

## **Nathan J. Cherrington, Ph.D.**

Professor, 1885 Society Distinguished Scholar  
Dept. of Pharmacology and Toxicology  
College of Pharmacy  
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### EDUCATION:

B.S.	1993	Brigham Young University, Provo, UT	Zoology
Ph.D.	1997	North Carolina State University, Raleigh, NC “ <i>Murine Hepatic Flavin-Containing Monooxygenases (FMO): Gender Differences across Species, Developmental Pattern, and Molecular Cloning and Expression in E. Coli.</i> ” Advisor, Ernst Hodgson	Toxicology
Postdoc	2002	Univ. of Kansas Medical Center, Kansas City, KS Advisor, Curtis D. Klaassen	Toxicology

### EMPLOYMENT:

2012-Present	Professor and 1885 Distinguished Scholar, Dept. of Pharmacology and Toxicology, University of Arizona, Tucson, AZ.
2011-Present	Director of Graduate Studies and Head, Dept. of Pharmaceutical Sciences, College of Pharmacy, University of Arizona, Tucson, AZ.
2008-2012	Associate Professor, Dept. of Pharmacology and Toxicology, University of Arizona, Tucson, AZ.
2010-Present	Associate Professor, Community Environment and Policy Division, Mel & Enid Zuckerman College of Public Health, University of Arizona, Tucson, AZ.
2002-2008	Assistant Professor, Dept. of Pharmacology and Toxicology, College of Pharmacy, University of Arizona, Tucson, AZ. Member, Southwest Environmental Health Sciences Center
1998-2002	Postdoctoral Fellow, University of Kansas Medical Center, Department of Pharmacology, Toxicology and Therapeutics. Dr. Curtis D. Klaassen Project: Coordinate regulation of xenobiotic transporter and drug metabolism genes.
1993-1997	Graduate Student, North Carolina State University, Department of Toxicology, Dr. Ernest Hodgson

Project: Role of flavin-containing monooxygenases in pesticide and drug metabolism.  
 1991-1993 Undergraduate Research Assistant, Brigham Young University, Department of Zoology, Dr. Gary M. Booth.  
 Project: Coupling supercritical fluid chromatography to biological endpoint assays.

SERVICE/OUTREACH:

- INTRAMURAL
- NIEHS Southwest Environmental Health Sciences Center, Director, Research Focus Group 4, Exposure Fate and Disposition 2008-Present
- NIEHS Southwest Environmental Health Sciences Center, Director, Pilot Projects Program 2008-Present
- Faculty Advisor, Rho Chi Honor Society 2010-Present
- Director of Graduate Studies, College of Pharmacy 2011-Present
- Chair, Faculty Search Committee 2013-Present
- University Faculty Small Grants Program Chair, Medical/Health Sciences 2009
- Graduate College Teaching and Mentoring Awards Review Committee 2009
- University Transformation Graduate Program Assessment Committee 2009
- Faculty Search Committee, Pharmacy Practice (filled 3 positions) 2008
- Department Chair 5-year Review Committee 2008-2009
- College of Pharmacy Academic Progress Committee 2008-2010
- College of Pharmacy ACPE Steering Committee 2008-2010
- University Graduate College Teaching and Mentoring Awards Committee 2008
- Pharmacology and Toxicology Graduate Program Chair 2007-2012
- University Graduate Council Member 2006-2012
- College of Pharmacy Evaluation and Special Study Committee 2006-Present
- College of Pharmacy Curriculum Committee 2003-2006
- Chair, Electives Courses Sub-Committee, College of Pharmacy Curriculum Committee 2003-2006
- Executive Committee, Pharmacology and Toxicology Graduate Program 2003-2012
- Executive Committee, NIEHS Training Grant in Toxicology and Toxicogenomics 2005-Present
- Comprehensive Exam Coordinator, Pharmacology and Toxicology Graduate Program 2003-2012
- Medicinal Chemistry and Pharmacology and Toxicology Graduate Program Recruiter, trips to Northern Arizona and Brigham Young (2) 2003-2004
- Undergraduate Biology Research Program – Careers, College of Pharmacy Rep. 2004
- Faculty Search Committees, College of Public Health 2004, 2006
- Interviewer, College of Pharmacy Admissions 2003-Present
- Presenter, Southwest Environmental Health Sciences Center COEP Teacher Summer Workshop 2004-Present
- Judge, Minority Health Disparities Summer Research Program 2004
- Faculty Search Committees (4), Pharmacology and Toxicology 2005-2008

