**CURRICULUM VITAE**
(January 2021)

RUTH BACKUS CALDWELL
Professor
Vascular Biology Center, Room CB3209A
Medical College of Georgia
Augusta University
1459 Laney Walker Boulevard
Augusta, Georgia 30912
Phone: (706) 721-6145 (Office)

**PERSONAL**

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| Home Address: | 2125 Gardner Street, Augusta, GA 30904 |
| Home Telephone: | (706) 738-0211 |
| Citizenship: | USA |

**EDUCATION**

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|---|---|---|
| B.A. | 1960 - 1964 | Mathematics, Agnes Scott College, Atlanta, GA |
| M.S. | 1973 - 1976 | Biopsychology, Memphis State University, Memphis, TN |
| Ph.D. | 1977 - 1979 | Biopsychology, Memphis State University, Memphis, TN |
| Post-doc. | 1979 - 1980 | Department of Anatomy and Neurobiology, University of Tennessee Center for the Health Sciences, Memphis, TN |

**PROFESSIONAL**

Academic Appointments

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| 1980 - 1984 | Instructor, Department of Anatomy, University of Tennessee Center for the Health Sciences, Memphis, TN |
| 1985 - 1988 | Assistant Professor, Department of Anatomy and Neurobiology, University of Tennessee, Memphis, The Health Science Center |
| 1986 - 1988 | Adjunct Assistant Professor, Department of Psychology, Memphis State University |
| 1988 - 1994 | Associate Professor, Department of Cellular Biology and Anatomy, Medical College of Georgia, Augusta, GA |
| 1992 - 1994 | Adjunct Associate Professor, Professor Department of Ophthalmology, Medical College of Georgia, Augusta, GA |
| 1994 - present | Professor, Department of Cellular Biology and Anatomy Department of Ophthalmology, Vascular Biology Center, Medical College of Georgia, Augusta University, Augusta, GA |
| 2005 – present | Senior Scientist, VA Medical Center, Research & Academic Affiliations, Augusta GA |

National Committees

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|---|---|
| 1989 - 1994 | National Eye Institute, Visual Sciences Review Group C, |
| 1993 – 1994 | National Eye Institute, Visual Sciences Review Group C, Chair |
| 1999 - 2003 | National Institute of Health, NCRR-RCMI Review Group |

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| 1999 | National Institute of Health, Metabolism Special Emphasis Panel |
| 2000 | The Juvenile Diabetes Foundation, Site Visit Review Group |
| 2000-2003 | American Heart Association, Southern Research Consortium Review Group |
| 2000-2004 | Fight for Sight Review Group |
| 2001 | American Heart Association, National Review, Vascular Wall Biology 2 |
| 2001-2004 | Juvenile Diabetes Research Foundation, Scientific Review Committee |
| 2004-2008 | VA Merit Review Subcommittee for Neurobiology C |
| 2009 | Juvenile Diabetes Research Foundation, Site Visit Review Group |
| 2012-2016 | National Eye Institute, Diseases and Pathophysiology of the Visual System Study Section |
| 1999-present | Ad hoc reviewer National Eye Institute |
| 2008-Present | American Heart Association, Vascular Endothelial Biology 1 |
| 2018-Present | VA Eligibility Review Committee |
| 2018-Present | VA Research Career Scientist Review Committee |
| 2018-Present | VA Promotions Review Committee |

Journal Review

American Journal of Physiology, American Journal of Pathology, Journal of Biological Chemistry, Oncogene, Circulation Research, Current Eye Research, Experimental Eye Research, General Pharmacology, Investigative Ophthmology and Visual Science, Journal of Histochemistry and Cytochemistry, Journal of Cell Science, Diabetes, Diabetes and Metabolism/Research Reviews, Diabetelogia, Journal of Clinical Investigation,

Editorial Board

Guest Editor for Investigative Ophthalmology and Visual Science
Editorial board member for The Open Ophthalmology Journal
Editorial board member for Cells
Guest Editor for Journal of Clinical Medicine, Diabetic Retinopathy: Biomolecules and Pathophysiology

