Sean S. Davies, Ph.D.
Curriculum Vitae

VITAL INFORMATION

Birthplace:	Honolulu, HI
Birthdate:	February 11, 1969
University Address:	Department of Pharmacology Division of Clinical Pharmacology Vanderbilt University Medical Center 556B RRB 2220 Pierce Ave Nashville, TN 37232-6602
Phone:	(615) 322-5049
E-mail Address:	sean.davies@vanderbilt.edu

EDUCATION:

1987-1993	B.S., Chemistry, University of Utah
1993-1999	Ph.D., Experimental Pathology, University of Utah Medical Center. Dissertation Title: Oxidized phospholipids activate Platelet-Activating Factor Receptor and Peroxisomal Proliferator Activated Receptors. Mentor: Dr. Thomas M. McIntyre.
1999-2002	Post-doctoral fellowship, Clinical Pharmacology, Vanderbilt University. Mentor: Dr. L. Jackson Roberts II.

PROFESSIONAL EXPERIENCE:

6/1992-8/1993	Undergraduate Research Assistant University of Utah, Salt Lake City, UT Supervisor: James N. Herron, Ph. D.
9/1993-3/1999	Graduate Student University of Utah, Salt Lake City, UT. Thesis Advisor: Thomas M. McIntyre, Ph.D.
4/1999-3/2002	Post-doctoral Research Fellow Vanderbilt University, Nashville, TN. Mentor: L. Jackson Roberts II, M.D
4/2002-8/2004	Research Instructor, Department of Pharmacology Vanderbilt University, Nashville, TN
9/2004-7/2008	Research Assistant Professor, Department of Pharmacology Vanderbilt University, Nashville, TN
7/2008-12/2015	Assistant Professor, Department of Pharmacology Vanderbilt University, Nashville, TN
10/2015-present	Associate Director of Graduate Studies, Department of Pharmacology
1/2016-present	Associate Professor, Department of Pharmacology Vanderbilt University, Nashville, TN
6/2017-present	Vanderbilt Diabetes Research Training Center Director of Enrichment and Outreach

AWARDS AND OTHER SPECIAL SCIENTIFIC RECOGNITION:

1992	Summer Undergraduate Fellowship University of Utah, Department of Pharmaceutics and Pharmaceutical Chemistry
1993	Pharmaceutical Manufacturers Association Undergraduate Fellowship
1994	Biochemistry Department Training Grant Fellowship, Univ. of Utah
1998	Young Investigator Award, Vascular Biology '98 Conference
1999-2001	Clinical Pharmacology Training Grant Fellowship, Vanderbilt University
2000	Young Investigator Award, Oxygen Society (now Soc. Free Rad. Biol. Med.)
2007	NIH Director's New Innovator Award
2012	Vanderbilt Department of Pharmacology Teaching Award
2016	Vanderbilt Department of Pharmacology Teaching Award
2019	Vanderbilt Department of Pharmacology Teaching Award

PATENTS

- Method of Preventing and/or Treating Oxidant Injury in Neurodegenerative and Oxidative Diseases. (US Patent #7705054)
- Use of Scavengers of Reactive Gamma-Ketoaldehydes to Extend Cell Lifespan and Healthspan (US Patent #116333370)
- System and Methods for Controlling Appetite, Promoting Weight Loss, Reducing Body Fat, and Improving Glucose Tolerance (Provisional 61/536,238)
- Use of 2-HOBA to Treat Atherosclerosis (PCT/US2021/35314 Pending)
- Method of Preventing Kidney Injury Disruption of Intestinal Lymphatics (PCT/US2021/054872 Pending)
- Benzothiazole-Phenylsulfonylpiperidine Analogs as Activtors of N-acylphosphatidylethanolamine Hydrolyzing Phospholipase D (PCT/US2023/018597 Pending)

PROFESSIONAL SOCIETIES

- American Society for Biochemistry and Molecular Biology
- American Heart Association
- American Diabetes Association

PROFESSIONAL AND SERVICE ACTIVITIES

Intramural

2010-2016	Vanderbilt Mass Spectrometry Core Advisory Committee.
2013	Ad hoc reviewer EDGE for Scholar reviews
2013-present	Ad hoc reviewer VICTR Grant and Manuscript Review Studios
2014-2016, 2022	Ad hoc review Vanderbilt DRTC pilot grants
2017-present	Vanderbilt Diabetes Research Day organizing committee (chair)
2020-present	Vanderbilt Interdisciplinary Graduate Program Curriculum Reform committee (group leader, Cell Signaling Block committee).

Extramural

Diabetes Research Center Virtual Seminar Series

2020-	Chair, Organizing Committee

Society for Free Radical Biology and Medicine (formerly Oxygen Society)
2007-10, ‘12 Conference abstract reviewer
2009-10 Conference Young Investigator Award judge
2009-2010 Young Investigator Committee member
2011-2012 Finance and Investments Committee member

International 4-Hydroxynonenal (HNE) Club
2018- Steering Committee Member

Conference Organization
2018 10th Biennial Meeting of International HNE Club, Chair
2023 2023 Fredrickson Lipid Research Conference, Co-chair

Conference Session chair
2010 Society for Free Radical Biology and Medicine Meeting
2016 Gordon Research Conference-Natural Products
2016 American Physiology Society-Inflammation, Immunity, and Cardiovascular Disease
2018 Winter Eicosanoid Conference
2023 19th Annual International Winter Eicosanoid Conference

Conference Abstract Reviewer
2016 American Heart Association General Sessions

Ad hoc Manuscript Referee for:

- Analytical Biochemistry
- Analytical Letters
- Archives of Biochemistry and Biophysics
- Biochemie
- Biochemical Journal
- BioMed Central-Microbe
- BioMed Central-Pediatrics
- Biomedical Sciences and Applications
- Bioorganic & Medicinal Chemistry
- Cell Host Microbe
- Chemical Research in Toxicology
- Chemistry and Physics of Lipids
- Chinese Medicine
- Circulation Research
- Clinical Chemistry
- Diabetes
- Free Radical Biology & Medicine
- Hypertension
- International Journal of Biological Sciences
- Journal of Chromatography B:
- Journal of Clinical Investigations
- Journal of Lipid Research
- Journal of Sport and Health Science
- Journal of Vascular Research
- Molecular Nutrition and Food Research
- Neuropsychopharmacology
- PLOSone
- PNAS
- Scientific Reports
- Sports Medicine-Open

Grant Review:
2008 Italian Telethon Foundation (ad hoc reviewer).
2011 NIH Study Section: Genes, Genomes, and Genetics (ad hoc mail reviewer).
2014 University of Alabama Nutrition and Obesity Research Center: Pilot and Feasibility Grant (ad hoc reviewer).

