

Curriculum Vitae

NAME Paul R.S. Baker, Ph.D.

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EDUCATION AND TRAINING

B.A. (Chemistry), University of Colorado at Boulder, 1992
B.A. (English Literature), University of Colorado at Boulder, 1992
Ph.D. (Biochemistry), Wake Forest University, NC, 2002

Short Courses:

Interpretation of CID Mass Spectra, Oct. 13-14, 2003
Advanced Quantitation in Liquid Chromatography Mass Spectrometry, Nov 14-16, 2006

SCHOLASTIC AND PROFESSIONAL EXPERIENCE

1992-1993	<u>Professional Research Assistant</u> , School of Pharmacy, University of Colorado
1993-1996	<u>Secondary School Science Teacher</u> (Chemistry, Physics and Math), Rotuma High School, The Fijian Ministry of Education/Peace Corps of the US
2002-2003	<u>Research Associate</u> , Department of Urology, Wake Forest University
2003-2005	<u>Postdoctoral Fellow</u> , Department of Anesthesiology, University of Alabama at Birmingham
2006	<u>Research Instructor</u> , Department of Pharmacology and Chemical Biology, University of Pittsburgh School of Medicine
2006-2011	<u>Co-director</u> , Department of Pharmacology and Chemical Biology Mass Spectrometry facility, University of Pittsburgh School of Medicine
2006-2011	<u>Research Assistant Professor</u> , Department of Pharmacology and Chemical Biology, University of Pittsburgh School of Medicine

2011-2012	<u>Applications Specialist (NA), AB SCIEX</u>
2012-2016	<u>Senior Applications Specialist (NA) & Global Lead Scientist –Lipidomics, AB SCIEX</u>
2016-Present	<u>Senior Applications Manager (NA) & Global Lead Scientist –Lipidomics, SCIEX</u>

HONORS AND AWARDS

1991	<u>American Cancer Society Student Research Fellow</u>
1996-1997	<u>Graduate Fellowship, Wake Forest University Graduate School of Arts and Science</u>
1998-2001	<u>Graduate Fellowship, Signal Transduction Mechanisms and Cell Function Training Grant</u>
2001	<u>Travel Award, Cayman Chemical Company Support for Scientific Conferences</u>
2001	<u>Selected Speaker, 7th International Congress on Platelet-Activating Factor and Lipid Mediators, Tokyo, Japan</u>
2003	<u>Young Investigator Award, Society for Free Radical Biology and Medicine, Seattle, WA</u>
2003-2005	<u>NIH Student Loan Repayment Award</u>
2004	<u>UAB Travel Award, 2004 Gordon Research Conference on Oxygen Radicals in Biology, Ventura, CA</u>
2004-2006	<u>Ruth L. Kirschstein National Research Service Award</u>
2004	<u>Poster Presentation Award, 15th Annual UAB Vascular Biology and Hypertension Symposium, Sandestin, FL</u>
2004	<u>Young Investigator Award, Selected Speaker and UAB Travel Award, Society for Free Radical Biology and Medicine, St. Thomas, Virgin Islands</u>
2005	<u>Travel Award and Selected Speaker, Society for Free Radical Biology and Medicine, Austin, TX</u>
2006	<u>Invited Speaker, 2006 Gordon Research Conference on Oxygen Radicals in Biology, Ventura, CA</u>
2007	<u>Invited speaker, V Meeting of the Society for Free Radical Biology and Medicine, Montevideo, Uruguay.</u>
2013	<u>Outstanding Applications Science and Support Award; AB SCIEX</u>

PEER REVIEWED ARTICLES

1. Delong, CJ, Baker, PRS, Samuel, M, Wykle, RL, Cui, Z, and Thomas, MJ. Phospholipid subclass analysis of total cellular lipid extracts using electrospray tandem mass spectrometry: factors affecting quantitation. *J. Lipid. Res.* (2001) **42**:1959-1968.

