

CURRICULUM VITAE

Jeffrey L. Osborn

I. Personal

Contact Information: Department of Biology
115 Thomas Hunt Morgan Building
University of Kentucky
Lexington, KY 40506
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Citizenship: United States of America

II. Education

Graduate/Professional: Michigan State University, East Lansing, MI. Ph.D. Physiology, 1979.
Dissertation Title: *Immaturity of Renal Function in Newborn Pigs: Factors Affecting Renal Hemodynamics, Sodium Excretion and Plasma Renin Activity.* Michael D. Bailie, M.D., Ph.D., Advisor.

Michigan State University, East Lansing, MI. M.S. Physiology, 1976
Thesis Title: *Control of Renin Secretion: Effect of d-Propranolol and Renal Denervation on Furosemide Induced Renin Secretion in the Dog.* Michael D. Bailie, M.D., Ph.D., Advisor

College: Amherst College, Amherst, Massachusetts B.A. Biology, 1974

III. Postdoctoral Training:

Postdoctoral Research Fellow, 1979-1981. Department of Internal Medicine and Cardiovascular Research Center, University of Iowa.
Gerald F. DiBona, M.D., Advisor.

IV. Academic Appointments

2003 – Present Professor
Associate-Chair 2010 –2015
Department of Biology
University of Kentucky
Lexington, KY

2011-2014 Professor of Physiology (Adjunct)
University of Medicine and Health Sciences
Basseterre, St. Kitts
West Indies

1999 - 2003 Director (Founding)
Greater Hartford Academy of Mathematics and Science
The Learning Corridor
Hartford, CT

1999 – 2003 Professor of Biology and Neuroscience (Adjunct)
Trinity College
Hartford, CT

1997 Visiting Sr. Scientist
 Department of Pediatrics
 Karolinska Institute
 Stockholm, Sweden
 Anita C. Aperia, M.D., Ph.D (Host)
 Professor of Pediatrics

1992 – 1999 Director (Founding)
 MCW Center for Science Education
 The Medical College of Wisconsin
 Milwaukee, Wisconsin

1988 - 1999 Associate Professor of Physiology
 The Medical College of Wisconsin
 Milwaukee, Wisconsin

1981 – 1988 Assistant Professor of Physiology
 The Medical College of Wisconsin
 Milwaukee, Wisconsin

V. **Major Awards**

University of Kentucky Undergraduate Research Mentor of the Year – 2015-2016
 “Teacher Who Made a Difference” Award; College of Education, University of Kentucky, 2013
 Arthur Guyton Teacher of the Year Award, American Physiological Society 2007
 Great Teacher Award, University of Kentucky Alumni Association 2006-2007
 President's Award for Distinction in Research, American Heart Association/WI Affiliate, 1994.
 American Society of Hypertension Young Investigator Award, Finalist, 1990.
 Established Investigator of the American Heart Association, 1987-1992.
 Kidney Foundation of Iowa, Research Fellowship, 1979.
 National Research Service Award. Cardiovascular Training Center, University of Iowa, Iowa City, 1979.

VI. **Professional Affiliations**

1979-Present American Physiological Society
 1982-Present American Heart Association - Council on Basic Science
 1982-Present American Heart Association - Council on Kidney in Cardiovascular Disease
 1982-Present American Heart Association - Council on High Blood Pressure
 2004-2012 Association of Science Teacher Education (ASTE)
 2003-2012 National Association of Biology Teachers
 1991-1996 American Society of Hypertension
 1988-1999 American Heart Association/Wisconsin Affiliate
 1981-1995 Society for Experimental Biology and Medicine
 1979-1989 American Federation for Clinical Research
 1979-1999 International Society of Nephrology
 1979-1999 American Society of Nephrology

VII. **Areas of Research Interest**

Regulation of Arterial Pressure: Neural Control of Renal Function; Genetic Factors in Neurogenic Hypertension of African Green Monkey (*C. aethiops sabaues*; vervet); Mechanisms of Ion Channel Mediation of Tissue Regeneration; Impacts of Inquiry Based Teaching on Student Achievement; Quantitative and Qualitative Predictors of Student Success in Medical Education; Effective Models of Teaching Mathematics and Science Among Students with Varying Backgrounds and Academic Preparation.