2015 National Institute of Food and Agriculture (USDA)- Function and Efficacy of Nutrients Program (review panel member).
2015 American Diabetes Association (Research Grant Review Committee).
2016 National Institute of Food and Agriculture (USDA)- Function and Efficacy of Nutrients Program (review panel member).
2016 American Diabetes Association (Research Grant Review Committee).
2016 University of Michigan Diabetes Research Center Regional Pilot Feasibility Study Grant program. (ad hoc reviewer)
2016 Projects of Excellence Initiative Universite Bourgogne Franche-Comte (ad hoc reviewer).
2017 American Diabetes Association (Research Grant Review Committee).
2018 American Diabetes Association (Research Grant Review Committee).
2019 National Institute of Food and Agriculture (USDA)- Function and Efficacy of Nutrients Program (review panel member).
2019 American Diabetes Association (Research Grant Review Committee).
2023 NIH Atherosclerosis and Vascular Inflammation (AVI) study section. Ad hoc member.
2023 American Diabetes Association (Post-doctoral fellowship review committee.)
2024 NIH Nutrition and Metabolism in Health and Disease (NMHD) study section. Ad hoc.
2024 NIH Atherosclerosis and Vascular Inflammation (AVI) study section. Ad hoc member.

TEACHING AND MENTORING

Undergraduate School Courses

2018-2019	Bioscience 1001: iSeminar, co-instructor 17 contact hr.

Graduate School Courses

2010-present	Pharmacology 8322A: Scientific Communications I, co-instructor, instructor of record, 60 contact hr.
2012-present	Pharmacology 8322B: Scientific Communications II, co-created this self-directed course with Dr. Claus Schneider, and serve as instructor of record, 2 contact hr.
2021-present	IGP Bioregulations I:Group leader for 4-week Cell Signaling block, lecturer, faculty facilitator for small group discussions.
2021-present	Pharmacology: Fundamentals of Pharmacology and Drug Discovery, course co-director and instructor.
2023-present	IGP Bioregulations II module: Lipid Metabolism in Physiology and Disease, instructor, 2 contact hours.
2011-2015	Pharmacology 8320: Targets, Systems & Drug Actions, instructor for Lipid Mediators section, 6 contact hours.
2014-2021	Pharmacology 8320: Targets, Systems & Drug Actions, instructor for Gut Microbiome lecture, Gastrointestinal Tract section, 1 contact hr.
2016-2021	Pharmacology 8320: Targets, Systems & Drug Action, section leader and instructor for Blood Lung and Immunology section, 8 contact hr.
2011-2013	IGP Bioregulations II module: Prostaglandins and Related Lipid Mediators, module director and instructor, 14 contact hours.
2012-2020	IGP Bioregulations I: instructor for Lipid Signaling section, 4 contact hr.

Curriculum Design

2016-present	Chair, Department of Pharmacology Curriculum Committee. (First major revision of curriculum implemented in 2016-2017. Second major revision implemented August 2020.)
2020-present	Vanderbilt Interdepartmental Graduate Program Curriculum Revision Committee.

Qualifying Exam Committee

2017-2018	Department of Pharmacology Phase I Qualifying Exam Committee
2021	Department of Pharmacology Phase I Qualifying Exam Committee for Amy Stark
2022	Department of Pharmacology Phase I Qualifying Exam Committee for Aaron Gochman, Vivian Jones, K.J. Li, and Zeljka Lanaghan.
2023	Department of Pharmacology Qualifying Exam Committee for Christopher Hansen, Lauren Schnitkey, and Emma Webb.

Research Supervision

Post-doctoral and Research Fellows

2009-2014	Lilu Guo
2010-2012	Yongqin Zhang
2014-2015	Zhuoheng Li
2015-2020	Linda May-Zhang
2016-2018	Geetika Aggarwal
2016-2017	Noura Dosoky
2017-2018	Zahra Mashhadi
2022-	Abdul-Mussawir Alli-oluwafuyi
2023-	Reza Fadaei

Graduate PhD Students (dissertation mentor)

2018-2023	Jonah Zarrow

Graduation PhD Students (Rotation only)

2008	Jeff Bylund
2009	Laura Anzaldi
2009	Rene Raphemot
2010	Nick Adams
2012	Leslie Roteta
2014	Jessica Jackson
2014	Jose Bermudez
2015	Kelly Barnett
2015	Eric Figueroa
2016	Vaughn Thada
2017	Paige Vega

Undergraduate or Master Students

2001	Mary Beth Watts.
2005	Daniel Matthews, Rice University
2006-2007	Ugo Nnodu, Meharry University
2007-2008	Alex Wendelborn, Vanderbilt University
2008-2010	Blake Sullivan, Lipscomb University
2010-2012	Stephen Gragg, Lipscomb University
2014	Stephen Lee, Vanderbilt University
2014	Monique Shelton, Fisk University graduate
2016	Emmanuel Jackson, Fisk University
2016-2018	Andrew Feigley
2017	Hanson Cowan, University of South Carolina
2017	Renner Tikofy, Fisk University
2018-2019	Leah Rowe, University of Arkansas-Pine Bluff
2020-2022	Isabelle Suero, Vanderbilt University
2021	Allison Pickens, Brigham Young University
2022	Andrew Jenkins, Brigham Young University
2023	Stetler Tanner, Brigham Young University

Honors Thesis Committees

2009	Ario Hosseini	Neuroscience, Vanderbilt University
2013	Grace Kim	Neuroscience, Vanderbilt University

Master's Thesis Committee

2014-2015[#]	Katie Sprinkel	Dept. of Pharmacology, Vanderbilt University
2016-2017	Blake Dieckmann	Dept. of Pharmacology, Vanderbilt University
2017-2018	Bradley Steiner	Dept. of Pharmacology, Vanderbilt University

