008, Singapore, CD

IFMBE Proceedings ECIFMBE 2008 "4th European Conference of the International Federation for Medical and Biological Engineering", Vol. 22, 2008, Antwerp, Belgium, CD

IFMBE Proceedings BIOMED 2008 "4th Kuala Lumpur International Conference on Biomedical Engineering",
Vol. 21, 2008, Kuala Lumpur, Malaysia, CD

IFMBE Proceedings NBC 2008 "14th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics",
Vol. 20, 2008, Riga, Latvia, CD

IFMBE Proceedings APCMBE 2008 "7th Asian-Pacific Conference on Medical and Biological Engineering",
Vol. 19, 2008, Beijing, China, CD

IFMBE Proceedings CLAIB 2007 "IV Latin American Congress on Biomedical Engineering 2007, Bioengineering Solution for Latin America Health", Vol. 18, 2007, Margarita Island, Venezuela, CD

IFMBE Proceedings ICEBI 2007 "13th International Conference on Electrical Bioimpedance and the 8th Conference on Electrical Impedance Tomography", Vol. 17, 2007, Graz, Austria, CD

IFMBE Proceedings MEDICON 2007 "11th Mediterranean Conference on Medical and Biological Engineering and Computing 2007", Vol. 16, 2007, Ljubljana, Slovenia, CD

IFMBE Proceedings BIOMED 2006 "Kuala Lumpur International Conference on Biomedical Engineering",
Vol. 15, 2004, Kuala Lumpur, Malaysia, CD

IFMBE Proceedings WC 2006 "World Congress on Medical Physics and Biomedical Engineering",
Vol. 14, 2006, Seoul, Korea, DVD

IFMBE Proceedings BSN 2007 "4th International Workshop on Wearable and Implantable Body Sensor Networks",
Vol. 13, 2006, Aachen, Germany

IFMBE Proceedings ICBMEC 2005 "The 12th International Conference on Biomedical Engineering",
Vol. 12, 2005, Singapore, CD

IFMBE Proceedings EMBEC'05 "3rd European Medical & Biological Engineering Conference, IFMBE European Conference on Biomedical Engineering", Vol. 11, 2005, Prague, Czech Republic, CD

IFMBE Proceedings ICCE 2005 "The 7th International Conference on Cellular Engineering",
Vol. 10, 2005, Seoul, Korea, CD

IFMBE Proceedings NBC 2005 "13th Nordic Baltic Conference on Biomedical Engineering and Medical Physics",
Vol. 9, 2005, Umeå, Sweden

IFMBE Proceedings Vol. 25/X
Olaf Dössel · Wolfgang C. Schlegel (Eds.)

World Congress on Medical Physics
and Biomedical Engineering
7–12 September, 2009
Munich, Germany

Biomaterials, Cellular and
Tissue Engineering, Artificial Organs

 Springer

Editors

Prof. Dr. Olaf Dössel
Univ. Karlsruhe
Inst. Biomedizinische Technik
Kaiserstr. 12
76128 Karlsruhe
Germany
E-mail: olaf.doessel@ibt.uni-karlsruhe.de

Prof. Dr. Wolfgang C. Schlegel
Deutsche Krebsforschungszentrum (DKFZ)
Abt. Medizinische Physik in der
Strahlentherapie
Im Neuenheimer Feld 280
69120 Heidelberg
Germany
E-mail: w.schlegel@dkfz-heidelberg.de

ISSN 1680-0737

ISBN 978-3-642-03899-0

e-ISBN 978-3-642-03900-3

Also available as set Vol. I–XIII ISBN 978-3-642-03897-6

DOI 10.1007/978-3-642-03900-3

Library of Congress Control Number: 2009934297

© International Federation for Medical and Biological Engineering 2009

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilm or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permissions for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The IFMBE Proceedings is an Official Publication of the International Federation for Medical and Biological Engineering (IFMBE)

Typesetting: Data supplied by the authors

Production & Cover design: Scientific Publishing Services Pvt. Ltd., Chennai, India.

Printed on acid-free paper

9 8 7 6 5 4 3 2 1

springer.com

Preface

Present Your Research to the World!

The World Congress 2009 on Medical Physics and Biomedical Engineering – the triennial scientific meeting of the IUPESM - is the world's leading forum for presenting the results of current scientific work in health-related physics and technologies to an international audience. With more than 2,800 presentations it will be the biggest conference in the fields of Medical Physics and Biomedical Engineering in 2009!

