
Susan C. J. Sumner, PhD
Professor, Nutrition Research Institute
Department of Nutrition
University of North Carolina at Chapel Hill
Susan_sumner@unc.edu
704-250-5066

Education

Staff Fellow, Spectroscopy, National Institutes of Health, Bethesda, MD, 1986 to 1989.

Ph.D., Physical Chemistry, North Carolina State University, Raleigh, NC, 1986.

B.S., Chemistry (minor: Biology), North Carolina State University, Raleigh, NC, 1982.

Professional Experience

Dec 1, 2016 to Present. Professor, Department of Nutrition, University of North Carolina at Chapel Hill

Director, Untargeted Analysis Core for the Children's Health Exposure Analysis (CHEAR) Hub (2015 to date).

Director, Metabolomics Core for the Center for Human Health and Environmental at NCSU (2015 to date).

Director, NCATS funded Metabolomics Core for the N.C. Translational Sciences Institute at UNC-CH (2013 to 2016).

Director, NIH Common Fund Eastern Regional Comprehensive Metabolomics Research Center (2012 to date).

Adjunct Faculty, Brody School of Medicine, East Carolina University, Greenville, NC (2009 to date).

2004 to 2016. RTI International, Research Triangle Park (RTP), NC.

Director, Untargeted Analysis Core for the Children's Health Exposure Analysis (CHEAR) Hub (2015 to 2016).

Director, Metabolomics Core for the Center for Human Health and Environmental at NCSU (2015 to 2016).

Director, NCATS funded Metabolomics Core for the N.C. Translational Sciences Institute at UNC-CH (2013 to 2016).

Director, Systems and Translational Sciences (STS) Center (2013 to 09/2016).

Adjunct Professor, Department of Nutrition, University of North Carolina at Chapel Hill, (2012 to 2016).

SUSAN C.J. SUMNER

Director, NIH Common Fund Eastern Regional Comprehensive Metabolomics Research Center (2012 to 2016).

Adjunct Faculty, Brody School of Medicine, East Carolina University, Greenville, NC (2009 to date).

Senior Scientist 2, Center for Estimating Human Health Risks from Exposure to Nanoparticles (2009 to 2016).

2001 to 2004. Paradigm Genetics, Inc., RTP, NC.

Manager, Contracts Research (2003 to 2004).

Head, Biochemical Profiling (2002 to 2004).

Staff Scientist (2001 to 2002).

1989 to 2001. Chemical Industry Institute of Toxicology (CIIT), RTP, NC.

Scientist 3, Center for Integrated Genomics, Department of Chemical Carcinogenesis, and Manager, NMR Facility (1999 to 2001).

Scientist 2, Department of Cancer Research, and Manager, NMR Facility (1995 to 1999).

Scientist 1, Department of Biochemical Toxicology, and Manager, NMR Facility (1989 to 1995).

1987 to 1989. National Institutes of Health, Bethesda, MD.

Staff Fellow, Laboratory of Chemistry, NHLBI, NIH.

1979 to 1986. North Carolina State University, Raleigh, NC.

Graduate Student (Physical Chemistry, Specialty in Spectroscopy), Department of Chemistry (1982 to 1986).

Undergraduate Student, Grader and Teaching Assistant, and Researcher, Department of Chemistry (1979 to 1982).

Selected Continued Education

Three I's (IACUC, IBC and IRB) Conference- 2012

Institutional Animal Care and Use Committee (IACUC) Training, 2001 to date.

Leading Change, 2012.

Management Dimensions for Effective Leadership, 2011.

Human Subject Research Training, 2011.

Bloodborne Pathogen, Radioactivity, and Safety Training, 2011.

One-on-One Executive Coaching for Leadership, 2002 to 2004 and 2010.

American Red Cross Adult/Child/Infant First Aid, Cardiopulmonary Resuscitation (CPR), automated external defibrillator (AED), renewed 2010.

PBPK and PKPD Models, Hamner Institutes, 2010.
GLP for QA and GLP Study Directors CIIT, 1995–2002, and RTI, 2004 to 2008.
Leadership Advantage (external consultant), RTI, 2007.
Understanding Computerized System Validation, Info Strength, 2004.
Validation and Control of Bioanalytical Methods, 2000.
Harassment Training, Capitol Associated Industries, Inc., 1998.
The Supervisor and Positive Human Relations, Capitol Associated Industries, Inc., 1998.
Managing Multiple Projects, Objectives, & Deadlines, American Management Association (AMA), 1996.
Criticism/Discipline Skills for Managers, AMA, 1996.
Supervising the Difficult Employee, Capitol Associated Industries, Inc., 1994.
Applications of NMR Spectroscopy in Toxicology, Society of Toxicology (SOT), 1993.
The Newly Appointed Supervisor, Capitol Associated Industries, Inc., 1992.
Writing for Non-scientist Readers, ERG, Inc., 1992.
Effective Presentations, R.J. Kulda, Professional Eloquence, 1991.
Project Management, Applied Management Associates, 1990.
Assertiveness Training, AMA, 1990.

Honors and Awards

Recipient, RTI Awards: Career Author Award, Science and Engineering Performance Award, Outstanding Paper, Highly Cited Author, Highly Published Author, Annual Award for Collaborative Research, President's Award, and Best Paper Award, 2005 to 2016.
Recipient, Best Paper Award, (for Church, R.J., H. Wu, M. Mosedale, S.J. Sumner, W. Pathmasiri, L. Kurtz, et al. 2014. A systems biology approach utilizing a mouse diversity panel identifies genetic differences influencing isoniazid-induced microvesicular steatosis. *Toxicological Sciences* 140:481–492), 2014.
Recipient, Internal Research and Development (IR&D) Award: Influence of the Physiological State of Obesity on the Distribution of Nanoparticles, RTI, 2010.
Recipient, IR&D Award: Maternal and Child NanoHealth: Distribution of [¹⁴C]C60 in the Pregnant and Lactating Rat and Effects on Endogenous Metabolism, RTI, 2008.
Recipient, Professional Development Award: Biomarkers, RTI, 2007 to 2008.
Recipient, IR&D Award: Dietary Influences of Phytoestrogens During Pregnancy on Biochemical Mechanisms in Developing Offspring, RTI, 2007.
Recipient, IR&D Award: Dietary Influences of Phthalates During Pregnancy on the Biochemical Mechanisms of the Developing Offspring, RTI, 2006.

Memberships in Scholarly and Professional Organizations

Elected, Board of Directors, Metabolomics Society: 2016 to 2018.
Elected, Board of Directors, Metabolomics Society: 2014 to 2016.
Elected Chair, North Carolina Section of ACS (membership of approximately 2,600), 2002.
Member, North Carolina Biotechnology Center (NCBC) Genomics and Bioinformatics Consortium: 2000 to 2002.
Advisor, Acrylamide Monomer Producers Association: 1999 to 2002.

Advisor, Styrene Information and Research Center: 1997 to 2002.

Full Member, Society of Toxicology, Active: 1990 – 2014.

Member, American Chemical Society (ACS) and/or North Carolina Chapter of ACS: 1986 – date.

Bibliography

Book Chapters

1. **Sumner, S. C. J.**, Pathmasiri, W., Carlson, J. E., McRitchie, S. L., & Fennell, T. R. (2016). Metabolomics. Chapter 5 in *Molecular and Biochemical Toxicology (5th edition)*. Eds. R.C. Smart and E. Hodgson). J Wiley and Sons: NY, NY. Accepted and in press.
2. Stewart, D., Dhungana, S., Clark, R., Pathmasiri, W., McRitchie, S., & **Sumner, S.** (2015). Omics technologies used in systems biology. In R. C. Fry (Ed.), *Systems Biology in Toxicology and Environmental Health: From the Genome to the Epigenome (1st edition)*. (pp. 57-84). London, UK: Elsevier.
3. Pathmasiri, W., R.W. Snyder, J.P. Burgess, J.A. Popp, T.R. Fennell, and **S.C.J. Sumner** (2011). Biomarkers for the assessment of acetaminophen induced liver injury. (pp. 299–324) Chapter 3 in *General, Applied, and Systems Toxicology*. Edited by D. Casiano and S.C. Saru. John Wiley & Sons Ltd., Hoboken, NJ. January. DOI: 10.1002/9780470744307.gat219.
4. **Sumner, S.**, R. Snyder, J. Burgess, R. Tyl, and T. Fennell. (2010). Omics in reproductive and developmental toxicology. (pp 372-384) Chapter 22 in *Reproductive Toxicology*, Third Edition. Edited by R. Kapp and R. Tyl. September. New York, N.Y., Informa Healthcare.
5. Fennell, T.R., and **Sumner, S.C.J.** (2000). Labelling studies in biochemistry using NMR. In *Encyclopedia of Spectroscopy and Spectrometry*. Edited by J.C. Lindon, G.E. Tranter, and J.L. Holmes. (pp. 1097-1104). San Diego, CA: Academic Press.

Refereed Articles

1. Laine J., Bailey K., Olshan A., Smeester L., Drobná Z., Styblo M., García-Vargas G., Rubio-Andrade M., Pathmasiri W., McRitchie S., **Sumner S.**, Fry R. (2017). Prenatal Arsenic Exposure and the Fetal Metabolome; Inter-Individual Differences in Fetal Metabolomic Profiles Related to Maternal Arsenic Biotransformation. (*accepted*).
2. Saggi, S.J., Mercier, K., Gooding, J.R., Friedman, E., Vyas, U., Ranganathan, N., Ranganathan, P., McRitchie, S., **Sumner, S.** (2017). Metabolic profiling of a chronic kidney disease cohort reveals metabolic phenotype more likely to benefit from probiotic treatment. (*accepted*).
3. Szabo, D. T., Pathmasiri, W., **Sumner, S.**, & Birnbaum, L. S. (2016). Different serum metabolomics profiles in neonatal mice following oral brominated flame retardant exposures to hexabromocyclododecane (HBCD) alpha, gamma, and commercial mixture. *Environmental Health Perspectives*. Accepted March 2016, *in press*.
4. Livanos, AE., Greiner, T.U., Vangay, P., Pathmasiri, W., Stewart, D., McRitchie, S., Li, H., Chung, J., Sohn, J., Kim, S., Gao, Z., Barber, C., Kim, J., Ng, S., Rogers, A.B, **Sumner, S.**, Zhang, X-S., Cadwell, K., Knights, D., Alekseyenko, A., Bäckhed, F., and Blaser, M.J (2016).