VIII. **Currently Active Projects**

Mechanisms of Spontaneous Hypertension and T2 Diabetes in the Non-Human Primate, *Chlorocebus aethiops sabaeus*; Role of Ion Channel Generated Electrical Currents in Tissue Regeneration; Role of Renin, Angiotensin and Renal Sympathetic Nerve Activity in Early Life Stress Hypertension; Louis Stokes Alliance for Minority Participation: Recruitment and Retention of Minority Students into STEM Majors.

IX. **Teaching Activities**

A. **Classroom, Seminar or Teaching Laboratory**

<u>Year</u>	<u>Level</u>	<u>Course</u>	<u>Hours</u>
2012-Present	Graduate	Biology 621 – Renal & Cardiovascular Physiology	3
2010 -Present	Collegiate	Biology 350 - Animal Physiology (UK)	4
2004-Present	Collegiate	Biology 550 – Advanced Human Physiology	3
2012-2014	Collegiate	Biology 198H – Honors Research	2
2011-2014	Collegiate	Biology 425 – Senior Seminar	1
2004-2008	Collegiate	Biology 151 & 153 Course Coordinator	
		Introductory Biology Labs – Biology Majors	2
2003-2011	Grad	Teaching High School Biology with Inquiry-UK	3
2001-2002	Grad	Inquiry Based Science Teaching for Middle and High School Teachers (UConn)	3
2002-2003	Collegiate	Methods of Neuroscience (Trinity)	4
2001-2003	Collegiate	General Endocrinology (Trinity)	4
2000-2003	Pre-College	Experimental Research (GHAMAS)	5
1999-2003	Pre-College	Pathophysiology & Pharmacology (GHAMAS)	5
1981-1999	Grad	Advanced Renal Physiology (MCW)	5
1981-1999	Grad	Medical Physiology (MCW)	8
1978	201	Introductory Physiology (MSU)	4

B. **Major Invited Lectureships**

1. Webinar: “Freedom: The Promise of Telemetry Revisited” Stellar Telemetry Webinar; TSE Systems, Inc.; June 2014.
2. Symposium, “Setting the Bar Higher”, Michigan Association of Public Schools Academies, Detroit, MI, October 27, 2006.
3. Keynote Address: “Wanted: Educational Leaders to Change the Face of Doing Business in Schools”. Kentucky Association for Equal Opportunities in Postsecondary Education, Lexington, KY, October 19, 2005.
4. Featured Tutorial Lecture, “Understanding and Using Molecular Biology to Study Cardiovascular Function: From DNA to Organ Systems”; American College of Sports Medicine, 51st Annual Meeting, Indianapolis, IN; June 2-5, 2004.
5. Symposium, “Inquiry-Based Teaching of Pathophysiology and Pharmacology to 11th and 12th Grade Students.” Experimental Biology ’03, San Diego, CA; April 2003.
6. Keynote Address, “Inquiry based education in science and mathematics”. PIMMS Leadership Conference, Wesleyan University, October 2000.
7. Symposium, “Long-Term Aberrations in Arterial Pressure Mediated by Renal Sympathetic Nerve Activity.” 6th Annual Conference on Sleep Disorders, Lake Louise, Alberta, Canada; March 27-31, 1999.
8. Symposium Address: “Creation of an Urban Based Academy of Science” Wisconsin Annual Conference on Charter Schools; February 22, 1999, Marquette University; Milwaukee, WI