Medical physics, biomedical engineering and bioengineering have been driving forces of innovation and progress in medicine and healthcare over the past two decades. As new key technologies arise with significant potential to open new options in diagnostics and therapeutics, it is a multidisciplinary task to evaluate their benefit for medicine and healthcare with respect to the quality of performance and therapeutic output.

Covering key aspects such as information and communication technologies, micro- and nanosystems, optics and biotechnology, the congress will serve as an inter- and multidisciplinary platform that brings together people from basic research, R&D, industry and medical application to discuss these issues.

As a major event for science, medicine and technology the congress provides a comprehensive overview and in-depth, first-hand information on new developments, advanced technologies and current and future applications.

With this Final Program we would like to give you an overview of the dimension of the congress and invite you to join us in Munich!

Olaf Dössel
Congress President

Wolfgang C. Schlegel
Congress President

Preface

Welcome to World Congress 2009!

Since the first World Congress on Medical Physics and Biomedical Engineering convened in 1982, medically and biologically oriented engineers and physicists from all continents have gathered every three years to discuss how physics and engineering can advance medicine, health and health care and to assess the clinical, scientific, technical and professional progress in their fields. In the tradition and the mission of our professions, which are the only ones involved in the whole loop of health and health care from basic research to the development, assessment, production, management and application of medical technologies, the theme of WC 2009 is "For the Benefit of the Patient". Thus, in addition to scientific aspects, the Congress will focus on all aspects of safe and efficient health technology in both industrialized and developing countries, including economic issues, the perspectives that advanced technologies and innovations in medicine and healthcare offer for the patients and the development of societies, the progress of MBE and MP, including health policy and educational issues as well as the need for the regulation and classification as health professionals of those biomedical/clinical engineers and medical physicists who are working in the health care systems.

The World Congress as the most important meeting of our professions, bringing together physicists, engineers and physicians from all over the world, including the delegates of the 138 constituent organizations of the IUPESM representing some 140,000 individual members, is the best place to discuss these issues, thereby contributing to the advancement of the physical and engineering sciences, our professions and thus to global health.

It gives me great pleasure to welcome you to this important event. I wish you a rewarding and enjoyable congress and a most pleasant time in Munich, the 'metropolis with heart' that has so much to offer.

Joachim H. Nagel
President of the IUPESM

Preface

Let's talk!

Is our level of communication between Medical Physics, Biomedical Engineering, Clinical Engineering, Medical Informatics, Tissue Engineering, etc. and Medicine good enough? We would like to answer: yes, we are quite good, but not good enough! There is a lot of room for improvement. Let' start right on the spot - on the World Congress on Medical Physics and Biomedical Engineering 2009. And please remember: communication is 50% talking and 50% listening.

Let's work together!

Do we have a perfect level of collaboration in our field? OK, we are quite good, but we can do better. Just to give an example: there should be no funded project in Medical Physics or Biomedical Engineering where there is no medical partner. And vice versa: medical doctors should join their forces with physicists and engineers if they are aiming at improvements on medical devices or healthcare systems. Let's start right here in Munich, September 2009, with innovative projects and innovative ways of cooperation.

Let's get to know each other!

It's known for more than thousand years: people who know each other personally and from face to face can talk with better mutual understanding, collaborate with less friction losses, are much more successful and have much more fun. Plenty of chances to make new friends and to refresh old relations on World Congress on Medical Physics and Biomedical Engineering 2009!

And here are the numbers:

More than 3000 scientists working in the field of Medical Physics and Biomedical Engineering meet in September 2009 in Munich. They come from more than 100 nations. They submitted about 2800 contributions. 10 plenary talks and 46 keynote lectures bring us to the top level of science in our field. 75 companies show their latest achievements in the industrial exhibition. It's definitely the largest market place of ideas and innovations in Medical Physics and Biomedical Engineering of the year 2009.