Medical Students (Emphasis Rotation or Summer Research Program)

2005	Dezy Banani, Vanderbilt University
2004	Eric Brantley, Vanderbilt University
2015	Zack Dale, Case Western Reserve
2016	Tiffany Pleasant, Meharry Medical College
2017	Connie Kha, Morehouse School of Medicine
2018	Tiffany Pleasent, Meharry Medical School
2019	Hunter Huff Towle, University of North Dakota Medical School
2022	Hannah Gier, Ohio University Medical College
2023	Lia Dopp, Eastern Virginia Medical University

Other Trainees

2005-2007	Yao Luo, Brentwood High School
2007-2008	Tian Yu, Brentwood High School
2008, 2013	Jonathan Davies, Hillwood High School
2012-2014	Phoebe Sharp, Hume Fogg High School
2017	John Esquibel, Taos High School

PhD Dissertation Committees

[#]chair

2011-2013	Sarah Njoroge	Dept. of Path., Micro., and Immuno. Vanderbilt
2010-2013	Jing Jin	Dept. of Pharmacology, Vanderbilt University
2011-2014[#]	Odaine Gordon	Dept. of Pharmacology, Vanderbilt University
2011-2014	Teniel Ramikie	Dept. of Psychiatry, Vanderbilt University
2011-2014	Jing Wu	Dept. of Pharmacology, Vanderbilt University
2012-2015	Will Beavers	Dept. of Chemistry, Vanderbilt University
2014-2015	Scott McCall	Dept. of Pharmacology, Vanderbilt University
2013-2016	Thuy Nguyen	Dept. of Pharmacology, Vanderbilt University
2016-2018	Elizabeth Gibson	Dept. of Pharmacology, Vanderbilt University
2017-2023	Mark Crowder	Dept. of Pharmacology, Vanderbilt University
2017-2019	Kristin Peterson	Dept. of Pharmacology, Vanderbilt University
2020-2022	Rebecca Weiner	Dept. of Pharmacology, Vanderbilt University
2020-[#]	Kennady Bullock	Dept. of Pharmacology, Vanderbilt University
2021-[#]	Amy Stark	Dept. of Pharmacology, Vanderbilt University
2023-	Jade Miller	Dept. of Pharmacology, Vanderbilt University
2023-	Audrey Thomas	Microbe-Host Interaction Program, Vanderbilt
2024-	Montana Young	Dept. of Pharmacology, Vanderbilt University
2024-	Tri Do	Dept. of Pharmacology, Vanderbilt University

FUNDING/GRANT SUPPORT

CURRENT

2P01HL116263-06A1 (Linton) 01/15/2021-12/31/2025 4.6 calendar months
NHLBI/VUMC
$461, 463 (subcontract to date)
HDL Function in Human Disease
High density lipoproteins (HDL) are important in suppressing the development of atherosclerosis but can become dysfunctional under certain conditions where oxidative stress also occurs. Oxidation of lipids can generate reactive compounds, called isolevuglandins, which can react with proteins in HDL and render it dysfunctional. This project will address the hypothesis that overproduction of isolevuglandins is responsible for rendering HDL dysfunctional.
Role on project: Project 4 leader; Core C director

E01 HT9425-23-1-0065 (Davies) 01/15/2023-01/14/2025 1.2 calendar months
CDMRP/DoD
$317,00 (total award)
Targeting the NAPE-PLD pathway for treatment of pressure ulcers
This project will test the hypothesis that reduced *Napepld* expression increases the severity and duration of pressure ulcers, and that therapeutic interventions that enhance NAPE-PLD activity will protect against development of pressure ulcers and accelerate wound healing in diabetic mice. If these activators are successful at raising Nape-pld activity in these studies, it could also pave the way for testing these activators in other conditions where Nape-pld activity is reduced such as obesity, diabetes, and atherosclerosis.
Role on project: Principal Investigator

R35 HL140016-03 (Harrison) 02/01/2018-12/31/2024 0.6 calendar months
NHLBI/VUMC
Mechanisms of Immune Activation in Hypertension
$ 69,481 (Subcontract to date)
The overall goal is to define responsible molecular pathways in experimental models and in humans with hypertension. Importantly, we have identified a novel mechanism for T cell activation in hypertension involving posttranslational modification of self- proteins by isolevuglandins (isoLGs). Dr. Davies will provide assistance in planning experiments that use IsoLG, including the synthesis of the active compound and analysis of IsoLG adducts.
Role on Project: Co-Investigator (subcontract PI)

1R01HL162698-01 (B. Davies) 01/13/2023-12/31/2027 0.4 calendar months
NHLBI/University of Iowa
$11, 085 (subcontract to date)
Regulation of Endothelial Lipase and HDL Metabolism by ANGPTL3
Dr. Sean Davies will provide protocols and instruction for isolating HDL from mouse plasma, and use mass spectrometry to analyze species of phosphatidylcholine (PC) and phosphatidylethanolamine (PE) and the ratios of lyso-PC to PC and lyso-PE to PE in HDL. Analysis will be performed on HDL from several genotypes including wildtype, Angptl3LPLonly, Angptl3–/–, ApoE–/–, Angptl3LPLonlyApoE–/–, Angptl3–/–ApoE–/– mice.
Role on project: Co-Investigator (subcontract PI)

P30 DK20593-42 (Powers/McGuinness) 04/01/2022-03/31/2027 0.6 calendar months
NIDDK/VUMC
$35,000 (Subcontract Total)

Vanderbilt Diabetes Research and Training Center
Role on Project: Director of the Enrichment Program.