**RESEARCH AND TRAINING GRANTS AWARDED**

**ACTIVE**

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| 2020-2025 | Veterans Administration Research Career Scientist Award<br>VA Research Career Scientist<br>PI<br>VA salary support |
| 2013-2022 | National Institutes of Health NEI R01 EY01176-17<br>"Cellular Mechanisms of Retinopathy: Role of Arginase"<br>Contact PI (Multi-PI)<br>Annual Direct Costs: $250,000 |
| 2019 –2024 | National Institutes of Health NEI R01 1R01EY029318<br>"Inflammation and Retinopathy of Prematurity"<br>Co-Investigator<br>Annual Direct Costs: $288,976 |
| 2016-2021 | National Institutes of Health NEI R01 EY026936<br>Targeting Interleukin-6 Trans-signaling in Diabetic Retinopathy<br>Co-Investigator<br>Annual Direct Costs: $250,000 |
| 2019-2024 | National Institutes of Health NEI R01 EY030500<br>"Myeloid glycolysis in pathological ocular angiogenesis |

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| | Contact PI (Multi-PI)<br>Annual Direct Costs: $294,000 |
| 2019-2024 | National Institutes of Health NEI K99 EY029373-01<br>**"**Role of Arginase 1 in Retinal Ischemia-reperfusion Injury<br>Sponsor for A. Fouda<br>Total Direct Costs: $967,524 |

**LAST 5 YEARS**

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| 2018-2020 | National Institutes of Health 1R43EY028779<br>Sub-contract Collaborator<br>Annual Direct Costs: $80,000 |
| 2015-2019 | Veterans Administration Merit Review Award 1I01BX003221-01<br>"Mechanisms of Traumatic Retinal Injury: Targeting the Arginase Pathway"<br>PI<br>Annual Direct Costs: $220,493 |
| 2018-2020 | American Heart Association<br>Role of arginase 1 in retinal ischemia-reperfusion injury<br>Sponsor for A. Fouda<br>Annual Direct Costs: $61,140 (Returned 2019) |
| 2015-2020 | Veterans Administration Research Career Scientist Award<br>VA Research Career Scientist<br>PI<br>VA salary support |
| 2014-2018 | National Institutes of Health NEI R01EY022704<br>Molecular Basis of Inflammation in Retina, and Novel Strategies for Limiting It<br>Co-Investigator<br>Annual Direct Costs: $282,627 |
| 2015-2017 | American Heart Association<br>Pre-Doctoral Fellowship Award for Esraa Shosha<br>"Mechanisms of Vasoprotection in Retinal Ischemia Reperfusion Injury: Role of Arginase"<br>Sponsor |
| 2011-2015 | Veterans Administration Merit Review Award 5I01BX001233<br>"Mechanisms of Diabetic Retinopathy: Oxidative Stress and Inflammation"<br>PI<br>Annual Direct Costs: $220,493 |

**AWARDS/HONORS:**

Excellence in Research Award (Faculty Advisor) for Graduate Student Research, 1991
Excellence in Research Award (Faculty Advisor) for Graduate Student Research, 1992
Excellence in Research Award (Faculty Advisor) for Graduate Student Research, 1993
National Eye Institute Visual Sciences Review Group Chairman, 1993-1994
School of Graduate Studies Distinguished Teaching Award, 1997
Fight For Sight Reviewer Appreciation Award, 2003
Mary Jane Kugel Award , JDRF, International, 2004
School of Graduate Studies Distinguished Research Award, 2006
Certificate of Appreciation, Sun-Yat Sen University, Guangzhou, China, 2006
Excellence in Research Award (Faculty Advisor) for Graduate Student Research, 2009
Excellence in Research Award (Faculty Advisor) for Graduate Student Research, 2012
ARVO Fellow, 2009-present

VA Career Scientist, 2009-present
Keynote Speaker: VA Research Week, 2015
Lifetime Achievement Award, Augusta University 2019
Keynote Speaker: VA Research Week, 2020

**TEACHING:**
The University of Tennessee, Memphis
Medical Neuroanatomy 1980-1984
Dental Neuroanatomy 1986
Dental Gross Anatomy of the Head and Neck 1984-1986
Medical Histology 1986-1988
Graduate Cell Biology 1980

The Medical College of Georgia
Department of Cellular Biology & Anatomy
Special Topics in Anatomy 1991
Graduate Cell Biology 1991 - 1996
Medical Gross Anatomy 1988 - 1991
Medical Neuroscience 1992 - 1997
Medical Cellular and Developmental Biology 1998 - 2001
Retinal Cell Biology 1995, 2000
SEEP Neuroscience 1998, 1999
Introduction to Research 1998-2016
Molecular Medicine 2004-2016

