

Translational Medicine and Bioengineering Conference 2016

San Francisco, California, USA
12 – 13 November 2016

ISBN: 978-1-5108-6374-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact AIChE
at the address below.

AIChE
120 Wall Street, FL 23
New York, NY 10005-4020

Phone: (800) 242-4363
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

BIOPHARMACEUTICALS

ENGINEERING ANTIBODY FABS FOR LONG ACTING DELIVERY TO THE EYE	1
<i>R. Kelley</i>	
EVALUATION OF INVERTEBRATE HEMOGLOBINS AS NOVEL BLOOD SUBSTITUTES	2
<i>J. Elmer, D. Zimmerman, J. Dienes, C. Neely, M. Nichola, S. Zabarnick</i>	
TRANSLATABLE AFFIBODY LIGAND DISCOVERY: ENGINEERED BIOPANNING, DEEP SEQUENCE-GUIDED LIBRARY DESIGN, AND PHARMACOKINETIC MODULATION	4
<i>B. Hackel, L. Stern, D. Woldring, B. Case</i>	
BIOPHARMACEUTICAL INFORMATICS: A STRATEGIC VISION FOR IMPROVED TRANSLATION OF BIOLOGIC DRUG DISCOVERIES INTO DRUG PRODUCTS	6
<i>S. Kumar, S. Singh</i>	
ENGINEERED MULTIVALENCY FOR ENHANCED EFFICACY OF HER3-TARGETED AFFIBODIES	8
<i>S. Jay, J. Schardt</i>	

GENE AND DRUG DELIVERY

DIRECTED EVOLUTION OF NEW VIRUSES FOR THERAPEUTIC GENE DELIVERY	10
<i>D. Schaffer</i>	
DISCOVERY OF POLYMERS FOR NUCLEIC ACID DELIVERY USING COMBINATORIAL AND CHEMINFORMATICS METHODS	12
<i>K. Rege</i>	
HISTONE-TARGETED GENE DELIVERY CARRIERS FOR BONE REGENERATION	13
<i>E. Munsell, M. Sullivan</i>	
MULTI-STAGE DRUG DELIVERY SYSTEM FOR ENHANCED PAYLOAD DELIVERY TO LYMPH NODE CELLS	14
<i>S. Thomas, A. Schudel, C. Higginson, M. Finn</i>	
PROBING CELLULAR-PARTICLE INTERACTIONS AND DEFORMABILITY IN THE DESIGN OF VASCULAR-TARGETED CARRIERS	16
<i>L. Eniola-Adefeso</i>	
DESIGN OF POLYELECTROLYTE MULTILAYERS TO PROMOTE IMMUNE TOLERANCE	17
<i>C. Jewell</i>	

IMMUNOENGINEERING

CONTROLLING IMMUNE CELL DYNAMICS USING MICROFLUIDICS	18
<i>S. Tay</i>	
DENDRITIC CELL-TARGETED IMMUNOMODULATION FOR TOLERANCE	19
<i>B. Keselowsky</i>	
IMMUNOENGINEERED PARTICLES AS ARTIFICIAL IMMUNE CELLS: THE IMPORTANCE OF SIZE AND SHAPE	20
<i>J. Green</i>	
QUANTITATIVE, MOLECULAR-LEVEL ANALYSIS OF THE SERUM ANTIBODY REPERTOIRE REVEALS UNANTICIPATED FEATURES OF THE RESPONSE TO INFLUENZA VACCINATION	22
<i>J. Lee, G. Georgiou, B. Dekosky, D. Boutz, V. Chromikova, M. Joyce, C. Vollmers, K. Leung, A. Horton, C. Lee, J. Lavinder, E. Murrin, C. Chrysostomou, K. Hoi, D. Park, M. Davis, A. Ellington, E. Marcotte, G Ippolito, S. Quake, P. Kwong, F. Krammer, J. Mascola, P. Wilson, T. Ross, C. Bloom, C. Dekker, L. Popova, W. Kong, L. Wang, Y. Zhang, B. Zhang, A. Druz, P. Thomas, Y. Tsybovsky</i>	
SYNTHETIC BIOLOGY IN CANCER CELLULAR IMMUNOTHERAPY	24
<i>W. Wong</i>	
TUMOR TARGETING AND IMMUNOTHERAPY ENABLED BY AN ENGINEERED PEPTIDE-FC FUSION	25
<i>J. Cochran</i>	