Scaling Success- (Davies) 04/01/2024-09/01/2024
Vanderbilt Internal
NAPE-PLD activators
$55,109

PENDING

1R01 HL-XX (Song) 02/01/2018-12/31/2024 0.6 calendar months
NHLBI/Brown University
Reducing the atherothrombogenic properties of Lipoprotein(a) with a potent dicarbonyl scavenger
$ 697,895 (Subcontract total)
Dr. Davies and his laboratory will perform or assist the PI in performing a variety of LC/MS analyses for these products, both in vitro and in tissues and plasma. They will also assist the PI by providing dicarbonyl scavengers or their inactive analogs, assist him in planning studies utilizing these compounds and interpreting the results of these experiments.
Role on Project: Co-Investigator (subcontract PI)

ADDF (Newhouse) 10/01/2024-09/30/2025 1.2 calendar months
Alzheimer's Drug Discovery Foundation/MTI
2-Hydroxybenzylamine (2-HOBA) Proof-of-Concept, Dose-Finding, Biomarker Studies in Early Alzheimer's Patients.
Dr. Davies and his laboratory will work up 192 cerebrospinal fluid samples which will be quantitatively analyzed by HPLC coupled to tandem mass spectrometry (LC/MS/MS) for lysine (Lys) modification by isolevuglandin (IsoLG) and malondialdehyde (MDA).
Role on Project: Co-Investigator

1R01DK130095-01 (Davies) 07/01/2022-06/30/2027 3.0 calendar months
NIDDK
$326,268
NAPE-PLD activators for treatment of metabolic diseases
This project will validate and optimize lead compounds that activate NAPE-PLD for the treatment of cardiometabolic disease.
Role on Project: Principal Investigator
Note: Will be resubmitted Nov. 2024.

COMPLETED

DP2OD003137 (Davies) 09/30/2007-08/31/2012
NIH/NIGMS $300,000/year direct
Transformed Probiotic Bacteria for Treatment of Chronic Diseases
The goal of this project is to develop a long-lasting pharmaceutical treatment strategy for chronic diseases using genetically modify probiotic bacteria to express peptide drugs in the gastrointestinal tract of obese, hypercholesterolemic mice.
Role: Principal Investigator

VUMC Pilot Project (Davies) 07/01/2012 – 06/30/2013
Vanderbilt Center in Molecular Toxicology $50,000
Bioactive Aldehyde-Modified Phosphatidylethanolamines

These studies are highly relevant to the mission of the Center for Molecular Toxicology because they will elucidate an entirely new mechanism by which toxicants and diseases that induce oxidative stress may actually lead to inflammation and injury, so that we will be able to target novel therapies to block these effects.
Role: PI

R03 AG030551-01A1/Kronos (Davies) 4/01/2008-3/31/2011
NIH/NIA
Systemic and Localized Stress Resilience in Aging: Effects of Physical Fitness
The goal of this project is to examine the effect of age and physical activity on the response to moderate ischemia/reperfusion induced by sustained inflation of a blood pressure cuff.
Role: Principal Investigator for Vanderbilt subcontract

Vanderbilt University Diabetes Research and Training Center
Pilot and Feasibility Project 3 (Sean Davies) $50,000/year 4/01/2005-3/31/2007
Gamma-ketoaldehydes in Diabetes
Role: Principal Investigator

HHSN2672008000020C (Neilsen, P) 11/01/2011 - 01/31/2014
Department of Health and Human Services $15,000/year
Biomarkers for Alcohol and ALD
Role on project: PI of Vanderbilt subcontract to measure phosphatidylethanol by LC/MS for comparison to ELISA assays performed by Echelon Biosciences

R37 GM42056 (Roberts) 09/14/2006-06/30/2011
NIA/NIGMS
Structural Identification of Prostaglandin Conjugates. The goal of this project is to study the isoprostane pathway of lipid peroxidation in human diseases and animal models of human disease.
Role: Develop small molecule inhibitors of isoketals and measure effects on protein adducts.

R01 HL058241 (Wikswo) 07/01/2009-06/30/2011
NIH/NHLBI
Correlative Multimodal Imaging of Cardiac Electrophysiology and Metabolism
Role on project: Measurement of isoketal protein adducts.

R01 AG023597 (Roberts) 4/15/2005-5/31/2009
NIH/NIA
Reactive Gamma-Ketoaldehydes in Dementia
The goal of this project is to explore the role of the gamma-ketoaldehydes, isoketals, in a mouse model of Alzheimer's disease.
Role: Co-investigator

R01 HL079365 (Roberts) 12/20/2004-11/30/2007
NIH/NHLBI
Oxidative Stress Na Channel Gating And Arrhythmias
The goal of this project is to determine the role of isoketals on cardiac Na channel function and on arrhythmias in a dog model of myocardial infarction
Role: Co-investigator

1R01HL111945-01A1 (Linton) 07/23/2012 - 04/30/2014
NHLBI

Mechanisms for Dysfunctional HDL Formation in Familial Hypercholesterolemia
Role on project: Co-investigator, measurement of isolevuglandins and modification of proteins.

1R01HL089385-01A2 (Hill) 04/01/2010-08/31/2014
NIH/NHLBI
Role of Oxidative Stress in Post-MI Cardiac Failure Associated with Diabetes
Role on project: Co-investigator, measurement of isolevuglandin protein adducts.

HEl Rosenblith NIA (Gowdy) 10/01/2015-09/30/2017
Vanderbilt sub-contract to East Carolina University
Scavenger receptor BI regulates pulmonary and vascular inflammation after ozone exposure.
Role on project: Dr. Sean Davies lab to run oxPL analysis on BAL and serum samples as well as lipidomics in year 2.

R01 AT007830 (Davies) 05/01/2013-8/30/2019
NIH/NCCAM
Therapeutically Modified Gut Bacteria for Treatment of Obesity
Role on project: Principal Investigator

R01 GM117174 (Lemon) 02/01/2016-01/31/2020
Vanderbilt sub-contract to Forsyth Institute
Impact of commensal Corynebacterium species on pathogen colonization and microbiota composition
Role on project: PI Vanderbilt subcontract-Dr. Davies lab with analyze Corynebacterium extracts for fatty acids and related lipid compounds by mass spectrometry.

Vanderbilt Discovery Grant (Davies) 04/01/2018-04/01/2020
High Throughput Screening for NAPE-PLD modulators
Role on project: Principal Investigator

SFRN34230125 (Roden) 11/01/2019-06/30/2020
AHA/VUMC
Reactive lipid metabolites as mediators of AF susceptibility in clinical and genetic risk models
$18,315 per year
Dr. Davies will provide assistance in planning experiments that use IsoLG and the analysis of IsoLG adducts.
Role on Project: Co-investigator

R01HL133127-04 (Murray) 04/01/2020-03/31/2021
NHLBI/VUMC
Novel Pathophysiological Targets in Atrial Fibrillation Susceptibility
$19,799 (Subcontract Total)
Dr. Davies will provide assistance in planning experiments that use IsoLG and the analysis of IsoLG adducts.
Role on Project: Co-investigator

P01 HL129941-04 (Harrison) 08/01/2016-07/31/2021
NHLBI/VUMC
The Role of Inflammation in Cardiovascular Disease
$178,467 (Total Subcontract)
This program project grant will investigate the mechanisms and define new treatments for these disabling diseases.