**SCIENTIFIC AND PROFESSIONAL SOCIETIES**
Association for Research in Vision and Ophthalmology, American Heart Association, International Society for Eye Research, North American Vascular Biology Organization, ASPET

**INVITED LECTURESHIPS, VISITING PROFESSORSHIPS, ETC.**
Sixth International Congress for Research in Vision and Ophthalmology, Alicante Spain, "Retinal Pigment Epithelial Cell Junctions in Diabetes", August, 1984.
International Symposium on Retinal Degenerations, San Francisco, CA, "RPE-associated extracellular matrix changes accompany retinal vascular proliferation and retino-vitreal membranes in a new model for proliferative retinopathy: the dystrophic rat", September, 1988.
Kentucky Lions Eye Center, University of Louisville, Louisville, KY, "Cell Biology of Proliferative Retinopathy", February, 1990.
Bowman Gray School of Medicine of Wake Forest University, Winston-Salem NC, "Cellular Studies of the Blood-Retinal Barrier", May, 1992.
Department of Anatomy, School of Medicine, Mansoura University, Mansoura, Egypt, "Cellular Biology of Vasculogenesis", October, 1992.
X International Congress for Eye Research, Stresa, Italy, "Do Astrocytes Induce Retinal Vasculogenesis?" October, 1992.
Departments of Anatomy and Ophthalmology, University of Louisville, Louisville, KY, "Astrocyte Modulation of Retinal Vasculogenesis", April, 1993.
Department of Anatomy, Texas College of Osteopathic Medicine, Fort Worth TX, "Astrocyte Modulate Endothelial Cell Differentiation and Fibronectin Expression", November, 1993.
XI International Congress for Eye Research, New Dehli, India,“Effects of Astrocyte-derived Factors on Angiogenesis in vitro”, November, 1994.

XI International Congress for Eye Research, New Dehli, India, "Effects of Retina-derived Factors on RPE Cell Tight Junction Breakdown in vitro", November, 1994.
International Congress for Microcirculation Research, Munich, Germany, "Glial and Neuroepithelial Cells Release Multiple Vasoactive Factors", November, 1996.
XIII International Congress of Pharmacology, Munich, Germany, "VEGF Induces NO-Dependent Hyperpermeabilty and Nuclear Translocation of Flk-1, eNOS and Caveolin-1", July, 1998.
University of South Carolina, Columbia, SC, "Endothelial Cell Signaling Mechanisms in Retinal Angiogenesis", January, 2000.
Eye Research Institute, Oakland University, Rochester MI, "Endothelial Cell Signaling Mechanisms in Retinal Angiogenesis", March, 2000.
CIBA Vision, Atlanta, GA, "VEGF Intracellular Signaling, Role of eNOS, Caveolae and STAT Proteins", September, 2000.
Morehouse University School of Medicine, "VEGF Signaling—Mechanisms of Vascular Permeability Increase", February, 2001.
7th World Congress for Microcirculation, "VEGF Increases Retinal Endothelial Cell Permeability by Increasing uPAR Expression", August, 2001.
Symposium on Mecanisms of Vision Impairment in Diabetic Retinopathy, Penn State Milton S. Hershey Medical Center, "Oxidative Stress in Diabetic Retinopathy", May, 2003.
Rich Lecture Series, Department of Ophthalmology, University of Alabama at Birmingham, "Oxidative Stress in Ischemic Retinopathy", February, 2004.
International Congress for Eye Research, Sydney, Australia, "'Molecular basis of blood-retinal barrier breakdown in pathological conditions", August, 2004
Symposium on Retinal and Choroidal Angiogenesis, Vanderbilt University, Nashville, TN, "Cellular and Molecular Basis of Retinal Angiogenesis—What have we learned from i*n vitro* models?" October, 2004.
Pennsylvania State University, "Redox Regulation of VEGF Expression and Function", March 2006.
New York Medical College, Valhalla, NY, "Molecular Mechanisms of Retinopathy, Role of Oxidative Stress in Vascular Inflammation and Permeability", March, 2007
VA Medical Center, Augusta, GA, "Role of VEGF in Retinopathy", February, 2007
Oral Biology, School of Dentistry, Medical College of Georgia, Augusta, GA, "Mechanisms of Retinopathy-- NADPH Oxidase and Reactive Oxygen Species", March, 2009
Vision Discovery Institute, Augusta, GA, "Regulation of Retinal Angiogenesis: How can we promote normal revascularization while inhibiting vitreous neovascularization?", March 2009
Hamilton Eye Institute, Memphis, TN, "Mechanisms of Retinopathy: The Emerging Role of Arginase", October, 2009
9th International Symposium on Ocular Pharmacology and Experimental Therapeutics, Rome, Italy, "Role of Arginase Activity in Acute Retinal Inflammation", December, 2009
10th International Symposium on Ocular Pharmacology and Experimental Therapeutics, Macao, China, "Role of IL-6 in Retinal Neovascularization", December 2010.
Lasker/IRRF Initiative for Innovation in Vision Science-Diabetic Retinopathy, Part 1, Woods Hole, MA, "Nitric Oxide/Arginase Pathway in diabetic Retinopathy", August, 2011.
ISOPT Meeting, Vienna Austria, Lasker/IRRF Initiative for Innovation in Vision Science-Diabetic Retinopathy, Part 2, Janelia Farms, VA, March 2012
ARVO Course on Diabetic Retinopathy, "Novel Therapeutic Targets for Diabetic Retinopathy:NADPH Oxidase", May 2012
Texas A & M University, Temple TX, "Vascular Injury and Repair in Retinopathy: Targeting the Arginase Pathway", July 2012
ICER Meeting, Berlin, Germany, "Hyperoxia Therapy Causes Regression of Vitreous Neovascularization by Down-regulating the VEGF/VEGFR2 Pathway", July 2012