August 2009

Olaf Dössel

Table of Contents

Synthesis and Characterization of a New Generation of Hydrogels for Biomedical Applications	1
<i>Krystyna Pietrucha and Stefan Verne</i>	
Biological Evaluation of Non-degradable Polyurethane for Aortic Valve Tissue Engineering	5
<i>B. Akra, R. Abou Rahal, A. Uhlig, U. Haas, C. Fano, M. Dauner, H. Gulbins, B. Meiser, G. Eissner, and B. Reichart</i>	
Perfusion Bioreactor: A New Pulsatile System for the Perfusion of Tissue Engineered Cardiovascular Prostheses	7
<i>B. Akra, A. Uhlig, U. Haas, C. Fano, M. Dauner, P. Lohse, H. Gulbins, B. Meiser, G. Eissner, and B. Reichart</i>	
Interactions of Cells with Elastic Cholesteryl Liquid Crystals	9
<i>C.F. Soon, M. Youseffi, N. Blagden, S.B. Lobo, F.A. Javid, and M.C.T. Denyer</i>	
Valve-Gear: A Contribution to Development of Artificial Cardiac Valves	13
<i>H.A. Vielberg</i>	
Finite Element Simulation of Mechanical Tests of Individual Cells	16
<i>J. Bursa and V. Fuis</i>	
Corrosion behavior of Some New Implant Biomaterials in Biofluids	20
<i>M.V. Popa, E. Vasilescu, P. Drob, D. Raducanu, I. Cinca, and C. Vasilescu</i>	
Electrochemical Stability of a New Ti Base Bioalloy in Simulated Human Fluids	24
<i>M.V. Popa, E. Vasilescu, P. Drob, and C. Vasilescu</i>	
Shear Stress Induces Differentiation of Arterial Endothelial Cells From Murine Embryonic Stem Cells	28
<i>Kimiko Yamamoto, Tomomi Masumura, Nobutaka Shimizu, Syotaro Obi, and Joji Ando</i>	
Infiltration/Accumulation of Low Density Lipoproteins in Endothelial/Smooth Muscle Cell Co-culture Preparations with Different Modes	30
<i>Z.F. Ding, Y.B. Fan, and X.Y. Deng</i>	
Osteoblast Culture on Titanium Base Bioalloy and Its Corrosion Resistance in Physiological Solutions	34
<i>M.V. Popa, D. Iordachescu, E. Vasilescu, P. Drob, A. Cimpean, C. Vasilescu, and S.I. Drob</i>	
Tissue Engineering of Small Caliber Vessel Grafts from Human Umbilical Veins	38
<i>M. Hoenicka, S. Schrammel, V.R. Jacobs, G. Huber, C. Schmid, and D.E. Birnbaum</i>	
Biomechanical In-Vitro Evaluation of a New Carrier Material for ADCT	42
<i>J. Beger, H. Fuchs, F. Heuer, S. Klingseis, C. Schilling, J. Mollenhauer, K. Benz, and H.-J. Wilke</i>	
Material and Structures for Gastrointestinal Stents	46
<i>R.A. Rothwell, M.S. Pridham, and G.A. Thomson</i>	

