Education

Ph.D., Biochemistry, University of Alabama at Birmingham, Birmingham, AL, 2001.

B.S., Biochemistry, University of Dayton, Dayton, OH, 1996.

Summary of Work Experience

Dr. Delisha Stewart is a Research Assistant Professor at the Nutrition Research Institute (NRI) in the Department of Nutrition at the University of North Carolina-Chapel Hill (UNC-CH). She is also the Project Leader for Oncology and Immunology projects in the National Institutes of Health (NIH) Eastern Regional Comprehensive Metabolomics Resource Core (ERCMRC) at the NRI. In this capacity, she uses various metabolomic technical methods (liquid chromatography-mass spectrometry [LC-MS] and nuclear magnetic resonance [NMR]) and analysis workflows; in addition to genomics an high-throughput molecular bioassays, to identify metabolically-derived biomarkers that primarily characterize 1) biological dysfunction in contrast to states of wellness and 2) therapeutic responses. Although she is proficient in doing metabolomics on studies across a broad range of disease disciplines, her areas of expertise involve the molecular basis of cancer, having conducted investigations in models of melanoma, leukemia, prostate, bone and breast cancer; to decipher etiology and mechanistic drivers of malignancy, the interplay between cancer and the immune system; and on identifying biomarkers that can be leveraged to guide prevention strategies, reveal mechanisms of health disparity outcomes or used as targets to develop novel therapeutics. As a member of the NRI faculty she will also study the influence of sub-optimal or altered nutritional states on breast cancer health disparity treatment outcomes.

Professional Experience

3/2017 to date. Department of Nutrition, University of North Carolina at Chapel Hill, Chapel Hill, NC.
Research Assistant Professor, Nutrition Research Institute and ERCMRC. As new research faculty, Dr. Stewart continues to build a program focused on the influence of immune system dysregulation in malignancy. Now as part of the NRI faculty, the impact of different nutritional states (i.e. deficiencies) on disparity outcomes in cancer or immunological perturbations present new research opportunities.

2013 to 2017. RTI International, Research Triangle Park, NC.
Research Biologist, NIH RCMRC. Year 1, post-doctoral training to become proficient in various metabolomic technical methods (LC-MS and NMR) and analysis workflows used to characterize diseases and biological dysfunction, identify biomarkers, and evaluate therapeutic responses. Responsibilities have included overseeing activities of RTI's RCMRC Pilot and Feasibility program, managing the logistics of the RCMRC Core Laboratory, and assisting with training of interns.

2010 to 2013. University of North Carolina at Chapel Hill, Chapel Hill, NC.
Postdoctoral Fellow, Departments of Pathology & Laboratory Medicine and Epidemiology. Used microarray and polymerase chain reaction (PCR)–based array technologies and analyses to characterize the phenotypic and genomic expression responses between different breast cancer microenvironments and macrophages. Participated in several aspects of the Normal Breast Study observational trial, from consenting patients and processing samples to conducting pilot studies on epidemiologically based research questions.

2012. North Carolina Central University, Durham, NC.
Guest Lecturer, General Biology (September to October). Prepared and delivered eight lectures covering two chapters on cell structure and function and on membrane structure and function. Assigned in-class work and homework to students. Contributed to exam questions and proctored exams.

2007 to 2009. City of Dayton Municipality, Dayton, OH.
Chemical Analyst, Wastewater Treatment Plant Laboratory. Conducted many analytical assays to monitor plant quality-control checkpoints for the wastewater treatment process. These assays include the biochemical oxygen demand test, fecal coliform assay, ammonia, nitrate and phosphorus monitoring, sludge handling, cyanide and heavy metals analyses. Documented and entered parameters into the Laboratory Information Management System (LIMS) for plant operations and U.S. Environmental Protection Agency–required reporting to ensure that safe effluent is discharged into the receiving waters as mandated by the National Pollutant Discharge Elimination System.

2004 to 2005. University of Alabama, Birmingham, AL.
Postdoctoral Fellow, Department of Pathology. Conducted research on prostate cancer metastasis to bone. Investigated the significance of the Notch signaling cascade during prostate cancer progression to determine whether the Notch protein or its downstream effector genes could serve as new therapeutic targets for treating metastatic prostate cancer.