9. Symposium, "Transforming Urban Science Education." Experimental Biology '99, Washington, D.C., April 1999.
10. Visiting Lecturer, Department of Pharmacology, University of Tennessee Health Science Center, Memphis, TN, December 1998. "Hands-On Science with Hands-On Scientists: Preparing Americas Youth for the 21st Century"
11. Visiting Lecturer, Department of Pharmacology, University of Tennessee Health Science Center, Memphis, TN, December 1998. "Aberrations in Renal Sympathetic Outflow Cause Chronic Hypertension"
12. Symposium, "Chronic Intrarenal Norepinephrine Upregulation of Alpha-2 Adrenoceptors." FASEB Summer Research Conference on Renal Hemodynamics: Integration of Endothelial, Epithelial and Vascular Control Mechanisms. Saxon River, VT, June 1998.
13. Symposium, "Middle School Science Education Programs at the MCW Center for Science Education." Society for Neuroscience, 27th Annual Meeting, October 1997.
14. Visiting Lecturer, Department of Internal Medicine and Physiology, Georgetown Univ. Medical Center, Washington, D.C., October, 1996. "Alterations in Adrenergic Receptor Populations in Renal Neuroadrenergic Hypertension."
15. Symposium, "Impact of Long-Term Increases in Sympathetic Activity on Arterial Pressure Regulation". Experimental Biology '96, Washington, D.C., April 14-18, 1996.
16. Symposium, "Renal Neurogenic Control of the Medullary Circulation". FASEB Summer Research Conference on Renal Hemodynamics: Integrative and Cellular Control Mechanisms. Saxon River, VT, June 1995.
17. Invited Workshop, "K-12 Science Education and Health Care", Human Anatomy and Physiology Conference, June 5-8, 1994, Portsmouth, N.H.
18. Visiting Lecturer, Departments of Pediatrics and Physiology, Georgetown Univ. Med. Center, Washington, D.C., March 31 - April 2, 1992. "Renal neurogenic control of sodium balance and arterial pressure".
19. "Sympathetic Regulation of Renal Function: Implications for Long-Term Control of Arterial Pressure". Symposium, American Heart Association Annual Meeting, Nov. 10-15, 1990, Dallas, Texas.
20. Workshop Lecture, "How to Develop Grass Roots Organizations in Support of Animal Research". FASEB, Washington, D.C., 1990.
21. Symposium, "Regulation of Sodium Balance: Mechanism of Sodium Sensor". FASEB, Washington, D.C., 1990.
22. Keynote Address: "New Strategies for Science Education in the 21st Century". National Science Teachers Association, Annual Meeting, Midwest Section, Milwaukee, WI, 1989.
23. "Renal Vasoconstrictor Response to Renal Nerve Stimulation: Effects of Renal Perfusion Pressure and Furosemide." FASEB Summer Research Conference on Renal Hemodynamics: Integrative and Cellular Control Mechanisms, Saxons River, Vermont, June 11, 1989.
24. Visiting Lecturer, Department of Physiology, Texas A & M University, February, 1989, "Renal Sympathetic Regulation of Renal Function and Arterial Pressure".
25. Visiting Lecturer, Department of Physiology, University of Birmingham School of Medicine, Birmingham, England, July 23-25, 1987, "Renal Sympathetic Regulation of Sodium Balance and Blood Pressure".
26. Visiting Lecturer, Department of Pharmacology, University of Limburg, Maastricht, Netherlands, July 16-17, 1987, "Renal Sympathetic Regulation of Arterial Pressure".
27. "Prostaglandin Interactions in Neurally Mediated Renin Secretion". Presented at FASEB Summer Research Conference on Central Neural Mechanisms in Cardiovascular Regulation, Saxons River, Vermont, July 29, 1982.

28. Visiting Lecturer, Department of Physiology, Rutgers University, New Brunswick, New Jersey, November 20, 1981, "Interaction of Renal Nerves and Prostaglandins in the Control of Renin Release".
29. "Role of Renal Nerves in the Regulation of Renin Secretion". Presented at 10th Annual Meeting of Iowa Kidney Foundation, Cedar Rapids, Iowa, September 6, 1980.

X. Other Professional Activities

American Journal of Physiology (Reviewer)
Renal, Fluid and Electrolyte Physiology
Regulatory, Integrative and Comparative Physiology
Heart and Circulatory Physiology
Advances in Physiology Education
Hypertension (Reviewer)
Acta Physiologica Scandinavica (Reviewer)
American Journal of Physiology: Advances in Physiology Education (Reviewer)
Clinical and Experimental Physiology and Pharmacology (Reviewer)