BIOMANUFACTURING

DISCOVERY AND ENGINEERING OF DISULFIDE BOND SWITCHES IN MAMMALS	26
<i>C. Khosla</i>	
NEXT-GENERATION SEQUENCING AND OMICS TECHNOLOGIES FOR BIOTHERAPEUTIC MANUFACTURING DEVELOPMENT	27
<i>J. Groot, C. Wright, S. Davis</i>	
RECENT DEVELOPMENTS IN DOWNSTREAM BIOPROCESSING: MULTIMODAL CHROMATOGRAPHY, AFFINITY PRECIPITATION AND INTEGRATED BIOPROCESSING	29
<i>S. Cramer</i>	
STEM CELL-BASED PRODUCT BIOMANUFACTURING: FROM CULTIVATION MODALITIES TO POPULATION BASED-MODELS	30
<i>E. Tzanakakis</i>	
SUGAR AND SPICE: SYSTEMS BIOTECHNOLOGY APPROACHES TO INTERPET AND IMPROVE MAMMALIAN CELL FACTORIES	32
<i>M. Betenbaugh</i>	
DEVELOPMENT OF A CHO-BASED CELL-FREE BIOMANUFACTURING PLATFORM FOR SYNTHESIS OF ACTIVE HUMAN MONOCLONAL ANTIBODIES	33
<i>R. Martin, N. Majewska, C. Chen, M. Jewett, V. Roy</i>	

STEM CELLS REGENERATIVE MEDICINE

DE NOVO PREDICTION OF HUMAN REPROGRAMMING USING NUCLEAR IMAGING DATA	35
<i>K. Saha, T. Harkness, J. Carlson-Stevermer, R. Prestil, S. Seymour, A. Abdeen</i>	
DEFINED, XENO-FREE PLATFORMS FOR MANUFACTURING CARDIOVASCULAR CELL TYPES FROM HUMAN PLURIPOTENT STEM CELLS	36
<i>S. Palecek</i>	
DISTINCT AND SHARED DETERMINANTS IMPACTING CARDIOMOCYTE CONTRACTILITY IN MULTI-LINEAGE COMPETENT ETHNICALLY DIVERSE IPSCS	37
<i>M. Tomov, J. Paluh, Z. Olmsted, H. Otu, M. Buck, H. Dogan, J. Cibelli</i>	
ENGINEERED SINGLE HUMAN IPSC-CARDIOMYOCYTES TO ASSAY CONTRACTILE DEFECTS INDUCED BY DRUGS AND DISEASE STATES	39
<i>A. Ribeiro, Y. Ang, M. Mandegar, B. Conklin, D. Srivastava, B. Pruitt</i>	
MIGRATION OF HUMAN RETINAL PROGENITOR CELLS IN 3D COLLAGEN GELS	41
<i>R. Carrier, J. Kundu, D. Blanton, P. Baranov, M. Oudin, M. Young, M. Miller, D. Lauffenburger</i>	
UTILIZING DEVELOPMENTAL CUES TO ‘ENGINEER’ NATIVE TISSUES FROM HUMAN INDUCED PLURIPOTENT STEM CELLS (IPSC)	43
<i>N. Bhutani, J. Lee</i>	
VASCULAR DIFFERENTIATION AND ENGINEERING FROM HUMAN PLURIPOTENT STEM CELLS	45
<i>S. Gerecht</i>	

POSTERS

ANALYZING AND PREDICTING ANTIBODY RESPONSES	46
<i>S. Reddy</i>	
APTAMER MICELLES TARGETING A NOVEL CHEMOKINE FOR CANCER THERAPEUTICS	47
<i>E. Kokkoli, M. Harris, T. Pearce, T. Pengo, H. Kuang, C. Forster</i>	
BIOPHYSICAL CUES MODULATE THE ANTI-FIBROTIC RESPONSE OF RABBIT CORNEAL STROMAL CELLS	49
<i>Y. Song, E. Rewinski, C. Murphy, V. Raghunathan, S. Thomasy</i>	
CHARACTERIZATION OF AN ELECTROSTATIC-BASED AIR SAMPLER FOR THE CAPTURE OF AIRBORNE NOROVIRUS	51
<i>D. Vega</i>	
COLLAGEN TURNOVER-STIMULATED GENE DELIVERY TO ENHANCE CHRONIC WOUND REPAIR	52
<i>M. Urello, K. Kück, M. Sullivan</i>	
COMBINATION CHEMO- AND IMMUNOTHERAPY AGAINST LATENT PULMONARY TUBERCULOSIS	54
<i>G. Chow, N. Kunda, D. Price, L. Stephens, P. Muttil</i>	