- EXTRAMURAL

Professional Organizations

Secretary/Treasurer, Society of Toxicology Mechanisms Specialty Section	2012-2014
Society of Toxicology Communications Committee	2011-Present
Scientific Advisory Board, 17th North American ISSX Meeting	2010-2011
17th North American ISSX Meeting, Symposium Co-Chair	2011
Organizing Committee, LDS Life Science Research Symposium	2010-Present
Society of Toxicology, Committee on Diversity Initiatives, Member	2009-2012
Society of Toxicology, Undergraduate Program Scientific Symposium	2009-2012
Society of Toxicology National Meeting, Symposium Co-Chair	2008-2009
Secretary/Treasurer, Mountain West Society of Toxicology Regional Chapter	2003-2007
Discussion Leader and Session Chair, Gordon Research Conference	2006
Chair, Awards Committee, Mountain West Society of Toxicology Regional Chapter	2003-2005
Session Chair, Society of Toxicology Meeting	2004
Local Organizing Committee, Biological Reactive Intermediates VII International Symposium	2005-2006

Study Sections

NIEHS Environmental Health Sciences Review Committee Member	2012-2016
NIH Special Emphasis Panel, Program Projects	2012
EPA/NHEERL Cooperative Training Partnership in Environmental Sciences	2011
NIH Small Business Study Section, Digestive Sciences Review Panel	2011
NIH/NIDDK Ancillary Studies to Ongoing Clinical Studies	2011
NIH Recovery Act RC4 Review Panel	2010
Wellcome Trust Scientific Review	2010
NIH Study Section Member, Hepatobiliary Pathophysiology, Toxicology and Pharmacology Review Panel: Member Conflicts Session	2009-2010
NIH Study Section, ARRA Challenge Grants in Health and Science (XNDA)	2009
NIH Study Section, NIDDK Ad hoc Review Committee	2009
NIH Study Section Member, NIEHS Superfund Review	2008
NIH Study Section Xenobiotic and Nutrient Disposition and Action (XNDA), Ad hoc Member	2007
NIH/NIDDK/NHLBI: Ancillary Studies to Major Ongoing Clinical Studies	2007
NCCAM Exploratory Research Special Emphasis Study Section ZAT1 DB	2006-2007

Journals

Editorial Board, <i>Toxicological Sciences</i>	2009-Present
Editorial Board, <i>Toxicology and Applied Pharmacology</i>	2008-Present
Editorial Board, Drug Metabolism and Disposition	2007-Present
Editorial Board, Toxicology Letters	2007-2010
Editorial Board, Journal of Biochemical and Molecular Toxicology	2007-Present
Reviewer for several journals (ad hoc): <i>Hepatology</i> , <i>Life Sciences</i> , <i>Journal of Hepatology</i> , <i>Journal of Pharmacology &amp; Experimental Therapeutics</i> , <i>Toxicology Mechanisms and Methods</i> , <i>Biochemical Pharmacology</i> , <i>Archives of Toxicology</i>	

HONORS/AWARDS:

1885 Society Distinguished Scholar, University of Arizona	2012
Society of Toxicology Achievement Award (One of two major awards given by SOT)	2011

TEACHING:

General and Systems Toxicology\* (PCOL 602A) 2003-Present  
Required course for Ph.D. and M.S. degrees in Pharmacology and Toxicology  
6 lectures each fall semester  
\* Course Coordinator

Drug Metabolism and Disposition\* (PCOL 550) 2003-Present  
Required course for Ph.D. and M.S. degrees in Pharmacology and Toxicology  
9 lectures each spring semester  
\* Course Coordinator

Science of Pharmacology (PCOL 871A) 2003-Present  
Required course for Pharm.D., Ph.D. and M.S. degrees  
6 lectures each fall semester

Cellular Communications and Signal Transduction (PCOL 630B) 2005-Present  
Required course for Ph.D. and M.S. degrees in Pharmacology and Toxicology  
3-4 lectures each fall semester

