Biomaterials for Drug and Cell Delivery

Symposium held November 29-December 1, 1993, Boston, Massachusetts, U.S.A.

EDITORS:

Antonios G. Mikos
Rice University
Houston, Texas, U.S.A.

Regina M. Murphy
University of Wisconsin
Madison, Wisconsin, U.S.A.

Howard Bernstein
Alkermes, Inc.
Cambridge, Massachusetts, U.S.A.

Nicholas A. Peppas
Purdue University
West Lafayette, Indiana, U.S.A.
PART I: TISSUE SCAFFOLDING AND REGENERATION

USE OF A MULTIPLE LUMEN CUFF FOR NERVE REGENERATION ............... 3
Raymond Greer, John Daniel, Etsuro Uemura, Raymond Kudej,
Yueh-Sheng Chen, and Chih-Hui Chung

THE TISSUE ENGINEERING APPROACH TO LIGAMENT
RECONSTRUCTION ..................................................... 13
Michael G. Dunn, J.B. Liesch, M.L. Tiku, S.H. Maxian, and J.P. Zawadsky

DEVELOPMENT OF A COLLAGEN-GAG COPOLYMER IMPLANT FOR
THE STUDY OF TENDON REGENERATION .......................... 19
L.K. Louie, I.V. Yannas, and M. Spector

COLLAGEN AS A BIOMATERIAL: AN APPLICATION IN KNEE
MENISCAL FIBROCARTILAGE REGENERATION ..................... 25
Shu-Tung Li, Debbie Yuen, Peggy C. Li, William G. Rodkey,
and Kevin R. Stone

A NOVEL BIODEGRADABLE POLY(LACTIC-CO-GLYCOLIC ACID)
FOAM FOR BONE REGENERATION ................................. 33
Robert C. Thomson, Michael J. Yaszemsik, John M. Powers, and
Antonios G. Mikos

BIODEGRADABLE FOAMS FOR CELL TRANSPLANTATION ............. 41
H. Lo, S. Kadiyala, S.E. Guggino, and K.W. Leong

STABILIZING FIBER-BASED CELL DELIVERY DEVICES
BY PHYSICALLY BONDING ADJACENT FIBERS ....................... 47
D.J. Mooney, C.L. Mazzoni, G.M. Organ, W.C. Puelacher,
J.P. Vacanti, and R. Langer

CONTROL OF PORE SIZE AND MORPHOLOGY IN COLLAGEN
MICROSPHERES ....................................................... 53
Gennaro J. Maffia

THE ROLE OF HEPATOTROPHIC STIMULATION IN HETEROTOPIC
HEPATOCTYE TRANSPLANTATION .................................... 59
P.-M. Kaufmann, S. Uyama, K. Sano, D. Mooney, and J.P. Vacanti

PART II: GENETIC ENGINEERING OF BIOMATERIALS,
TARGETED DRUG DELIVERY, AND BIODEGRADABLE
CONTROLLED RELEASE SYSTEMS

ATTACHMENT OF MUCIN SPECIFIC LECTINS TO ALGINATE FOR
USE AS BIOADHESIVES ............................................... 67
Donald E. Chickering III, Jules S. Jacob, Annie Keung, Tejal A. Desai,
and Edith Mathiowitz

CONTROLLED DRUG DELIVERY TO THE JOINTS BY ENZYMATICALLY
DEGRADABLE MICROSPHERES ....................................... 73
Kimberly E. Brown, Wen Shao, Joan Bathon, and Kam W. Leong
DESIGN OF BIOERODIBLE DEVICES WITH OPTIMAL RELEASE CHARACTERISTICS

Kyriacos Zygourakis

THE EROSION PROPERTIES OF POLYANHYDRIDES

Lisa Shieh, Achim Gopferich, and Robert Langer

CONTROLLED RELEASE OF TRIMATERENE FROM POLY(DL-LACTIDE-CO-GLYCOLIDE) MICROSPHERES

Amy D. Ouellette and Nicholas A. Peppas

DOUBLE-WALLED MICROSPHERES FOR DRUG DELIVERY

Part III: Receptor-Mediated Cell Adhesion, Cell-Biomaterial Interactions, and Cell Encapsulation