Role on Project: Co-investigator

1R01HL157583-01 (Dikalov) 04/01/2021-03/31/2025 0.36 calendar months
NHLBI/VUMC
$15,771 (subcontract only)
Sirtuin 3 Inactivation and SOD2 Acetylation in Vascular Dysfunction and Hypertension
Dr. Davies will provide assistance in interpreting studies involving IsoLG.
Role on Project: Co-Investigator (subcontract PI)

PUBLICATIONS AND PRESENTATIONS

Peer-reviewed Original Research Articles

*Corresponding Author

1. G. Marathe, **S. Davies**, K. Harrison, R. Murphy, S. Prescott, G. Zimmerman, and T. McIntyre. Inflammatory Platelet-activating Factor-like Phospholipids in Oxidized Low Density Lipoproteins are Fragmented Alkyl Phosphatidylcholine. J. Biological Chemistry, 274, 28395-28404, 1999.
2. K.A. Harrison, **S.S. Davies**, G.K. Marathe, T. McIntyre, S. Prescott, K.M. Reddy, J.R. Falck, and R.C. Murphy. Analysis of oxidized glycerophosphocholine lipids using electrospray ionization mass spectrometry and microderivatization techniques. J. Mass Spectrometry, 35, 224-236, 2000.
3. **S.S. Davies**, A.V. Pontsler, G.K. Marathe, K.A. Harrison, R.C. Murphy, J.C. Hinshaw, G.D. Prestwich, A. St. Hilaire, S.M. Prescott, G.A. Zimmerman, and T.M. McIntyre. Oxidized Alkyl Phospholipids are Specific, High Affinity PPARγ Ligands. J. Biological Chemistry, 276, 16015-16023, 2001.
4. N. Bernoud-Hubac, **S.S. Davies**, O. Boutaud, T.J. Montine, and L.J. Roberts, II. Formation of highly reactive γ-ketoaldehydes (neuroketals) as products of the neuroprostane pathway. J. Biological Chemistry, 276, 30964-30970, 2001.
5. **S.S. Davies**, V. Amarnath, K.S. Montine, N. Bernoud-Hubac, O. Boutaud, T.J. Montine, and L.J. Roberts, II. Effects of reactive gamma-ketoaldehydes formed by the isoprostane pathway (isoketals) and cyclooxygenase pathway (levuglandins) on proteasome function. FASEB J, 16(7), 715-7, 2002.
6. **S.S. Davies**, W.-K. Ju, A.H. Neufeld, D. Abran, S. Chemtob, and L.J. Roberts, II. Hydrolysis of bimatoprost (Lumigan) to its free acid by ocular tissue in vitro. J. Ocular Pharmacology and Therapeutics, 19, 45-54, 2003.
7. O. Boutaud, J. Li, I. Zagol, E.A. Shipp, **S.S. Davies**, L.J. Roberts, II, and J.A. Oates. Levuglandinyl adducts of proteins are formed via a prostaglandin H_2 synthase-dependent pathway after platelet activation. J. Biological Chemistry, 278, 16926-16928, 2003.
8. V. Amarnath, K. Amarnath, K. Amarnath, **S. Davies**, and L.J. Roberts, II. Pyridoxamine: An Extremely Potent Scavenger of γ-Ketoaldehydes. Chemical Research in Toxicology, 17, 410-415, 2004.
9. C.J. Brame, O. Boutaud, **S.S. Davies**, T. Yang, D. Roden, J.A. Oates, and L.J. Roberts, II. Modification of Proteins by Isoketal-Containing Oxidized Phospholipids. J. Biol. Chem., 279, 13447-13451, 2004.
10. **S.S. Davies***, M. Talati, X. Wang, R. Mernaugh, V. Amarnath, J. Fessel, B.O. Meyrick, J. Sheller, and L.J. Roberts, II. Localization of Isoketal Adducts In Vivo Using an Anti-Isoketal Single Chain Antibody. Free Radical Biology Medicine, 36, 1163-1174, 2004.
11. N. Bernoud-Hubac, L.B. Fay, V. Armarnath, M. Guichardant, S. Bacot, **S.S. Davies**, L.J. Roberts, II, and M. Lagarde. Covalent binding of isoketals to ethanolamine phospholipids. Free Radical Biology and Medicine, 37, 1604-1611, 2004.

12. V. Amarnath, K. Amarnath, T. Matherson, **S. Davies**, and L.J. Roberts, II. A Simplified Synthesis of Diastereomers of Levuglandin E_2. Synthetic Communications, 35, 397-408, 2005.
13. K. Fukuda, **S.S. Davies**, T. Nakajima, B.-H. Ong, S. Kupershmidt, J. Fessel, V. Amarnath, M.E. Anderson, P.A. Boyden, P.C. Viswanathan, L.J. Roberts, II, and J.R. Balser. Oxidative Mediated Lipid Peroxidation Recapitulates Proarrhythmic Effects on Cardiac Sodium Channels. Circulation Research, 97, 1262-1269, 2005.
14. **S.S. Davies***, W. Zackert, Y. Luo, C.C. Cunningham, M. Frisard, and L.J. Roberts, II. Quantification of dinor, dihydro metabolites of F_2-isoprostanes in urine by LC/MS/MS. Anal. Biochem., 348, 185-191, 2006.
15. M. Talati, B. Meyrick, R.S. Peebles, Jr., **S.S. Davies**, R. Dworski, R. Mernaugh, D. Mitchell, M. Boothby, L.J. Roberts, II, and J.R. Sheller. Oxidant stress modulates murine allergic airway responses. Free Radical Biology and Medicine, 40, 1210-1219, 2006.
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13. C. Schneider and **S.S. Davies.** Chapter 1 “Non-enzymatic mechanisms of lipid oxidation” in Lipid Oxidation in Health and Disease. Editors Henry J. Forman and Corinne Spickett. Taylor and Francis. (2014).
14. **S.S. Davies*** and L. Guo. Lipid peroxidation generates biologically active phospholipids including oxidatively *N*-modified phospholipids. Chem. Phys. Lipids. 181:1-33 (2014).