XI. University, State and National Committees

A. University

2016-Present	Graduate Affairs Committee, Dept. of Biology, University of Kentucky
2016-Present	Executive Committee, Department of Biology, University of Kentucky
2015-Present	Institutional Animal Care and Use Committee (UK IACUC)
2014-Present	College of Education, STEM Education Advisory Board.
2009-Present	Louis Stokes Alliance for Minority Participation, UK Campus Coordinator
2011-2014	Faculty Senate (Elected 3 year term)
2012	Kirwan Faculty Prize Selection Committee
2011-2013	Instructor Search Committee, Department of Biology, Chair
2010-2012	Lecturer Search Committee, Department of Biology, Chair
2010-2012	Beckman UG Research Scholars Committee, Chair
2008-2009	Science Education Search Committee (Chair), Department of Curriculum & Instruction, College of Education
2006-2007	Biology Chair Search Committee, UK Department of Biological Science
2005-2006	External Review Committee, UK Undergraduate Studies Program
2003-2008	Executive Committee, Appalachian Math Science Partnership
2001-2003	Institutional Animal Care and Use Committee, Trinity College
2000-2003	Center for Health Sciences Advisory Board, Trinity College
1999	Search Committee, Luce Professorship on Health and Human Rights, Trinity College
1994 -1997	Committee on School-to-work, Milwaukee Public Schools.
1994 -1996	Committee on Academic Standing, Medical College of Wisconsin
1989-1992	Admissions Committee, Medical College of Wisconsin
1988-1992	Director, Science and Education Program, Medical College of Wisconsin
1985	Advisory Council on Development of "Health is Wealth", Discovery World, Milwaukee, Wisconsin
1983-84	Graduate Admissions and Welfare Committee, Medical College of Wisconsin
1983-89	Research Affairs Committee, Medical College of Wisconsin Chairman, 1984-88, Secretary 1988-89
1982-91	Graduate Qualifying Examination Committee, Dept. of Physiology Medical College of Wisconsin
1984-89	Human Research Review Committee, Medical College of Wisconsin

- B. State**
- 2005-2011 Board of Advisors, Partnership Institute for Math Science Education Reform (PIMSER)
 - 2005-2010 Science Education Advisory Board, Louisville Science Center, Louisville, KY
 - 2000-2003 Board of Directors, Biomedical Engineering Alliance and Consortium (BEACON) of New England
 - 2000- 2003 Connecticut State Department of Education Advisory Board on Gifted and Talented Programs
 - 2000- 2003 Connecticut Biobus (CURE), Advisory Board
 - 1995-1999 Sally Ride Academy, Board of Directors-Milwaukee, WI
 - 1989-1999 Board of Directors, Wisconsin Association for Biomedical Research and Education (WABRE), President, 1993-1996
 - 1990-1998 Board of Governors, AHA/WI Affiliate
 - 1992-1995 Chairman, Research Peer Review Committee, American Heart Association/WI Affiliate
 - 1989-1995 Research Peer Review Committee, American Heart Association/WI Affiliate
 - 1990-1992 President, Milwaukee Division, AHA/WI Affiliate
 - 1988-1991 Chairman, Milwaukee WABRE Steering Committee, Committee on Education
- C. National**
- 2015–Present American Physiological Society Council – Ex Officio
 - 2015-Present American Physiological Society Education Committee Chair
 - 2006-Present Advisory Board, National Amblyopia Genetic Stock Center
 - 2016 AHA Established Investigator Award Review Committee
 - 2011-2015 AHA Cardiorenal Peer Review Committee (section 2), Chair
 - 2008-2011 AHA Cardiorenal Peer Review Committee, Great Rivers Affiliate
 - 2006-2009 American Association for Accreditation of Laboratory Animal Care (AAALAC): Regular Site Visitor
 - 2000-2003 American Physiological Society Education Committee
 - 1998-1999 American Heart Association Midwest Consortium Peer Review Committee: Cardiorenal Section, Co-Chair: 1998, Chair: 1999
 - 1997-2006 American Association for Accreditation of Laboratory Animal Care (AAALAC): Ad hoc Site Visitor - Special Emphasis
 - 1997 American Heart Association Representative (WI), National Consensus Conference on Research Programs for 21st Century
 - 1996-1999 American Heart Association Great America Peer Review Consortium Steering Committee
 - Vice-Chairman: 1998-1999
 - Chairman: 1999 Association Northland Affiliate Research Committee
 - Vice-Chairman: 1998-1999
 - 1995-1996 American Association for Accreditation of Laboratory Animal Care (AAALAC) - Board of Directors
 - 1995-1996 Chairman, APS Animal Care and Experimentation Committee
 - 1993-1996 Animal Care and Experimentation Committee, American Physiological Society
 - 1989-1992 Water and Electrolyte Section of the American Physiological Society, Program Committee