University of Oklahoma, OK, "Novel Therapeutic Targets for Diabetic Retinopathy: NOX2 and Arginase", September, 2012
Case Western Reserve, Cleveland, OH, "Novel Therapeutic Targets for Retinopathy: NADPH oxidase and Arginase", October 2012
ISOPT Meeting, Paris France, Nitric Oxide/Arginase Pathway in Diabetic Retinopathy", March 2013,
Wilmer Eye Institute, Johns Hopkins School of Medicine, "Nitric oxide/Arginase Pathway in Ischemic Retinopathy", April 2013
ARVO Course on Diabetic Retinopathy, Seattle WA, "Oxidative Stress: Mediators and Mechanisms", May 2013
Faculty of Pharmacy, Mahidol University, Bangkok, Thailand, "Mechanisms of Retinal Neuro-vascular Injury: Role of the Arginase Pathway", October 2013
11th ISOPT Clinical Symposium, Rjkevek, Iceland, "Targeting the Arginase/Polyamine Pathway as a Novel Therapy", June 2014
VA Research Week, Augusta Georgia, "A Decade with the VA--Insights on Oxidative Stress and Blinding Eye Diseases", May 2015
VA Research Week, Columbia Missouri, "21st Century Translational Medicine: Path to Progress for Improving Veterans Health", May, 2016
International Congress of Eye Research, Tokyo, Japan, Insights on oxidative stress and blinding eye disease—A novel therapeutic target: the urea cycle enzyme arginase, September 2016
Department of Ophthalmology, Asahikawa Medical College, Asahikawa, Japan, Mechanisms of retinopathy, September 2016
International Society for Eye Research, Belfast, Northern Ireland, Mechanisms of diabetic retinopathy, September, 2018

**PUBLICATIONS IN REFERRED JOURNALS**

1. Caldwell RB, Mize RR: Superior colliculus neurons which project to the cat lateral posterior nucleus have varying morphologies, J Comp Neurol 1981, 203:53-66
2. Harrell JV, Caldwell RB, Mize RR: The superior colliculus neurons which project to the dorsal and ventral lateral geniculate nuclei in the cat, Exp Brain Res 1982, 46:234-242
3. Caldwell RB, Ward JP: Central visual field representation in striate-peristriate cortex as the functional unit of pattern discrimination in the bushbaby (Galago senegalensis), Brain Behav Evol 1982, 21:161-174
4. Caldwell RB, McLaughlin RJ, Boykins LG: Intramembrane changes in retinal pigment epithelial cell junctions of the dystrophic rat retina, Invest Ophthalmol Vis Sci 1982, 23:305-318
5. Caldwell RB, McLaughlin BJ: Permeability of retinal pigment epithelial cell junctions in the dystrophic rat retina, Exp Eye Res 1983, 36:415-427
6. McLaughlin BJ, Boykins LG, Caldwell RB: Lectin-ferritin binding on dystrophic and normal retinal pigment epithelial membranes, J Neurocytol 1984, 13:467-480
7. Caldwell RB, Wade LA, McLaughlin BJ: A quantitative study of intramembrane changes during cell junctional breakdown in the dystrophic rat retinal pigment epithelium, Exp Cell Res 1984, 150:104-117
8. Caldwell RB, McLaughlin BJ: Redistribution of Na-K-ATPase in the dystrophic rat retinal pigment epithelium, J Neurocytol 1984, 13:895-910
9. McLaughlin BJ, Caldwell RB, Sasaki Y, Wood TO: Freeze-fracture quantitative comparison of rabbit corneal epithelial and endothelial membranes, Curr Eye Res 1985, 4:951-961
10. Caldwell RB, Slapnick SM, McLaughlin BJ: Lanthanum and freeze-fracture studies of retinal pigment epithelial cell junctions in the streptozotocin diabetic rat, Curr Eye Res 1985, 4:215-227
11. Caldwell RB, McLaughlin BJ: Freeze-fracture study of filipin binding in photoreceptor outer