Case Studies in Biochemical Pharmacology (PCOL 870/871) 2003-Present  
Required course for Pharm.D. students  
3 case studies each fall and spring semesters  
Authored "Marilyn Daines" Acetaminophen Toxicity case

Individualized Medicine: Applied Pharmacogenetics (PHPR 887) 2010-Present  
Required course for Pharm.D. students  
2 lectures each spring semester

Advanced Toxicology\* (PCOL 596C) 2004-2010  
Required course for Ph.D. and M.S. degrees in Pharmacology and Toxicology  
6-7 lectures each fall semester  
\* Course Coordinator

Pharmacogenetics/Pharmacogenomics (PCOL 820) 2003-2007  
Elective course for Pharm.D. and Ph.D. students  
4 lectures each fall semester

Research Conference (Colloquium) (PCOL695A) 2003-Present  
Required course for Ph.D. and M.S. degrees  
Laboratory instruction fall and spring semester

Intro to Pharmacology/Toxicology Research (PCOL586B) Required course for Ph.D. and M.S. degrees Laboratory introduction fall and spring semester	2003-Present
Doctoral Research (PCOL900) Required course for Ph.D. and M.S. degrees fall and spring semester	2003-Present
Dissertation Research (PCOL920) Required course for Ph.D. and M.S. degrees fall and spring semester	2003-Present
Current Topics in Pharmacology/Toxicology* (PHSC 596H) Elective course discontinued by curriculum overhaul 8 lectures spring semester * Course Coordinator	2002-2004

MENTORING:

Ph.D. Graduate Committees

Andrew Lickteig, Pharmacology and Toxicology (major advisor) (2007)  
Lisa Ahern, Pharmacology and Toxicology (major advisor) (2008)  
Craig Fisher, Pharmacology and Toxicology (major advisor) (2009)  
Matthew Merrell, Pharmacology and Toxicology (major advisor) (2010)  
Rhiannon Hardwick, Pharmacology and Toxicology (major advisor) (2012)  
April Lake, Pharmacology and Toxicology (major advisor)  
Mark Canet, Pharmacology and Toxicology (major advisor)  
David Klein, Pharmacology and Toxicology (major advisor)  
Anika Schwander, Pharmacology and Toxicology (major advisor)  
Steven Warner, Medicinal Chemistry (2004)  
Yvonne Pak, Pharmaceutical Sciences (2005)  
Huadong Tang, Pharmaceutical Sciences (2005)  
Nick Roman, Pharmacology and Toxicology (2005)  
Chris Orton, Pharmacology and Toxicology (2006)  
Tiffany Bredfelt, Pharmacology and Toxicology (2006)  
Kathila Rajapaksa, Physiology (2007)  
Haipeng Sun, Medical Pharmacology (2007)  
Taylor Jensen, Pharmacology and Toxicology (2008)  
Timothy Marshall, Medical Pharmacology (2009)  
Yaofeng Cheng, Medical Pharmacology (2010)  
Samantha Kendrick Cancer Biology (2010)  
Gabe Knudsen Medical Pharmacology (2011)  
Weixi Kong Medical Pharmacology (2012)  
Joe Herndon, Pharmacology and Toxicology  
Alexandria Lau, Pharmacology and Toxicology (2012)

James Sollome, Pharmacology and Toxicology  
Sarah Lamore, Pharmacology and Toxicology (2012)  
Sean O'Connell, Pharmaceutics  
Bethzaida Astorga, Physiological Sciences (2011)  
Nick Mastrandrea, Pharmacology and Toxicology  
Tongde Wu, Pharmacology and Toxicology  
Shuxi Qiao, Pharmacology and Toxicology  
Christopher Sanchez, Pharmacology and Toxicology  
Tianfang (Sherly) Huang, Pharmacology and Toxicology  
Ryan Canetsey, Pharmacology and Toxicology  
Anika Schwander, Pharmacology and Toxicology

M.S. Graduate Committees

Jason Orozco, Pharmacology and Toxicology (2005)  
David Aguilar, Pharmacology and Toxicology (2008)  
Golriz Rad, Medical Pharmacology (2009)  
Parvathi Sinha, Pharmacology and Toxicology (2010)