15. J. Frijhoff, P. Winyard, N. Zarkovic, **S. S. Davies**, R. Stocker, D. Cheng, A. Knight, E. Taylor, J. Oettrich, T. Ruskovska, A. Gasparovic, A. Cuadrado, D. Weber, H. Poulsen, T. Grune, H. Schmidt, P. Ghezzi. Clinical relevance of biomarkers of oxidative stress. (2015) Antioxid. Redox Signal 23:1144-70. PMC4657513.
16. M.F. Linton, P.G. Yancey, **S.S. Davies**, WGJ Jerome, E.F. Linton, K.C. Vickers. The Role of Lipids and Lipoproteins in Atherosclerosis. In: Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc. https://www.ncbi.nlm.nih.gov/books/NBK343489/
17. L.S. Zhang and **S.S. Davies***. Microbial metabolism of dietary components to bioactive metabolites: Opportunities for new therapeutic interventions. Genome Medicine 8:46 (2016). PMC4840492.
18. **S.S. Davies*** and L. Zhang. Reactive Carbonyl Species Scavengers-Novel Therapeutic Approaches for Chronic Diseases (2017) Curr Pharm Reports 3:51-67. PMC5630168.
19. K. Dixon, **S.S. Davies**, and A. Kirabo. Dendritic Cells and Isolevuglandins in Immunity, Inflammation and Hypertension (2017) Am J Physiol Heart Circ Physiol 312:H368-H374. PMCID in progress.
20. **S.S. Davies*** and L.S. May-Zhang. Isolevuglandins and cardiovascular disease. Prostaglandins Other Lipid Mediat (2018) 139:29-35.
21. **S.S. Davies***, L.S. May-Zhang, O. Boutaud, V. Amarnath, A. Kirabo, D.G. Harrison. Isolevuglandins as mediators of disease and the development of dicarbonyl scavengers as pharmaceutical interventions. Pharmacol Ther. (2020) 205:107418.
22. N.S. Dosoky NS, L.S. May-Zhang, **S.S. Davies***. Engineering the gut microbiota to treat chronic diseases. Appl Microbiol Biotechnol. (2020) 104:7657-7671. doi: 10.1007/s00253-020-10771-0.
23. L.S. May-Zhang, A. Kirabo, J. Huang, M.F. Linton, **S.S. Davies** & K.T. Murray. Scavenging Reactive Lipids to Prevent Oxidative Injury. (2021) *Annu Rev Pharmacol Toxicol* **61**, 291-308.
24. Fadaei R, **Davies SS***. Oxidative modification of HDL by lipid aldehydes impacts HDL function. (2022) Arch Biochem Biophys. 730:109397. doi: 10.1016/j.abb.2022.109397.
25. **Davies SS***, Forman HJ. Progress in HNE Biology. (2023) Arch Biochem Biophys. 735:109513. doi: 10.1016/j.abb.2023.109513.
26. Linton MF, Yancey PG, Tao H, **Davies SS.** HDL Function and Atherosclerosis: Reactive Dicarbonyls as Promising Targets of Therapy. (2023) Circ Res. 132:1521-1545. doi: 10.1161/CIRCRESAHA.123.321563.

Invited lectures (intramural)

2009 *Novel Cellular Targets of Isoketals.* Vanderbilt Oxidative Injury Interest Group.
2009 *Drugs from Bugs.* Vanderbilt Department of Microbiology and Immunology.
2010 *N-modified PE and Inflammation.* Vanderbilt Oxidative Injury Interest Group.
2012 *Genetically Modified Bacteria and Obesity.* Vanderbilt Oxidative Injury Interest Group.
2013 *Genetically Modified Bacteria and Obesity.* Vanderbilt Diabetes Training and Research Center seminar.
2013 *Genetically Modified Bacteria and Obesity* Vanderbilt Microbiome Interest Group.
2014 *Therapeutic Bacteria for Treatment of Obesity.* Vanderbilt Digestive Diseases Research Center Retreat.
2014 *Targeting the Gut Microbiome as Treatment for Obesity*. Vanderbilt Institute for Obesity and Metabolism seminar.
2015 *Treatment of chronic diseases via targeting the gut microbiota.* Vanderbilt Department of Pathology, Microbiology, and Immunology.
2015 *Therapeutically modified bacteria for the treatment of metabolic disease. Vanderbilt Summer Science Academy,* June 17.
2015 *Engineering Gut Microbiota for treatment of cardiometabolic diseases.* Vanderbilt Department of Medicine Mini-Retreat on Microbiome, Aug. 29.

2015 *Engineering Gut Microbiota for treatment of cardiometabolic diseases.* Vanderbilt Department of Cardiology, Sept. 16.
2016 Engineering the Gut Microbiome, Digestive Diseases Research Center retreat, Jan. 25.
2016 *Engineering Gut Microbiota for treatment of cardiometabolic diseases.* Vanderbilt Department of Pharmacology, Jan. 27.
2017 *Lipid Mediators of Oxidative Stress.* Vanderbilt Clinical Pharmacology Fellows Conference, Jan 31.
2017 *Gut microbial expression of NAPEs for treatment of cardiometabolic disease*. Chemical Biology Student Association. Feb. 20.
2017 *Lesson learned in quest to understand isolevuglandins* Jack Roberts Symposium, Vanderbilt University. April. 5
2017 *"How to" study contribution of lipid peroxidation to disease.* Vanderbilt Vascular Biology Center, Aug. 2.
2018 *Engineering the gut microbiome.* Vanderbilt Molecular Medicine Symposium on Gut Microbiome, Feb. 7th.
2018 *Engineering the gut microbiota to treat obesity and its associated diseases.* Vanderbilt Chemical and Physical Biology REU Seminar June 7th
2018 *The Gut Microbiome in Health and Disease-A primer.* Vanderbilt Diagnostic Labs Lunch and Learn Seminar. Dec. 4th
2019 N-acyl-ethanolamides and metabolic syndrome. Vanderbilt Digestive Disease Research Center Retreat. April 14th
2020 *Feeding-Induced N-acylethanolamide Synthesis and Fat*. Vanderbilt Diabetic Research and Training Center. Feb. 14th
2023 NAPE-PLD Regulates Efferocytosis by Macrophages. Vanderbilt Division of Clinical Pharmacology. Oct. 10th.