2002 to 2004. University of Delaware, Newark, DE.
Postdoctoral Fellow, Department of Biological Sciences. Identified and validated microarray-detected differentially expressed genes as potential oncofetal biomarkers in the LNCaP prostate cancer progression model. Conducted an in vivo epigenetic stress study on prostate development, evaluating key developmental in utero exposures of the urogenital sinus to estrogen or testosterone and survival-surgery castration on prostate tissues harvested and analyzed by microarray technology. Conducted research on the in vitro efficacy of novel sodium channel blockers in breast cancer cell line models.

1996 to 2001. University of Louisville, Louisville, KY; and University of Alabama, Birmingham, AL.
Graduate Research Assistant, Department of Biochemistry and Molecular Genetics. Conducted dissertation research. Designed and tested the in vitro and in vivo efficacy of rationally modified clamp-forming antisense oligonucleotides targeting the importance of c-*myc* oncogene overexpression in melanoma cell lines and a melanoma mouse model.

1996. Rohm and Haas Company, Spring House, PA.
Summer Research Intern, Architectural Coatings Division (June to August). Monitored and evaluated the viscosity, flow, and shear of rheology modifiers to determine the best compositions for use in exterior paint coatings. The internship was a component of an award received as part of a research presentation contest at the Annual Conference of the National Organization for the Advancement of Black Chemists and Chemical Engineers.

1995 to 1996. Montgomery County Crime Laboratory, Dayton, OH.
Undergraduate Research Intern, Division of Toxicology. Standardized the method of dry ashing digestion used by the Crime Laboratory for detecting arsenic poisoning.

1995 to 1996. University of Dayton, Dayton, OH.
Senior Research Fellow, Department of Chemistry. Conducted the thesis project on medicinal chemistry, focusing on the synthesis of novel adenine analog nucleosides to be evaluated for antiviral efficacy.

1995. Montgomery County Coroner's Office, Dayton, OH.
Visceration Assistant, Division of Autopsy (May to August). Assisted a Pathologist in conducting autopsies, including specimen collection and final body preparation.

Continuing Education

Evidence-Based Interventions workshop, sponsored by the North Carolina Translational and Clinical Sciences Institute (NC TraCS), Raleigh, NC, 2012.

Participatory Research Approaches workshop, sponsored by NC TraCS, Raleigh, NC, 2011.

Community Based Participatory Research workshop, sponsored by NC TraCS, Raleigh, NC, 2010.

Writing from the Reader's Perspective workshop, hosted by Dr. George Gopen, Duke University, Chapel Hill, NC, 2010.

Mentoring Experience

2010 to 2012. University of North Carolina at Chapel Hill, Chapel Hill, NC.

Graduate student academic coaching (January to June 2012). Serve as a mentor for a University of North Carolina at Chapel Hill Graduate student. The student was sponsored by the Training Initiatives in Biomedical & Biological Sciences and Academic and Career Excellence Programs funded by the university's Offices of Graduate Education and Postdoctoral Affairs. Interacted with the student weekly to coach her through the steps needed to prepare a successful preliminary proposal for candidacy. Specifically, assisted with reading and critically analyzing data in the literature, and writing exercises as she is an ESL student.

Undergraduate laboratory mentoring (2010 to 2011). Supervised an undergraduate Biology major in all experiments conducted to study the interactions between macrophages and different breast cancer subtype cell lines. This research project resulted in a university award, a presentation of the work at a National Undergraduate Research Conference, and contributing authorship on a related manuscript.

2002 to 2004. University of Delaware, Newark, DE.

Managerial laboratory mentoring. During the first postdoctoral fellowship, served as Laboratory Manager and assisted with hiring of personnel and training all new technicians, undergraduates, and graduate students in Good Laboratory Practices and techniques. Also mentored students on specific projects focusing on prostate cancer etiology and with preparing presentations and manuscripts.

1997 to 1999. University of Alabama at Birmingham, Birmingham, AL.