Rotating Graduate Students

Kathila Rajapaksa, Physiology  
Taylor Jensen, Toxicogenomics  
Sarah Salt, Pharmacology and Toxicology  
Chieko Saito, Physiology  
April Robb, Pharmacology and Toxicology  
Nichole Villeneuve, Pharmacology and Toxicology  
Dima Hami, Pharmacology and Toxicology  
Sarah Lamore, Pharmacology and Toxicology  
Alexandria Lau, Pharmacology and Toxicology  
Rhiannon Hardwick, Pharmacology and Toxicology  
Parvathi Sinha, Pharmacology and Toxicology  
April Lake, Pharmacology and Toxicology  
Pablo Sanchez, Pharmacology and Toxicology  
Lucinda Lizzaraga, Pharmacology and Toxicology  
Mark Canet, Pharmacology and Toxicology  
Tianfang (Sherly) Huang, Pharmacology and Toxicology  
Jessica Sapiro, Pharmacology and Toxicology  
David Klein, Pharmacology and Toxicology  
Anika Schwander, Pharmacology and Toxicology  
Ashley Knudsen, Pharmacology and Toxicology  
Kathleen Yeh, Pharmacology and Toxicology

PUBLICATIONS:

1. Cherrington, N.J., Falls, J.G., Rose, R.L., Clements, K.M., Philpot, R.M., Levi, P.E., and Hodgson, E. Molecular cloning, sequence and expression of mouse flavin-containing monooxygenases 1 and 5. *J Biochem Mol Toxicol*. 1998; 12: 205-212.

2. Cherrington, N.J., Cao, Y., Cherrington, J.W., Rose, R.L., and Hodgson, E. Physiological factors effecting protein expression of flavin-containing monooxygenases 1, 3, and 5. *Xenobiotica* 1998; 28: 673-82.
3. Falls, J.G., Cherrington, N.J., Clements, K.M., Philpot, R.M., Levi, P.E., and Hodgson, E. Molecular cloning, sequencing, and expression in E. Coli of mouse flavin-containing monooxygenase 3 (FMO3): comparison with the human isoform. *Arch Biochem Biophys.* 1997; 347: 9-18.
4. Hodgson, E., Cherrington, N. J., Coleman, S. C., Liu, S., Falls, J. G., Cao, Y., Goldstein, J. E., and Rose, R. L. Flavin-containing monooxygenase and cytochrome P450 mediated metabolism of pesticides: from mouse to human. *Revs. Toxicology* 1998;231-44.
5. Hodgson, E., Rose, R. L., Cherrington, N. J., and Philpot, R. M. \*Biochemical Aspects of Flavin-Containing Monooxygenases (FMOs) Proceedings of *NATO ASI*, Plenum Press, (Arinc E, Schenkman JB, and Hodgson E. Eds). 1998.
6. Takiguchi, M., Cherrington, N.J., Hartley, D.P., Klaassen, C.D., and Waalkes, M.P. Cyproterone acetate induces a cellular tolerance to cadmium in rat liver epithelial cells involving reduced cadmium accumulation. *Toxicology* 2001; 165: 13-25.
7. Cherrington, N.J. Hartley, D.P. Li, N. Johnson, D.R. and Klaassen, C.D. Organ distribution of multidrug resistance proteins 1, 2, and 3 (Mrp1, 2 and 3) mRNA and hepatic induction by constitutive androstane receptor (CAR) activators in rat. *J Pharmacol Exp Ther* 2002; 300: 97-104.
8. Slitt, A.L., Cherrington, N.J., Hartley, D.P., Leazer, T.M. and Klaassen, C.D. Tissue specific expression of the organic cation transporters. *Drug Metab Dispos* 2002; 30: 212-219.
9. Buist, S.C.N., Cherrington, N.J., Choudhuri, S., Hartley, D.P. and Klaassen, C.D. Tissue and developmental expression of rat organic anion transporters (OATs). *J Pharmacol Exp Ther* 2002; 301: 145-51.
10. Li, N., Hartley, D.P., Cherrington, N.J. and Klaassen, C.D. Tissue expression, ontogeny, and inducibility of organic anion transporting polypeptide 4 (Oatp4). *J Pharmacol Exp Ther* 2002; 301: 551-60.
11. Park, J.D., Cherrington, N.J., and Klaassen, C.D. Intestinal absorption of cadmium is regulated by divalent metal transporter 1 in rats. *Toxicol Sci.* 2002; 68:288-94
12. Brady, J.M., Cherrington, N.J., Hartley, D.P., Li, N. and Klaassen, C.D. Tissue expression and chemical inducibility of multiple drug resistance genes in rats. *Drug Metab Dispos.* 2002; 30:838-44
13. Buist, S.C.N., Cherrington, N.J., and Klaassen, C.D. Endocrine regulation of rat organic anion transporter expression. *Drug Metab Dispos.* 2003 :559-64
14. Shelby, M.K., Cherrington, N.J., Vansell, N.R., and Klaassen, C.D. Tissue expression of the rat UDP-Glucuronosyltransferase superfamily. *Drug Metab Dispos.* 2003 :326-33.
15. Slitt, A.L. Cherrington, N.J. Maher, J.M. and Klaassen, C.D. Increased plasma levels of acetaminophen-glucuronide is associated with induction of multidrug resistance protein 3 (Mrp3) in liver. *Drug Metab Dispos.* 2003; 31:1176-86.
16. Choudhuri\*, S., Cherrington\*, N.J., Li, N. and Klaassen, C.D. (\* denotes equal contribution) Constitutive expression of various xenobiotic and endobiotic transporter mRNA in the choroid plexus of adult sprague-dawley rats. *Drug Metab Dispos.* 2003; 31:1337-45.
17. Cherrington, N.J., Slitt, A.L., Maher, J.M., Zhang, X.X., Zhang, J., Huang, W., Wan, Y., Moore, D.D., and Klaassen, C.D. Induction of multidrug resistance protein 3 (Mrp3) in vivo is independent of constitutive androstane receptor. *Drug Metab Dispos.* 2003; 31:1315-9.