- Antibiotic-mediated gut microbiome perturbation accelerates development of type 1 diabetes in mice. *Nature Microbiology*, 1, Article number:16140; doi:10.1038/nmicrobiol.2016.140.
5. Fennell T.R., Mortensen N.P., Levine K., Black S.L., Snyder R.W., Holland N.A., Poitras E., Harrington J., Pathmasiri W., Wingard C.J., **Sumner S. J.** (2016). Disposition of Intravenously or Orally Administered Silver Nanoparticles in Pregnant Dams and the Effect on the Biochemical Profile in Urine. *Journal of Applied Toxicology*. Oct 3.DOI: 10.1002/jat.3387. PMID 27696470.
 6. Ewald, R and **Sumner, S.J.** (2016). Blood Type Biochemistry and Human Disease *Wiley Interdisciplinary Reviews. Systems biology and medicine*. Nov;8(6):517-535. doi: 10.1002/wsbm.1355. Epub 2016 Sep 7.
 7. Dhungana, S., Carlson, J.E., Pathmasiri, W., McRitchie, S., Davis, M., **Sumner, S.** and Appt, Sue. (2016). Impact of Western Diet on the Ovarian and Serum Metabolome. *Journal of Maturitas*. Oct; 92:134-42. doi: 10.1016/j.maturitas.2016.07.008. Epub 2016 Jul 14. PMID: 27621251.
 8. Stewart, DA, Winnike, JH, McRitchie, SL, Clark, RF, Pathmasiri, WW, and **Sumner, SJ.** Metabolomics Analysis of Hormone-Responsive and Triple-Negative Breast Cancer Cell Responses to Paclitaxel Identify Key Metabolic Differences. (2016). *Journal of Proteome Research*, Sep 2;15(9):3225-40. PMID: 2744733.
 9. Dennis, K. K., Auerbach, S. S., Balshaw, D. M., Cui, Y., Fallin, M. D., Smith, M. T., Spira, A., **Sumner, S.**, and Miller, G. (2016). The importance of the biological impact of exposure to the concept of the exposome. *Environmental Health Perspectives*. 2016 Oct;124(10):1504-1510. DOI:10.1289/EHP140. PMID: 27258438.
 10. Mercier K., McRitchie S, Pathmasiri W., Novokhatny A., Koralkar R., Askenazi D., Brophy P.D., **Sumner, S.** (2016) Preterm Neonatal Urinary Renal Developmental and Acute Kidney Injury Metabolomic Profiling: An Exploratory Study. *Pediatric Nephrology*. PMID: 27435284, DOI: 10.1007/s00467-016-3439-9.
 11. Gelaye B, **Sumner S**, McRitchie S, Carlson JE, Ananth CV, Enquobahrie DA, Chunfang Q, Sorensen TK, Williams MA (2016). Maternal Early Pregnancy Serum Metabolomics Profile and Abnormal Vaginal Bleeding as Predictors of Placental Abruption: A Prospective Study. *PlosOne* 11(6):e0156755. doi:10.1371/journal.pone.0156755. PMID: 27300725.
 12. Mortensen NP, Mercier KA, McRitchie S, Cavallo T, Pathmasiri W, Stewart D, and **Sumner S** (2016). Microfluidics Meets Metabolomics to Reveal the Impact of *Campylobacter jejuni* Infection on Biochemical Pathways. *Biomedical Microdevices* 18(3):51. doi: 10.1007/s10544-016-0076-9. PMID: 27231016.
 13. Wang, W., Liang, S., Gao, J., Sun, C., Wang, J., Xia, W, **Sumner, S. J.**, Zhang, F., Sun, C., and Wu, L. (2016). Potential serum biomarkers from metabolomics study of autism potential serum biomarkers from metabolomics study of autism. *Journal of Psychiatry and Neuroscience*, 41(1), 27–37. PMID: 26395811, PMCID: PMC4688025.
 14. Sandlers, Y., Mercier, K., Pathmasiri, W., Carlson, J., McRitchie, S., **Sumner, S.**, and Vernon, H.J. (2016). Metabolomics reveals new mechanisms for pathogenesis in Barth syndrome and introduces novel roles for cardiolipin in cellular function. *PLoS ONE*, 11(3), e0151802. PMID: 27015085. DOI: 10.1371/journal.pone.0151802.

15. Loeser, L. R., Jr., Pathmasiri, W., **Sumner, S.**, McRitchie, S., Beavers, D., Saxena, P., Nicklas, B.J., Guermazi, A., Hunter, D.J., Messier, S.P. (2016) Association of urinary metabolites with radiographic progression of knee osteoarthritis in overweight and obese adults. *Osteoarthritis Cartilage*, Aug;24(8):1479-86. DOI: 10.1016/j.joca.2016.03.011. PMID: 27012755.
16. Harrington, J. M., Young, D. J., Fry, R. C., **Sumner, S. J.**, & Levine, K. E. (2016). Validation of a metallomics analysis of placenta tissue by inductively-coupled plasma mass spectrometry. *Biological Trace Element Research*, 169(2), 164–173.
17. Sumner, L. W., Styczynski, M., McLean, J., Fiehn, O., Jander, G., Liao, J., **Sumner, S.**, et al. (2015). Introducing the USA Plant, Algae, and Microbial Metabolomics Research Coordination Network (PAMM-NET). *Metabolomics*, 11(1), 3–5.
18. Holland, N. A., Becak, D. P., Shannahan, J. H., Brown, J. M., Carratt, S. A., Winkle, L., Pinkerton, K.E., Wang, C.M., Munusamy, P., Baer, D.R., **Sumner, S. J.**, Fennell, T.R., Lust, R.M., and Wingard, C.J. (2015). Cardiac ischemia reperfusion injury following instillation of 20 nm citrate-capped nanosilver. *Journal of Nanomedicine and Nanotechnology*, S6-006. doi:10.4172/2157-7439.S6-006. PMID: 26966636.
19. Sud, M., Fahy, E., Cotter, B., Azam, K., Vadivelu, I., Burant, C. F., Edison, A., Fiehn, O., Higashi, R., Nair, K. S., **Sumner, S.**, & Subramaniam, S. (2016). Metabolomics Workbench: An international repository for metabolomics data and metadata, metabolite standards, protocols, tutorials and training, and analysis tools. *Nucleic Acids Research*, 44(D1), D463–70.
20. Snyder, R. W., Fennell, T. R., Wingard, C. J., Mortensen, N. P., Holland, N. A., Shannahan, J. H., Pathmasiri, W., Lewin, A., and **Sumner, S. C.** (2015). Distribution and biomarker of carbon-14 labeled fullerene C60 ($[^{14}\text{C}(\text{U})\text{C}60$) in pregnant and lactating rats and their offspring after maternal intravenous exposure. *Journal of Applied Toxicology*, 35(12), 1438–1451. doi: 10.1002/jat.3177. PMID: 26081520.
21. Milner, J., Rebeles, J., Dhungana, S., Stewart, D. A., **Sumner, S. C.**, Meyers, M. H., Mancuso, P., and Beck, M.A. (2015). Obesity increases mortality and modulates the lung metabolome during pandemic H1N1 influenza virus infection in mice. *Journal of Immunology*, 194(10), 4846–4859. doi: 10.4049/jimmunol.1402295. Epub 2015 Apr 10.
22. **Sumner, S. C.**, Snyder, R. W., Wingard, C., Mortensen, N. P., Holland, N. A., Shannahan, J. H., et al. (2015). Distribution and biomarkers of carbon-14 labeled fullerene C60 ($[^{14}\text{C}(\text{U})\text{C}60$) in female rats and mice for up to 30 days after intravenous exposure. *Journal of Applied Toxicology*, 35(12), 1452–1464. doi: 10.1002/jat.3110. PMID: 25727383.
23. Pratt, K. J., McRitchie, S., Collier, D. N., Lutes, L. D., & **Sumner, S.** (2015). Parent & family influences on adopting healthy weight-related behaviors: Views and perceptions of obese African-American female adolescents. *Journal of the National Medical Association*, 107(2), 74–79.
24. Poitras, E. P., Levine, M. A., Harrington, J. M., Essader, A. S., Fennell, T. R., Snyder, R. W., ... **Sumner, S. J.**, et al. (2015). Development of an analytical method for assessment of silver nanoparticle content in biological matrices by inductively-coupled plasma mass spectrometry. *Biological Trace Element Research*, 163(1–2), 184–192.

25. Mazagova, M., Wang, L., Anfora, A. T., Wissmueller, M., Lesley, S. A., Miyamoto, Y., ... **Sumner, S.**, et al. (2015). Commensal microbiota is hepatoprotective and prevents liver fibrosis in mice. *The FASEB Journal: Official Publication of the Federation of American Societies for Experimental Biology*, 29(3), 1043–1055.
26. Vidanapathirana, A. K., Thompson, L. C., Odom, J. T., Holland, N. A., **Sumner, S. J.**, Fennell, T. R., et al. (2014). Vascular tissue contractility changes following late gestational exposure to multi-walled carbon nanotubes or their dispersing vehicle in Sprague Dawley rats. *Journal of Nanomedicine and Nanotechnology*, 5(3), 1–15.
27. Wingard, C. J., Holland, N. A., Thompson, L. C., Brown, J. M., Lewin, A. H., **Sumner, S. J.**, et al. (2014) The need for reflective consideration of an integrative understanding of cardiovascular consequences to PVP formulated C60 exposure. *Toxicological Sciences*, 141(2):327–328.
28. Vidanapathirana, A. K., Thompson, L. C., Mann, E. E., Odom, J. T., Holland, N. A., **Sumner, S. J.**, et al. (2014). PVP formulated fullerene (C60) increases Rho-kinase dependent vascular tissue contractility in pregnant Sprague Dawley rats. *Reproductive Toxicology*, 49C, 86–100.
29. Harrington, J. M., Young, D. J., Essader, A. S., **Sumner, S. J.**, & Levine, K. E. (2014). Analysis of human serum and whole blood for mineral content by ICP-MS and ICP-OES: Development of a mineralomics method. *Biological Trace Element Research*, 160(1), 132–142.
30. Church, R. J., Wu, H., Mosedale, M., **Sumner, S. J.**, Pathmasiri, W., Kurtz, C. L., et al. (2014). A systems biology approach utilizing a mouse diversity panel identifies genetic differences influencing isoniazid-induced microvesicular steatosis. *Toxicological Sciences*, 140(2), 481–492. (Awarded Best Paper of the Year).
31. Thompson, L. C., Urankar, R. N., Holland, N. A., Vidanapathirana, A. K., Pitzer, J. E., Han, L., **Sumner, S. J.**, et al. (2014). C60 exposure augments cardiac ischemia/reperfusion injury and coronary artery contraction in Sprague Dawley Rats. *Toxicological Sciences* 138(2), 365–378.
32. Vidanapathirana, A. K., Lai, X., Hilderbrand, S. C., Pitzer, J. E., Podila, R., **Sumner, S. J.**, et al. (2012). Multi-walled carbon nanotube directed gene and protein expression in cultured human aortic endothelial cells is influenced by suspension medium. *Toxicology*, 302(2–3), 114–122.
33. Banerjee, R., Pathmasiri, W. W., Snyder, R., McRitchie, S., & **Sumner, S.** (2012). Metabolomics of brain and reproductive organs: Characterizing the impact of gestational exposure to butylbenzyl phthalate on dams and resultant offspring. *Metabolomics*, 8(6), 1012–1025.
34. Pathmasiri, W. W., Pratt, K. J., Collier, D. N., Lutes, L. D., McRitchie, S., & **Sumner, S. C.** (2012). Integrating metabolomic signatures and psychosocial parameters in responsivity to an immersion treatment model for adolescent obesity. *Metabolomics*, 8(6), 1037–1051.
35. Gika, H.G., Theodoridis, G.A., Earl, M., **Sumner, S.**, and Wilson. I.D. (2010). Does the mass spectrometer define the marker? A comparison of global metabolite profiling data generated simultaneously via UPLC-MS on two different mass spectrometers. *Analytical Chemistry* 82(19):8226–8234.
36. **Sumner, S. C.**, Burgess, J., Snyder, R., Popp, J., & Fennell, T. R. (2010). Metabolomics of urine for the assessment of microvesicular lipid accumulation in the liver following isoniazid exposure. *Metabolomics*, 6(2), 238–249.

