BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Marsha P. Cole	Assistant Professor, Department of Biochemistry and Molecular Biology, University of Louisville
eRA COMMONS USER NAME MARCIECOLE	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
University of Kentucky, Lexington	B.S.	1996	Chemistry
University of Kentucky, Lexington	M.S.	1998	Chemistry
University of Kentucky, Lexington	Ph.D.	2004	Nutritional Sciences

A. Personal Statement

My research is focused on the role of redox signaling in oxidative cardiac injury and heart disease. I have been working with animal-based models of disease and inflammation for 20 years. I am interested in fundamental biochemical events to further our knowledge of occurrence, progression, and prevention of obesity-induced cardiovascular disease and heart injury. My work has concentrated on understanding the cell signaling and pathogenesis (and measurement) of nitric oxide (NO) and NOx, including consumption of NO via reactive oxygen species, as well as NO (and nitrite)-mediated nitration of unsaturated fatty acids. Nitric oxide homeostasis is often disrupted by environmental exposure and can have a negative impact on myocardial function. Importantly, my work has established that the weight loss supplement, conjugated linoleic acid, modulates NO levels and induces cardiac toxicity following myocardial ischemia. The University of Louisville provides an ideal atmosphere for collaborative colleague interactions, both intra- and inter-departmentally, as well as excellent training environments for graduate/postdoctoral students, leading to successful discovery and translation of novel therapeutic strategies for treatment of vascular and cardiac inflammation in heart disease, as well as environmental-influenced cardiac toxicity.

B. Positions and Honors

Appointments

1996-1998 Teaching Assistant, Dept of Chemistry, University of Kentucky, Lexington, Kentucky

1999-2000 Teaching Assistant, Dept of Nutrition and Food Science, University of Kentucky, Lexington, Kentucky

2001-2004 NIH Predoctoral Scholar (NRSA), School of Medicine, Graduate Center for Nutritional Sciences, University of Kentucky, Lexington, Kentucky

2004 Postdoctoral Scholar, Graduate Center for Toxicology, University of Kentucky, Lexington, Kentucky

2005 Postdoctoral Fellow, Dept of Anesthesiology, University of Alabama, Birmingham, Alabama

2006-2008 NIH Postdoctoral Scholar (NRSA), School of Medicine, Dept of Endocrinology, University of Pittsburgh, Pittsburgh, Pennsylvania

2009-2010 Instructor, School of Medicine, Dept of Pharmacology & Chemical Biology, University of Pittsburgh, Pittsburgh, Pennsylvania

2009-2010 Research Assistant Professor, School of Medicine, Dept of Pharmacology & Chemical Biology, University of Pittsburgh, Pittsburgh, Pennsylvania

2011-present Assistant Professor, Dept of Biochemistry and Molecular Biology, University of Louisville, Louisville, Kentucky

2013-present Associate Faculty, Department of Physiology and Biophysics, University of Louisville, Louisville, Kentucky

Honors and Awards

1995-1996 Howard Hughes Medical Institute Award, Dept of Chemistry, University of Kentucky, Lexington, Kentucky

2002 Young Investigator Award*, Society for Free Radical Biology and Medicine

2005 Career Enhancement Award, Postdoctoral Office, University of Alabama, Birmingham, Alabama

2005 Young Investigator Award*, Society for Free Radical Biology and Medicine
2007 Young Investigator Award*, Society for Free Radical Biology and Medicine
2009-2010 The Hartwell Foundation Fellowship Award#
2012 Pre-Tenure Career Conference Award, Dean's Office, University of Louisville
*10 total awards per year nationally (selected from graduate and postdoctoral student members of SFRBM)
#1 of 10 fellows in the US

Professional Memberships

1996-present American Chemical Society
2000-present Society for Free Radical Biology and Medicine
2010-present American Heart Association (Peer Reviewer-Vascular Wall Biology 4 (2011-present)

C. Selected Peer-Reviewed Publications (24 of 31)

1. Humphrey ML, **Cole MP**, Pendergrass JC, and Kiningham KK. Mitochondrial mediated thimerosal-induced apoptosis in a human neuroblastoma cell line (SK-N-SH). Neurotoxicology, 26(3):407-16, 2005. PMID: 15869795

2. Chaiswing L, **Cole MP**, Ittarat W, Szweda LI, St. Clair DK, and Oberley TD. Manganese superoxide and inducible nitric oxide synthase modify early oxidative events in acute Adriamycin-induced mitochondrial toxicity. Mol Cancer Ther, 4(7):1056-64, 2005. PMID: 16020663

3. **Cole MP**, Chaiswing L, Oberley TD, Edelmann SE, Piascik MT, Lin SM, Kiningham KK, and St. Clair DK. The protective roles of nitric oxide (˙NO) and superoxide dismutase (SOD) in Adriamycin (ADR)-induced cardiotoxicity. Cardiovasc Res, 69(1):186-97, 2006. PMID: 16157314

4. Tangpong J, **Cole, MP**, Sultana R, Estus S, Vore M, St. Clair W, Ratanachaiyavong S, St. Clair DK, and Butterfield DA. Adriamycin mediated nitration of manganese superoxide dismutase in the central nervous system: insight into the mechanism of chemobrain. J Neurochem, 100(1):191-201, 2007. PMID: 17227439