Mentoring of undergraduate and high school students during summer research. As a graduate student, I had the opportunity to mentor undergraduate science majors at the University of Alabama at Birmingham and high school students from local public schools in Birmingham, AL, who wanted research experience. Trained the students in basic laboratory techniques, and they assisted with experiments specific to my Ph.D. dissertation research project.

Research Support

1U24DK097193-01 Susan Sumner (Principal Investigator [PI]) 9/2012–8/2017
Funding Agency: NIH Common Fund; administered through the National Institute of Diabetes and Digestive and Kidney Diseases
Title: NIH Eastern Regional Comprehensive Metabolomics Resource Core at RTI International (RTI RCMRC)
Role: Postdoctoral fellowship (2013 [1 year]); Research Biologist (2014 to date)

U01 ES019472 Melissa Troester (PI) 7/2012–1/2013
Funding Agency: National Institute of Environmental Health Sciences (NIEHS)
Title: Pregnancy, Obesogenic Environments, and Basal-like Breast Cancer
Role: Postdoctoral fellowship

5T32ES0070017 Department of Pathology & Laboratory Medicine 7/2011–6/2012
Funding Agency: NIEHS
Title: Environmental Pathology Training Grant
Role: Postdoctoral fellowship

Professional Service

American Association for Cancer Research, 1998 to 2005 and 2012 to date.

Breast Cancer and the Environment Research Program, 2011 to 2014.

American Chemical Society, 1996 to 2005.

National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, 1996 to 2005.

Honors and Awards

RTI Annual Awards, 2013, 2014 and 2016.

Minority Scholar in Cancer Research Award, American Association for Cancer Research, 2013.

Environmental Pathology Training Grant Postdoctoral Fellowship, University of North Carolina at Chapel Hill, 2010 to 2011.

True Grit Award, City of Dayton Wastewater Treatment Plant, 2009.

United Negro College Fund–Merck Postdoctoral Science Research Fellowship Award, 2003 to 2004.

NIH Minority Supplement Postdoctoral Fellowship Award (declined acceptance), 2003 to 2004.

Golden Key National Honor Society, 1996 to 2004.

Departmental "In the Spotlight" Recognition, University of Delaware, 2004.

Comprehensive Minority Faculty Student Development Fellowship, University of Alabama at Birmingham, 1996 to 2001.

Presidential Scholars Achievement Award, University of Alabama at Birmingham, 2000.

W.S. McIntosh Memorial Scholarship and City of Dayton Internship, 1992 to 1996.

Undergraduate Scholastic Research Award, National Organization for the Professional Advancement of Black Chemists and Chemical Engineers and the Rohm & Haas Company 1996.

America–Israel Friendship League Youth Ambassador, Ohio Delegation, 1991.

Publications

Bruce M. McClenathan, Delisha A. Stewart, Christina E. Spooner, Wimal W. Pathmasiri, Jason P. Burgess, Susan L. McRitchie, Young S. Choi, Susan C. Sumner. 2017. Metabolites as Biomarkers of Adverse Reactions Following Vaccination: A Pilot Study using Nuclear Magnetic Resonance Metabolomics. *Vaccine*, 35(9):1238-1245.

Delisha Stewart, Jason Winnike, Susan McRitchie, Wimal Pathmasiri, and Susan Sumner. 2016. Metabolomics analysis of hormone-responsive versus triple-negative breast cancer cell responses to Taxol identify key differences. *Journal of Proteome Research*, Sep 2;15(9):3225-40.

Alexandra E. Livanos, Thomas Greiner, Pajau Vangay, Wimal Pathmasiri, Delisha Stewart, Susan McRitchie, Huilin Li, Jennifer Chung, Jiho Sohn, Zhan Gao, Cecily Barber, Sara Kim, Joanne Kim, Sandy Ng, Arlin Rogers, Susan Sumner, Dan Knights, Alexander Alekseyenko, Fredrik Bäckhed and Martin J. Blaser. 2016. Antibiotic-mediated gut microbiome perturbation accelerates development of type 1 diabetes in NOD mice. *Nature Microbiology*, 1, Article 1.