Invited lectures (extramural)

2005 *Going Rancid: Lipid Peroxidation in Diseases of Aging.* Brigham Young University, Department of Physiology and Developmental Biology Seminar, October 6, Provo, UT.
2008 *Oxidative Stress in Chronic Diseases: Novel Therapeutic Interventions*, Univ. California-Davis, Department of Molecular Biosciences, May 12, Davis, CA.
2010 *N-modified Phosphatidylethanolamine and Cardiovascular Disease.* Univ. California-Los Angeles, Atherosclerosis Research Unit, April 27. Los Angeles, CA.
2012 *Lipid Peroxidation Generates Aldehyde-Modified Phosphatidylethanolamines.* Echelon Bioscience Inc., June 22, Salt Lake City, UT.
2012 *Biologically Active Lipid Aldehydes.* Case Western Reserve University, Oct. 11, Cleveland, OH.
2013 *Genetic modification of gut microbiota as a novel treatment for obesity.* Tennessee Physiology Society, Lipscomb University, Nov. 22, Nashville, TN.
2014 *Contrasting roles of N-modified Phosphatidylethanolamines in Obesity.* University of Louisville, Apr. 22, Louisville, KY.
2014 *The Yin and Yang of N-modified Phosphatidyl Ethanolamine in Obesity.* University of Virginia, August 28, Charlottesville, VA.
2014 *A New Hope: Treating Obesity by Genetically Modifying Gut* Bacteria. Intersessions Seminar-Meharry Medical College, Sept. 24, Nashville, TN.
2015 *Engineering the gut microbiome to treat metabolic disease*. Auburn University 8th Annual Boshell Diabetes Research Day, February 13, Auburn, AL. *Plenary Speaker*
2015 *Engineering the gut microbiome to treat metabolic disease*. University of Iowa Diabetes Research Center seminar-February 23, Iowa City, IA.

2015 *The Yin and Yang of N-modified Phosphatidylethanolamine in Obesity.* University of Colorado-Denver, Department of Pharmacology seminar-March 23, Denver, CO.
2015 *Therapeutically modified bacteria for the treatment of metabolic diseases*, Loma Linda University, School of Pharmacy, May 28th, San Bernadino, CA.
2015 *Modulating the Gut Microbiota for treatment of cardiometabolic disease.*Meharry Medical College, Sept. 22nd, Nashville, TN.
2015 *Lipid peroxidation products contribute to development of chronic diseases.* East Carolina University, Department of Pharmacology, Oct. 21st, Greenville, NC.
2015 *Genetic Engineering of Gut Microbiota as Treatment of Cardiometabolic Disease.* University Alabama-Birmingham Nutrition and Obesity Research Center, Dec. 1st, Birmingham, AL.
2017 *Gut microbial expression of NAPEs for treatment of cardiometabolic disease.* Department of Nutrition and Food Science. Texas A&M University, Feb. 6, College Station, TX
2017 *Engineering the gut microbiota to treat obesity and its associated diseases.* Department of Biochemistry MARC program. University of Arizona, Nov. 6, Tucson, AZ
2018 *Isolevuglandins in disease: evidence, challenges, and potential opportunities.* Cayman Chemical Inc. June 11, Ann Arbor, MI.

National and International Conferences (Oral Presentations)

2008 *Role of Isoketals in Ischemic Cardiomyopathy.* 15th Annual Meeting of Society for Free Radical Biology and Medicine, Nov. 22. Indianapolis, IN
2009 *Phosphatidylethanolamine is Modified by Isoketals in Cells and Contributes to Isoketal Induced Cytotoxicity.* 11th International Conference on Bioactive Lipids in Cancer, Inflammation and Related Diseases Oct. 28, Cancun, Mexico
2010 *Modification of Phosphatidylethanolamine Mediates Levuglandin/Isoketal Cytoxicity.* Experimental Biology 2010. April 25, Anaheim, CA.
2011 *Lipid Aldehyde-Modified Aminophospholipids Induce ER Stress and Activate the Inflammatory Response of Endothelial Cells.* European Atherosclerosis Society Meeting, June 29, Gothenburg, Sweden.
2011 *Lipid Peroxidation generates aldehydes-modified PE that induce inflammation.* 12th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Sept. 20, Seattle, WA.
2011 *Lipid aldehydes induce inflammation by modifying phosphatidylethanolamines.* Southeast Lipids Research Conference, Oct. 8, Callaway Gardens, GA.
2011 *Lipid Peroxidation Generates Aldehyde-Modified Phosphatidylethanolamines that Induce Inflammation.* 8th GERLI Lipidomics Meeting, Oct. 26, Lyon, France.
2012 *Gut Bacteria Engineered to Express N-acyl-phosphatidylethanolamine Reduce Weight Gain in High-Fat Fed Mice.* International Society for Study of Fatty Acids and Lipids 2012 May 29, Vancouver, Canada.
2012 *Modification of phosphatidylethanolamines mediate pro-inflammatory effects of lipid aldehydes.* Society for Free Radical Research International 2012, Sept 5, London, United Kingdom.
2012 *Therapeutic Modification of Gut Bacteria Prevents Obesity.* NIH Pioneer Award Symposium, Sept 13, Bethesda, MD.
2013 *Modification of Enteric Bacteria to Secrete N-acyl Phosphatidylethanolamines Inhibits Diet Induced Obesity.* 13th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Nov. 5, San Juan, Puerto Rico, USA.

2014 *Genetically Engineered Therapeutic Bacteria. Keystone Symposia: Exploiting and Understanding Chemical Biotransformations in the Human Microbiome.* April 4, Big Sky, MT. *Invited Speaker*

2014 *Using Genetically Engineered Bacteria to Beneficially Alter the Gut Microbiota.* NHLBI Working Group on the Microbiome in Cardiovascular, Pulmonary, and Hematologic Health and Disease, June 25, Bethesda, MD. *Invited speaker*

2014 *Incorporation of N-acylphosphatidylethanolamine expressing bacteria into gut microbiota as treatment for obesity.* Diabetes and the Microbiome Conference, American Diabetes Association, Oct. 29, Chicago, IL.