XII. Financial Resources (Grants and Contracts)

A. Currently Active

- Biomedical Science Research Group, LLC Mechanisms of Cardiovascular and Renal Disease in the African Green Monkey.
Jeffrey L. Osborn, Ph.D. President
11/14 – Present ~ \$350,000 annual generation of research funds through private contracts and collaborating scientists.
- AHA 17Pre33670127 The African Green Monkey: A Novel Model of Spontaneous Hypertensive Pregnancy Disorders.
AHA Predoctoral Award to Chelsea Weaver (J.L. Osborn – Sponsor)
7/1/17 – 6/30/19 \$51,900
- NHLBI 1RO1HL142969 The role of soluble prorenin receptor in hypertension associated with obesity.
7/15/2018 – 6/30/2022 \$1,510,766
Frederique B. Yiannikouris, Ph.D. (PI)
Jeffrey L. Osborn, Ph.D. (Co-I)
- NIDDK 1R42DK120261 Oxalo Therapeutics, Inc. (Phase I/II)
9/30/18 – 10/1/22 \$365,511
Hatim Hassan, M.D. University of Chicago, Dept. Medicine (PI)
J.L. Osborn, Ph.D. (Co-I); Subcontract

B. Pending/Planned

- NIH/NIDDK (RO1) APOL-1 Genetic Variant Controllers in Hypertension and End Stage Renal Disease.
Jeffrey L. Osborn, Ph.D. University of Kentucky PI
(2019-2023 Submission Date February 2019)
- NIH/NHLBI (RO1) Determinants and Mechanisms of Development of Spontaneous Gestational Hypertension and Preeclampsia in Nonhuman Primates.
Mark Santillan, M.D., Ph.D. University of Iowa PI
Justin Grobe, Ph.D. University of Iowa Co-I
James Ankrum, Ph.D. University of Iowa Co-I
Jeffrey L. Osborn, Ph.D. University of Kentucky Co-I
(2019 – 2023 Submission Date July, 2019)

C. Previous Grants or Contracts (All Listed as DIRECT Costs only)

2010 – Present: Our most recent work began with examining the relationships among renal mitochondrial gene expression, inflammation, renal sympathetic nerve activity and the development of spontaneous hypertension in rats. We initially implemented a breeding paradigm yielding a conplastic strain of offspring wherein the mitochondrial genome of spontaneously hypertensive rats (Aoki-Okamoto SHR) was inserted onto a background of nearly all nuclear genes from a normotensive Brown-Norway. In these rats, with 98% normotensive Brown Norway nuclear genome and 100% hypertensive SHR mitochondrial genome, hypertension persisted in the majority of animals. The hypertension was characterized and the level of salt sensitivity determined. We also evaluated the neurogenic components that contribute to the overall level of blood

pressure in adulthood. We have now begun to determine the specific mitochondrial genetic loci responsible for this SHR mediated mitochondrial hypertension. In addition, these hypertensive animals exhibited elevated renal and hypothalamic expression of angiotensin type 1 (AT1) receptors suggesting a direct linkage between mitochondrial gene expression, and brain/kidney AT1 receptors. This outcome aligns closely with our previous work that hypothalamic AT1 receptors are critical to neurogenic hypertension in rats raised on a high NaCl intake from weaning to adulthood (see 2000-2010). The latest publication (PLoS One, 2015, 10(8): e0136441. doi:10.1371/journal.pone.0136441), shows selective renal downregulation of 11 out of 13 mitochondrially expressed genes in the hypertensive compared to normotensive animals. **Current Research** is now moved exclusively to understanding translational, spontaneous hypertension in *Chlorocebus aethiops sabeus* or African Green Monkeys. This unique model of spontaneous hypertension exhibits altered structures, glomerulopathy, renal vascular wall thickening, myocardial hypertrophy and age related hypertension. Furthermore, we have reported preliminary findings for *C. aethiops* exhibiting spontaneous gestational hypertension, early onset preeclampsia, downregulation of renal medullary mitochondrial genes and expression of the genetic variants of the APOL1 genes known to precede early onset end stage renal disease in African American humans. This exciting new model of spontaneous hypertension in the nonhuman primate will undoubtedly yield new insights into the development of human essential hypertension and provide the biomedical scientific community with a novel and necessary translational model for the long-term study of cardiovascular and end-stage renal disease. Laboratory Research: Direct Cost Funding, AHA, \$96,000/yr; Biomedical Science Research Group, LLC, ~ \$350,000/yr.). Educational Research: A STEM teacher development program has been developed and implemented. The NOYCE Fellows program is providing school districts in Kentucky with outstanding 21st century science educators (NSF: \$748,6250)

