

Curriculum Vitae

Michelle Dawson, Ph.D.

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Appointments

The Petit Institute for Bioengineering and Bioscience, Georgia Institute of Technology.
Graduate Bioengineering Program, Georgia Institute of Technology.

Education

Postdoctoral Research Fellow, Massachusetts General Hospital & Harvard Medical School, Boston, MA, Advisor: Rakesh K. Jain. 2005-2008.
Ph.D., Chemical and Biomolecular Engineering, The Johns Hopkins University, Baltimore, MD, Advisor: Justin Hanes. 2000-2005.
B.S., Biomedical Engineering, Louisiana Tech University, Ruston, LA. 1995-1999.

Funded Projects

1. Georgia Cancer Coalition Breast Cancer Research Award, Mesenchymal Stem Cell-Based Therapeutics for the Treatment of Breast Cancer, 2009.

Honors and Awards

1. Carl Storm Minority Fellowship for attending the Gordon Research Conference, 2007.
2. Ford Foundation Postdoctoral Minority Fellowship, 2006.
3. National Science Foundation Graduate Research Fellowship, 2001-05.
4. CRS-Capsugel/Pfizer Innovative Aspects of Oral Drug Delivery and Absorption Graduate Student/Post-Doc Award, 2004.
5. Science and Engineering Education Scholars Program Travel Award, 2004.
6. Ford Foundation Predoctoral Minority Fellowship, 2001-04.
7. International Society for Aerosol Medicine Student Research Award (one award is given every two years), 2003.
8. Biophysical Society FASEB MARC Travel Award, 2003.
9. Achievement Rewards for College Students Fellowship, 2000-01.

Publications

1. Suh J, Dawson M, Hanes J. (2005). Real-time particle tracking: Applications to drug and gene delivery, *Adv Drug Del Rev*, 57:63-78.
2. Dawson M, Krauland E, Wirtz D, Hanes J. (2004). Transport of polymeric nanoparticle gene carriers in gastric mucus, *Biotech Prog*, 20(3):851-857.
3. Dawson M, Wirtz D., and Hanes J. (2003). Enhanced viscoelasticity of human cystic fibrotic sputum correlates with increasing microheterogeneity in particle transport, *J. Biol. Chem.*, 278:50393-50401.
4. Hanes J, Dawson M, Har-el Y, Suh J, Fiegel J (2003). Gene delivery to the lung. In *Pharmaceutical Inhalation Aerosol Technology*, AJ Hickey (Ed.), 2nd Ed., pp. 489-539. Marcel Dekker Inc., New York.
5. Dawson M, Wirtz D, Zeitlin PL, Boyle MP, Hanes J, N-acetyl-L-cysteine decreases while rhDNase unexpectedly increases the Cystic Fibrosis sputum barrier to nanoparticle movement, submitted.

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6. Perentes JY, McKee TD, Ley CD, Mathiew H, Dawson M, Padera TP, Munn LL, Jain RK, Boucher Y. In vivo imaging of extracellular matrix remodeling by tumor-associated fibroblasts, accepted to Nature Methods.
7. Suk JS, Lai SK, Wang Y-Y, Boyle MP, Dawson M, Hanes J, Coated polymer nanoparticles that efficiently penetrate Cystic Fibrosis sputum, in preparation.
8. Dawson M, Duda D, Fukumura D, Jain RK. Spontaneous Lung Metastasis after Removal of the Primary Tumor is Independent of VEGFR1, submitted.
9. Dawson M, Duda D, Jain RK. Cell Lineage-dependent Effects of Bone Marrow Stromal Cells on Tumor Progression, in preparation.