5. Spasojević I, Chen Y, Noel TJ, Yu Y, **Cole MP**, Zhang L, Zhao Y, St. Clair DK, and Batinic-Haberle I. Mn porphyrin-based superoxide dismutase (SOD) mimic, Mn(III) TE-2-PyP(5+), targets mouse heart mitochondria. Free Radic Biol Med, 42(8):1193-200, 2007. PMID: 17382200

6. Nithipongvanitch R, Ittarat W, **Cole MP**, Tangpong J, St. Clair, DK, and Oberley, TD. Mitochondrial and nuclear p53 localization in cardiomyocytes: redox modulation by Adriamycin. Antioxid Redox Signal, Jul;9(7):1001-8. Review, 2007. PMID: 17508921

7. Kim C-S, Jung S-B, Naqvi A, Hoffman TA, DeRicco J, Yamamori T, Jeon BH, **Cole MP**, and Irani K. P53 impairs endothelium-dependent vasomotor function by transcriptionally upregulating p66shc expression. Circ Res, 103(12):1441-50, 2008. PMID: 18988897

8. Iles KE, Wright MM, **Cole MP**, Welty NE, Ware LB, Matthay MA, Schopfer FJ, Baker PR, Agarwal A, and Freeman BA. Fatty acid transduction of nitric oxide signaling: LNO_2 mediates protective effects through regulation of the ERK pathway. Free Radic Biol Med, 46(7):866-75, 2009. PMID: 19133325

9. Rudolph V, Schopfer FJ, Khoo NH, Rudolph TK, **Cole MP**, Woodcock S, Baker PR, Golin-Bisello F, Bonacci G, Groeger A, Chen CS, and Freeman BA. Metabolism of nitro-oleic acid: saturation, desaturation and β-oxidation. J Biol Chem, 284(3):1461-73, 2009. PMID: 19015269

10. Schopfer FJ, Batthyány C, Baker PRS, Bonacci G, **Cole MP**, Rudolph V, Rudolph TK, Nadtochiy S, Brookes PS, and Freeman, BA. Detection and quantification of protein adduction by electrophilic fatty acid nitration products: mitochondrial generation of fatty acid nitroalkene derivatives. Free Radic Biol Med, 46(9):1250-9, 2009. PMID: 19353781

11. **Cole MP** and Freeman BA. Promotion of cardiovascular disease by exposure to the air pollutant ozone. Am J Physiol Lung Cell Mol Physiol, 297:L205-8, 2009. PMID: 19525390

12. **Cole MP**, Rudolph TK, Khoo NH, Motanya UN, Golin-Bisello F, Wertz JW, Schopfer FJ, Rudolph V, Woodcock S, Bolisetty S, Ali MS, Zhang J, Chen YE, Agarwal A, Freeman BA, and Bauer PM. Nitro-fatty acid inhibition of neointima formation after endoluminal vessel injury. Circ Res, 105(10):965-72, 2009. PMID: 19797175

13. Rudolph V, Rudolph TK, Schopfer FJ, Bonacci G, Woodcock SR, **Cole MP**, Baker PRS, Ramani R, and Freeman BA. Endogenous generation and protective effects of nitro-fatty acids in a murine model of focal cardiac ischemia and reperfusion. Cardiovasc Res, 85(1):155-66, 2009. PMID: 19666678

14. Khoo NK, Rudolph V, **Cole MP**, Golin-Bisello F, Schopfer FJ, Woodcock SR, Batthyany C, Freeman BA. Activation of vascular endothelial nitric oxide synthase and heme oxygenase-1 expression by electrophilic nitro-fatty acids. Free Radic Biol Med, 48(2):230-9, 2009. PMID: 19857569

15. Borniquel S, Jansson EÅ, **Cole MP**, Freeman BA, and Lundberg JO. Nitrated oleic acid up-regulates colonic peroxidsome proliferator-activated receptor gamma and attenuates experimental inflammatory bowel disease. Free Radic Biol Med, 48(4):499-505, 2010. PMID: 19932165

16. Schopfer FJ*****, **Cole MP***, Groeger A***, Chen C-S, Woodcock S, Golin-Bisello F, Motanya UN, , Khoo NH, Rudolph T, Rudolph V, Hallis TM, Bonacci G, Xu HE, Chen YE, Agarwal A, and Freeman BA. Covalent peroxisome proliferator-activated receptor γ binding by nitro-fatty acids: distinctive coregulatory protein interactions and restoration of insulin sensitivity. J Biol Chem, 285(16):12321-12333, 2010. PMID: 20097754 ***contributed equally**

17. Rudolph, TK, Rudolph V, Edreira MM, Bonacci G, Schopfer FJ, Woodcock SR, **Cole MP**, Khoo NKH, Hasty A, and Freeman BA. Nitro-fatty acids reduce atherosclerosis in apoE$^{-/-}$ mice. Arterioscler Thromb Vasc Biol, 30(5):938-945, 2010. PMID: 20167658