segments and pigment epithelium of dystrophic and normal retinas, J Comp Neurol 1985, 236:523-537
12. Caldwell RB, Slapnick SM, McLaughlin BJ: Decreased anionic sites in Bruch's membrane of spontaneous and drug-induced diabetes, Invest Ophthalmol Vis Sci 1986, 27:1691-1697
13. Caldwell RB, Slapnick SM, McLaughlin BJ: Quantitative freeze-fracture and filipin-binding study of retinal pigment epithelial-cell basal membranes in diabetic rats, Exp Eye Res 1987, 44:245-259
14. Caldwell RB: Filipin and digitonin studies of cell membrane changes during junction breakdown in the dystrophic rat retinal pigment epithelium, Curr Eye Res 1987, 6:515-526
15. Caldwell RB: Blood-retinal barrier changes in the retinal pigment epithelium of RCS rats with inherited retinal degeneration, Prog Clin Biol Res 1987, 247:333-347
16. Fitzgerald ME, Slapnick SM, Caldwell RB: Alterations in lectin binding accompany increased permeability in the dystrophic rat model for proliferative retinopathy, Prog Clin Biol Res 1989, 314:409-425
17. Fitzgerald ME, Caldwell RB: Lectin-ferritin binding on spontaneously diabetic and control rat retinal microvasculature, Curr Eye Res 1989, 8:271-283
18. Caldwell RB, Slapnick SM, Roque RS: RPE-associated extracellular matrix changes accompany retinal vascular proliferation and retino-vitreal membranes in a new model for proliferative retinopathy: the dystrophic rat, Prog Clin Biol Res 1989, 314:393-407
19. Caldwell RB, Slapnick SM: Increased cytochrome oxidase activity in the diabetic rat retinal pigment epithelium, Invest Ophthalmol Vis Sci 1989, 30:591-599
20. Caldwell RB, Roque RS, Solomon SW: Increased vascular density and vitreo-retinal membranes accompany vascularization of the pigment epithelium in the dystrophic rat retina, Curr Eye Res 1989, 8:923-937
21. Caldwell RB: Extracellular matrix alterations precede vascularization of the retinal pigment epithelium in dystrophic rats, Curr Eye Res 1989, 8:907-921
22. Roque RS, Caldwell RB: Muller cell changes precede vascularization of the pigment epithelium in the dystrophic rat retina, Glia 1990, 3:464-475
23. Fitzgerald ME, Caldwell RB: The retinal microvasculature of spontaneously diabetic BB rats: structure and luminal surface properties, Microvasc Res 1990, 39:15-27
24. Roque RS, Caldwell RB: Pigment epithelial cell changes precede vascular transformations in the dystrophic rat retina, Exp Eye Res 1991, 53:787-798
25. Chang CW, Roque RS, Defoe DM, Caldwell RB: An improved method for isolation and culture of pigment epithelial cells from rat retina, Curr Eye Res 1991, 10:1081-1086
26. Caldwell RB, Fitzgerald ME: The choriocapillaris in spontaneously diabetic rats, Microvasc Res 1991, 42:229-244
27. Yokoyama T, Liou GI, Caldwell RB, Overbeek PA: Photoreceptor-specific activity of the human interphotoreceptor retinoid-binding protein (IRBP) promoter in transgenic mice, Exp Eye Res 1992, 55:225-233
28. Roque RS, Caldwell RB, Behzadian MA: Cultured Muller cells have high levels of epidermal growth factor receptors, Invest Ophthalmol Vis Sci 1992, 33:2587-2595
29. Fitzgerald ME, Caldwell RB, Reiner A: Vasoactive intestinal polypeptide-containing nerve fibers are increased in abundance in the choroid of dystrophic RCS rats, Curr Eye Res 1992, 11:501-515
30. Caldwell RB, Slapnick SM: Freeze-fracture and lanthanum studies of the retinal microvasculature in diabetic rats, Invest Ophthalmol Vis Sci 1992, 33:1610-1619
31. Roque RS, Caldwell RB: Isolation and culture of retinal microglia, Curr Eye Res 1993, 12:285-290
32. Jiang B, Liou GI, Behzadian MA, Caldwell RB: Astrocytes modulate retinal vasculogenesis: effects on fibronectin expression, J Cell Sci 1994, 107 ( Pt 9):2499-2508
33. Jiang B, Bezhadian MA, Caldwell RB: Astrocytes modulate retinal vasculogenesis: effects on