Effect of Fluid Shear Stress on Tubular Kidney Epithelial Cell Structure	50
<i>L. Condorelli, I. Cattaneo, C. Arrigoni, L. Antiga, N. Perico, and A. Remuzzi</i>	
Electromechanically Active Polymers: New Opportunities for Biomaterials and Tissue Engineering	53
<i>Federico Carpi, Gabriele Frediani, and Danilo De Rossi</i>	
The Isolation and Proliferation Characteristics of Rabbit Adipos Derived Stromal Cells at Early Stage in Vitro	57
<i>Jianjiang Xu, Jiaxu Hong, and Sun Xinghuai</i>	
Application of a Microcellular Injection Molding Process (MuCell®) to Produce an Implant with Porous Structure	61
<i>Hongbin Wu, Erhard Krampe, Henning Schlicht, and Erich Wintermantel</i>	
Cytological Evaluation of a Porous Implant made from TPU	65
<i>Hongbin Wu, Sabine Wacker, Henning Schlicht, and Erich Wintermantel</i>	
Multifunctional Characterization of Engineered Cartilage Using Nano-Pulsed Laser	69
<i>M. Ishihara, I. Bansaku, M. Sato, J. Mochida, and M. Kikuchi</i>	
Preosteoblasts Enhance the Proliferation and Osteogenesis of Embryonic Stem Cells via Cell-Cell Contact and Osteogenic Supplements	71
<i>M.T. Tsai, S.T. Lin, and W.H. Chang</i>	
In vitro Degradation of Chitosan under Mechanical Load	75
<i>Ping Li, Xiaoliang Feng, Lu Jia, Jingwen Li, Chunqiu Zhang, and Yubo Fan</i>	
Optical Measurement System for pH of Medium Adjacent to Contracting Cultured Myotube in Vitro	77
<i>S. Hashimoto, S. Mochizuki, E. Yamada, K. Kida, K. Nishimura, and D. Inoue</i>	
Non-invasive Characterization of the Osteogenic Differentiation of hMSCs in 3D by Impedance Spectroscopy	81
<i>Cornelia Hildebrandt, Impidjati, and Hagen Thielecke</i>	
Contractile Forces during Cancer Cell Invasion	85
<i>B. Fabry, T.M. Koch, S. Münster, C.T. Mierke, and J.P. Butler</i>	
Enhancement of a Culture of Human Osteoblasts Inside Hydroxyapatite Scaffolds via [2 mT; 75 Hz]-Electromagnetic Bioreactor	87
<i>L. Fassina, E. Saino, L. Visai, M.G. Cusella De Angelis, F. Benazzo, and G. Magenes</i>	
Akt1-Dependent Pathways Involved in the Regulation of Tumor Conditioned Medium -Induced Endothelial Cell Migration and Survival	91
<i>H.Q. Wang, L.J. Chen, J. Tang, X.D. Sun, J.B. Feng, D.G. Xu, D.S. Li, and T.Z. Huang</i>	
Microsystems for the Characterization of 3D-ECM Analogous Bio-Interfaces	94
<i>U. Fröber, M. Stubenrauch, T. Weiß, A. Berg, D. Voges, R. Schade, G. Hildebrand, M. Schnabelrauch, K. Liefeith, M. Hoffmann, and H. Witte</i>	
Reverse Transcription PCR Screening of Different Neuronal Guiding Cues and Their Receptors in Human Staurosporine Differentiated SH-SY5Y Cells	98
<i>Marco Glaß, Heinz-Georg Jahnke, and Andrea A. Robitzki</i>	

Membrane Loads in a Compressed Skeletal Muscle Cell Computed Using a Cell-Specific Finite Element Model	102
<i>N. Slomka and A. Gefen</i>	
Strategies Combining Cells and Scaffolds for Bone Tissue Engineering	105
<i>E. Saino, L. Fassina, M.S. Sbarra, M.G. Cusella De Angelis, G. Magenes, F. Benazzo, and L. Visai</i>	
Microstructural Comparison and Analysis of Bone Scaffold Prepared by FDM and SLS Process	109
<i>Lin liulan, Rong bin, Hu Qingxi, and Fang Minglun</i>	
The Effects of MGF on the Physiological Behaviors of Osteoblasts	113
<i>Liling Tang, Min Qiu, Dajun Li, Fangyi Jiang, and Yuanliang Wang</i>	
Bone Marrow Concentrate: A Novel Tool for Bone Repair!	116
<i>M. Jäger, M. Herten, E.M. Jelinek, U. Fochtmann, and R. Krauspe</i>	
Cyclic Mechanical Cells Stimulation of Myoblasts in Skeletal Muscle Tissue Engineering: A Preliminary Study	119
<i>G. Silvani, L. Portella, L. Fassina, L. Benedetti, G. Magenes, and M.G. Cusella De Angelis</i>	
Microstructure and Cell Adhesion of Hydroxyapatite/Collagen Composites	122
<i>H.R. Le, S. Pranti-Haran, K. Donnelly, and R.P. Keatch</i>	
The Development of a Combined Electrical and Mechanical Stimulation Bioreactor to Improve Tissue Engineered Muscle Function	126
<i>J.B. Vorstius, R.P. Keatch, K. Donnelly, and P.S. Maher</i>	
Bio-mechanical Evaluation of a 3D Printed Composite Material	130
<i>P.S. Maher, R.P. Keatch, K. Donnelly, and J.B. Vorstius</i>	
PEG-Based Thermo-Responsive Polymer Coatings for the Control of Cell Adhesion	134
<i>A. Lankeau, E. Wischerhoff, K. Uhlig, H.G. Börner, JF. Lutz, and C. Duschl</i>	
Development and Characterization of High Volume Producible Micro Structured Surfaces for Tissue Engineering Applications	136
<i>C. Brecher, C. Wenzel, F. Pretzsch, H. Bueth, and P. Kluger</i>	
Two-Photon Polymerization for Microfabrication of Three-Dimensional Scaffolds for Tissue Engineering Application	140
<i>T. Weiß, A. Berg, S. Fiedler, G. Hildebrand, R. Schade, M. Schnabelrauch, and K. Liefeth</i>	
Study on Adhesion Force of Endothelial Progenitor Cells and Endothelial Cells on Different Adhesion Substrates	143
<i>G.X. Wang, C.J. Tang, L. Xiao, X. Wu, X. Xie, and L. Yang</i>	
Development of a System for the Performance and Evaluation of Mechanical Conditioning on Tissue Engineered Vascular Grafts	146
<i>Stefanos E. Diamantouros, Thomas C. Flanagan, Thomas Finocchiaro, Thorsten Deichmann, Mathias Wilhelm, Thomas Schmitz-Rode, and Stefan Jockenhoevel</i>	
Bioreactor Development for the Study of Angiogenesis within Tissue Engineered Constructs	150
<i>J. Frese, K. Motejlek, T. Schmitz-Rode, J. Neulen, and S. Jockenhoevel</i>	

