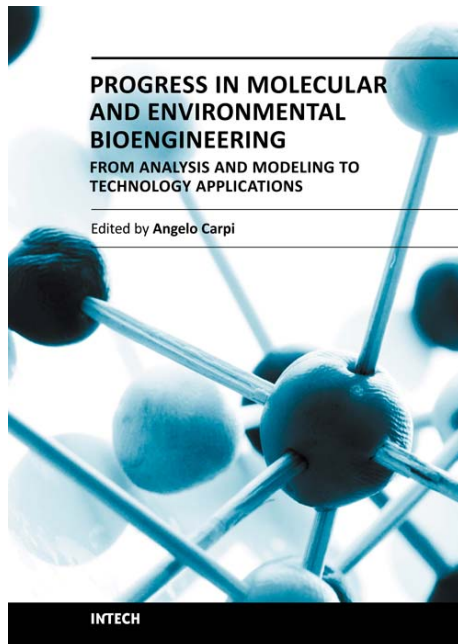


**ANGELO CARPI (EDITOR)
PROGRESS IN MOLECULAR
AND ENVIRONMENTAL BIOENGINEERING
FROM ANALYSIS AND MODELING
TO TECHNOLOGY APPLICATIONS**



InTech
ISBN 978-953-307-268-5
Hard cover
646 pages
August 2011

Open access book www.intechopen.com

The book *Progress in Molecular and Environmental Bioengineering – from Analysis and Modeling to Technology Applications* provides an example of the successful and rapid expansion of bioengineering within the world of the science.

The content classification mainly reflects the increasing number of studies on genetically modified microorganisms directed towards non-biomedical industry. An important application field of these studies is the ecosystem as indicated by the chapters included in the part on environmental bioengineering.

The book includes a core of studies on bioengineering technology applications so important that their progress is expected to improve both human health and ecosystem.

This core consists of thirteen chapters describing results obtained with up to date biotechnologies which include:

- insertion of DNA sequences from a different microorganism species (chimeric genes),
- biochemical change of the existing microorganism gene sequences (conjugative plasmids or transposoms),
- DNA and RNA transfer into embryos,
- particular bioprocessing, optimization and enrichment of medium culture.

Two other groups of chapters include:

- design and modeling in molecular, tissue and environmental bioengineering,
- production and important applications of biomaterials in the biomedical field as well as in other fields like agriculture and electronics.

These studies provide an important update on technology and achievements in molecular and cellular engineering as well as in the relatively new field of environmental bioengineering.

The book will hopefully attract the interest of not only the bioengineers, researchers or professionals, but also of everyone who appreciates life and environmental sciences.

Table of Contents

Preface	xi
Part 1 Molecular and Cellular Engineering: Modeling and Analysis	1
Chapter 1 Fractional Kinetics Compartmental Models <i>Davide Verotta</i>	3
Chapter 2 Advances in Minimal Cell Models: A New Approach to Synthetic Biology and Origin of Life <i>Pasquale Stano</i>	23
Chapter 3 Wavelet Analysis for the Extraction of Morphological Features for Orthopaedic Bearing Surfaces <i>X. Jiang, W. Zeng and Paul J. Scott</i>	45
Chapter 4 Ten Years of External Quality Control for Cellular Therapy Products in France <i>Béatrice Panterne, Marie-Jeanne Richard, Christine Sabatini, Sophie Ardiot, Gérard Huyghe, Claude Lemarié, Fabienne Pouthier and Laurence Mouillot</i>	83
Part 2 Molecular and Cellular Engineering: Biomedical Applications	115
Chapter 5 Hydrogels: Methods of Preparation, Characterisation and Applications <i>Syed K. H. Gulrez, Saphwan Al-Assaf and Glyn O. Phillips</i>	117
Chapter 6 Chemical Mediated Synthesis of Silver Nanoparticles and its Potential Antibacterial Application <i>P. Prema</i>	151
Chapter 7 Polymer-Mediated Broad Spectrum Antiviral Prophylaxis: Utility in High Risk Environments <i>Dana L. Kylvik, Troy C. Sutton, Yevgeniya Le and Mark D. Scott</i>	167
Chapter 8 Solid Lipid Nanoparticles: Technological Developments and in Vivo Techniques to Evaluate Their Interaction with the Skin <i>Mariella Bleve, Franca Pavanetto and Paola Perugini</i>	191
Chapter 9 Bioprocess Design: Fermentation Strategies for Improving the Production of Alginate and Poly-β-Hydroxyalkanoates (PHAs) by <i>Azotobacter vinelandii</i> <i>Carlos Peña, Tania Castillo, Cinthia Núñez and Daniel Segura</i>	217
Chapter 10 Research and Development of Biotechnologies Using Zebrafish and Its Application on Drug Discovery <i>Yutaka Tamaru, Hisayoshi Ishikawa, Eriko Avşar-Ban, Hajime Nakatani, Hideo Miyake and Shin'ichi Akiyama</i>	243
Chapter 11 Liver Regeneration: The Role of Bioengineering <i>Pedro M. Baptista, Dipen Vyas and Shay Soker</i>	257
Chapter 12 Platelet Rich Plasma in Reconstructive Periodontal Therapy <i>Selcuk Yılmaz, Gokser Cakar and Sebnem Dirikan Ipci</i>	269