37. **Sumner, S. J.**, Fennell, T. R., Snyder, R. W., Taylor, G., & Lewin, A. H. (2010). Distribution of carbon-14 labeled C60 ([¹⁴C]C60) in the pregnant and in the lactating dam and the effect of C60 exposure on the biochemical profile of urine. *Journal of Applied Toxicology*, 30(4), 354–360.
38. **Sumner, S.C.J.**, R. Snyder, J. Burgess, C. Myers, R. Tyl, C. Sloan, and T. Fennell. 2009. Metabolomics in the assessment of chemical-induced reproductive and developmental outcomes using non-invasive biological fluids: Application to the study of butylbenzyl phthalate. *Journal of Applied Toxicology* 29(8):703–714.
39. Mosquin, P.L, Licata, A.C., Liu, B., **Sumner, S.J.**, and Okino, M. (2009). Reconstructing exposures from small samples using physiologically based pharmacokinetic (PBPK) models and multiple biomarkers. *Journal of Exposure Science and Environmental Epidemiology* 19(3):284–297.
40. **Sumner, S.C.J.**, and T.R. Fennell. (2007). Biomarkers, omics, and species comparisons. *Human and Ecological Risk Assessment* 13(1):111–119.
41. Garner, C., C. Sloan, S.C. **Sumner, J.** Burgess, J. Davis, A. Etheridge, A. Parham, and B.I. Ghanayem. (2007) CYP2E1-catalyzed oxidation contributes to the sperm toxicity of 1-bromopropane in mice. *Biology of Reproduction* 76(3):496–505.
42. Garner, C.E., **Sumner, S.C.J.**, Davis, J.G., Burgess, J.P., Yueh, Y., Demeter, J., Zhan, Q., Valentine, J., Jeffcoat, A.R., Burka, L.T., and Mathews, J.M. (2006) Metabolism and disposition of 1-bromopropane in rats and mice following inhalation or intravenous administration. *Toxicology and Applied Pharmacology* 215(1):23–36.
43. Fennell, T.R., **Sumner, S.C.**, Burgess, J., Snyder, R.W., and Friedman, M.A. (2006). Kinetics of elimination of urinary metabolites of acrylamide in humans. *Toxicological Sciences* 93(2):256–267.
44. Fennell, T.R., **Sumner, S.C.**, Snyder, R.W., Burgess, J., Spicer, R., Bridson, W.E., and Friedman, M.A. (2005). Metabolism and hemoglobin adduct formation of acrylamide in humans. *Toxicological Sciences* 85(1):447–459.
45. Weis, B.K., Balshaw, D., Barr, J.R, Brown, D., Ellisman, M., Lioy, P., Omenn, G., Potter, J.D., Smith, M.T., Sohn, L., Suk, W.A., Sumner, S., Swenberg, J., Walt, D.R., Watkins, S., Thompson, C., and Wilson, S. (2005). Personalized exposure assessment: promising approaches for human environmental health research. *Environmental Health Perspectives* 113(7):840–848.
46. Xirasager, S., Gustafson, S., Merrick, A., Tomer, K., Stasiewicz, S., Chan, D.D., Yost, J., Yates, J.R., **Sumner, S.**, Ziao, N., and Waters, M.D. (2004). CEBS object model for systems biology data. CEBS MAGE SysBio-Om. *Bioinformatics* 20(13):2004–2015.
47. Fennell, T.R., Krol, W.L., **Sumner, S.C.**, and Snyder, R.W. (2004). Pharmacokinetics of dibutylphthalate in pregnant rats. *Toxicological Sciences* 82:407–418.
48. Fennell, T.R., Snyder, R., Krol, W.L., and **Sumner, S.C.J.** (2003). Comparison of the hemoglobin adducts formed by administration of N-methylolacrylamide and acrylamide to rats. *Toxicological Sciences* 71(2):164–175.

49. **Sumner, S.C.J.**, Janszen, D.B., Asgharian, B., Moore, T.A., Bobbitt, C.M., and Fennell, T.R. (2003). Blood pharmacokinetics of tertiary amyl methyl ether in male and female F344 rats and CD-1 mice after nose-only inhalation exposure. *Journal of Applied Toxicology* 23(6):419–425.
50. **Sumner, S.C.J.**, Asgharian, B., Moore, T.A., Parkinson, H., Bobbitt, C.M., and Fennell, T.R. (2003). Characterization of metabolites and disposition of tertiary amyl methyl ether in male F-344 rats following inhalation exposure. *Journal of Applied Toxicology* 23:411–417.
51. **Sumner, S.C.J.**, Janszen, D.B., Asgharian, B., Moore, T.A., Parkinson, H.D., and Fennell, T.R. (2003). Species and gender differences in the metabolism and distribution of tertiary amyl methyl ether in male and female rats and mice after inhalation exposure or gavage administration. *Journal of Applied Toxicology* 23:427–436.
52. **Sumner, S.C.**, Williams, C.C., Snyder, R.W., Krol, W.L., Asgharian, B., and Fennell, T.R. (2003). Acrylamide: A comparison of metabolism and hemoglobin adducts in rodents following dermal, intraperitoneal, oral, or inhalation exposure. *Toxicological Sciences* 75(2):260–270.
53. Banajamali, A., DeMatteo, V., and **Sumner, S.C.J.** (2003). A mechanism for the formation of bis-glutathione conjugates of propargyl alcohol. *Pest Management Science* 59:331–338.
54. Ghanayem, B.I., Wang, H., and **Sumner, S.C.J.** (2000). Using cytochrome P450 gene knockout mice to study chemical metabolism, toxicity, and carcinogenicity. *Toxicologic Pathology* 28(6):839–850.
55. Johanson, G., Ernstrand, L., Gullstrand, E., Löf, A., Osterman-Golkar, S., Williams, C., and **Sumner, S.** (2000). Styrene oxide in blood, hemoglobin adducts, and urinary metabolites in human volunteers exposed to (13)C(8)-styrene vapors. *Toxicology and Applied Pharmacology* 168(1):36–49.
56. Snyder, R.W., Maness, S.C., Gaido, K.W., Welsch, F., **Sumner, S.C.J.**, and Fennell, T.R. (2000). Metabolism and disposition of bisphenol A in female rats. *Toxicology and Applied Pharmacology* 168(3):225–234.
57. Boogaard, P.J., **Sumner, S.C.J.**, de Kloe, K.P., van Elburg, P.A., and Wong, B.A. (2000). Disposition of [ring-U-¹³C]styrene in rats and mice exposed by recirculating nose-only inhalation. *Toxicological Sciences* 58(1):161–172.
58. Boogaard, P.J., de Kloe, K.P., Wong, B.A., **Sumner, S.C.J.**, Watson, W.P., and van Sittert, N.J. (2000). Quantification of DNA adducts formed in liver, lungs, and isolated lung cells of rats and mice exposed to ¹³C-styrene by nose-only inhalation. *Toxicological Sciences* 57(2):203–216.
59. Banajamali, A.R., Xu, Y., DeMatteo, V., Strunk, R.J., Gay, M.H., Putterman, G.J., and **Sumner, S.** (2000). Identification of metabolites of [1,2,3-¹³C]propargyl alcohol in mouse urine by ¹³C NMR and mass spectrometry. *Journal of Agricultural and Food Chemistry* 48(10):4693–4710.
60. **Sumner, S.C.J.**, Fennell, T.R., Moore, T.A., Chanas, B., Gonzalez, F., and Ghanayem, B.I. (1999). The role of cytochrome P450 in the metabolism of acrylamide and acrylonitrile in mice. *Chemical Research in Toxicology* 12(11):1110–1116.

61. Nihlén, S., **Sumner, S.**, Löf, A., and Johanson, G. (1999). ¹³C-Labelled methyl tertiary-butyl ether (¹³C₂-MTBE): toxicokinetics and characterization of urinary metabolites in humans. *Chemical Research in Toxicology* 12(9):822–830.
62. Collins, A.S., **Sumner, S.C.J.**, Borghoff, S.J., and Medinsky, M.A. (1999). A physiological model for tert-amyl methyl ether and tert-amyl alcohol: Hypothesis testing of model structures. *Toxicological Sciences* 49:15–28.
63. Banajamali, A.R., Xu, Y., Strunk, R.J., Gay, M.H., Ellis, M.C., Putterman, G.J., and **Sumner, S.** (1999). Identification of metabolites of ¹³C-labeled propargyl alcohol in rat urine by ¹³C NMR and mass spectrometry. *Journal of Agricultural and Food Chemistry* 47(4):1717–1729.
64. **Sumner, S.C.J.**, Selvaraj, L., Nauhaus, S.K., and Fennell, T.R. (1997). Urinary metabolites from F344 rats and B6C3F1 mice co-administered acrylamide and acrylonitrile for 1 or 5 days. *Chemical Research in Toxicology* 10(10):1152–1160.
65. **Sumner, S.C.**, Cattley, R.C., Asgharian, B., Janszen, D.B., and Fennell, T.R. (1997). Evaluation of the metabolism and hepatotoxicity of styrene in F344 rats, B6C3F1 mice, and CD-1 mice following single and repeated inhalation exposures. *Chemico-Biological Interactions* 106(1):47–65.
66. Boogaard, P.J., **Sumner, S.C.J.**, Turner, M.J., and Bond, J.A. (1996). Hepatic and pulmonary glutathione conjugation of 1:2,3:4 diepoxide in human, rat, and mouse in vitro. *Toxicology* 113(1–3):297–299.
67. Boogaard, P., **Sumner, S.C.J.**, and Bond, J.A. (1996). Glutathione conjugation of 1,2,3,4-diepoxybutane in human rat and mouse liver and lung in vitro. *Toxicology and Applied Pharmacology* 136(2):307–316.
68. Nauhaus, S.K., Fennell, T.R., Asgharian, B., Bond, J.A., and **Sumner, S.C.J.** (1996). Characterization of urinary metabolites in rats and mice exposed to [1,2,3,4-¹³C]butadiene. *Chemical Research in Toxicology* 9(4):764–773.
69. **Sumner, S.C.J.**, Stedman, D.B., Cheng, S-Y., Welsch, F., and Fennell, T.R. (1995). Dose effects on the excretion of urinary metabolites of [1,2-methoxy-¹³C]2-methanol. *Toxicology and Applied Pharmacology* 134(1):139–147.
70. **Sumner, S.C.J.**, Stedman, D.B., Cheng, S-Y., Welsch, F., and Fennell, T.R. (1995). Characterization of urinary metabolites produced following administration of [1,2-methoxy-¹³C]2-methoxyethanol to male F344 rats and pregnant CD-1 mice. *Occupational Hygiene* 2:25–31.
71. **Sumner, S.C.J.**, and Fennell, T.R. (1994). Review of the metabolic fate of styrene. *Critical Reviews in Toxicology* 24(s1):S11–S33.
72. Osterman-Golkar, S.M., MacNeela, J.P., Turner, M.J., Walker, V.E., Swenberg, J.A., **Sumner, S.C.J.**, Youtsey, N., and Fennell, T.R. (1994). Monitoring exposure to acrylonitrile using adducts to N-terminal valine in hemoglobin. *Carcinogenesis* 15(12):2701–2707.
73. Fennell, T.R., and **Sumner, S.C.J.** (1994). Identification of metabolites of carcinogens by ¹³C NMR spectroscopy. *Drug Metabolism Reviews* 26(1–2):469–481.