CONTROLLED DRUG RELEASE WITH ULTRASOUND IMAGING MONITORING CAPABILITY	56
<i>Y. Park</i>	
DETECTION OF TUBERCULOSIS VOLATILE ORGANIC BIOMARKERS METHYL NICOTINATE AND METHYL PHENYL ANISATE USING TWO-STEP ANODIZED TITANIUM DIOXIDE NANOTUBE ARRAYS.....	57
<i>Y. Saffary, C. Willis, M. Misra, S. Mohanty</i>	
ELASTIN-LIKE POLYPEPTIDES FOR GENERATION OF INDUCED PLURIPOTENT STEM CELLS.....	59
<i>C. Lee, H. Gill</i>	
ENHANCE METHANOL TOLERABILITY OF M. EXTORQUENS AM1 BY ADAPTIVE EVOLUTION.....	60
<i>L. Cui, W. Liang, C. Zhang, X. Xing, W. Zhu</i>	
FUNCTIONAL OVARIAN TISSUE CONSTRUCT WITH ENGINEERED MULTI-LAYERED FOLLICLES THAT SECRETE SEX HORMONES.....	62
<i>R. Leung</i>	
IMPROVED SURVIVAL OF PANCREATIC ISLETS THROUGH DELIVERY OF ALANINE FROM PEGDMA MICROPARTICLES.....	64
<i>A. Long, L. Le, R. Weber, G. Faleo, T. Desai</i>	
INQUIRY INTO NEURODEGENERATION: ENGRAILED PROTEINS AND PARKINSON'S DISEASE.....	66
<i>H. Koziol</i>	
LEARNING HOW IMMUNE CELLS OF THE GUT CONTRIBUTE TO AUTOIMMUNE DISEASE THROUGH REVERSE-ENGINEERED TRANSCRIPTIONAL REGULATORY NETWORKS.....	68
<i>E. Miraldi, M. Pokrovskii, J. Hall, D. Castro, N. Carriero, A. Watters, D. Littman, R. Bonneau</i>	
MESENCHYMAL STEM CELLS AS TROJAN HORSES FOR THE SELECTIVE DELIVERY OF NANOPARTICLES TO TUMORS.....	70
<i>J. Santamaria, M. Encabo-Berzosa, M. Arruebo, M. Gimeno, M. Sancho-Albero, L. Lujan, M. Martin-Duque, L. Gomez, M. Quintanilla, V. Sebastian</i>	
N-ACETYLCYSTEINE-DOPED MICROPARTICLES EFFICIENTLY RESCUE OLIGODENDROCYTE PRECURSOR CELL REDOX STATE IN AN OXIDATIVE ENVIRONMENT	72
<i>K. Lampe, N. Murphy</i>	
NANOPARTICLE THERAPEUTICS FOR TREATING CANCER AND OTHER DISEASES OF THE BRAIN.....	74
<i>M. Davis</i>	
NEXT-GENERATION SEQUENCING AND OMICS TECHNOLOGIES FOR BIOTHERAPEUTIC MANUFACTURING DEVELOPMENT.....	75
<i>N/A</i>	
ON-DEMAND NANOVAACCINES MANUFACTURING	77
<i>J. Crecente-Campo</i>	
POINT OF CARE SCREENING OF TUBERCULOSIS FROM BREATH USING FUNCTIONALIZED TiO2 NANOTUBE ARRAY SENSING PLATFORM.....	79
<i>S. Mohanty, Y. Saffary, C. Willis, M. Misra</i>	
POLLEN GRAINS FOR ORAL VACCINATION.....	81
<i>H. Gill</i>	
PRODUCTION OF DESIGNER LIPIDS USING “CLICK” CHEMISTRIES	82
<i>D. Konestski, C. Bowman, C. Wang, B. Worrell, T. Gong, X. Zhang, A. Baranek, W. Xi, S. Chatani</i>	
PROOF-OF-CONCEPT STUDY FOR RAPID DETECTION OF ZIKA VIRAL RNA VIA DNA BIOSENSOR.....	84
<i>H. Dylewski, S. Eda, J. Ramos, H. Rice</i>	
SELF-AGGREGATION OF FUNCTIONALIZED CAPSIDS USING COARSE GRAINED MOLECULAR DYNAMICS	85
<i>V. Karra, S. Libring, L. Chong, M. Dutt</i>	
SYNTHESIS AND ENANTIOSELECTIVE TRANSFORMATION OF A NEW SERIES OF PHARMACOLOGICALLY IMPORTANT 4-ARYL-1, 4-DIHYDROPHYRIDINES BY MICROBIAL LIPASES.....	86
<i>J. Kaur, A. Kaur</i>	
THE PROTEIN DATA BANK JAPAN (PDBJ): UNCOVERING HIDDEN TRENDS IN MACROMOLECULAR STRUCTURE DATA	88
<i>M. Ragsac, H. Nakamura, A. Kinjo</i>	

THEORETICAL AND IN VITRO UNDERSTANDING OF THE EFFECT OF LIGAND-RECEPTOR VALENCY ON DUAL-LIGAND NANOPARTICLE GENE DELIVERY TO CANCER CELLS	89
<i>R. Levine, E. Kokkoli</i>	
TOWARDS THE DEVELOPMENT OF ROBUST AND MEANINGFUL POTENCY ASSAYS FOR MSCS	91
<i>F. Abukar</i>	
Author Index	