Chapter 13 Ocular Surface Reconstitution <i>Pho Nguyen, Shabnam Khashabi and Samuel C. Yiu</i>	291
Chapter 14 A Liquid Ventilator Prototype for Total Liquid Ventilation Preclinical Studies <i>Philippe Micheau, Raymond Robert, Benoit Beaudry, Alexandre Beaulieu, Mathieu Nadeau, Olivier Avoine, Marie-Eve Rochon, Jean-Paul Praud and Hervé Walti</i>	323
Part 3 Molecular and Cellular Engineering: Industrial Application	345
Chapter 15 Isolation and Purification of Bioactive Proteins from Bovine Colostrum <i>Mianbin Wu, Xuewan Wang, Zhengyu Zhang and Rutao Wang</i>	347
Chapter 16 Separation of Biosynthetic Products by Pertraction <i>Anca-Irina Galaction and Dan Cașcaval</i>	367
Chapter 17 Screening of Factors Influencing Exopolymer Production by <i>Bacillus licheniformis</i> Strain T221a Using 2-Level Factorial Design <i>Nurrazean Haireen Mohd Tumpang, Madihah Md. Salleh and Suraini Abd-Aziz</i>	395
Chapter 18 Biocatalysts in Control of Phytopatogenic Fungi and Methods for Antifungal Effect Detection <i>Cecilia Balvantín-García, Karla M. Gregorio-Jáuregui, Erika Nava-Reyna, Alejandra I. Perez-Molina, José L. Martínez-Hernández, Jesús Rodríguez-Martínez and Anna Ilyina</i>	405
Chapter 19 Cofactor Engineering Enhances the Physiological Function of an Industrial Strain <i>Liming Liu and Jian Chen</i>	420
Chapter 20 The Bioengineering and Industrial Applications of Bacterial Alkaline Proteases: The Case of SAPB and KERAB <i>Bassem Jaouadi, Badis Abdelmalek, Nedra Zará Jaouadi and Samir Bejar</i>	445
Chapter 21 Bioengineering Recombinant Diacylglycerol Acyltransferases <i>Heping Cao</i>	467
Chapter 22 Microalgal Biotechnology and Bioenergy in <i>Dunaliella</i> <i>Mansour Shariati and Mohammad Reza Hadi</i>	483
Chapter 23 New Trends for Understanding Stability of Biological Materials from Engineering Prospective <i>Ayman H. Amer Eissa and Abdul Rahman O. Alghannam</i>	507
Chapter 24 Morphology Control of Ordered Mesoporous Carbon Using Organic-Templating Approach <i>Shunsuke Tanaka and Norikazu Nishiyama</i>	533
Part 4 Environmental Engineering: Modeling and Applications	551
Chapter 25 Streambank Soil Bioengineering Approach to Erosion Control <i>Francisco Sandro Rodrigues Holanda and Igor Pinheiro da Rocha</i>	553
Chapter 26 Improving Biosurfactant Recovery from <i>Pseudomonas aeruginosa</i> Fermentation <i>Salwa Mohd Salleh, Nur Asshifa Md Noh and Ahmad Ramli Mohd Yahya</i>	577



Chapter 27 New Insight into Biodegradation of Poly (L-Lactide), Enzyme Production and Characterization	
<i>Sukhumaporn Sukkhum and Vichien Kitpreechavanich</i>	587
Chapter 28 Engineering Bacteria for Bioremediation	
<i>Elen Aquino Perpetuo, Cleide Barbieri Souza and Claudio Augusto Oller Nascimento</i>	605
Chapter 29 Construction and Characterization of Novel Chimeric β-Glucosidases with <i>Cellvibrio gilvus</i> (CG) and <i>Thermotoga maritima</i> (TM) by Overlapping PCR	
<i>Kim Jong Deog and Hayashi Kiyoshi</i>	633