- Rhoads, M.K., S. Goleva, W. Beierwaltes and **J.L. Osborn**. Renal vascular and glomerular pathologies associated with spontaneous hypertension in the non-human primate *Chlorocebus aethiops sabeus*. *Am J Physiol Regul Integr Comp Physiol*. 313(3): R211-218, 2017; doi: 10.1152/ajpregu.00026.2017. (Chosen by AJP editors for 2017 APS Select).
- Loria, A. and **J.L. Osborn**. Maternal separation diminishes alpha-adrenergic receptor density and function in renal vasculature from male Wistar Kyoto rats. *Am J Physiol Renal Physiol*. 313(1):F47-F54, 2017.; doi:10.1152/ajprenal.00591.2016.
- Collett, J.A., J.K. Paulose, V.M. Cassone and **J.L. Osborn**. Kidney-Specific Reduction of Oxidative Phosphorylation Genes Derived from Spontaneously Hypertensive Rat. *PLoS ONE* (2015), 10(8): e0136441. doi:10.1371/journal.pone.0136441.
- Collett, J.A., A. Hart, E. Patterson, J.K. Kretzer and J.L. Osborn. Renal Angiotensin II Type 1 receptor expression and associated systemic hypertension in rats with minimal SHR nuclear genome. *Physiological Reports* 1 (5) 2013: e00104, doi: 10.1002/phy2.104.

2000 – 2010: Anterior hypothalamic regions of the brain control renal nerve activity, the Na⁺ and water balance and the development of hypertension. Our research showed that immediately following birth and weaning, at 3 weeks of age, and after raising rats on a minimally high Na⁺ diet until adulthood, subpressor doses of brain angiotensin II infusion

caused hypertension. This hypertension required intact renal nerves. Thus, central neural structures were sensitized to angiotensin II such that very low doses of angiotensin II in the brain, in combination with the lifetime elevation of Na⁺ intake, elicit neurogenic hypertension dependent upon intact renal innervation. Thus, critical, central neural interactions are driven by lifetime levels of NaCl intake that sensitize hypothalamic structures devoid of a blood brain barrier to circulating angiotensin and thereby elicit antinatriuresis and hypertension via elevation of renal sympathetic nerve activity. (NIH/NHLBI \$877,096)

Educational Research Activities: I directed significant work that provides K-12 students and teachers with improved opportunities in science and mathematics. This included expanding middle and high school science teacher programs (Dorr Foundation, \$120,000), creating a high school based robotics and electronics program for inner city students in Hartford, CT (H.A. Vance Foundation, \$100,000), building teacher inquiry-based professional development programs in STEM for middle and high school students (Hartford Courant Foundation, Arthur Vining Davis Foundation, Toyota USA Foundation, CT State Department of Education, KY Department of Education, \$4,055,243; NSF, \$7,256,865).

1990 – 2000: Small and subtle changes in renal sympathetic nerve activity have significant impacts on renin secretion and renal tubular Na⁺ reabsorption even in the absence of changes in glomerular filtration or renal blood flow. Thus, low level renal sympathetic nerve activity, control of extracellular fluid volumes, and blood pressure was investigated. Intact renal innervation was responsible for impacting the rate of changes in urinary Na⁺ excretion following a step increase or decrease in sodium intake. Antinatriuresis was accompanied by a concomitant increase in renal sympathetic nerve activity. This finding is of particular clinical relevance since behaviorally human Na⁺ intake occurs with sudden changes following ingestion of a meal containing varying amounts of NaCl. These changes in neural control of Na⁺ related to blood pressure and hypertension were demonstrated in a seminal paper (*Hypertension* 28:1034-1040, 1996) in which very low doses of the renal adrenergic neurotransmitter, norepinephrine, were infused intrarenally for 28 consecutive days in conscious dogs resulting in the immediate and sustained elevation of blood pressure. Thus, our lab was the first to experimentally document that long term selective elevation of renal sympathetic neurotransmitter elicits hypertension (NIH/NHLBI \$2,297,533; AHA, \$236,310; Swedish Medical Research Council, \$24,000).

Educational Research Activities: I established the first medical school based K-12 and public science outreach center with public and private foundation funding. The MCW Center for Science Education began a nationwide initiative for medical schools reaching out to K-12 students and teachers in a plethora of ways that best fit their region and demographics. The MCW Center for Science Education functioned during both the academic year and the summer months with STEM-based outreach programs directed at students and teachers throughout the Milwaukee and greater southeastern Wisconsin regions (GE Medical Foundation, Milwaukee Public Schools, \$352,865).

