BIOGRAPHICAL SKETCH

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NAME: Thomas D. Dziubla

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POSITION TITLE Professor of Chemical and Materials Engineering

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Purdue University, West Lafayette, IN	Honors B.S.	05/1998	Chemical Engineering
Drexel University, Philadelphia, PA	Ph.D.	05/2002	Chemical Engineering
University of Pennsylvania School of Medicine, Philadelphia, PA	NRSA Postdoc	02/2004	Pharmacology

B. Positions and Honors

Positions and Employment

2004-2006	Research Associate, Institute for Environmental Medicine (IFEM), University of Pennsylvania, Philadelphia, PA
2006-2012	Assistant Professor, Department of Chemical and Materials Engineering, University of Kentucky, Lexington, Kentucky
2012-2017	Associate Professor, Department of Chemical and Materials Engineering, University of Kentucky, Lexington, Kentucky
2014-2015	Co-Director of Graduate Studies in Chemical Engineering
2015-2018	Director of Graduate Studies in Chemical and Materials Engineering
2017-Present	Professor, Department of Chemical and Materials Engineering, University of Kentucky, Lexington, Kentucky

Other Experience and Professional Memberships

1995- Present	AICHE Member
2000- Present	Society for Biomaterials
2002	Visiting Scientist, Hoshi University, Tokyo, Japan
2005-2006	UPENN, Institute for Translational Medicine and Therapeutics, Affiliate Member
2007	ASEE Chemical Engineering Faculty Summer School
2009-2011	Society of Biomaterials, Drug Delivery SIG treasurer/secretary
2011-2015	Society of Biomaterials, Drug Delivery SIG Programming Chair
2011-Present	Journal of Biomedical Materials Research, Part B, Editorial Board Member
2012-Present	Member of Drug Discovery, Delivery and Translational Therapeutics Group, Markey Cancer Center (an NCI Designated Cancer Center), University of Kentucky, Lexington, Kentucky

Honors

2002-2004	NIH NRSA Postdoctoral Training Award

2011	Paper of Distinction (Top 10% of Research Presented) at Digestive Disease Week's AGA Institute (Chicago, IL)
2011	Kentucky Science and Engineering Foundation Commercialization Fund Award
2012-2017	Gill Professor of Engineering, University of Kentucky
2014	Featured in UKnow Focus – Collaboration in Research

C. Abbreviated Contribution to Science

Please refer to this link for a complete list of my publications:
https://www.ncbi.nlm.nih.gov/myncbi/collections/bibliography/43912632

Antioxidant Polymers

Cellular oxidative stress, the overproduction of free radicals, is a central theme in many diseases, from cardiovascular diseases, neurological diseases and cancer. Moreover, as it impacts cytocompatibility and inflammation, oxidative stress also plays a key role in biomaterial biocompatibility. My laboratory has pioneered the area of antioxidant polymers as a potential way to tune material biocompatibility and serve as a possible treatment platform for oxidative stress related diseases. We have made degradable polyesters composed of polyphenols, including trolox, curcumin, quercetin and resveratrol. We have demonstrated the ability to inhibit injury resulting from metal nanoparticles, including nano cobalt and iron oxide nanoparticles. Along with Dr. Hilt, we have developed a poly(beta amino ester) based polymer system that is amendable to a number of natural and synthetic compounds drugs, providing a wide range of therapeutic, controlled release applications. This work has resulted in a Kentucky Commercialization Award, the founding of a new company, Bluegrass Advanced Materials, which is currently developing a polymeric antioxidant system for the treatment of oral mucositis.

1. P. Wattamwar, Y. Mo, R. Wan, R. Palli, Q. Zhang and T. Dziubla, "Antioxidant Activity of Degradable Polymer Poly(trolox ester) to Suppress Oxidative Stress Injury in the Cells." Advanced Functional Materials 20:147-154 (2010)
2. Cochran, D, Wattamwar, PP, Wydra R., Hilt, JZ, Anderson, KA, Eitel, RE, T.D. Dziubla "Suppressing iron oxide nanoparticle toxicity by vascular targeted antioxidant polymer nanoparticles" Biomaterials 34:9615-9622 (2013)
3. VS Patil, TD Dziubla, DS Kalika*, "Static and dynamic properties of biodegradable poly (antioxidant β-amino ester) networks based on incorporation of curcumin multiacrylate," Polymer 75, 88-96 (2015)
4. Lakes AL, Jordan CT, Gupta P, Puleo DA, Hilt JZ, Dziubla TD. "Reducible disulfide poly(beta-amino ester) hydrogels for antioxidant delivery." Acta Biomaterialia 68:178-189 (2018)