2014 *Programmable Cell Technologies.* Center for the Study of Inflammatory Bowel Disease 24th Annual Workshop: Microbes, Metabolism, and Mucosal Circuits. Nov 7, Cambridge, MA.-*Invited Speaker*

2015 *Engineered probiotics for treatment of obesity.* 4th Beneficial Microbes Conference. March 17,The Hague, Netherlands.-*Invited Speaker*

2015 *Incorporation of therapeutic bacteria into the gut microbiome for treatment of obesity.* 249th American Chemical Society National Meeting, March 22, Denver, CO-*Invited Speaker*.

2015 *Genetic Engineering of Human Commensals for the treatment of cardiometabolic disease*, Atherosclerosis Gordon Research Conference, June 20, Newry, ME. *Invited Speaker.*

2015 *Probiotics and the Treatment of Obesity*, UK Probiotics Conference 2015, June 29, Royal Holloway, United Kingdom. *Invited Speaker.*

2015 *We are what they eat: Engineering the gut microbiota to inhibit obesity.* Obesity Week 2015, Nov. 6, Los Angeles, CA*. Invited Speaker.*

2016 *Inhibiting Obesity with Engineered Therapeutic Bacteria.* Keystone Symposia: Gut Microbiota, Metabolic Disorders, and Beyond, April 19th, Newport, RI.

2016 *Manipulating the gut microbiota to treat obesity.* FASEB-Immunological Aspects of Obesity, August 5, Big Sky, MT. *Invited Speaker*

2016 *Altering the microbiota for weight control.* American Physiology Society-Inflammation, Immunity, and Cardiovascular Disease, August 26, 2016, Westminister, CO. *Invited Speaker.*

2016 *Recombinant bacteria for treatment of obesity-related diseases.* 4th Microbiome R&D and Business Collaboration Forum in La Jolla, Oct. 4th, La Jolla, CA. *Invited speaker.*

2017 *Role of highly reactive lipid dicarbonyls in vascular disease associated with oxidative stress.* Society for Redox Biology and Medicine Regional Redox Symposium, March 17th, Birmingham, AL. *Invited speaker.*

2017 *Manipulating the Microbiome to Treat Metabolic Disease*, American Diabetes Association 77th Scientific Sessions, June 9th, San Diego, CA. *Invited speak*er

2017 *Gut bacteria expressing NAPE inhibit development of obesity and associated diseases.* 15th International Conference of Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Oct. 24th, Puerto Vallarta, Mexico.

2018 I*solevuglandins and Cardiovascular Disease.* Winter Eicosanoid Meeting, March 12, Baltimore, MD. *Invited speaker.*

2018 *Methods to measure isolevuglandin protein and phospholipid adducts.* Society for Redox Biology and Medicine 2018 Annual Meeting. Nov. 14, Chicago, IL. *invited speaker.*

2019 *Intestinal NAPE biosynthesis and cardiometabolic disease.* Kern Conference, August 14. Vail, CO. *Invited speaker.*

2019 Feeding-induced increases in intestinal N-acyl-ethanolamides critically regulate energy balance in zebrafish. 16th International Conference of Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Oct. 22nd, St. Petersburg, FL.

2020 *Lipid dicarbonyl modification of HDL as a contributing factor to atherosclerosis*. Winter Eicosanoid Meeting; Oct. 9, Baltimore, MD.

2022 *Modulating NAPE-PLD activity alters macrophage efferocytosis.* 17th International Conference of Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Oct. 22nd, New Orleans, LA.

2023 *NAPE-PLD Regulates Efferocytosis by Macrophages.* Winter Eicosanoid Conference; Oct. 17, Baltimore, MD. *Invited Speaker.*

2023 *HDL and macrophage function in atherosclerosis.* American Heart Association Scientific Sessions. Nov. 12, Philadelphia, PA. *Invited Speaker.*

National and International Conferences (Poster Presentations)

2009 *Transformed Probiotic Bacteria For Chronic Drug Delivery.* NIH Pioneer and New Innovator Symposium, Sept 22nd, Bethesda, MD.

2009 *Treatment with Isoketal Scavenger, Salicylamine, Prevents Loss of Working Memory in Humanized ApoE4 Mice.* Bioactive Lipids in Cancer, Inflammation, and Related Diseases, 11th International Conference, Oct. 22nd, Cancun, Mexico.

2009 *Phosphatidylethanolamine is modified by isoketals in cells and contributes to isoketal induced cytotoxicity*. Society for Free Radical Biology and Medicine. Nov 21st.

2010 *N-modification of phosphatidylethanolamine by γ-ketoaldehydes induces HUVEC activation.* Lipid MAPS, May 3-4, La Jolla, CA.

2010 *Simplified LC/MS/MS analysis of N-modified phosphatidylethanolamines.* American Society for Mass Spectrometry, May 23, Salt Lake City, UT.

2011 *Phosphatidylethanolamines N-modified by γ-Ketoaldehydes are Proinflammatory.* Gordon Research Conference on Oxidative Stress. March 15, Ventura, CA.

2012 *Gut Bugs Delivering Drugs: Incorporating Genetically Modified Bacteria into Gut Microbiota Reduces Obesity.* Society for Free Radical Biology and Medicine 2012. Nov. 16th, San Diego, CA.

2016 I*nhibiting Obesity with Engineered Therapeutic Bacteria.* Keystone Symposia: Gut Microbiota, Metabolic Disorders, and Beyond, April 19th, Newport, RI.

2019 *Intestinal N-acyl-PEs regulate energy balance.* Southeast Lipid Research Conference. Sept. 13th, Cincinnati, OH.

2022 *Development of NAPE-PLD activators for the treatment of metabolic diseases.* Fredrickson Lipid Research Conference. Sept. 6th, Durham, NC.

2023 *Regulation of macrophage function and efferocytosis capacity by NAPE-PLD.* Cellular and Molecular Biology of Lipids Gordon Research Conference, July 24th, Waterville Valley, NH.