1981-1990: Research activities focused upon 2 major contributions to understanding the neural control of renal function: 1) low frequencies of renal nerve stimulation (0.5 – 2.0 Hz) selectively mediate renin secretion from the kidney (lowest frequencies) in the absence of changes in tubular sodium reabsorption and renal vasoconstriction; slightly

higher frequencies increase renin secretion and tubular sodium reabsorption by activation of a Na⁺-H⁺ antiporter in tubular segments and high frequencies increase renin secretion, tubular sodium reabsorption and renal vasoconstriction; 2) pharmacological identification of α_1 -adrenergic receptor control of renal tubular and vascular function, and that β_1 receptors mediate renin secretion. While each of these responses may occur independently of one another, interactions among these two systems are responsible for enhancing the functional changes in renin secretion, tubular Na⁺ reabsorption, and vascular resistance.

Funding: American Heart Association (\$413,819); Medical College of Wisconsin (\$8,800); National Heart, Lung and Blood Institute (\$2,180,850).

Educational Research: During this decade, I launched the first medical school based summer teacher fellowship program over a 4 year period (\$111,000, Faye McBeath Foundation).

XIII. Physical Facilities

- A. **Office:** 115 Thomas Hunt Morgan, University of Kentucky (225 ft²)
- B. **Laboratories:** Renal Hypertension Lab: Room 205 Medical Research Building 3 (600 ft²), 302 Thomas Hunt Morgan Building (1250 sq. ft); Bioscience/STEM Education: Room 201 (750 ft²), 115B/C (250 ft²) T.H. Morgan Building.

XIV. Sabbaticals Hosted

Mahendr Kochar, M.D. (1990)
Theodore Kotchen, M.D. (1988)

XV. Dissertation and Thesis Committees/Postdoctoral Fellows

- A. **Masters Theses Directed**
 - Samuel P. Carmichael, II, M.D. (Biology) 2008
 - Joel N. Swerdel (Physiology) 1985
- B. **Dissertations Directed**
 - Current*
 - Chelsea Weaver (Biology) 2015-Present
 - Past*
 - Megan K. Rhoads, Ph.D. (Biology) 2018
 - Brandon M. Franklin, Ph.D. (Biology) 2017
 - Jason A. Collett, Ph.D. (Biology) 2014
 - Timothy Bradshaw (Biology) 2012
 - Craig F. Plato (Physiology) 1997
 - Amadou K.S. Camara (Physiology) 1995
 - Lawrence D. Nelson (Physiology) 1992
 - Suzanne G. Greenberg (Physiology) 1990
- C. **Dissertation Committees**
 - Julia Howell (Biology – UK) 2017 - Present
 - Clifford Harpole (Biology – UK) 2011- Present
 - Sydney Crawley (Entomology-UK) 2016
 - Justin LeVaughan (Science Education – UK) 2016
 - Knutson, Nicole (Educational Policy & Evaluation – UK) 2011
 - Cunningham, Jessica (Educational Policy & Evaluation-UK) 2009
 - Crowe, Cheryl (Curriculum & Instruction-UK) 2008
 - Slone, Katrina (Curriculum & Instruction-UK) 2007
 - Runze Wu (Biomedical Engineering-UK) 2005