Gene Expression Modulation in Stretched Muscle Cells	154
<i>G. Silvani, L. Fassina, L. Benedetti, G. Magenes, and M.G. Cusella De Angelis</i>	
Comparison of Composite Polysaccharide-Based Materials for Tissue Engineering by Means of Texture Analysis	157
<i>F. Brun, A. Accardo, G. Turco, and S. Paoletti</i>	
Quantification of the Time Course of Proliferation and Scattering Activity of Cells in Time Lapse Videos	161
<i>T. Timmel, A. Bauer, U. Kertzsch, K. Affeld, and J. Hengstler</i>	
Ultrasound Biomicroscopy of Healthy and Repair Cartilage Tissue	163
<i>K. Gelse, A. Olk, S. Eichhorn, B. Swoboda, F. Hennig, M. Schoene, and K. Raum</i>	
Inhibition of E-Selectin by Selectively deSulfated Heparin through Chitosan Microspheres Impregnated Collagen Scaffold	167
<i>T.S. Ramyaa Lakshmi, N. Shanmugasundaram, and Mary Babu</i>	
Monitoring of Cartilage Synthesis in Tissue-Engineered Scaffolds by Ultrasound Biomicroscopy	169
<i>N. Männicke, K. Raum, W. Richter, and E. Steck</i>	
Investigation of Plasma Protein Adsorption, Platelets Adhesion and Partial Thromboplastin Time on Plasma SiCOH Nanocoating	173
<i>G.X. Wang, Q. Zhang, Y. Shen, L.J. Wan, D.Y. Jia, C.J. Tang, S.P. Ge, and Q.S. Yu</i>	
Influence of Ascorbic Acid (AsA) Concentration in Culture Medium on Mechanical Property of Regenerated Cartilage	177
<i>S. Omata, Y. Sawae, and T. Murakami</i>	
Nanoscaled San-Huang-Xie-Xin-Tang Suppresses Liver Hepatic Stellate Cell Activation and Fibrosis by TGF-β_1	181
<i>Sherry Huang, Miffy Yang, Jin-Ching Chen, and Walter H. Chang</i>	
On the Impact of Single Cell Biomechanics on the Spatio-temporal Organization of Regenerative Tissue	185
<i>J. Galle, A. Krinner, P. Buske, D. Drasdo, and M. Loeffler</i>	
Transforming Growth Factor β 3 Causes Decreased HaCaT Cell Alignment to Extracellular Matrix Proteins Fibronectin, Laminin and Collagen Type I as a Result of an Enhanced Migratory Phenotype	189
<i>R. Berends, M. Youseffi, and M. Denyer</i>	
Biodegradable Sirolimus-loaded Poly(lactide) Nanoparticles as Delivery Systems for the Prevention of Restenosis in Coronary Stent Application	193
<i>F. Luderer, K. Sternberg, H.W. Rohm, M. Löbner, K. Köck, H.K. Kroemer, and K.-P. Schmitz</i>	
A Comparative Study of Two Oxidation Treatments to Form Bismuth-Doped Titanium Surface	197
<i>Y.C. Ko, J.Y. Chen, H.L. Huang, and D.J. Lin</i>	
Differentiation of Side Population Cells Isolated from Human Amniotic Mesenchymal Cells into Vascular Endothelial Cells	201
<i>Naoko Maruyama, Kenichi Kokubo, Toshihiro Shinbo, Minoru Hirose, Mamoru Kobayashi, Norio Sakuragawa, and Hirosuke Kobayashi</i>	