2. Baker, PRS, Owen, JS, Nixon, AB, Thomas, LN, Wooten, R, Daniel, LW, O'Flaherty, JT and Wykle, RL. Regulation of platelet-activating factor synthesis in human neutrophils by MAP kinases. *Biochim. Biophys. ACTA* (2002) **1592**:175-184.
3. Schopfer, FJ, Baker, PRS and Freeman, BA. NO-dependent protein nitration: a cell signaling event or an oxidative inflammatory response? *TIBS* (2003) **28**:646-654.
4. Baker, PRS, Schopfer, FJ, Sweeney and Freeman, BA. From the cover: Red cell membrane and plasma linoleic acid nitration products: Synthesis, clinical identification and quantitation. *Proc. Natl. Acad. Sci. USA* (2004) **101(32)**:11577-11582*.
**Commentary: Nitrated lipids: a class of signaling molecules. Proc. Natl. Acad. Sci. USA (2004) 101(32):11527-11528.*
5. Baker, PRS, Cramer, SD, Kennedy, M, Assimos, DG and Holmes, RP. Glycolate and glyoxylate metabolism in Hep G2 cells. *Am. J. Physiol. Cell. Phys.* (2004) **287(5)**:C1359-1365.
6. Schopfer, FJ, Lin, Y, Baker, PRS, Cui, T, Garcia-Barrio, M, Zhang, J, Chen, K, Chen, Y and Freeman, BA. Nitrolinoleic acid—an endogenous PPAR γ ligand. *Proc. Natl. Acad. Sci. USA* (2005) **102(7)**:2340-2345.
7. Owen, JS, Baker, PRS, O'Flaherty, JT, Thomas, MJ Samuel, MP, Wooten, RE and Wykle, RL. Stress-induced platelet-activating factor synthesis in human neutrophils. *Biochim. Biophys. ACTA* (2005) **1733(2-3)**:120-129.
8. Schopfer, FJ, Baker, PRS, Giles, G, Chumley, P, Batthyany, C, Patel, RP, Hogg, N, Branchaud, BP, Lancaster, JR Jr and Freeman, BA. Fatty acid transduction of nitric oxide signaling: nitro-linoleic acid is a hydrophobically stabilized nitric oxide donor. *J. Biol. Chem.* (2005) **280(19)**:19289-19297.
9. Baker, PRS, Lin, Y, Schopfer, FJ, Woodcock, SR, Groeger, AL, Batthyany, C, Sweeney, S, Long, MH, Iles, KI, Baker, LMS, Branchaud, BP, Chen, YE and Freeman, BA. Fatty acid transduction of nitric oxide signaling: multiple nitrated unsaturated fatty acid derivatives exist in human blood and urine and serve as endogenous PPAR ligands. *J. Biol. Chem.* (2005) **280(51)**:42646-42475*.
**Designated by the Editors as "JBC Paper of the Week"*
10. Wright, M, Schopfer, FJ, Baker, PRS, Vidyasagar, V, Powell, P, Chumley, P, Isles, KI, Freeman, BA and Agarwal, A. Fatty acid transduction of nitric oxide signaling: Nitrolinoleic acid potently activates endothelial heme oxygenase-1 expression. *Proc. Natl. Acad. Sci. USA* (2006) **103(11)**:4299-4304.
11. Batthyany, C, Schopfer, FJ, Baker PRS, Duran, R, Baker LMS, Huang, Y., Cervenansky, C, Branchaud, BP and Freeman, BA. Reversible post-translational modification of proteins by nitrated fatty acids in vivo. *J. Biol. Chem.* (2006) **281(29)**:20450-20463.
12. Cui, T, Schopfer, FJ, Zhang, J, Chen, K, Ichikawa, T, Baker, PRS, Batthyany, C, Chacko, BK, Feng, X, Patel, RP, Agarwal, A, Freeman, BA and Chen, YE. Nitrated fatty acids: endogenous anti-inflammatory signaling mediators. *J. Biol. Chem.* (2006) **281(47)**:35686-35698*.

**Editor's Choice: Science STKE Immunology. Nitrated Fatty Acids as Signaling Molecules. Science STKE, (2006) 2006(363):401.*