SYNTHESIS, SURFACE AND CELL ADHESION PROPERTIES OF POLYURETHANES CONTAINING COVALENTLY GRAFTED RGD-PEPTIDES

Horng-Ban Lin and Stuart L. Cooper

CELL FUNCTION ON SUBSTRATES CONTAINING IMMOBILIZED BIOACTIVE PEPTIDES

Kay C. Doe, Thomas T. Andersen, and R. Bates

OSTEOBLAST ADHESION ON BIOERODABLE POLYMER SUBSTRATES


OSTEOBLAST-ORTHOPAEDIC BIOMATERIAL RESPONSE

S. L. Blaud, M. J. Yaszemski, R. Bizios, and O. G. Mikos

OSTEOBLAST ADHESION ON BIOERODABLE POLYMER SUBSTRATES CONTAINING COVALENTLY GRAFTED RGD PEPTIDES

Hong-Ban Lin and Stuart L. Cooper

Human osteoblast expression of osteonectin on different charged substrata


CELL INTERACTIONS WITH FIBRONECTIN-COATED ELECTRICALLY CONDUCTING POLYPYRROLE THIN FILMS

Joyce Y. Wong, Robert Langer, and Donald E. Ingber

TUMOR CELL-SUBSTRATE STABILIZATION MEDIATED BY INTEGRINS, THE D, SUBUNIT

Joyce Y. Wong, Robert Langer, and Donald E. Ingber

INTEGRIN-MEDIATED FIBROBLAST ADHESION STRENGTH: ROLE OF THE A, SUBUNIT

Joyce Y. Wong, Robert Langer, and Donald E. Ingber

CELL INTERACTIONS WITH FIBRONECTIN-COATED ELECTRICALLY CONDUCTING POLYMERIC FILMS

Joyce Y. Wong, Robert Langer, and Donald E. Ingber

INTEGRIN-MEDIATED FIBROBLAST ADHESION STRENGTH: ROLE OF THE A, SUBUNIT

Joyce Y. Wong, Robert Langer, and Donald E. Ingber

CHARACTERIZATION OF BIOERODABLE POLYESTER FILMS AND THEIR INTERACTION WITH HEPATOCTES

Ann Park, Linda Griffith Cima, and P.-Matthias Kaufman

CHARACTERIZATION OF BIOERODABLE POLYESTER MEMBRANES (NONPOROUS) PROTEIN-PRIMABLE PROLIFERATION AND INTERACTIONS OF SEVERAL CELL TYPES ENCAPSULATED WITH HYDROPHOBIC MEMBRANES

Julie E. Taylor, Allet S. Ward, Kathleen A. White, Robert W. Kuhn, Julie E. Taylor, and Judith K. John
MACROMOLECULAR NUTRIENT LIMITATIONS OF ENCAPSULATED CELLS .................................................. 171
Erik Einar Hancock and Linda Griffith Cima

PART IV: BIOMACROMOLECULAR CONTROLLED DELIVERY AND HYDROGELS

*STRUCTURAL ELEMENTS WHICH GOVERN THE RESISTANCE OF INTESTINAL TISSUES TO COMPOUND TRANSPORT .................................................. 179
Werner Rubas, Mary Cromwell, Tom Gadek, Daljit Narindray, and Randy Mrsny

THE DEVELOPMENT OF AN IN SITU ASSAY FOR bFGF RELEASE .................................................. 187

A PHOTOPATTERNERED GLUCOSE RESPONSIVE HYDROGEL, FOR USE IN A CONDUCTIMETRIC SENSOR .................................................. 193
Matthew J. Lesho and Norman F. Sheppard, Jr.

POLY(METHACRYLIC ACID-g-ETHYLENE GLYCOL) HYDROGELS AS pH RESPONSIVE BIOMEDICAL MATERIALS .................................................. 199
Cristi L. Bell and Nicholas A. Peppas

EFFECTS OF TEMPERATURE ON BULK PROPERTIES OF HYDROGELS MADE FROM HYDROPHOBICALLY MODIFIED HYDROXYETHYL CELLULOSE IN SURFACTANT SOLUTIONS .................................................. 205
Shun-Yuan Wu and Carol A. Steiner

TEMPERATURE- AND pH-SENSITIVE HYDROGELS FOR CONTROLLED RELEASE OF ANTITHROMBOTIC AGENTS .................................................. 211
Christopher S. Brazel and Nicholas A. Peppas

IONOTROPICALLY GELLED BICONTINUOUS CUBIC PHASE AS A MATRIX FOR CONTROLLED RELEASE .................................................. 217
S. Puvvada, J. Naciri, and B.R. Ratna

NOVEL PREPARATION OF POLY(VINYL ALCOHOL) MICROPARTICLES WITHOUT CROSSLINKING AGENT FOR CONTROLLED DRUG DELIVERY .................................................. 223
Becky J. Ficek and Nicholas A. Peppas

THE IMPACT OF FORMULATED INTERLEUKIN-2/DELIVERY DEVICE SURFACE INTERACTIONS ON BIOEFFICACY .................................................. 227
Stelios T. Tzannis, Todd M. Przybycien, William J.M. Hrushesky, and Patricia Wood

PART V: BIOMATERIALS CHARACTERIZATION AND ORTHOPEDIC BIOMATERIALS

CHARACTERIZATION OF A POLYANHYDRIDE SERIES BY FTIR .................................................. 235
Mark R. Kreitz, Kathleen J. Pekarek, and Edith Mathiowitz

PRELIMINARY XPS SPECTROSCOPIC CHARACTERIZATION OF AUTOCRAVED TINI SHAPE MEMORY ALLOYS FOR IMPLANTS .................................................. 239

*Invited Paper