Daniel Q. McNerny

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University of Michigan Department of Mechanical Engineering
Michigan Nanotechnology Institute for Medicine and Biological Sciences

RESEARCH INTERESTS

- Applications of 1-D and 2-D carbon nanostructures
- Interfacing of carbon nanostructures with biological systems
- Molecular targeting for sensing and therapeutics

EDUCATION

Ph.D. **University of Michigan** Chemical Engineering *with Nanobiology certificate*
August 2010; Advisor: Dr. James R. Baker, Jr.
Title: "Dendron avidity platforms with orthogonal focal point coupling site"

M.S. **University of Michigan** Chemical Engineering, 2007

B.S. **Carnegie Mellon University** Chemical Engineering, Biomedical Engineering, 2005

RESEARCH EXPERIENCE

Postdoctoral Researcher, September 2010
Advisor: Prof. A. John Hart
University of Michigan – Mechanosynthesis Laboratory, Department of Mechanical Engineering

Projects included:

- Synthesis of monomer precursors for graphene growth
- Scalable self-assembly of graphene

Graduate Student Research Assistant, 2005 – 2010
Advisor: Dr. James R. Baker, Jr.
University of Michigan - Michigan Nanotechnology Institute for Medicine and Biological Sciences

Projects included:

- Design and synthesis of binary dendron-dendron platforms for targeting applications
- Design and evaluation of binary functionalized dendrons as a synthetic avidity platform
- Synthesis of biotin-PAMAM dendron conjugates for label-free biosensing applications
- Design of optimized folic acid-bound polyethylene glycol chains for atomic force pulling studies

Undergraduate Research Assistant, 2004
Advisor: Dr. Todd M. Przybycien
Carnegie Mellon University - Department of Chemical Engineering

Project: **"Understanding Protein Structural Change in Hydrophobic Chromatography"**
Constructed a database of thermodynamic stabilities for a pre-selected list of proteins, in search of a clearer understanding of what protein properties cause proteins to unfold more readily.

PUBLICATIONS

[1] Leroueil, P. R.; Berry, S. A.; Duthie, K.; Han, G.; Rotello, V. M.; McNerny, Daniel Q.; Baker, J. R.; Orr, B. G.; Banaszak Holl, M. M. **Wide varieties of cationic nanoparticles induce defects in supported lipid bilayers.** Nano Letters (2008), 8(2), 420-424.

[2] Mullen, D. G.; Desai, A. M.; Waddell, J. N.; Cheng, X.; Kelly, C. V.; McNerny, Daniel Q.; Majoros, I. J.; Baker, J. R.; Sander, L. M.; Orr, B. G.; Banaszak Holl, M. M. **The Implications of Stochastic Synthesis for the Conjugation of Functional Groups to Nanoparticles.** Bioconjugate Chemistry (2008), 19(9), 1748-1752.

[3] McNerny, Daniel Q.; Kukowska-Latallo, J. F; Mullen, D. G.; Wallace, J. M.; Desai, A. M.; Shukla, R.; Huang, B.; Banaszak Holl, M. M.; Baker, J. R. **RGD Dendron Bodies; Synthetic Avidity Agents with Defined and Potentially Interchangeable Effector Sites That Can Substitute for Antibodies.** Bioconjugate Chemistry (2009), 20(10), 1853-1859.

[4] McNerny, Daniel Q.; Mullen, D. G.; Majoros, I. J.; Banaszak Holl, M. M.; Baker, J. R. **Dendrimer Synthesis and Functionalization by Click Chemistry for Biomedical Applications.** In Click Chemistry for Biotechnology and Material Science (ed. Joerg Lahann), Wiley, 2009.

[5] McNerny, Daniel Q.; Leroueil, P. R.; Baker, J. R. **Understanding specific and non-specific toxicities; A requirement for the development of dendrimer-based pharmaceuticals.** Nanomedicine and Nanobiotechnology (2009), 2(3), 249-259.

[6] Mullen, D. G.; Byrne, E.L.; Fang, M.; McNerny, Daniel Q.; Desai, A. M.; Baker, J. R.; Orr, B.G.; Banaszak Holl, M. M. **Effect of Mass Transport in the Synthesis of Partially Acetylated Dendrimer: Implications for Functional Ligand-Nanoparticle Distributionsorm.** Macromolecules, accepted.

[7] Mullen, D. G.; McNerny, Daniel Q.; Desai, A. M.; Cheng, X.; DiMaggio, S. C.; Kotlyar, A.; Qin, S.; Kelly, C. V.; Thomas, T. P..; Majoros, I. J.; Orr, B. G.; Baker, J. R.; Banaszak Holl, M. M. **Design, Synthesis, and Biological Functionality of a Dendrimer-based Modular Drug Delivery Platform.** In preparation.

POSTERS AND ABSTRACTS

[1] McNerny, Daniel Q.; Cheng, C. M.; LeDuc, P. R. **Laser focusing for biological systems through refractive index modulation with microchannels.** Biomedical Engineering Society 2005 Annual Fall Meeting, Abstract No. 1387, (2005).

[2] McNerny, Daniel Q.; Mullen, D. G.; Majoros, I. J.; Cheng, X.; Huang, B.; Banaszak Holl, M. M.; Baker, J. R. **Design of binary codendrons for targeted drug delivery.** Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, United States, (2008).

[3] McNerny, Daniel Q.; Kukowska-Latallo, J., Mullen, D. G.; Shukla, R.; Huang, B.; Banaszak Holl, M. M.; Baker, J. R. **Design of a binary PAMAM dendron platform and evaluation of specific targeting.** University of Michigan Macromolecular Science & Engineering Annual Symposium, (2008).

[4] McNerny, Daniel Q.; Mullen, D. G.; Kukowska-Latallo, J., Wallace, J. M..; Huang, B.; Banaszak Holl, M. M.; Baker, J. R. **Dendron-bodies: synthetic avidity agents with orthogonal focal point coupling site** University of Michigan Herbert D. Doan Nanotechnology Symposium, (2009).

PATENT APPLICATIONS

"Dendrimer Based Modular Platforms" U.S. Patent Application Serial No. 61/140,480. Provisional Application Submitted: 12/23/2008

TEACHING

Graduate Student Instructor,
Polymer Synthesis Laboratory, CHEM 436/536 & MACRO 536, 2009
Nanobiology Certificate Program, APPPHYS 514, 2008-2010

AWARDS

University of Michigan Herbert D. Doan Nanotechnology Symposium, 2nd place in poster competition, 2009

Carnegie Mellon Chemical Engineering Undergraduate Research Fellowship, 2004

TECHNICAL SKILLS

Nuclear magnetic resonance	High performance liquid chromatography
Infrared spectroscopy	Surface plasmon resonance
Cell culture	Flow cytometry
Cytotoxic assays	Gas pressure chromatography
Mass assisted laser desorption/ionization	Differential scanning calorimetry