74. Yates, J.M., Fennell, T.R., Turner, M.J., Recio, L., and **Sumner, S.C.J.** (1994). Characterization of phosphodiester adducts produced by the reaction of cyanoethylene oxide with nucleotides. *Carcinogenesis* 15(2):277–283.
75. **Sumner, S.C.J.**, and Fennell, T.R. (1993). A possible mechanism for the formation of $^{14}\text{CO}_2$ via 2-methoxyacetic acid in mice exposed to ^{14}C -labelled 2-methoxyethanol. *Toxicology and Applied Pharmacology* 120(1):162–164.
76. Yates, J.M., **Sumner, S.C.J.**, Turner, M.J., Recio, L., and Fennell, T.R. (1993). Characterization of an adduct and its degradation product produced by the reaction of cyanoethylene oxide with deoxythymidine and DNA. *Carcinogenesis* 14(7):1363–1369.
77. Kedderis, G.L., **Sumner, S.C.J.**, Held, S.D., Batra, R., Turner, M.J., Roberts, A.E., and Fennell, T.R. (1993). Dose-dependent urinary excretion of acrylonitrile metabolites by rats and mice. *Toxicology and Applied Pharmacology* 120(2):288–297.
78. **Sumner, S.C.J.**, Jaing, S-P., Jernigan, R.L., and Ferretti, J.A. (1992). Conformational analysis of the receptor specific tachykinin analogues, septide and senktide. *Journal of Biomolecular Structure and Dynamics* 10:429–439.
79. **Sumner, S.C.J.**, MacNeela, J.P., and Fennell, T.R. (1992). Characterization and quantitation of urinary metabolites of [1,2,3- ^{13}C]acrylamide in rats and in mice using ^{13}C nuclear magnetic resonance spectroscopy. *Chemical Research in Toxicology* 5(1):81–89.
80. **Sumner, S.C.J.**, Stedman, D.B., Clarke, D.O., Welsch, F., and Fennell, T.R. (1992). Characterization of urinary metabolites from [1,2, methoxy- ^{13}C]2-methoxyethanol in mice using ^{13}C NMR spectroscopy. *Chemical Research in Toxicology* 5(4):553–560.
81. Fennell, T.R., **Sumner, S.C.J.**, and Walker, V.E. (1992). A computer model for the formation and removal of hemoglobin adducts. *Cancer Epidemiology, Biomarkers, and Prevention* 1(3):213–219.
82. Fennell, T.R., Kedderis, G.K., and **Sumner, S.C.J.** (1991). Urinary metabolites of [1,2,3- ^{13}C]acrylonitrile in rats and mice detected by ^{13}C nuclear magnetic resonance spectroscopy. *Chemical Research in Toxicology* 4(6):678–687.
83. **Sumner, S.J.**, Gallagher, K.S., Davis, D., Covell, D.G., Jernigan, R.L., and Ferretti, J.A. (1990). Conformational analysis of the tachykinins in solution: Substance P and physalaemin. *Journal of Biomolecular Structure and Dynamics* 8(3):687–707.
84. **Sumner, S.J.**, and Ferretti, J.A. (1989). Conformational behavior of the linear hexapeptide, senktide: A receptor selective tachykinin analogue. *FEBS Letters* 253(1,2):117–120.
85. **Sumner, S.J.**, Moreland, C.G., Carroll, F.I., Brine, G.A., and Boldt, K.G. (1989). Solid state and solution conformations of methadone hydrochloride and related derivatives. *Magnetic Resonance in Chemistry* 27(4):311–317.
86. Moreland, C.G., Stejskal, E.O., **Sumner, S.C.J.**, Memory, J.D., Carroll, F.I., Brine, G.A., and Portogehese, P.S. (1989). Nonbonded ^{13}C - ^{14}N dipole-dipole interactions. *Journal of Magnetic Resonance* 83(1):173–176.

Monographs and Reports

1. Tyl, R.W., Sloan, C.S., Hamby, B.H., Ehman, K.D., and **Sumner, S.** (2006). *Hershberger Background Review Document*. EPA contract number EP-W-06-026 Prepared by RTI International. Available at <http://www.oecd.org/dataoecd/18/57/37880949.pdf>. (201 pages).
2. **Sumner, S.C.J.** (2005). *Using Metabolomics/'Omics to Explore Species Differences in Metabolism*. Monograph presented at the National Academy of Sciences (NAS) Workshop on Toxicogenomics and Cross Species Comparisons, August 2004. National Academy of Sciences Press.
3. **Sumner, S.C.J.**, and Fennell, T.R. (2005). *Biomarkers, Omics, and Species Comparisons*. Monograph presented at the Board of Scientific Counselors (BOSC) Risk Assessment Workshop. National Academy of Sciences Press. February 2.
4. Collins, F. lead the development of this white paper. (2005). All subgroups and authors are listed at the link. *Design Considerations for a Potential United States Population-Based Cohort to Determine the Relationships among Genes, Environment, and Health: Recommendations of an Expert Panel*. **Susan Sumner** served on the Environmental Exposure Technology Development Sub-group. Available at <http://www.genome.gov/Pages/About/OD/ReportsPublications/PotentialUSCohort.pdf>.
5. **Sumner S.C.J.**, and Liu, G. (2004). Pathway linkage and data integration: Metabolomics holds key to intelligent discovery efforts. Pp. 127–128 in *Methods and Techniques in Drug Discovery*. Larchmont, NY: Mary Ann Liebert.
6. Colatsky, T., and **Sumner, S.C.J.** (2003). Metabolic profiling and biomarker discovery. *Current Opinions in Investigational Drugs* 4(3):1–3.
7. **Sumner, S.C.J.**, and Liu, G. (2002). Pathway linkage and data integration. *Genetics and Engineering News* 22(19). November 7.
8. **Sumner, S.C.J.**, Cruzan, G., Johanson, G., Ghanayem, B., and Fennell, T.R. (2001). Metabolism of styrene in rats, mice, and humans. *CIIT Activities* 21:(3–4).
9. **Sumner, S.**, T. Williams, B. Asgharian, and T. Fennell. 2001. *Acrylamide: Metabolism, Distribution, and Hemoglobin Adducts in Male F344 Rats and B6C3F1 Mice Following Inhalation Exposure and Distribution and Hemoglobin Adducts Following Dermal Application to F344 Rats*. TEGEWA.
10. **Sumner, S.**, C. Williams, and T. Fennell. 1999. *Characterization of Urinary Metabolites of [1, 2, 3-¹³C]Acrylamide in Male F344 Rats Following Dermal Application or IP Injection*. Acrylamide Monomer Producers Association.
11. **Sumner, S.** 1999. *Urinary Metabolites of ¹³C-styrene in Exposed Human Volunteers*. Styrene Information and Research Center.
12. **Sumner, S.C.J.**, R.C. Cattley, D. Janszen, and T.R Fennell. 1999. *Blood Pharmacokinetics of Propylene Glycol Methyl Ether (PGME) and Propylene Glycol Methyl Ether Acetate (PGMEA) in Male F-344 Rats After Dermal Application*. Chemical Manufacturers Association.

13. **Sumner, S.C.J.**, T.A. Moore, R.C. Cattley, and T.R. Fennell. 1999. *1,1,1,3,3,3-hexachloropropane: Metabolism and Distribution in Male and Female Sprague Dawley Rats Following Inhalation Exposure or IP Administration*. Vulcan Chemicals.
14. **Sumner, S.C.J.**, B. Asgharian, C. Laethem, and T.R. Fennell. 1997. *Tertiary Amyl Methyl Ether (TAME): Metabolism and Distribution in Male and Female F344 Rats and CD-1 Mice after Single or Repeated Inhalation Exposures or Gavage Exposure*. American Petroleum Institute. Final Report.
15. **Sumner, S.C.J.**, B. Asgharian, and T.R. Fennell. 1997. *Blood Pharmacokinetics of Tertiary Amyl Methyl Ether in Male and Female Rats and Mice Following Inhalation Exposure at 100, 500, and 2,500 ppm*. American Petroleum Institute. Final Report.
16. **Sumner, S.C.J.**, B. Asgharian, T.A. Moore, and T.R. Fennell. 1997. *Tertiary Amyl Methyl Ether (TAME): Pilot Study for Metabolism, Distribution, and Pharmacokinetics in Male F344 Rats after a Single Nose-Only Inhalation Exposure*. American Petroleum Institute, Final Report.
17. **Sumner, S.C.J.**, and Fennell, T.R. (1990). Nuclear magnetic resonance spectroscopy in metabolism studies. *CIIT Activities* 10(2):1–8.

Selected Conference Abstracts and Published Abstracts

1. Merchant, M., Gooding, J., **Sumner, S.**, McRitchie, S., Harrington, J., Burgess, J.P., Rovin, B.H., Klein, J.B., and Himmelfarb, J. (2016). Hemodialysis Patient Plasma Trace Metals Associate with Dialysis Incidence Versus Prevalence, Gender and Response to Erythropoiesis Stimulating Agents. Accepted for ASN Kidney Week 2016 Nov 17 – 20, Chicago, IL.
2. Onger, E.M., Niyitegeka, J.M., Whitaker, C., McRitchie, S., Gooding, J., and **Sumner, S.** Meprin expression/activity impacts metabolite profiles in kidney tissue of mice with STZ induced type 1 diabetes. (2016). Accepted for ASN Kidney Week 2016 Nov 17 – 20, Chicago, IL.
3. Gooding, J., Niyitegeka, J-M V., Mcritchie, S., **Sumner, S.**, Onger E.M., and Whitaker, C. Meprin beta-associated changes in serum and urine metabolite profiles of mice with streptozotocin (STZ) induced type 1 diabetes. Accepted for ASN Kidney Week 2016 Nov 17 – 20, Chicago, IL.
4. McClenathan B, Choi YS, Stewart D, Pathmasiri W, and **Sumner S.** (2016). Metabotypes of subjects with adverse reactions following vaccination: a pilot study. Oral presentation at the Military Health System Conference, August 2016, Florida.
5. McRitchie, S, Richardson, A, Pathmasiri, W, Perera, F, **Sumner, S.** (2016). Structural equation modeling: linking exposure to birth- and early life- health outcomes via the metabotype of cord blood.” 2016 Metabolomics Society Meeting, Dublin, Ireland, June 2016.
6. Snyder, R. W., Mortensen, N. P., Pathmasiri, W. W., **Sumner, S. J.**, & Fennell, T. R. (2016). Distribution, cellular localization, and metabolomics of multi-walled carbon nanotubes in female rats.” Society of Toxicology 55th Annual Meeting and ToxExpo, New Orleans, LA., March, 2016.
7. Vickery B, Kulis M, Hamilton D, Stewart D, Pathmasiri W, McRitchie S, Burgess J, **Sumner S**, Burks AW (2016) NMR-based metabolomics analysis reproducibly identifies unique subject-specific profiles that change during peanut oral immunotherapy. American Academy of Allergy, Asthma & Immunology Annual Meeting, Los Angeles, CA, March, 2016.