endothelial cell differentiation, Glia 1995, 15:1-10
34. Behzadian MA, Wang XL, Jiang B, Caldwell RB: Angiostatic role of astrocytes: suppression of vascular endothelial cell growth by TGF-beta and other inhibitory factor(s), Glia 1995, 15:480-490
35. Roque RS, Imperial CJ, Caldwell RB: Microglial cells invade the outer retina as photoreceptors degenerate in Royal College of Surgeons rats, Invest Ophthalmol Vis Sci 1996, 37:196-203
36. Oldham CD, Li C, Feng J, Scott RO, Wang WZ, Moore AB, Girard PR, Huang J, Caldwell RB, Caldwell RW, May SW: Amidative peptide processing and vascular function, Am J Physiol 1997, 273:C1908-1914
37. Chang CW, Ye L, Defoe DM, Caldwell RB: Serum inhibits tight junction formation in cultured pigment epithelial cells, Invest Ophthalmol Vis Sci 1997, 38:1082-1093
38. Chang CW, Defoe DM, Caldwell RB: Retinal pigment epithelial cells from dystrophic rats form normal tight junctions in vitro, Invest Ophthalmol Vis Sci 1997, 38:188-195
39. Chang C, Wang X, Caldwell RB: Serum opens tight junctions and reduces ZO-1 protein in retinal epithelial cells, J Neurochem 1997, 69:859-867
40. Marrero MB, Venema VJ, He H, Caldwell RB, Venema RC: Inhibition by the JAK/STAT pathway of IFNgamma- and LPS-stimulated nitric oxide synthase induction in vascular smooth muscle cells, Biochem Biophys Res Commun 1998, 252:508-512
41. Brooks SE, Gu X, Kaufmann PM, Marcus DM, Caldwell RB: Modulation of VEGF production by pH and glucose in retinal Muller cells, Curr Eye Res 1998, 17:875-882
42. Behzadian MA, Wang XL, Al-Shabrawey M, Caldwell RB: Effects of hypoxia on glial cell expression of angiogenesis-regulating factors VEGF and TGF-beta, Glia 1998, 24:216-225
43. Marrero MB, Venema VJ, Ju H, He H, Liang H, Caldwell RB, Venema RC: Endothelial nitric oxide synthase interactions with G-protein-coupled receptors, Biochem J 1999, 343 Pt 2:335-340
44. Kaesemeyer WH, Caldwell RB, Huang J, Caldwell RW: Pravastatin sodium activates endothelial nitric oxide synthase independent of its cholesterol-lowering actions, J Am Coll Cardiol 1999, 33:234-241
45. He H, Venema VJ, Gu X, Venema RC, Marrero MB, Caldwell RB: Vascular endothelial growth factor signals endothelial cell production of nitric oxide and prostacyclin through flk-1/KDR activation of c-Src, J Biol Chem 1999, 274:25130-25135
46. Feng Y, Venema VJ, Venema RC, Tsai N, Caldwell RB: VEGF induces nuclear translocation of Flk-1/KDR, endothelial nitric oxide synthase, and caveolin-1 in vascular endothelial cells, Biochem Biophys Res Commun 1999, 256:192-197
47. Feng Y, Venema VJ, Venema RC, Tsai N, Behzadian MA, Caldwell RB: VEGF-induced permeability increase is mediated by caveolae, Invest Ophthalmol Vis Sci 1999, 40:157-167
48. Kaesemeyer WH, Ogonowski AA, Jin L, Caldwell RB, Caldwell RW: Endothelial nitric oxide synthase is a site of superoxide synthesis in endothelial cells treated with glyceryl trinitrate, Br J Pharmacol 2000, 131:1019-1023
49. Ehrhart IC, Zou L, Theodorakis MJ, Parkerson JB, Gu X, Caldwell RB, Catravas JD: Effect of nitrite on endothelial function in isolated lung, Gen Pharmacol 2000, 34:401-408
50. Bartoli M, Gu X, Tsai NT, Venema RC, Brooks SE, Marrero MB, Caldwell RB: Vascular endothelial growth factor activates STAT proteins in aortic endothelial cells, J Biol Chem 2000, 275:33189-33192
51. Behzadian MA, Wang XL, Windsor LJ, Ghaly N, Caldwell RB: TGF-beta increases retinal endothelial cell permeability by increasing MMP-9: possible role of glial cells in endothelial barrier function, Invest Ophthalmol Vis Sci 2001, 42:853-859
52. Brooks SE, Gu X, Samuel S, Marcus DM, Bartoli M, Huang PL, Caldwell RB: Reduced severity of oxygen-induced retinopathy in eNOS-deficient mice, Invest Ophthalmol Vis Sci 2001, 42:222-228