Quantitative 3D High Speed Video Analysis of Capsule Formation during Encapsulation Processes	204
<i>I. Meiser, S.C. Müller, H. Zimmermann, and F. Ehrhart</i>	
Bioreactor and Scaffold Design for the Mechanical Stimulation of Silk Based Anterior Cruciate Ligament Grafts	208
<i>M. Hohlieder, K. Cicha, A. Teuschl, M. van Griensven, H. Redl, and J. Stampfl</i>	
<i>In vitro</i> Biocompatibility of Electrospinning Polyaniline Fibers	211
<i>Mu-Feng Shie, Wen-Tyng Li, Chung-Feng Dai, and Jui-Ming Yeh</i>	
Chemical Surface Modification of Poly(ϵ-caprolactone) for Accelerated Wound Healing after Implantation of Vascular Devices	215
<i>M. Teske, H.W. Rohm, K. Kunna, H. Keul, M. Wilhelmi, S. Jockenhövel, A. Ovsianikov, K.-P. Schmitz, and K. Sternberg</i>	
Fractal Dimension Characteristics of Human Mesenchymal Stem Cell Proliferation	219
<i>M. Rabbani, M. Tafazzoli Shadpour, Z. Goli Malekabadi, and M. Janmaleki</i>	
Methods for Encapsulation and Storage of Human Stem Cells in Three Dimensional Alginate Aggregates	222
<i>J.C. Schulz, F.K. Groeber, A.F.J. Beier, I. Meiser, F. Ehrhart, U. Zimmermann, and H. Zimmermann</i>	
Revealing of Medical and Biological Relevant Cellular Processes by Automated Time Lapse Microscopy	226
<i>M.M. Gepp, I. Sébastien, F.K. Groeber, J.C. Schulz, F. Ehrhart, and Heiko Zimmermann</i>	
Tissue Engineering of Heart Valve Leaflet by Self-assembly of Tissue Spheroids Biofabricated from Human Fat Tissue Derived Stem Cells	230
<i>V. Mironov, V. Kasyanov, A. Nagy-Mehesz, R. Moreno, Z. Hajdu, T. Trusk, I. Ozolanta, M. Murovska, Y. Wu, H. Yao, V. Beachley, X. Wen, A. Bradshaw, R. Visconti, R. Norris, and R. Markwald</i>	
The Influences of Reuse Solution and the Hemodialysis Environment on the High Flux Polyamide Hollow Fiber Membranes	233
<i>N. Sarıca, M.E. Aksoy, M. Usta, C. Bindal, and A.H. Üçışık</i>	
Novel Dynamic Bioreactor System for Heart Valve Cultivation under Echocardiographic Control	237
<i>S. Kreitz, G. Dohmen, S. Diamantouros, J. Frese, T.C. Flanagan, T. Schmitz-Rode, R. Autschbach, and S. Jockenhoewel</i>	
Biological and Micromechanical Approaches to Single Osteon of Equine Tibia	241
<i>Hidetake Yamamoto, Yu Araki, and Yuta Takahashi</i>	
Electrically Functionalized Hydroxyapatite and Calcium Phosphate Surfaces to Enhance Immobilization and Proliferation of Osteoblasts in <i>Vitro</i> and Modulate Osteogenesis In <i>Vivo</i>	245
<i>Yu. Dekhtyar, M.V. Dvornichenko, A.V. Karlov, I.A. Khlusov, N. Polyaka, R. Sammons, and K.V. Zaytsev</i>	
Biopolymers from African Giant Snail Shells Waste: Isolation and Characterization	249
<i>E.E.C. Agoha and E.A. Mazi</i>	