- David Weber (Physiology-MCW) 1998
 Heather Drummond (Physiology-MCW) 1995
 Sharon Lu (Physiology-MCW) 1993
 David Mattson (Physiology-MCW) 1989
 Verne E. Cowles (Physiology-MCW) 1989
 Jose Eduardo Krieger (Physiology-MCW) 1988
 Zeljko Dujic (Physiology-MCW) 1986
 David C. Merrill (Physiology-MCW) 1984
 Michael J. Burke (Physiology-MCW) 1984
 Leonard B. Bell (Physiology-MCW) 1984
 Lawrence G. Pan (Physiology-MCW) 1983
- D. M.D. Honors in Research Theses Directed**
 Daniel P. O'Hair, M.D. (1988) Medical College of Wisconsin
 Denise D. Kinstetter, M.D. (1988) Medical College of Wisconsin
 Mark T. Lawton, M.D. (1987) Medical College of Wisconsin
 Russell W. Harland, M.D. (1987) Medical College of Wisconsin
- E. Postdoctoral Fellows**
 David P. Basile, Ph.D. 1997-1999
 Xiao Feng Li, M.D., Ph.D. 1996-1997
 Craig F. Plato, Ph.D. 1997
 Gary Bachowski, M.D., Ph.D. 1996
 Wei Hua Wang, M.D. 1993-1995
 Xiao Rui He, M.D., Ph.D. 1993-1996
- G. Undergraduate Research Fellows: University of Kentucky**
 Sushovan Dixit 2017-Present
 Lucas Barrett 2017-Present
 Emma Bateman 2017-Present
 Efe Disi 2016-2018 (NIDDK Minority Research Fellow '16)
 Joseph Caldwell 2016-2017 (Gertrude & Flora Ribble Fellow '16-'17)
 Anthony Gutierrez 2015-2016 (Am. Physiol. Soc. IOSP Research Fellow '15)
 Alex Gutierrez 2015-2016 (Am. Physiol. Soc. STRIDE Research Fellow '15)
 Slavina Goleva 2013-2016 (Am. Physiol. Soc. Research Fellow '14 & '15)
 Rachael Guess 2014-2016 (NASA Minority Research Fellow)
 Michael Cunningham 2014-2016
 Caroline Munhoz 2014-2015
 Alyssa Moore 2014-2015
 Anna Swigert 2013-2015
 Chelsea Lawson 2013-2015
 Alexandra Guest 2013 (Summer REU Intern)
 Mitchell Mefford 2013-2015
 Eleni Maroudas 2011-2013
 Caitlyn Morrissey 2012 (Summer REU Intern)
 Alex J. Morris 2011-2012
 Richard S. Bradford 2010-2013
 Aimee Thompson 2010-2012
 Katherine Carter 2011-2012
 Raven Price 2009-2012
 Brandon Franklin 2009-2011
 Adesuwa Ighodaro 2009-2012 (Am. Physiol. Soc. Research Fellow '11-'12)
 Gregory Todd 2008-2011
 Kody Carpenter 2008-2010
 Lauren Ison 2008-2009

Immaculate Foy	2008-2010 (Am. Physiol. Soc. Research Fellow '09-'10)
Gregory Blandford	2008-2010
Michael Spitnale	2008-2010
Eric Kreps	2008-2010
Justin Eichenger	2007-2009
Michelle O'Brien	2007-2009
Rebecca Crutcher	2007-2009
Elaine Patterson	2006-2009
Julie Kretzer	2006-2009 (Am. Physiol. Soc. Research Fellow '08-'09)
Jason Collett	2005-2006
Erin Wyatt	2005-2006 (Am. Physiol. Soc. Research Fellow '05-'06)
Aaron White	2006-2007
Kristen Blaker	2006-2007
Natalie Hess	2006-2007
Elias Salloum	2005-2007
Aaron D. Fain	2005-2007 (Am. Physiol. Soc. Research Fellow '05-'06)
H. Pre-College Research Fellows (Selected)	
Alexandra Sunnenberg	2012 (Gatton Academy of Math and Science)
Jiyang Zhang	2008-2010 (Paul Laurence Dunbar HS – MSTC Program)
Leslie Davis	2007-2009 (Paul Laurence Dunbar HS – MSTC Program)
Hersh Patel	2006-2007 (Paul Laurence Dunbar HS – MSTC Program)

XVII. Bibliography

A. Books, Chapters and Invited Reviews

Bradshaw, T., Carmichael S., Collett, J., Ferrier, A. and **J. L. Osborn**. Using vernier in *Tested Studies for Laboratory Teaching*, Volume 29 (K.L. Clase, Editor); pp 188-204., Proceedings of the 29th Workshop/Conference of the Association for Biology Laboratory Education (ABLE), 2008.

Osborn, J.L and S.G. Greenberg. “Renal Nerves and Extracellular Fluid Volume Regulation. *Hypertension Primer* 3rd ed.; J. L. Izzo, Jr. And H.R. Black, editors; pages 108-111, 2003.

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C. Selected Abstracts (* presented; Last 10 years)

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Emma Bateman, Chelsea C. Weaver, Jeffrey L. Osborn. “Infant Birth Weight and Postpartum Hypertension in African Green Monkeys.” Experimental Biology, San Diego, CA April 2018.

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Megan K Rhoads, Chelsea C Weaver and Jeffrey L Osborn. “Sex and Hypertension in the African Green Monkey, a Translational Model of Human Cardiovascular Disease.” Experimental Biology, Chicago, IL April 2017

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