53. Jin L, Abou-Mohamed G, Caldwell RB, Caldwell RW: Endothelial cell dysfunction in a model of oxidative stress, Med Sci Monit 2001, 7:585-591
54. Robinson GS, Ju M, Shih SC, Xu X, McMahon G, Caldwell RB, Smith LE: Nonvascular role for VEGF: VEGFR-1, 2 activity is critical for neural retinal development, Faseb J 2001, 15:1215-1217
55. Gu X, Samuel S, El-Shabrawey M, Caldwell RB, Bartoli M, Marcus DM, Brooks SE: Effects of sustained hyperoxia on revascularization in experimental retinopathy of prematurity, Invest Ophthalmol Vis Sci 2002, 43:496-502
56. Liou GI, Matragoon S, Samuel S, Behzadian MA, Tsai NT, Gu X, Roon P, Hunt DM, Hunt RC, Caldwell RB, Marcus DM: MAP kinase and beta-catenin signaling in HGF induced RPE migration, Mol Vis 2002, 8:483-493
57. Liou GI, Pakalnis VA, Matragoon S, Samuel S, Behzadian MA, Baker J, Khalil IE, Roon P, Caldwell RB, Hunt RC, Marcus DM: HGF regulation of RPE proliferation in an IL-1beta/retinal hole-induced rabbit model of PVR, Mol Vis 2002, 8:494-501
58. Al-Shabrawey M, El-Remessy A, Gu X, Brooks SS, Hamed MS, Huang P, Caldwell RB: Normal vascular development in mice deficient in endothelial NO synthase: possible role of neuronal NO synthase, Mol Vis 2003, 9:549-558
59. Bartoli M, Platt D, Lemtalsi T, Gu X, Brooks SE, Marrero MB, Caldwell RB: VEGF differentially activates STAT3 in microvascular endothelial cells, Faseb J 2003, 17:1562-1564
60. Behzadian MA, Windsor LJ, Ghaly N, Liou G, Tsai NT, Caldwell RB: VEGF-induced paracellular permeability in cultured endothelial cells involves urokinase and its receptor, Faseb J 2003, 17:752-754
61. Caldwell RB, Bartoli M, Behzadian MA, El-Remessy AE, Al-Shabrawey M, Platt DH, Caldwell RW: Vascular endothelial growth factor and diabetic retinopathy: pathophysiological mechanisms and treatment perspectives, Diabetes Metab Res Rev 2003, 19:442-455
62. El-Remessy AB, Abou-Mohamed G, Caldwell RW, Caldwell RB: High glucose-induced tyrosine nitration in endothelial cells: role of eNOS uncoupling and aldose reductase activation, Invest Ophthalmol Vis Sci 2003, 44:3135-3143
63. El-Remessy AB, Behzadian MA, Abou-Mohamed G, Franklin T, Caldwell RW, Caldwell RB: Experimental diabetes causes breakdown of the blood-retina barrier by a mechanism involving tyrosine nitration and increases in expression of vascular endothelial growth factor and urokinase plasminogen activator receptor, Am J Pathol 2003, 162:1995-2004
64. El-Remessy AB, Khalil IE, Matragoon S, Abou-Mohamed G, Tsai NJ, Roon P, Caldwell RB, Caldwell RW, Green K, Liou GI: Neuroprotective effect of (-)Delta9-tetrahydrocannabinol and cannabidiol in N-methyl-D-aspartate-induced retinal neurotoxicity: involvement of peroxynitrite, Am J Pathol 2003, 163:1997-2008
65. Gu X, El-Remessy AB, Brooks SE, Al-Shabrawey M, Tsai NT, Caldwell RB: Hyperoxia induces retinal vascular endothelial cell apoptosis through formation of peroxynitrite, Am J Physiol Cell Physiol 2003, 285:C546-554
66. Abou-Mohamed G, Johnson JA, Jin L, El-Remessy AB, Do K, Kaesemeyer WH, Caldwell RB, Caldwell RW: Roles of superoxide, peroxynitrite, and protein kinase C in the development of tolerance to nitroglycerin, J Pharmacol Exp Ther 2004, 308:289-299
67. Liou GI, Samuel S, Matragoon S, Goss KH, Santoro I, Groden J, Hunt RC, Wang F, Miller SS, Caldwell RB, Rustgi AK, Singh H, Marcus DM: Alternative splicing of the APC gene in the neural retina and retinal pigment epithelium, Mol Vis 2004, 10:383-391
68. Salis MB, Graiani G, Desortes E, Caldwell RB, Madeddu P, Emanueli C: Nerve growth factor supplementation reverses the impairment, induced by Type 1 diabetes, of hindlimb post-ischaemic recovery in mice, Diabetologia 2004, 47:1055-1063
69. Al-Shabrawey M, Bartoli M, El-Remessy AB, Platt DH, Matragoon S, Behzadian MA,