Abstracts and Proceedings

1. Tang B, Dawson M, Lai S, Wang Y, Yang M, Fu J, Watkins N and Hanes J (2008). Polymer Nanoparticles That Overcome the Mucus Barrier and Their Efficacy In a Mouse Model of Human Lung Cancer, Proceedings of the American Institute of Chemical Engineers.
2. Huang P, Dawson M, Lanning R, Jain RK, and Fukumura D (2008). Preliminary Study of Spontaneous Tumors in VEGF-GFP/FVB and Tie2-GFP/FVB Transgenic Mice. American Association for Laboratory Animal Science. JAALAS 47(5): 170.
3. Dawson M, Duda D, Jain R (2007). Engineering Drug, Gene, and Cell-Based Delivery Systems for the Treatment of Human Disease, Proceedings of the American Institute of Chemical Engineers. Poster presentation.
4. Dawson M, Duda D, Jain R (2007). Quantitative Analysis of the Effects of VEGFR1-Signaling on Bone Marrow-Derived Cell Recruitment and Accumulation in Lung Metastases, Proceedings of the American Institute of Chemical Engineers. Podium presentation.
5. Tang B, Dawson M, Fu J, Watkins N, Hanes J (2007). In Vitro and In Vivo Evaluation of Poly (ether-anhydride) Particles for Potential Treatment of Lung Cancer. Controlled Release Society.
6. Dawson M, Duda D, Jain R (2006). The Role of Mesenchymal Bone Marrow-derived Cells in Tumor Formation, Proceedings of the American Institute of Chemical Engineers. Podium presentation.
7. Dawson M, Duda D, Jain R (2006). The Role of Mesenchymal Bone Marrow-derived Cells in Tumor Formation, Conference of Ford Fellows, Academic Exchange. Podium presentation.
8. Dawson M, Wirtz D, Hanes J (2004). Microscopic Viscoelasticity of CF Sputum Determined by High-Resolution Nanoparticle Tracking, Proceedings of the American Institute of Chemical Engineers. Podium presentation.
9. Dawson M, Wirtz D, Hanes J (2004). Gene Carriers Modified w/PEG Demonstrate Increased Transport and Stability in Mucus as Explored with High-Resolution Nanoparticle Tracking, Proceedings of the American Institute of Chemical Engineers. Podium presentation.
10. Dawson M, Wirtz D, Hanes J (2004). Real-time tracking of nanoparticle gene carriers in gastrointestinal mucus, *Biophys. J.*, 86 (Supplement): 598a. Poster presentation.
11. Dawson M, Krauland E, Wirtz D, and Hanes J (2004). Transport of Cationic Particle Gene Carriers in Gastric Mucus, Proceedings of the International Symposium on Controlled Release of Bioactive Materials. Controlled Release Society. Podium presentation.
12. Dawson M, Wirtz D, and Hanes J (2004). The Effects of Mucolytic Agents on Transport Rates of Nanoparticles in Human CF Sputum, Proceedings of the International Symposium on Controlled Release of Bioactive Materials. Controlled Release Society. Poster presentation.
13. Dawson M, Wirtz D, and Hanes J (2003). Transport Phenomena and Microrheology in Human Cystic Fibrotic Mucus by Real-Time Nanoparticle Tracking, Proceedings of the International Symposium on Controlled Release of Bioactive Materials. Controlled Release Society, Proceeding 30:101-102. Podium presentation.
14. Dawson M, Wirtz D, Hanes J (2003). Effects of rhDNase Therapy on the Microrheological Properties and Transport Rates of Nanoparticles in Cystic Fibrotic Mucus as Probed by Multiple Particle

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Tracking and Confocal Microscopy, Proceedings of the American Institute of Chemical Engineers. Podium presentation.

15. Dawson M, Wirtz D, Hanes J (2003). Individual Gene Carrier Transport Phenomena in Human Cystic Fibrosis Sputum Treated with rhDNase. Biomedical Engineering Society Annual Meeting. Poster presentation.
16. Dawson M, Wirtz D, Hanes J (2003). Nanoparticle Transport in Cystic Fibrosis (CF) Mucus by Multiple Particle Tracking (MPT), *J. Aero. Med.* 16: 205. Podium and poster presentations.
17. Dawson M, Wirtz D, and Hanes J (2003). Dynamics of gene carrier transport in synthetic and cystic fibrosis mucus as explored by multiple particle tracking and rheology, *Biophys. J.*, 84 (Supplement): 185a-186a. Poster presentation.
18. Dawson M, Wirtz D, Hanes J (2002). Mucosal Barriers to Drug and Gene Delivery in the Lung Explored with Nanoparticle Tracking, Proceedings of the American Institute of Chemical Engineers. Podium presentation.

Invited Talks

1. Dawson M, Duda D, Jain R (2007). Infiltration of Bone Marrow Derived Cells into Tumors: A Critical Step in Tumor Growth and Metastasis, Conference of Ford Fellows, Presentations by the Fellows, Beckman Center of the National Academies, Irvine, CA.
2. Dawson M, Wirtz D, Hanes J (2004). Nanoparticle Transport through Mucus Barriers, American Institute of Chemical Engineers Mid-Atlantic Divisional Meeting, Baltimore, MD.
3. Dawson M, Wirtz D, Hanes J (2003). Real-Time Nanoparticle Transport in Cystic Fibrosis and Synthetic Sputum, Department of Physiology, The Johns Hopkins University School of Medicine, Baltimore, MD.

Patents

1. Hanes J, Dawson M, Krauland E, Wirtz D, Drug and gene carrier particles that rapidly move through mucus barriers (Pending; provisional filed January 28, 2004).
2. Hanes J, Dawson M, Wirtz D, Fu, J, Surface Modification of Particles with Polyethylene Glycol (PEG) or Other Proteins, Polymers, or Materials Leads to Reduced Particle Adhesion, Faster Transport, and an Increase in the Fraction of Particles Undergoing More Rapid Transport (Pending; provisional filed June 14, 2004).

Teaching/Academic Experience

Teaching, Transport Phenomena II: Heat and Mass Transfer, Spring, 2009.

Grader, "Kinetic Processes", Department of Chemical and Biomolecular Engineering, The Johns Hopkins University, 2003.

Teaching assistant, "Engineering Thermodynamics", Department of Chemical and Biomolecular Engineering, The Johns Hopkins University, 2002.

Served on organizational committee for the graduate student summer seminar, Department of Chemical and Biomolecular Engineering, The Johns Hopkins University, 2004.

Teaching and research workshops attended:

Gordon Research Conference: Stem Cells and Cancer, Big Sky, Montana, 2007.

Boston Angiogenesis Meeting; Tufts School of Medicine, 2005; Harvard Medical School, 2006.

Tumor Micro-Environment Course: Tumor Microcirculation, Angiogenesis, and Metastasis, Harvard Medical School and Massachusetts General Hospital, 2005-2007.

Science and engineering education workshop, College of Engineering, The PENN State University, 2004.