Mortensen NP, Mercier KA, McRitchie S, Cavallo T, Pathmasiri W, Stewart D, Sumner S. 2016. Microfluidics Meets Metabolomics to Reveal the Impact of Campylobacter jejuni Infection on Biochemical Pathways. *Biomedical Microdevices* 18(3):51. doi: 10.1007/s10544-016-0076-9.number:16140; doi:10.1038/nmicrobiol.2016.140.

Milner, J., J. Rebeles, S. Dhungana, D.A. Stewart, S.C. Sumner, M.H. Meyers, P. Mancuso, and M.A. Beck. 2015. Obesity increases mortality and modulates the lung metabolome during pandemic H1N1 influenza virus infection in mice. *Journal of Immunology 194*(10):4846–4859.

Pirone, J.R., M. D'Arcy, D.A. Stewart, W.C. Hines, M. Johnson, M.N. Gould, P. Yaswen, J.J. Jerry, S.S. Schneider, and M.A. Troester. 2012. Age-associated gene expression in normal breast tissue mirrors qualitative age-at-incidence patterns for breast cancer. *Cancer Epidemiology, Biomarkers & Prevention 21*(10):1735–1744.

Fleming, J.M.., T.C. Miller, M. Kidacki, M, E. Ginsburg, C.H. Stuelten, D.A. Stewart, M.A. Troester, and B.K. Vonderhaar. 2012. Paracrine interactions between primary human macrophages and human fibroblasts enhance murine mammary gland humanization in vivo. *Breast Cancer Research 14*(3):R97.

Stewart, D.A., Y. Yang, L. Makowski, and M.A. Troester. 2012. Basal-like breast cancer cells induce phenotypic and genomic changes in macrophages. *Molecular Cancer Research 10*(6):727–738. (*Selected as the June Issue Highlight.*)

Camp, J.T., F. Elloumi, E. Roman-Perez, J. Rein, D.A. Stewart, J.C. Harrell, C.M. Perou, and M.A. Troester. 2011. Interactions with fibroblasts are distinct in basal-like and luminal breast cancers. *Molecular Cancer Research 9*(1):3–13.

Stewart, D.A., C.R. Cooper, and R.A. Sikes. 2004. Changes in extracellular matrix (ECM) and ECM–associated proteins in the metastatic progression of prostate cancer. *Reproductive Biology and Endocrinology 2*:2.

Stewart, D.A., X. Xu, S.D. Thomas, and D.M. Miller. 2002. Acridine-modified, clamp-forming oligonucleotides synergize with cisplatin to inhibit c-*Myc* expression and B16-F0 tumor progression. *Nucleic Acids Research 30*(11):2565–2574.

Stewart, D.A., S.D. Thomas, C.A. Mayfield, and D.M. Miller. 2001. Psoralen-modified, clamp-forming antisense oligonucleotides reduce cellular c-*Myc* protein expression and B16-F0 proliferation. *Nucleic Acids Research 29*(19):4052–4061.

Stewart, D.A. 2001. Ph.D. Dissertation: *The Efficacy of Clamp-Forming Antisense Oligonucleotides on c-Myc Oncogene Expression in a Mouse Melanoma Model*. University of Alabama at Birmingham, Birmingham, AL.

Stewart, D., J. Trauth, J. Windholtz, and K. Church. 1996. Adenosine nucleoside analog synthesis via electrophilic activation of electron rich alkenes. *Synthetic Communications 26*(22):4279–4288.

Stewart, D.A. 1996. Senior thesis: *Synthesis of Adenine Analogue Nucleosides via Amino-Selenation*. University of Dayton, Dayton, OH.

Stewart, D.A., S. Dhungana, R.F. Clark, W.W. Pathmasiri, S.L. McRitchie, and S.J. Sumner. 2015. Omics technologies used in systems biology. Pp. 57–84 in *Systems Biology in Toxicology and Environmental Health.* 1st Edition. Edited by R. Fry (Ed.). Waltham, MA: Academic Press.

Papers and Presentations

Stewart, D.A. 2017. *Metabolic Biomarkers in Cancer and Immunology Research.* Web-based talk presented for the NIH C-F Metabolomics Consortium Data Seminar, February.