18. Wright, S.H., Evans, K.K., Zhang, X., Cherrington, N.J., Sitar, D.S., and Dantzer, W.H. Functional map of TEA transport activity in isolated rabbit renal proximal tubules. *Am J Physiol Renal Physiol.* 2004; 287: F442-51
19. Cherrington, N.J., Slitt, A.L., Li, N., and Klaassen, C.D. Lipopolysaccharide-mediated regulation of hepatic transporter mRNA levels in rats. *Drug Metab Dispos* 2004 32: 734-741
20. Li, N., Choudhuri, S., Cherrington, N.J., and Klaassen, C.D. Down-regulation of mouse organic anion transporting polypeptide 4 (Oatp4; Slc21a10) by lipopolysaccharide is through the toll-like receptor 4 (TLR4). *Drug Metab Dispos* 2004 32: 1265-1271.
21. Aleksunes, L.M., Slitt, A.L., Cherrington, N.J., Thibodeau, M.S., Klaassen, C.D., and Manautou, J.E. Differential expression of mouse hepatic transporter genes in response to acetaminophen and carbon tetrachloride. *Toxicol Sci.* 2005; 83:44-52
22. Augustine, L.M., Markelewicz, R.J., Boekeleide, K., and Cherrington, N.J. Xenobiotic and endobiotic transporter mRNA expression in the blood-testis barrier. *Drug Metab Dispos* 2005; 33:182-9.
23. Rose RL, Tang J, Choi J, Cao Y, Usmani A, Cherrington N, Hodgson E. Pesticide metabolism in humans, including polymorphisms. *Scand J Work Environ Health* 2005;31 suppl 1:156-163
24. Erickson RP, Bhattacharyya A, Hunter RJ, Heidenreich RA, Cherrington NJ. Liver disease with altered bile acid transport in Niemann-Pick C mice on a high-fat, 1% cholesterol diet. *Am J Physiol Gastrointest Liver Physiol.* 2005; 289:G300-7.
25. Maher JM, Slitt AL, Cherrington NJ, Cheng X, Klaassen CD. Tissue distribution and hepatic and renal ontogeny of the multidrug resistance-associated protein (MRP) family in mice. *Drug Metab Dispos* 2005; 33:947-55
26. Maher JM, Cherrington NJ, Slitt AL, Klaassen CD. Tissue distribution and induction of the rat multidrug resistance-associated proteins 5 and 6. *Life Sci.* 2006 78:2219-25
27. Groves CE, Suhre WB, Cherrington NJ, Wright SH. Sex Differences in the mRNA, protein and functional Expression of Oat1, Oat3 and Oct2 in Rabbit Renal Proximal Tubules. *J Pharmacol Exp Ther.* 2005 316:743-52
28. Slitt, AL, Cherrington, NJ, Dieter, MZ, Huang, W, Aleksunes, LM, Scheffer, GL, Moore, DD, Klaassen, CD. Trans-stilbene oxide induces expression of genes involved in metabolism and disposition in mouse liver via CAR and Nrf2 transcription factors. *Mol Pharmacol.* 2006; 69:1554-63
29. Slitt AL, Cherrington NJ, Fisher CD, Negishi M, Klaassen CD. Induction of genes for metabolism and transport by trans-stilbene oxide in livers of sprague-dawley and wistar-kyoto rats. *Drug Metab Dispos.* 2006; 34:1190-7.
30. Das PC, Cao Y, Cherrington N, Hodgson E, Rose RL. Fipronil induces CYP isoforms and cytotoxicity in human hepatocytes. *Chem Biol Interact.* 2006; 164:200-14
31. Slitt AL, Allen K, Morrone J, Aleksunes LM, Chen C, Maher JM, Manautou JE, Cherrington NJ, Klaassen CD. Regulation of transporter expression in mouse liver, kidney, and intestine during extrahepatic cholestasis. *Biochim Biophys Acta.* 2007; 1768:637-47.
32. Lickteig AJ, Slitt AL, Arkan MC, Karin M, Cherrington NJ. Differential regulation of hepatic transporters in the absence of TNF- $\alpha$ , IL-1 $\beta$  and NF- $\kappa$ B in two models of cholestasis. *Drug Metab Dispos.* 2007; 35:402-9
33. Aleksunes LM, Slitt AL, Maher JM, Dieter MZ, Knight TR, Goedken M, Cherrington NJ, Chan JY, Klaassen CD, and Manautou JE. Nrf2 expression in liver is critical for induction