18. Groeger AL, Cipollina C, **Cole MP**, Woodcock SR, Bonacci G, Rudolph TK, Rudolph V, Freeman BAand Schopfer FJ. Cyclooxygenase-2 generates anti-inflammatory mediators from omega-3 fatty acids. Nat Struct Mol Biol, 6(6):433-441, 2010. PMID: 20436486

19. Zhang J, Villacorta L, Chang L, Fan Z, Hamblin M, Zhu T, Chen CS, **Cole MP**, Schopfer FJ, Deng CX, Garcia-Barrio MT, Feng YH, Freeman BA, and Chen YE. Nitro-oleic acid inhibits angiotensin II-induced hypertension. Circ Res, 107(4):540-548, 2010. PMID: 20558825

20. Jung S-B, Kim C-S, Naqvi A, Yamamori T, Mattagajasingh I, Hoffman TA, **Cole MP**, Jumar A, DeRicco J, Jeon BH, and Irani K. Histone Deacetylase-3 antagonizes Aspirin-stimulated Endothelial Nitric Oxide production by reversing Aspirin-induced lysine acetylation of Endothelial Nitric Oxide Synthase. Circ Res, 107(7):877-887, 2010. PMID: 20705923

21. Bonacci G, Baker PR, Salvatore SR, Shores D, Khoo NK, Koenitzer JR, Vitturi DA, Woodcock SR, Golin-Bisello F, **Cole MP**, Watkins S, St. Croix C, Batthyany CI, Freeman BA, and Schopfer FJ. J Biol Chem, 287(53):4407-82, 2012. PMID: 23144452

22. Kelm NQ, Piell KM, Solinger JC, and **Cole MP**. Combination treatment with conjugated linoleic acid and nitrite protects against myocardial infarction. Redox Biol, 2:1-7, 2013. PMID: 24363996

23. **Cole MP***, Tangpong J, Oberley RD, Chaiswing L, Kiningham KK, and St. Clair DK. Nuclear interaction between ADR-induced p65 and p53 mediates cardiac injury in iNOS (-/-) mice. PLoS One, 9(2):e89251. PMID: 24586632 ***Corresponding Author**

24. Piell KM, Kelm NQ, Caroway MC, Aman M, and **Cole MP**. Nitrite attenuates conjugated linoleic acid induced cardiac dysfunction in aged mice. Free Radic Biol Med, 72C:66-75, 2014. PMID: 24721151

Book Chapters and Invited Reviews

Cole MP, Chaiswing L, Oberley TD, Kiningham KK, and St. Clair DK. Superoxide, superoxide dismutases, and cardiovascular dysfunction. Mechanisms of Cardiovascular Aging, Chapter 9 (Elsevier, Editor Tory Hagen), December 2002.

Cole, MP and Freeman, BA. Nitric oxide modulation of inflammatory-mediated lipid signaling. Nitric Oxide, 2nd Edition, Chapter 11 (Elsevier, Editor Louis Ignarro), 391-414, 2010.

C. Research Support

Current:

R00 HL095769 06/01/12-05/31/15
Principal Investigator: Cole, Marsha P
Metabolic Stress-Induced Fatty Acid Nitration and Cardiovascular Function
NIH/NHLBI

P20GM103494 09/01/13-06/30/18
Principal Investigator: Bhatnagar, Aruni
Center for Excellence in Diabetes and Obesity Research
NIH/NIGMS
Percent Effort: 5%
Role: Collaborator – Project #3: *Regulation of Metabolism by Nitric Oxide*

Completed:

School of Medicine Basic Grant-University of Louisville
Principal Investigator: Cole, Marsha P 12/01/13-11/30/14
Preservation of cardiovascular function using conjugated linoleic acid (cLA) in combination with nitrite following myocardial ischemia (MI)
Percent Effort: N/A

KSTC-184-512-14-176 01/01/14-12/31/2014
Principal Investigator: Wang, Eugenia
Generating Transgenic mouse mutants overexpressing key circulating microRNAs in blood plasma
Percent Effort: 2.5%
Role: Subcontract PI

K99HL095769 (NIH/NHLBI) 06/01/10-05/31/2012
Principal Investigator: Cole, Marsha P
Metabolic Stress-Induced Fatty Acid Nitration and Cardiovascular Function

Hartwell Foundation 01/01/09-12/31/10
Principal Investigator: Cole, Marsha P
Fellowship Award for Career Development
Role: Postdoctoral Fellow/Trainee

P30 DK046204-15 (NIH/NIDDK) 03/01/08-02/28/09
Principle Investigator: Kakicic, John
Obesity/Nutrition Research Center
Nitro-Fatty Acid Modulation in Type II Diabetes
Role: Awardee of pilot/feasibility project

T32DK007052-39 (NIH/NIDDK) 07/01/06-06/30/08
Principle Investigator: Andrew Stewart
Research Training in Diabetes and Endocrinology
Role: Post-doctoral Fellow/Trainee

T32DK007778-13 (NIH/NIDDK) 07/01/01-06/30/04
Principal Investigator: Lisa Cassis
Training Program in Oxidative Stress and Nutrition
Role: Pre-doctoral Fellow/Trainee