Self-Assembled Polymer Films and Barriers

Another active area of research of my laboratory is that of self-forming polymer barriers for surface wounds. In abdominal surgeries, organ surface damage can result in the formation of a fibrin clot that bridges adjacent surfaces. Left unchecked, this bridging can turn into a fibrous scar that links the surfaces into a surgical adhesion. These adhesions can cause severe pain, bowel obstructions and even infertility. Current strategies to prevent their formation rely upon placement of solid polymer films. However, these films do not always prevent adhesions as it is not always possible to know where they will form. We have demonstrated that by modifying a block copolymer of grafted poly(ethylene glycol)–b-poly(methacrylic acid) with affinity peptides (CREKA) directed to fibrin clots, it is possible to reduce the degree of adhesions formed in a mouse model. Since this initial work, we have extended the concept to oral wounds, were we have developed a layer by layer approach to deposit a film onto a surface that is resistance to chemical mechanical wear. Most recently, we have taken the concept further towards depositing worm micelles in a layer by layer crosslinked film. The resulting polymer network possesses a nanoscale fibrous structure that recreates the morphology of natural mucin. This work is extremely exciting as it represents a flexible technology for a variety of applications. Most importantly, it serves as the basis for the proposed depot approach described in this application.

1. J. Medley, E. Beane, E. Kaplan and T Dziubla* "Block copolymers for the rational design of self-forming postsurgical adhesion barriers." Acta Biomaterialia 6:72-82 (2010)
2. Medley JM, Kaplan E, Oz HS, Sundararaj SC, Puleo DA, Dziubla TD*. "Fibrin-targeted block copolymers for the prevention of postsurgical adhesions." J Biomed Mater Res B Appl Biomater. doi: 10.1002/jbm.b.31876 (2011)

3. S.P. Authimoolam, D.A. Puleo and T.D. Dziubla*. “Affinity Based Multilayered Polymeric Self-assemblies for Oral Wound Applications.” Advanced Healthcare Materials Epub ahead of Print (2013)
4. SP Authimoolam, AL Vasilakes, NM Shah, DA Puleo, TD Dziubla*, “Synthetic oral mucin mimic from polymer micelle networks” Biomacromolecules 15 (8), 3099-3111 (2014)
5. SP Authimoolam, AL Lakes, DA Puleo, TD Dziubla*, “Layer-by-Layers of Polymeric Micelles as a Biomimetic Drug-Releasing Network,” Macromolecular Bioscience 16, 242-254 (2016)

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/thomas.dziubla.1/bibliograpahy/43912632/public/?sort=date&direction=ascending

D. Research Support

Ongoing Research Support

P42ES007380 Hilt (PI) 04/01/2014-03//31/2019
Biomimetic Magnetic Nanocomposites as a Platform technology for the Capture and Sensing of PCBs
The goal of this project is to develop a polymer system which contains phenol rich binding pockets for the selective binding and detection of PCBs from environmental sources.
Role: Co-Investigator

2R44DE023523 Bhandari (PI) 08/01/2016-07/31/2017
In this work, we are conducting in vivo efficacy studies of poly(curcumin) PBAE materials in a radiation hamster model of oral mucositis.
Role: Subcontract PI

CCSG- Markey Cancer Dziubla (PI) 02/01/2017-01/31/2018
The goal of this project is to develop a new sunscreen built upon natural polyphenols that can absorb the UV light and provide prolonged release of active agents.

Completed Research Support

R01AR060964 Puleo (PI) 08/01/2012-07/31/2016
Modulating Inflammation and Fibrosis to Control Scarring in Muscle Wounds
The goal of this proposal is to develop a multi-drug delivery polymer film for the sequential release of anti-inflammatories, antioxidants and pro-wound resolving compounds to reduce scar tissue formation.

Role: Co-Investigator
R43DE023523 Shah(PI) 09/23/2013-08/31/2014
Synthesis and Characterization of Polymeric Antioxidant Microparticles for the Prevention of Oral Mucositis.
The goal of this project is to develop a poly(Curcumin) degradable polymer to inhibit radiation induced oral mucositis.
Role: Subcontract PI

NSF CPD I/UCRC Dziubla(PI) 09/01/2014-03/31/2015
Polymeric Prodrug Formulations for the stabilization of Labile Pharmaceutically active ingredients
The goal of this proposal was to evaluate the use of drugs polymerized into networks to reduce in formulation crystallization and improve long term bioavailability.
Role: PI

SBIR Phase II: Stockley (PI) 09/01/2013 – 11/31/2015
Anti-counterfeit edible integral lens array for pharmaceuticals
FDA
The goal of the proposal is to develop an on tablet lens array for the purposes of creating 3D images as an anti-counterfeit measure.
Role: Subcontract PI