Stewart, D.A., J. Winnike, S.L. McRitchie, W.W. Pathmasiri, and S.J. Sumner. 2015. *Triple Negative Breast Cancer Biomarker Identification for Drug Development*. Poster presented at 2015 Metabolomics Society Meeting, San Francisco, CA. June.

Li, J., P. Stewart, K. Fisher, S. Dhungana, D.A. Stewart, S.J. Sumner, E. Welsh, S. Eschrich, A. Chen, and E. Haura. 2015. *Proteo-metabolomic Dissection of Small Cell Lung Cancer Using Activity Based Protein Profiling and Metabolomics Profiling*. Presented at the Annual Meeting of the Metabolomics Society, San Francisco, CA. June.

Stewart, D.A., J. Winnike, S.L. McRitchie, W.W. Pathmasiri, and S.J. Sumner. 2015. *Triple Negative Breast Cancer: Metabolomics and Flux Analysis to Identify Targets for Drug Development*. Poster presented at the Annual Meeting of the American Association for Cancer Research, Philadelphia, PA. April.

Stewart, P.A., J. Li, K.J. Fisher, S. Dhungana, D. Stewart, S. Sumner, E. Gardner, J. Poirier, C.M. Rudin, E.A. Welsh, S. Eschrich, A. Chen, and E.B. Haura. 2015. *Integrating Proteomics and Metabolomics Characterizes Active Pathways and Potential Drug Targets in Small Cell Lung Cancer*. Poster presented at the Annual Meeting of the American Association for Cancer Research, Philadelphia, PA. April.

Stewart, D.A. 2015. *Metabolomics in Cancer Research*. Presented at the Omics in the Characterization, Classification and Treatment of Autoimmune Diseases and Cancer Conference, Bethesda, MD.

Mortensen, N.P., D.A. Stewart, W.W. Pathmasiri, K.A. Mercier, S.L. McRitchie, T. Cavallo, T.R. Fennell, and S.J. Sumner. 2014. *Metabolomics and Darkfield Microscopy of Mammalian Cells from Microfluidic and Transwell Systems*. Poster presented at National Institutes of Health Common Fund Metabolomics Consortium Meeting, Research Triangle Park, NC. October.

Stewart, D.A. 2013. *Characterizing Breast Cancer Subtype-Specific Responses to Macrophages*. Poster presented to the American Association for Cancer Research, Washington, DC. April.

Stewart, D.A. 2011. *Basal-like Breast Cancer Cells Induce Phenotypic and Genomic Changes in Macrophages in vitro.* Poster presented to the Breast Cancer and the Environment Research Program, Cincinnati, OH.

Stewart, D.A. 2011. *Basal-like Breast Cancer Microenvironments Induce Phenotypic and Genomic Differentiation in THP-1 Cells.* Poster presented at the Department of Pathology and Laboratory Medicine Annual Research Symposium, Chapel Hill, NC.

Stewart, D.A. 2010. *THP-1 Cells Respond to a Heterotypic Stromal Coculture System by Differentiating into M2-tropic Macrophages.* Poster presented at the Department of Pathology and Laboratory Medicine Annual Research Symposium, Chapel Hill, NC.

Stewart, D.A. 2004. *Efficacy of Novel Sodium Channel Blockers in Human Breast Cancer Cells*. Poster presented to the American Association for Cancer Research, Orlando, FL.

Stewart, D.A. 2001. Presented a talk on *Psoralen-modified, clamp-forming antisense oligonucleotides reduce cellular c-Myc protein expression and B16-F0 proliferation*. Presented to the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, Baltimore, MD.

Stewart, D.A. 1999. *The Efficacy of Clamp-Forming Antisense Oligonucleotides on c-Myc Oncogene Expression in a Mouse Melanoma Model*. Poster presented to the American Association for Cancer Research, Philadelphia, PA.

Stewart, D.A. 1999. Presented a talk on the *efficacy of clamp-forming antisense oligonucleotides on c-Myc oncogene expression in a mouse melanoma model*. Presented to the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, San Diego, CA.

Stewart, D.A. 1996. *Synthesis of Adenine Analogue Nucleosides via Amino-Selenation*. Presented to the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, Detroit, MI.