13. Trostchansky, A, Souza, JM, Ferreira, A, Blanco, F, Trujillo, M, Castro, D, Cerecetto, H, Baker, PRS, O'Donnell, VB and Rubbo, H. Synthesis, isomer characterization and anti-inflammatory properties of nitroarachidonate. *Biochem.* (2007) **46(15)**:4645-53.
14. Maskrey, BH, Bermúdez-Fajardo, A, Morgan, A, Stewart-Jones, E, Dioszeghy, V, Taylor, GW, Baker, PRS, Coles, B, Coffey, MJ, Kühn, Hartmut, and O'Donnell, VB. Activated platelets and monocytes generate four hydroxyphosphatidylethanolamines via lipoxygenase. *J. Biol. Chem.* (2007) **282(28)**:20151-20163.
15. Baker, LMS, Baker, PRS, Golin-Bisello, F, Schopfer, FJ, Fink, M, Woodcock, SR, Branchaud, BP, Radi, R and Freeman, BA. Nitro-fatty acid reaction with glutathione and cysteine: kinetic analysis by a Michael addition reaction. *J. Biol. Chem.* (2007) **282(42)**:31085-31093.
16. Freeman, BA, Baker, PRS, Schopfer, FJ, Woodcock, SR, Napolitano, A and d'Ischia, M. Nitro-fatty acid formation and signaling. *J. Biol. Chem.* (2008) **283(23)**:15515-15519.
17. Ichikawa, T, Zhang, J, Chen, K, Liu, K, Schopfer, FJ, Baker, PRS, Freeman, BA, Chen, YE and Cui, T. Nitroalkenes suppress LPS-induced STAT signaling in macrophages: a critical role of MKP-1. *Endocrin.* (2008) **149(8)**:4086-4094.
18. Li, Y, Zhang, J, Schopfer, FJ, Martynowski, D, Garcia-Barro, MT, Kovach, A, Suino-Powell, K, Baker, PRS, Freeman, BA, Chen, YE and Xu, HE. Molecular recognition of nitrated fatty acids by PPAR γ . *Nat. Struct. Mol. Biol.* (2008) **15(8)**:865-867
19. Ferreira, AM, Ferrari, MI, Trostchansky, A, Batthyany, C, Souza, JM, Alvarez, MN, Lopez, GV, Baker, PRS, Schopfer, FJ, O'Donnell, V, Freeman, BA and Rubbo, H. Macrophage activation induces formation of the anti-inflammatory lipid cholesteryl-nitrooleate. *Biochem. J.* (2008) **417**:223-234
20. Nadtochiy, SM*, Baker, PRS*, Freeman, BA and Brookes, PS. Nitration of linoleic acid in mitochondria during ischemic preconditioning: cardioprotection via activation of mitochondrial H⁺ leak. *Cardiovasc. Res.* (2008) **82(2)**:333-340 *Co-first authors #

#News item in *US News & World Report* and a feature editorial in *Nature Medicine* (doi:10.1038/nm0209-132)
21. Rudolph V, Schopfer FJ, Khoo NK, Rudolph TK, Cole MP, Woodcock SR, Bonacci G, Groeger A, Golin-Bisello F, Chen CS, Baker PRS and Freeman BA. Nitro-fatty acid metabolome: Saturation, desaturation, beta -oxidation and protein adduction. *J. Biol. Chem.* (2008) **284(3)**:1461-1467
22. Iles, KE, Wright, MM, Cole, MP, Welty, NE, Ware, LB, Matthay, MA, Schopfer, FJ, Baker, PRS, Agarwal, A and Freeman, BA. Fatty acid transduction of nitric oxide signaling: nitrooleic acid mediates protective effects through regulation of the ERK pathway. *Free Rad. Bio. Med.* (2009) **46(8)**:866-875
23. Schopfer, FJ, Batthyany, C, Baker, PRS, Bonacci, G, Cole, MP, Rudolph, V, Groeger, A, Rudolf, TK, Nadtochiy, S, Brookes, PS and Freeman, BA. Detection and quantification of protein adduction by electrophilic fatty acids: mitochondrial generation of fatty acid nitroalkene derivatives. *Free. Rad. Bio. Med.* (2009) **46(9)**:1250-1259