Studies on the Electric Field Distribution Using Different Electrode Shapes for Electrochemotherapy	252
<i>Mamdouh M. Shawki, Mohammed A. Elbelbesy, Thannaa E. Shalaby, Metwali A. kotb, and Youssef S. Youssef</i>	
Effects of Shear Stress on the Binding of Atherosclerosis Targeting Nanoparticles to Activated Endothelial Cells	256
<i>K. Rhee, J.H. Na, and G. Khang</i>	
Materials Science Aspects of Bone Fracture and Regeneration	259
<i>Peter Fratzl, Richard Weinkamer, Manjubala Inderchand, Paul Roschger, Andreas Lendlein, and Georg Duda</i>	
Seeding Human Mesenchymal Stem Cells into Fibrin-Based Scaffolds - A Potential for a Future Angiogenic Therapy?	260
<i>E. Lotan and S. Einav</i>	
Development of Unified Transcutaneous Transformer for Energy and Information Transmission for a Totally-Implantable Artificial Heart	264
<i>T. Yamamoto, K. Koshiji, A. Homma, E. Tatsumi, and Y. Taenaka</i>	
Numerical Assessment on the Metabolic Response of Chondrocytes after Cyclic Loading: The Influence of Stress Rate and Magnitude	266
<i>A. Tasci, S. Ferguson, and P. Büchler</i>	
Biomechanical Stability and Biological Effect of Titanium Intramedullary Implant in Rabbit Femur with the Filler of Fast-Setting Calcium Phosphate Cement	270
<i>D.J. Lin, J.H. ChernLin, C.P. Ju, W.C. Chen, S.H. Huang, and Y.C. Tien</i>	
Consideration of Measurement of Electrical Characteristics for Sacrificed Cow Muscles	274
<i>Wataru Kiyoyama, Takahiko Yamamoto, Kohji Koshiji, Tatsumi Eisuke, Akihiko Homma, and Yoshiyuki Taenaka</i>	
Lubrication Property of Hydrogel Layer on Articular Cartilage Surface	276
<i>Takaki Tokuyama, Yusuke Morita, Kazuto Tanaka, Tsutao Katayama, and Eiji Nakamachi</i>	
Effects of BaTiO₃ Piezoelectric Thin Film Coating on Activity of Rat Bone Marrow Cell	279
<i>Yuki Tateyama, Yusuke Morita, Kazuto Tanaka, Tsutao Katayama, and Eiji Nakamachi</i>	
An Evaluation in Microstructural Properties of Xenogeneic Cancellous Bone Being Scaffold Subjected to Mechanical Strain in Bone Tissue Engineering	282
<i>Xu Xiao-ying, Zhang Xi-zheng, Guo Chun, Guo Yong, and Guo Xin</i>	
Bioimpedance Measurement Setup for the Assessment of Viability and Number of Human Adipose Stem Cells Cultured as Monolayers	286
<i>L. Jaatinen, L. Sippola, M. Kellomäki, S. Miettinen, R. Suuronen, and J. Hyttinen</i>	
Quantitative Assessment of Bone Properties during Defect Healing in an Animal Defect Model by Scanning Acoustic Microscopy	289
<i>M. Schulz, J. Brandt, K. Raum, and K. Brehme</i>	
Effect of Crosslinkers on Physical Properties of Gelatin Hollow Tubes for Tissue Engineering Application	293
<i>Chu-Hua Chiu, Han-Chin Shih, Shyh-Chuan Jwo, and Ming-Fa Hsieh</i>	

Disruption and Re-polymerization Kinetics of f-Actin Cytoskeleton in Bone Cells Subjected to Dynamic Mechanical Stimulus	297
<i>R.S.A. Nesbitt, J. Macione, M. Eschbach, Y. Roberts, A. Debroy, and S.P. Kotha</i>	
Relaxation of Strained Actin Networks	300
<i>A. Pomerance and W. Losert</i>	
Poly (Vinyl Alcohol) Based Monomers for Lithography-Based 3D Fabrication	303
<i>C. Heller, M. Schwentenwein, M. Porodec, M. Schulz-Siegmund, J. Stampfl, F. Varga, and R. Liska</i>	
Nanoparticulate Detection Systems for the Evaluation of New Drug Delivery Approaches and Drug Targeting Principles	307
<i>J.K. Teßmar, A.F.E. Hezinger, G. Zayed, B. Kosog, C. Rose, and A.M. Göpferich</i>	
Quantitative Analysis and Manipulation of Cell Adhesion to Molecular Resolution	311
<i>Jens Friedrichs, Anna Taubenberger, and Daniel Müller</i>	
Author Index	313