Caldwell RW, Caldwell RB: Inhibition of NAD(P)H oxidase activity blocks vascular endothelial growth factor overexpression and neovascularization during ischemic retinopathy, Am J Pathol 2005, 167:599-607

70. Caldwell RB, Bartoli M, Behzadian MA, El-Remessy AE, Al-Shabrawey M, Platt DH, Liou GI, Caldwell RW: Vascular endothelial growth factor and diabetic retinopathy: role of oxidative stress, Curr Drug Targets 2005, 6:511-524
71. Platt DH, Bartoli M, El-Remessy AB, Al-Shabrawey M, Lemtalsi T, Fulton D, Caldwell RB: Peroxynitrite increases VEGF expression in vascular endothelial cells via STAT3, Free Radic Biol Med 2005, 39:1353-1361
72. Tawfik A, Jin L, Banes-Berceli AK, Caldwell RB, Ogbi S, Shirley A, Barber D, Catravas JD, Stern DM, Fulton D, Caldwell RW, Marrero MB: Hyperglycemia and reactive oxygen species mediate apoptosis in aortic endothelial cells through Janus kinase 2, Vascul Pharmacol 2005, 43:320-326
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| 1993 - 1996 | C. W. Chang, M.D., Ph.D.<br>Current Position: Senior Scientist, CDC, Atlanta, GA |
| 1996 - 1998 | Mohamed Al-Shabrawey, M.D., Ph.D.<br>Current Position: Professor, Augusta University |
| 1996 – 2001 | Xaiolin Gu, M.D., Ph.D.<br>Current Position: Senior Scientist, Alcon Laboratories, Fort Worth, Texas |
| 2001 - 2004 | Dan Platt, Ph.D.<br>Current Position: Professor, Georgia Military Academy, Augusta, GA |
| 2004 – 2006 | Bala Ambati, M.D., Ph.D.<br>Current Position: Professor, University of Utah, Salt Lake City, UT |
| 2006 –2011 | Jinling Yang, Ph.D.,<br>Current Position: Research Scientist, Boston University, Boston, MA |
| 2010–2012 | Shawn Elms, Ph.D,<br>Current Position: Scientist, TEVA Pharmaceutics, Atlanta, GA |
| 2011–2013 | Kanjana Jittiporn, B.S., Ph.D.<br>Current Position: Assistant Professor, Naresuan University, Phitsanulok, Thailand |
| 2008 – 2014 | Jutamas Suwanpradid, B.S., Ph.D.<br>Current Position: Post-doctoral Fellow, Duke University |
| 2008 – 2014 | Chintan Patel, B.S., Ph.D. with distinction<br>Current Position: Investigator, RxGen, New Haven, CT |
| 2013 – 2017 | Esraa Shosha, B.S., Ph.D. with distinction<br>Current Position: Post-doctoral Fellow, Augusta University |