8. Byrd, W., Carlson, J., McRitchie, S. **Sumner, S.J.**, Buse, J., Bencharit, S. (2016) Exploring Salivary Metabolomic Profiles of Well-Controlled and Poorly-Controlled Type 1 and Type 2 Diabetes. 2016 AADR/CADR Annual Meeting (March 16-19, 2016, Los Angeles, CA).
9. Gooding, J. R., Saggi, S. J., Friedman, E., Ranganathan, N., Ranganathan, P., Mercier, K., McRitchie, S. & **Sumner S.** (2015). Metabolomics of Chronic Kidney Disease in a Cohort of Patients Given Probiotics. Kidney Week, San Diego, CA, November 2015.
10. Gooding JR, Burgess J, McRitchie S, Agarwal S, Acuff Z, Smoyer WE, **Sumner S** (2015). Metabolism in Steroid-Sensitive and Steroid-Resistant Nephrotic Syndrome. Mayo Clinic Metabolomics Symposium, Rochester, MN. Awarded second-place in poster competition, October 2015.
11. Cabrera A, Dhungana S, Sheridan P, and **Sumner S** (2015). Metabolic profiling of anxiety prone HSV-latently infected obese mice. American Chemical Society. Duke University. Durham, NC., September 2015.
12. Moreno, M., Mercier, K., Deese-Spruill, Ward, T., and **Sumner, S.** (2015). A Metabolomics investigation on the impact of exposure to particulate matter from on Asthmatic Children. RTI Internship Showcase, August 2015.
13. Cabrera A, Dhungana S, Sheridan P, **Sumner S** (2015). Metabolomic Profiling of Anxiety Prone HSV-Latently Infected Obese Mice. RTI Internship Showcase, August 2015
14. Harris R, Dhungana S, **Sumner S.** (2015) UPLS-MS Broad Spectrum Lipidomics Platform Development.” RTI Internship Showcase, August 2015.
15. **Sumner, S. J.**, Richardson, A. S., McRitchie, S. L., Pathmasiri, W. W., & Perera, F. (2015) *Relating exposure to health outcomes via the metabolome of cord blood. A problem for structural equation modeling.* Poster presented at Advancing Analysis of Xenobiotics in Environmental and Biological Media, U.S. Environmental Protection Agency, Research Triangle Park, NC, August 2015.
16. Deese-Spruill, J. Y., Carlson, J. E., Mercier, K. A., Monero, M., Devlin, R., Ward, T., and **Sumner, S. J.** (2015). *Particulate matter exposure and perturbations in the metabolome.* Poster presented at Advancing Analysis of Xenobiotics in Environmental and Biological Media, U.S. Environmental Protection Agency, Research Triangle Park, NC, August 2015.
17. Dhungana, S., & **Sumner, S. J.** (2015). *Profiling endocannabinoids and cannabinoid receptor agonist/antagonist fatty acid amides using UPLC-TOF ion mobility mass spectrometry.* Poster presented at Advancing Analysis of Xenobiotics in Environmental and Biological Media, U.S. Environmental Protection Agency, Research Triangle Park, NC, August 2015.
18. Fennell, T. R., Snyder, R. W., Pathmasiri, W. W., McRitchie, S. L., Burgess, J. P., & **Sumner, S. J.** (2015). *Metabolomics in the assessment of prior in utero exposure.* Poster presented at Advancing Analysis of Xenobiotics in Environmental and Biological Media, U.S. Environmental Protection Agency, Research Triangle Park, NC, August 2015.
19. Pathmasiri, W. W., Laine, J. E., Bailey, K. A., Olshan, A. F., Smeester, L., Drobna, Z., ... **Sumner, S. J.**, et al. (2015). *A metabolomic signature of in utero inorganic arsenic exposure in fetal cord serum.* Poster presented at Advancing Analysis of Xenobiotics in Environmental and Biological Media, U.S. Environmental Protection Agency, Research Triangle Park, NC, August 2015.
20. Li, J., Stewart, P., Fisher, K., Dhungana, S., Stewart, D. A., **Sumner, S. J.**, et al. (2015). *Proteometabolomic dissection of small cell lung cancer using activity based protein profiling and*

- metabolomics profiling*. Presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
21. Cox, L., Pathmasiri, W. W., McRitchie, S. L., Sohn, J., Robine, N., **Sumner, S. J.**, et al. (2015). *Systemic metabolic impact of early-life microbiota disruption*. Presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 22. Weiss, E. R., Dhungana, S., Osawa, S., McRitchie, S. L., & **Sumner, S. J.** (2015). *Metabolomic profiling of early events in retinal degeneration*. Presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 23. Petrovic, S., McRitchie, S. L., DuBose, Jr., T., Pathmasiri, W. W., Burgess, J. P., Xu, J., **Sumner, S. J.** (2015). *Urine Metabolomics Profile in Early CKD*. Oral and poster presentations at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 24. Brophy, P., Mercier, K. A., McRitchie, S. L., Pathmasiri, W. W., **Sumner, S. J.**, Koralkar, R., et al. (2015). *Metabolomics profiling of renal development and acute kidney injury in premature infants*. Presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 25. Stewart, D. A., Winnike, J., McRitchie, S. L., Pathmasiri, W. W., & **Sumner, S. J.** (2015). *Triple negative breast cancer biomarker identification for drug development*. Poster presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 26. Pathmasiri, W. W., Loeser, R., **Sumner, S. J.**, McRitchie, S. L., Beavers, D., Saxena, P., et al. (2015). *Correlation of urinary metabolites with radiographic progression of knee osteoarthritis in overweight and obese adults*. Poster presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 27. Wiernek, S., Mercier, K. A., Pathmasiri, W. W., McRitchie, S. L., **Sumner, S. J.**, & Dai, X. (2015). *Global metabolomic profiling of endothelial cell response to inorganic phosphate*. Poster presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 28. Dhungana, S., & **Sumner, S. J.** (2015). *Profiling endocannabinoids and cannabinoid receptor agonist/antagonist fatty acid amides using UPLC-TOF ion mobility mass spectrometry*. Poster presented at The Metabolomics Society Meeting, San Francisco, CA, June 2015.
 29. Brophy, P., Mercier, K. A., Novokhatny, A., McRitchie, S. L., Pathmasiri, W. W., Burgess, J. P., **Sumner, S. J.**, et al. (2015). *Metabolomics profiling of renal development and acute kidney injury in premature infants*. Presented at Metabolomics 2015, Burlingame, CA, June 2015.
 30. Wang, H., Liang, S., Wang, M., Gao, J., Sun, C., Wang, J., **Sumner, S. J.**, et al. (2015). *Metabolomics study of autism for biomarker discovery in Han Chinese population*. Poster presented at Society of Biological Psychiatry's 70th Annual Scientific Meeting entitled Stress, Emotion, Neurodevelopment, and Psychopathology, Toronto, Canada, May 2015.
 31. Stewart, D. A., Winnike, J., McRitchie, S. L., Pathmasiri, W. W., & **Sumner, S. J.** (2015). *Triple negative breast cancer: Metabolomics and flux analysis to identify targets for drug development*. Poster presented at the American Association for Cancer Research Annual Meeting, Philadelphia, PA, April, 2015.
 32. Kenley, S., Whitaker, C., Niyitegeka, J., Sedighi, R., Gooding, J., McRitchie, S., **Sumner, S.**, & Onger, E. M. (2015). *Meprin deficiency associated with higher levels of neutrophil gelatinase associated lipocalin (NGAL) and kidney injury molecule (KIM-1) in mice with streptozotocin induced type 1 diabetes*. Experimental Biology, San Diego, CA, April 2015.

33. Appt, S., Dhungana, S., McRitchie, S. L., & **Sumner, S. J.** (2014). *Ovarian metabolomic profiles differ between monkeys consuming prudent and Western diets*. Poster presented at North American Menopause Society (NAMS) 25th Annual Meeting, Washington, DC, October 2014.
34. Raymer, J. H., Michael, L. C., **Sumner, S. J.**, Studabaker, W. B., Deese-Spruill, J. Y., Ward, T., Noonan, C., & Devlin, R. (2014). *Environmental exposures to PM and resultant metabolomic perturbations in humans*. Poster presented at the Annual Conference of the International Society of Exposure Science (ISES 2014), Cincinnati, OH, October 2014.
35. Mortensen, N. P., Stewart, D. A., Pathmasiri, W. W., Mercier, K. A., McRitchie, S. L., Cavallo, T., **Sumner, S. J.** (2014). *Metabolomics and darkfield microscopy of mammalian cells from microfluidic and transwell systems*. Poster presented at NIH Common Fund Metabolomics Consortium Meeting, Research Triangle Park, NC, October, 2014.
36. Burgess, J. P., Cavallo, T., Pathmasiri, W. W., Mercier, K. A., McRitchie, S. L., Novokhatny, A., & **Sumner, S. J.** (2014). *Metabotyping of ABO blood groups*. Poster presented at NIH Common Fund Metabolomics Consortium Meeting, Research Triangle Park, NC, October 2014.
37. **Sumner, S. J.**, McRitchie, S. L., Pathmasiri, W. W., & Dhungana, S. (2014). *Metabolomics in the assessment of exposure and health outcomes*. Poster presented at 10th Annual International Conference of the Metabolomics Society, Tsuruoka, Japan, June 2014.
38. Weiss, E. R., Osawa, S., Dhungana, S., McRitchie, S. L., **Sumner, S. J.** (2014). *Metabolic differences between light- and dark-adapted mouse retinas*. Poster presented at The Association for Research in Vision and Ophthalmology (ARVO), Orlando, FL, May, 2014.
39. Novokhatny, A., **Sumner, S. J.**, Snyder, R. W., Lewin, A. H., Pathmasiri, W. W., Brown, J. M., et al. (2013). *A distribution and metabolomics investigation of the impact of fullerene C60 exposure in mice fed high fat diets and mice fed diets normal in fat*. Poster presented at North Carolina Section of the American Chemical Society Sectional Conference, North Carolina State University, Raleigh, NC, November 2013.
40. Dhungana, S., Thomas, B. F., & **Sumner, S. J.** (2013). *Comparison and refinement of UPLC-MS based broad spectrum metabolomics methods*. Poster presented at the American Society for Mass Spectrometry's 61st Conference on Mass Spectrometry and Allied Topics, Minneapolis, MN, July 2013.
41. Novokhatny, A., **Sumner, S. J.**, Snyder, R. W., Lewin, A. H., Pathmasiri, W. W., Brown, J. M., et al. (2013). *A distribution and metabolomics investigation of the impact of fullerene C60 exposure in mice fed high fat diets and mice fed diets normal in fat*. Poster presented at 52nd Annual Conference of the Society of Toxicology, San Antonio, TX, March, 2013.
42. Novokhatny, A., **Sumner, S. J.**, Snyder, R. W., Lewin, A. H., Brown, J. M., McRitchie, S. L., et al. (2012). *A distribution and metabolomics investigation of the impact of fullerene C60 exposure in mice fed high fat diets and mice fed diets normal in fat*. Poster presented at 8th Annual State of North Carolina Undergraduate Research and Creativity Symposium, Fitzpatrick Atrium, Duke University, Durham, NC, November, 2012.
43. Novokhatny, A., **Sumner, S. J.**, Snyder, R. W., Lewin, A. H., Pathmasiri, W. W., Brown, J. M., et al. (2012). *A distribution and metabolomics investigation of the impact of fullerene C60 exposure in mice fed high fat diets and mice fed diets normal in fat*. Poster presented at 4th Annual RTI International Internship Showcase, Dreyfus Auditorium, RTI International, Research Triangle Park, NC, August, 2012.
44. Brown, J.M., A. Vidanapathirana, J.E. Pitzer, P. Ramakrishna, R.W. Snyder, **S.J. Sumner**, A.H. Lewin, L. Han, C.J. Wingard, X. Lai, F.A. Witzmann, and T.R. Fennell. (2012). Endothelial cell