24. Baker, PRS, Schopfer, FJ, O'Donnell, V and Freeman, BA. Convergence of Nitric Oxide and Lipid Signaling: Anti-Inflammatory Nitro-Fatty Acids. *Free. Rad. Bio. Med.* (2009) **46(8)**:989-1003
25. Rudolph V, Rudolph, T, Schopfer FJ, Bonacci, G, Woodcock SR, Cole, MP, Baker, PRS, Ramani, R and Freeman, BA. Endogenous generation and protective effects of nitro-fatty acids in a murine model of focal cardiac ischemia and reperfusion. *Cardiovasc. Res.* (2010) **85(1)**:155-166 Doi: 10.1093/cvr/cvp275.
26. Schopfer FJ, Cole MP, Groeger AL, Chen CS, Khoo NK, Woodcock SR, Golin-Bisello F, Motanya UN, Li Y, Zhang J, Garcia-Barrio MT, Rudolph TK, Rudolph V, Bonacci G, Baker PRS, Xu HE, Batthyany CI, Chen YE, Hallis TM and Freeman BA. Covalent peroxisome proliferator-activated receptor γ binding by nitro-fatty acids: Endogenous ligands act as selective modulators. *J. Biol. Chem.* (2010);**285(16)**:12321-33
27. Shores, DR, Binion, DG, Freeman, BA and Baker, PRS. New insights into the role of fatty acids in the pathogenesis and resolution of inflammatory bowel disease. *Inflamm. Bowel. Dis.* (2011) **17(10)**:2192-204. Doi: 10.1002/ibd.21560
28. Bonacci, G, Baker, PRS, Salvatore, SR, Shores D, Khoo, NK, Koenitzer, JR, Vitturi, DA, Woodcock, SR, Golin-Bisello, F, Cole, MP, Watkins, S, St Croix, C, Batthyany, CI, Freeman, BA and Schopfer FJ. Conjugated linoleic acid is a preferential substrate for fatty acid nitration. *J. Biol. Chem.* (2012) 287(53):44071-82. Doi: 10.1074/jbc.M112.401356.
29. Salvatore, SR, Vitturi, DA, Baker, PRS, Bonacci, G, Koenitzer, JR, Woodcock, SR, Freeman, BA and Schopfer, FJ. Characterization and quantification of endogenous fatty acid nitroalkene metabolites in human urine. *J. Lipid Res.* (2013) Jul;54(7):1998-2009. doi: 10.1194/jlr.M037804. Epub 2013 Apr 25.
30. Lintonen, TP, Baker, PRS, Suoniemi, M, Ubhi, BK, Koistinen, KM, Duchoslav, E, Campbell, JL and Ekroos, K. Differential mobility spectrometry-driven shotgun lipidomics. *Anal. Chem.* (2014) Oct 7;86(19):9662-9. doi: 10.1021/ac5021744. Epub 2014 Sep 8
31. Baker PRS, Armando AM, Campbell JL, Quehenberger O³, Dennis EA². Three-dimensional enhanced lipidomics analysis combining UPLC, differential ion mobility spectrometry, and mass spectrometric separation strategies. *J. Lipid Res.* (2014) Nov;55(11):2432-42. doi: 10.1194/jlr.D051581. Epub 2014 Sep 15
32. Liaw, L., Prudovsky, I., R.A. Koza, R.V. Anunciado-Koza, M.E. Siviski, Lindner, V, R.E. Friesel, C.J. Rosen, P.R.S. Baker, B. Simons, and C.P.H. Vary. Lipid profiling of in Vitro Cell Models of Adipogenic Differentiation: Relationships with Cell Models of Adipocyte Differentiation. *J Cell Biochem.* 2016 Sep;117(9):2182-93. doi: 10.1002/jcb.25522. Epub 2016 Mar 16
33. Baba, T., Campbell, J.L., Le Blanc, J.C.Y. and Baker P.R.S. In-depth Sphingomyelin Characterization using Electron Impact Excitation of Ions from Organics (EIEIO) and Mass Spectrometry. *J Lipid Res.* 2016 May;57(5):858-67. doi: 10.1194/jlr.M067199. Epub 2016 Mar 22
34. Baba, T. Campbell, J.L., LeBlanc, J.C.Y., and Baker, P.R.S. Structural Identification of Triacylglycerol Isomers Using Electron Impact Excitation of Ions from Organics (EIEIO). *J. Lipid Res.* 2016 Jul; doi: jlr.M070177

35. Baba T, Campbell JL, Le Blanc JCY, Baker PRS, Hager JW, and Thomson BA. Development of a Branched Radio Frequency Ion Trap for Electron Based Dissociation and Related Applications. *Mass Spectrom (Tokyo)*. 2017;6(1):A0058. doi:10.5702/massspectrometry.A0058. Epub 2017 Jun 15.
36. Baba T, Campbell JL, Le Blanc JCY, Baker PRS. Distinguishing Cis and Trans Isomers in Intact Complex lipids using Electron Impact Excitation of Ions from Organics (EIEIO) Mass Spectrometry. *Anal Chem*. 2017 Jun 14. doi: 10.1021/acs.analchem.6b04734. [Epub ahead of print]

GRANT SUPPORT

1. American Diabetes Association Junior Faculty Development Grant (7-06-JF-06). Principal Investigator; 50% effort. *Characterization of nitrated fatty acids as partial PPARgamma agonists*. 07/01/2006 to 06/30/2009; \$434,000

INSTITUTIONAL SERVICE

Graduate Student Association Representative for the Department of Biochemistry, Wake Forest University, 1996-2000

Judge for Graduate Student Research Day, University of Alabama at Birmingham, 2005

Research Faculty Development Committee, for the Department of Pharmacology, University of Pittsburgh School of Medicine, 2006-2010

TEACHING EXPERIENCE

Secondary School Science Teacher (Chemistry, Physics and Math), Rotuma High School, The Fijian Ministry of Education/Peace Corps of the US 1993-1996

Secondary School Science Teacher Trainer (Chemistry), Peace Corps of the US 1994

Medical Student Tutor, Department of Biochemistry, Wake Forest University, 1999-2002

Guest Lecturer for course entitled: "Biological Applications of Mass Spectrometry." Departamento de Bioquímica and Center for Free Radical and Biomedical Research, Facultad de Medicina, Universidad de la República, Montevideo, Uruguay. May 9-13, 2005

Senior Technical Trainer Responsible for development and lecture of proteomic course material, including Protein ID and Peptide Quantitation. 2011-2012