- cytotoxicity and activation by C60, multi-walled carbon nanotubes and graphene nanosheets. *Toxicologist* (Poster presented at the 2012 Annual Meeting of the Society of Toxicology, San Francisco, CA).
45. **Sumner, S.C.J.**, R.W. Snyder, A.H. Lewin, J.A. Brown, C.J. Wingard, and T.R. Fennell. (2012). Pharmacokinetics and distribution of fullerene C60 in female rats and mice. *Toxicologist* (Poster presented at the 2012 Annual Meeting of the Society of Toxicology, San Francisco, CA).
46. Yoon, M., Y. Yang, **S.J. Sumner**, R.W. Snyder, J Pitzer, J.M. Brown, T.R. Fennell, and H.J. Clewell. (2012). Development of a PBPK model for C60 fullerene disposition during gestation and lactation in the rat. *Toxicologist* (Poster presented at the 2012 Annual Meeting of the Society of Toxicology, San Francisco, CA).
47. Brim, H., Lee, E. L., Nelson, K. E., Smoot, D. T., Sears, C. L., Hassanzadeh, H., **Sumner, S. C.**, et al. (2012). A comprehensive taxonomic, metagenomic and metabolomic gut flora analysis reveals distinct profiles in healthy and colon adenoma African Americans. *Gastroenterology*, 142 (5, Supplement 1), S-655.
48. Szabo, D., Shah, R., **Sumner, S.**, & Birnbaum, L. (2012). NBTS 35: Systems biology approach for better understanding of mechanisms of neurodevelopment toxicity: A case study using the major flame retardant HBCD. *Neurotoxicology and Teratology*, 34(3), 379.
49. Thompson, L.C., E.E. Mann, A. Vidanapathirana, B.S. Harrison, L. Han, A.H. Lewin, **S. Sumner**, T.R. Fennell, J.M. Brown, and C.J. Wingard. (2012). Pulmonary exposure to multi-walled carbon nanotubes and C60 fullerenes activate indomethacin sensitive coronary constrictor responses to endothelin-1. *Toxicologist* (Poster presented at the 2012 Annual Meeting of the Society of Toxicology, San Francisco, CA).
50. Urankar, R.N., R.A. Lust, A.H. Lewin, L. Han, **S. Sumner**, T.F. Fennell, J.M. Brown, and C.J. Wingard. (2012). Cardiac ischemic/reperfusion injury response to instilled C60 fullerene. *Toxicologist* (Poster presented at the 2012 Annual Meeting of the Society of Toxicology, San Francisco, CA).
51. Vidanapathirana, A.K., L.C. Thompson, E.E. Mann, **S. Sumner**, L. Han, A.H. Lewin, T.R. Fennell, J.M. Brown, and C.J. Wingard. (2012). The effect of C60 fullerene instillation on the vascular responses in pregnant Sprague Dawley rats. *Toxicologist* (Poster presented at the 2012 Annual Meeting of the Society of Toxicology, San Francisco, CA).
52. Banerjee, R., R. Snyder, W. Pathmasiri, and **S. Sumner**. (2011). Metabolomics: Investigating the impact of gestational exposure to a phthalate on the brain and reproductive organs of the dam and prepubertal pups. *Toxicologist* 2202:472.
53. Szabo, D., W. Pathmasiri, J. Diliberto, **S. Sumner**, and L. Birnbaum. (2011). Metabolomic analysis of serum after treatment with the emerging POP flame retardant Hexabromocyclododecane (HBCD): Commercial mixture, alpha and gamma stereoisomers elicit differential effects in infantile mice. *Toxicologist* 2248:482.
54. Collier, D.N., W. Pathmasiri, K.J. Pratt, Y. Crawford, S. Henes, A. Gross-McMillan, L. Lutes, and **S. Sumner**. (2011). Obesity treatment and the biology of behavior: Metabolomic analysis of response to a behavioral intervention. American Pediatrics Society Meeting, Denver, CO, April 30–May 3.
55. **Sumner, S.C.**, R. Snyder, T. Fennell, R. Fernando, and B.J. Collins. (2010). Metabolomics analysis of urine from resveratrol-treated male, female, and pregnant Wistar Han rats. *Toxicologists* 131:284.

56. Fennell, T. R., Fernando, R. A., **Sumner, S.**, & Collins, B. J. (2010). *Metabolomic analysis of urine from resveratrol-treated male, female, and pregnant Wistar Han rats*. Poster presented at the Annual Meeting of the Society of Toxicology, Salt Lake City Ut, March 2010.
57. Snyder, R., Fennell, T., Taylor, G. F., Lewin, A. H., Burgess, J. P., & **Sumner, S. J.** (2009). *Nanotoxicology in vivo distribution of [14C]C60 in pregnant and lactating rats*. Poster presented at the Annual Meeting of the Society of Toxicology, Baltimore, MD, March 2009.
58. **Sumner, S. J.**, & Knudsen, T. B. (2009). *Incorporating 'omics in the study of reproduction and development*. Presented at the Annual Meeting of the Society of Toxicology, Baltimore, MD, March, 2009.
59. **Sumner, S. J.**, Snyder, R., Burgess, J. P., Tyl, R., Sloan, C., & Fennell, T. (2009). *Metabolomics in the study of reproduction and development*. Presented at the Annual Meeting of the Society of Toxicology, Baltimore, MD, March, 2009.
60. Snyder, R., T. Fennell, G. Taylor, A. Lewin, J. Burgess, and **S. Sumner**. (2009). Distribution of ¹⁴C[C60] in the pregnant and lactating rat. Published in *Toxicologist 340*:112, March 2009.
61. **Sumner, S.** and T. Knudsen. (2009). Incorporating –omics in the study of reproduction and development. Published in *Toxicologist 1313*:218, March 2009.
62. **Sumner, S.**, R. Snyder, J. Burgess, R. Tyl, S. Sloan, and T. Fennell. (2009). Metabolomics in the study of reproduction and development. Published in *Toxicologist 1414*:218, March 2009.
63. **Sumner, S.C.J.**, R. Snyder, J. Burgess, C. Myers, R. Tyl, C. Sloan, and T. Fennell. (2008). Metabolomics: Application to the study of phthalates in reproduction and development. *Toxicologist 63*, March, 2008. Published in *Toxicologist 64*:11.
64. Snyder, R. W., **Sumner, S. J.**, Fennell, T. R., Burgess, J. P., Myers, C. B., & Deese-Spruill, J. Y. (2008) *Metabolomics: Markers of drug-induced liver injury*. Poster presented at the Annual Meeting of the Society of Toxicology, Seattle, WA, March 2008.
65. Snyder, R., Burgess, J., Deese-Spruill, J., Myers, C., Wu, S., Fennell, T., and **Sumner, S.** (2008). Metabolomics: Urinary markers of drug-induced liver injury with correlation with lobe variations in response. Published in *Toxicologist 1917*:344.
66. Snyder, R., J. Burgess, C. Myers, C. Sloan, R. Tyl, T. Fennell, and **S. Sumner**. (2007). *Metabolomics: Application to Reproductive and Developmental Toxicology*. North Carolina Society of Toxicology (NCSOT), U.S. Environmental Protection Agency, Research Triangle Park, NC, March 19, 2007.
67. **Sumner, S.**, R. Snyder, J. Burgess, C. Myers, R. Tyl, C. Sloan, and T. Fennell. (2007). Metabolomics in Reproduction and Development from Exposure to Phthalates, NIEHS Workshop Publication on Endocrine Disruption, Durham, NC, August 27–29, 2007.
68. Deese-Spruill, J. Y., Snyder, R. W., Fennell, T. R., Burgess, J. P., Myers, C., & **Sumner, S. J.** (2007). *GC/MS metabolomics: Application to drug-induced liver injury*. Poster presented at RTI Fellows Internal Symposium (Presented by J. Y. Deese-Spruill), Research Triangle Park, NC, October, 2007.
69. Snyder, R. W., Burgess, J. P., Deese-Spruill, J. Y., Myers, C. B., Wu, S., Fennell, T. R., & **Sumner, S. J.** (2007). *Metabolomics: Urinary markers of drug-induced liver injury with correlation lobe variations in response* (Presented by J. Deese-Spruill). Poster presented to the North Carolina Society of Toxicology (NCSOT), Charlotte, NC, March 2007.
70. Deese-Spruill, J. Y., Snyder, R. W., Fennell, T. R., Burgess, J. P., Myers, C., & **Sumner, S. J.** (2007). *GC/MS metabolomics: Application to drug-induced liver injury*. Presented to the North

Carolina Society of Toxicology (NCSOT) (Presented by J. Deese-Spruill), Research Triangle Park, NC, March, 2007.

71. Burgess, J. P., Snyder, H., Page, K. M., Fennell, T. R., Myers, C. B., & **Sumner, S. J.** (2007). *Quantitative NMR metabolomics of liver extracts: Application to drug-induced liver injury*. Presented to the North Carolina Society of Toxicology (NCSOT) at the National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, NC, March, 2007.
72. Fennell, T.R., R.W. Snyder, S.C. **Sumner, J.** Burgess, and M.A. Friedman. (2006). Kinetics of elimination of urinary metabolites of acrylamide in humans. *Toxicological Sciences* 90:S-1. [Abstract No. 166].
73. Burgess, J., R. Snyder, T. Fennell, and **S. Sumner**. (2006). *Metabolomics for discovery of biomarkers of hepatotoxicity*. Presented at SMASH, Burlington, VT, September 11–13.
74. Fennell, T., J. Burgess, S. Wu, R. Snyder, and **S. Sumner**. (2006). *Quantitative metabolomics: Markers of drug-induced liver injury*. Presented at the Biomarker World Congress, Philadelphia, PA. May 16–18.
75. **Sumner, S. J.** (2006). *Metabolomics in reproductive toxicology*. Presented at Science and Engineering Fellows Symposium (Sponsor: Rochelle Tyl), RTI International, Research Triangle Park, NC, September, 2006.
76. Colatsky, T.J., A.J. Higgins, B.R. Bullard, and **S.C. Sumner**. (2004). Metabolomics: Urine and serum biomarkers for acetaminophen hepatotoxicity in rats. *Toxicologist* 78(S1):843.
77. Higgins, A.J., T.J. Colatsky, B.R. Bullard, and **S.C. Sumner**. (2004). Metabolomic analysis of the mechanisms of acetaminophen liver toxicity in rats. *Toxicologist* 78(S1):842.
78. Fennell, T.R., R.W. Snyder, W. Krol, M. Friedman, and **S.C. Sumner**. (2003). Hemoglobin adducts from N-methylolacrylamide in rats: comparison with those formed by acrylamide. *Toxicological Sciences* 72:S-1. [Abstract No. 1206].
79. **Sumner, S. C.**, C.C. Williams, R. Snyder, W. Krol, and T.R. Fennell. (2002). Acrylamide: Metabolism and hemoglobin adducts following intraperitoneal, dermal, or inhalation exposure. *Toxicological Sciences* 66:S-1. [Abstract No. 1383].
80. Fennell, T.R., R.W. Snyder, W. Krol, B. Chanas, F. Gonzalez, B.I. Ghanayem, and **S.C. Sumner**. (2002). Effect of CYP2E1 genotype on acrylonitrile hemoglobin adducts. *Toxicological Sciences* 66:S-1. [Abstract No. 1112].
81. Banijamali, A.R., V. DeMatteo, M.H. Gay, R.J. Strunk, and **S.J. Sumner**. (2001). Deuterium Labeling: A Novel Approach in Determining the Biochemical Pathway for the Formation of Bis-Glutathione Conjugates of Propargyl Alcohol in Rats. *221st American Chemical Society National Meeting*. San Diego, CA, April.
82. **Sumner, S.**, B. Ghanayem, B. Asgharian, C. Williams, B. Chanas, F. Gonzalez, and T.R. Fennell. (2001). The role of cytochrome P450 in the metabolism of [¹³C/¹³C]styrene. *Toxicological Sciences* 60(Suppl):403. [Abstract No. 1921].
83. Friedman, M., T.R. Fennell, B. Asgharian, C. Williams, and **S.J. Sumner**. (2001). Metabolism and distribution of acrylamide in rats and mice following inhalation exposure or dermal application. *Toxicological Sciences* 60(Suppl):93. [Abstract No. 444].
84. Fennell, T.R., W. Krol, **S.C.J. Sumner**, and R.W. Snyder. (2001). Placental transfer of dibutylphthalate metabolites in pregnant rats. *Toxicological Sciences*, 60(Suppl):292. [Abstract No. 1390].

85. Friedman, M., **S. Sumner**, C. Williams, and T. Fennell. (2000). Characterization of urinary metabolites of [1, 2, 3-¹³C]acrylamide in male F344 rats following dermal application or ip injection. *Toxicological Sciences* 54(Suppl):296. [Abstract No. 1385].
86. **Sumner, S.**, B. Asgharian, K. Roberts, T.A. Moore, and T.R. Fennell. (2000). 1,1,1,3,3,3-Hexachloropropane: Metabolism and distribution in male and female Sprague Dawley rats. *Toxicological Sciences*, 54(Suppl):57. [Abstract No. 265].
87. Fennell, T.R., R.W. Snyder, S.C. Maness, K.W. Gaido, **S. Sumner**, and F. Welsch. (2000). Metabolism and disposition of bisphenol A in female rats. *Toxicological Sciences* 54(Suppl):371. [Abstract No. 1740].
88. **Sumner, S.**, T. Fennell, T. Moore, B. Chanas, F. Gonzalez, and B. Ghanayem. (1999). The role of cytochrome P450 in the metabolism of acrylamide. *Toxicological Sciences* 48(1-S):110. [Abstract No. 516].
89. **Sumner, S.**, T. Fennell, T. Moore, B. Chanas, F. Gonzalez, and B. Ghanayem. (1999). The role of cytochrome P450 2E1 (CYP 2E1) in acrylonitrile metabolism. *Toxicological Sciences* 48(1-S):110. [Abstract No. 517].
90. Banijamali, A.R., Y. Xu, R.J. Strunk, M.H. Gay, G.J. Putterman, and **S.J. Sumner**. (1999). Identification of Metabolites of [1,2,3-¹³C]Propargyl Alcohol in Mouse Urine by ¹³C NMR and Mass Spectrometry. *2nd Pan-Pacific Conference on Pesticide Science*, Honolulu, HI, October.
91. **Sumner, S.**, B. Asgharian, T. Moore, and T. Fennell. (1998). Metabolism of tertiary amyl methyl ether in mice. *Toxicological Sciences* 42 (1-S):90. [Abstract No. 443].
92. Collins, A. S., **Sumner, S. J.**, Borghoff, S. J., & Medinsky, M. A. (1998). *PBPK modeling and hypothesis testing for TAME and TAA in male Fischer-344 rats*. Poster presented at 1998 National Institute of Environmental Health Sciences (NIEHS) Trainees Assembly Science Fair, NIEHS, Research Triangle Park, NC, December, 1998.
93. Collins, A. S., **Sumner, S. J.**, Borghoff, S. J., & Medinsky, M. A. (1998). *Hypothesis testing of model structures using physiologically based pharmacokinetic models for tert-amyl methyl ether and tert-amyl alcohol*. Presented at the Annual Meeting of the Society for Risk Analysis, Phoenix, AZ, June, 1998.
94. Collins, A. S., **Sumner, S. J.**, Borghoff, S. J., & Medinsky, M. A. (1998). *PBPK modeling and hypothesis testing for TAME and TAA in male Fischer-344 rats*. Poster presented at Fourth National Health and Environmental Effects Research Laboratory's (NHEERL's) Symposium on Research Advances in Risk Assessment, Cary, NC, April, 1998.
95. Collins, A. S., **Sumner, S. J.**, Borghoff, S. J., & Medinsky, M. A. (1998). *Development of a physiologically based pharmacokinetic model for tertiary-amyl methyl ether and tertiary-amyl alcohol in male Fischer-344 rats*. Poster presented at the 37th Annual Meeting of the Society of Toxicology, Seattle, WA, March 1998. *Toxicological Sciences*, 42, 1-S (Abstract No. 702).
96. Selveraj, L., T.R. Fennell, and **S.C.J. Sumner**. (1997). Characterization of phosphodiester adducts produced by the reaction of ethylene oxide with nucleotides. *Fundamental and Applied Toxicology* 36(1, Part 2):97. [Abstract No. 496].
97. **Sumner, S.C.J.**, B. Asgharian, and T.R. Fennell. (1997). Blood pharmacokinetics of tertiary amyl methyl ether in male and female rats and mice following inhalation exposure. *Fundamental and Applied Toxicology* 36(1, Part 2):338. [Abstract No. 1719].

98. **Sumner, S.C.J.**, B. Asgharian, C. Laethem, and T.R. Fennell. (1997). Blood pharmacokinetics of tertiary amyl methyl ether in male and female rats and mice following inhalation exposure. *ISSX Proceedings* 12:144. [Abstract No. 288].
99. Nauhaus, S.K., T.R. Fennell, and **S.C.J. Sumner**. (1996). Metabolites in rat and mouse urine following administration of a mixture of [1,2,3-¹³C]acrylamide and [1,2,3-¹³C]acrylonitrile analyzed by NMR spectroscopy. *Toxicologist* 30:9. [Abstract No. 48].
100. **Sumner, S.C.J.**, S.K. Nauhaus, J.A. Bond, B. Asgharian, and T.R. Fennell. (1996). Characterization of urinary metabolites from Sprague-Dawley rats and B6C3F1 mice exposed to [1,2,3,4-¹³C]butadiene. *Toxicologist* 30:317. [Abstract No. 1628].
101. Banijamali, A.R., R.A. Covey, and **S.J. Sumner**. (1996). Characterization of the urinary metabolites of [1,2,3-¹³C]propargyl alcohol in rats using ¹³C NMR spectroscopy. 211th American Chemical Society National Meeting, New Orleans, LA, March.
102. Cheng, S.-Y., C.D. Brown, T.R. Fennell, and **S.C. Jenkins-Sumner**. (1995). Detecting metabolites in tissues of rats exposed to ¹³C-labeled acrylamide using NMR spectroscopy. *Toxicologist* 15:109 [Abstract No. 576].
103. Cheng, S.-Y., C.D. Brown, T.R. Fennell, and **S.C. Jenkins-Sumner**. (1995). Application of NMR spectroscopy for direct detection of metabolites in tissues of rats exposed to ¹³C-labeled acrylamide. *Int. Toxicologist*, 85-P-6.
104. **Sumner, S.C.**, B. Asgharian, O. Moss, R.C. Cattley, and T.R. Fennell. (1995). Correlating styrene metabolism and distribution with hepatotoxicity. *Toxicologist* 15:4. [Abstract No. 20].
105. Cheng, S.-Y., D.B. Stedman, F. Welsch, T.R. Fennell, and **S.C.J. Sumner**. (1994). Urinary metabolites of [1,2, methoxy-¹³C] 2-methoxyethanol in rats and mice at different doses determined by ¹³C NMR spectroscopy. *Toxicologist* 12:87.
106. Fennell, T.R., N.L. Youtsey, O. Moss, B. Asgharian, and **S.C.J. Sumner**. (1994). Metabolism of inhaled styrene in rats and mice. *Toxicologist* 14:332.
107. **Sumner, S.C.J.**, K. Krishnan, O. Moss, O. Asgharian, and T.R. Fennell. (1993). Evaluation of species and sex differences in the urinary metabolites of [¹³C]-ethylene oxide using NMR spectroscopy. *Toxicologist* 13:402.
108. **Sumner, S.C.J.**, K. Krishnan, O. Moss, O. Asgharian, and T.R. Fennell. 1993. Investigation of species and sex differences in the metabolism and disposition of ethylene oxide. *Proceedings of the American Association for Cancer Research* 34:161.
109. Fennell, T.R., V.E. Walker, and **S.C.J. Sumner**. 1992. A model for the accumulation and removal of hemoglobin adducts. *Toxicologist* 12:191.
110. Yates, J.M., T.R. Fennell, M.J. Turner, L. Recio, and **S.C.J. Sumner**. 1992. Characterization of DNA adducts from the reaction of cyanoethylene oxide with nucleosides, nucleotides, calf thymus DNA, and oligonucleotides that model mutational target sequences. *Toxicologist* 12:249.
111. **Sumner, S.C.J.**, D.B. Stedman, T.R. Fennell, and F. Welsch. 1992. Species and dose effects on the urinary metabolites of [1,2, 3-¹³C] methoxyethanol using NMR spectroscopy. *Toxicologist* 12:387.
112. Fennell, T.R., V.E. Walker, and **S.C.J. Sumner**. 1992. A model for the accumulation and removal of hemoglobin adducts. *Proceedings of the American Association for Cancer Research* 33:147.

113. **Sumner, S.C.J.**, T.R. Fennell, B. Asgharian, O.R. Moss, and J.A. Bond. 1992. Characterization of metabolites in rat and mouse urine following exposure to 1,3-butadiene. *Proceedings of the American Association for Cancer Research* 33:157.
114. Fennell, T.R., **S.C.J. Sumner**, S.D. Held, and G.L. Kedderis. 1991. Detection of urinary metabolites of [1,2,3-¹³C]acrylonitrile in the rat and mouse using ¹³C nuclear magnetic resonance spectroscopy. *Toxicologist* 10:333.
115. **Sumner, S.C.J.**, D.O. Clarke, F. Welsch, and T.R. Fennell. 1991. Urinary metabolites of 2-methoxyethanol determined by NMR spectroscopy. *Toxicologist* 11:50.
116. **Sumner, S.C.J.**, and T.R. Fennell. 1991. The assignment and quantitation of urinary metabolites of acrylonitrile in the rat and mouse using NMR spectroscopy. *Proceedings of the American Association for Cancer Research* 32:123.
117. Fennell, T.R., and **S.C.J. Sumner**. 1991. NMR characterization of the complex mixture of endogenous and exogenous metabolites in urine. *Proceedings of the 32nd Experimental NMR Spectroscopy Conference* 199.
118. **Sumner, S.C.J.**, J.P. MacNeela, and T.R. Fennell. 1990. Urinary metabolites of [1,2,3-¹³C]acrylamide determined by ¹³C nuclear magnetic resonance spectroscopy. *Toxicologist* 10:332.

Selected Invited Presentations

1. *Harmonization of Untargeted Analysis Cores for the Children's Health Exposure Analysis Resource (CHEAR) Hub*. International Society of Exposure Sciences. Utrecht, Netherlands. October 10, 2016.
2. *Structure Equation Modelling to Link Exposure to Health Outcomes via the MetaboType of Cord Blood*. International Society of Exposure Sciences. Utrecht, Netherlands. October 10, 2016.
3. *Metabolomics in Women's Health*, University of California at Davis, September, 7, 2016.
4. *Metabolomics in Maternal and Child Health*, Presented at National Institute of Standards and Technology, Charleston, South Carolina, August 1, 2016.
5. *Experiences as a Regional Metabolomics Center*. 4th Annual Workshop on Metabolomics, University of Alabama Birmingham, July 17-21, 2016.
6. *Early biomarkers to predict risk of third trimester placental abruption*. June 30, 2016 Metabolomics Society Meeting, Dublin, Ireland.
7. *Metabolomics in Nutrition Research*. Presented at the Nutrigenomics, Nutrigenomics, and Precision Nutrition Workshop. May 22-26, 2016.
8. *Metabolomics in Nutritional Research, and Implications in Blood Type Research*. Presented at American Society for Nutrition (ASN) Experimental Biology, Promise of Metabolomics for Advancing Nutrition Research, San Diego, CA. April 6, 2016.
9. *Biomarkers in Maternal and Child Health*. Presented at New York University Medical Center, New York, NY. January 29, 2016.
10. *Metabolomics for Pediatric Biomarkers*. J. Yaffe Memorial Lecture Series, Eunice Kennedy Shriver National Institute of Child Health and Human Development. Bethesda, MD. January 16, 2016.

11. *Metabolomics in Maternal and Child Health*. Presented at the University of Michigan Medical School, Ann Arbor, MI. December 9, 2015.
12. *Metabolomics to Reveal Markers of the Environmental Influence of Disease in Pregnancy and Early in Life*. Presented at Emory University, Atlanta, GA. October 13, 2015.
13. *Metabolomics as a Tool for Characterizing the Exposome*. Presented at the National Academy of Sciences, Washington, DC. May 28–29, 2015.
14. *New Horizons. Metabolomics of Kidney Disease*. Presented at the Emerging Trends in Dialysis Care. SUNY DownState Medical Center, NY, May 8, 2015.
15. *Metabolomics in Epidemiology*. Presented to the School of Veterinary Medicine, North Carolina State University, Raleigh, NC. March 2015.
16. *Why Biomarkers Matter*. Presented at Cancer Prevention in India: Catalyzing Action and Enhancing Implementation, New Delhi, India. February 20, 2015.
17. *Translational Sciences*. Presented to the Department of Biology, North Carolina AT&T State University, Greensboro, NC. January 30, 2015.
18. *Metabolomics in Environmental Sciences*. Presented at the Nicholas School of the Environment, Duke University, Durham, NC. January 28, 2015.
19. *Metabolomics to Provide Biomarkers and Mechanistic Insights*. INDO-US Symposium: Mass Spectrometry Based Metabolomics in Disease Biology, Trivandrum, Kerala, India. January 23–24, 2014.
20. *Metabolomics in Toxicology*. Presented to the American Chemical Society, Indianapolis, IN. October 10, 2013.
21. *Metabolomics at RTI*. Presented at the Metabolomics Society Meeting, Glasgow, Scotland. July 2013.
22. *Metabolomics in Urology*. Presented at the NIH Workshop at Lister Hill, Bethesda, MD. February 2013.
23. *Personalized Medicine and Environmental Omics*. Presented at the Environmental Omics Conference, Guangzhou, Guangdong Province. November 8–12, 2011.
24. *Metabolomics for the Midwestern Pediatric Nephrology Consortium*. Presented in Chicago, IL. November 11, 2012.
25. *Metabolomics in Epidemiology*. Presented at the University of North Carolina at Chapel Hill, Chapel Hill, NC. November 2012.
26. *Metabolomics in Pharmacology*. Presented at the Duke University, Durham, NC. November 2012.
27. *Metabolomics in Clinical Research*. Presented at Wake Forest University, Greensboro, NC. October 2012.
28. *Personalized medicine and environmental OMICS. Session E2*. Presented at 2011 International Conference on Environmental OMICS (ICEO), November 11, 2011, Guangzhou, China.
29. *Biomarkers in Personalized Medicine: Applications of Metabolomics to Provide Biomarkers for the Treatment of Obesity, Liver Injury, and Reproduction and Development Outcomes*. Presented to the American Association for the Advancement of Sciences, Washington, DC. February 19, 2011.

30. *Applications of Metabolomics*. National Toxicology Program. Presented at NIEHS, RTP, NC. June 16, 2010.
31. Panelist, Personalized Medicine Symposium, sponsored by RTI and the North Carolina Biotechnology Center (NCBC), Sheraton Imperial Hotel and Convention Center, RTP, NC. June 15, 2010.
32. *Emerging Technologies in Personalized Medicine*. Presented at the Brody School of Medicine, East Carolina University, Greenville, NC. February 4, 2010.
33. *Metabolomics and Proteomics: Early and Sensitive Markers for Personalized Medicine*. Presented at the RTI Fellows' Symposium, Friday Center, Chapel Hill, NC. November 2, 2009.
34. *Incorporation of 'Omics in the Study of Reproduction and Development*. Presented to SOT, Baltimore, MD. March 2009.
35. *Metabolomics in Drug Discovery and Drug Development*. Presented to the Eastern Analytical Society (EAS), Somerset, NJ. November 17–20, 2008.
36. *Metabolomics in the Study of Reproduction and Development*. Presented at the Women's Health Initiative, Friday Center, Chapel Hill, NC. April 2, 2008.
37. *Metabolomics: Application to the Study of Phthalates in Reproduction and Development*. Presented at the SOT Meeting, Seattle, WA. March 17, 2008.
38. *Metabolomics: Applications to Pediatrics Health*. Presented at the 5th Annual Pediatric Healthy Weight Conference, Greenville, NC. March 6, 2008.
39. *Biomarkers in Translational Medicine*. Presented at the Innovations and Technologies for India's Public Health System, New Delhi, India. November 1–2, 2007.
40. *Metabolomics in the Study of Endocrine Disruption*. Presented to EPA's Endocrine Disrupting Chemical Discussion Group, EPA, RTP, NC. October 10, 2007.
41. *Developing Markers Informative of Adverse Response from Drugs or Chemicals*. Presented at the Advances in Metabolite Profiling Conference, London, England. October 17–19, 2006.
42. *Metabolomics in Reproductive Toxicology*. Presented at the Science and Engineering Fellows Symposium (Sponsor: Rochelle Tyl), RTI, RTP, NC. September 2006.
43. *Metabolomics and biomarkers*. New Jersey Drug Metabolism Group Symposium, Somerset, NJ. October 2005.
44. *Metabolomics: Promises and Realities*. Presented at the Fox Chase Cancer Research Center, Buckingham, PA. April 2005.
45. *Metabolomics, Biomarkers, and Cross Species Extrapolation*. Presented at the Board of Scientific Councilors EPA Workshop, National Academy of Sciences, Washington, DC. February 2005.
46. *Cross-species Extrapolation of Toxicogenomics Data*. Presented at the Board of Scientific Councilors' EPA Workshop, National Academy of Sciences Workshop, Washington, DC. August 2004.
47. *Metabolomics: Data Analysis and Pathway Mapping*. Presented at the NIH ADME/Toxicity Summit, NIH Lister Hill, Bethesda, MD. June 2004.
48. *From Metabolites to the Metabolome: Chemistry and Biochemistry Symposium*. Presented at the University of North Carolina at Wilmington, Wilmington, NC. January 29, 2004.

SUSAN C.J. SUMNER

49. *Metabolomics and Pathway Mapping*: Triangle Array Users Group. Presented at NCBC, RTP, Park, NC. November 2003.
50. *Metabolomics: Processes and Approaches*. Presented to the NIEHS ToxPath Working Group, NIEHS, RTP, NC. June 2003.
51. *Metabolomics: From Genes to Cells to Systems*. Presented to the NIEHS International Workshop on Metabonomics, NIEHS, RTP, NC. May 2003.
52. Lecturer, Continuing Education Course, *Applications of NMR Spectroscopy in Toxicology*. Presented to SOT. March 1993.