- of NAD(P)H:quinone oxidoreductase 1 during cholestasis. *Cell Stress Chaperones*. 2006; 11:356-63.
34. Fisher CD, Augustine LM, Maher JM, Klaassen CD, Nelson DM, Lehman-McKeeman LD, and Cherrington NJ. Activation of CAR and Nrf2 in the induction of drug metabolizing enzymes by garlic and allyl sulfide compounds. *Drug Metab Dispos*. 2007; 35:995-1000.
  35. Lickteig AJ, Fisher CD, Augustine LM, Aleksunes LM, Besselsen DG, Slitt AL, Manautou JE, and Cherrington NJ. Efflux transporter expression and acetaminophen metabolite excretion are altered in rodent models of non-alcoholic fatty liver disease. *Drug Metab Dispos*. 2007; 35:1970-8
  36. Zhang X, Cherrington NJ, and Wright, SH. Molecular identification and functional characterization of rabbit Mdr1 and Mdr2-K. *Am J Physiol Renal Physiol*. 2007; 293:F360-70.
  37. Barnes SN, Aleksunes LM, Augustine L, Scheffer GL, Goedken M, Jakowski AB, Pruimboom-Brees IM, Cherrington NJ, Manautou JE. Induction of hepatobiliary efflux transporters in acetaminophen-induced acute liver failure cases. *Drug Metab Dispos*. 2007; 35:1963-9
  38. Lickteig AJ, Fisher CD, Augustine LM, and Cherrington NJ. Genes of the antioxidant response undergo up-regulation in a rodent model of nonalcoholic steatohepatitis. *J Biochem Mol Toxicol*. 2007; 21:216-20.
  39. Aleksunes LM, Augustine LM, Cherrington NJ, Manautou JE. Influence of acetaminophen vehicle on regulation of transporter gene expression during hepatotoxicity. *J Toxicol Environ Health A*. 2007; 70:1870-2.
  40. Aleksunes LM, Slitt AL, Maher JM, Augustine LM, Goedken MJ, Chan JY, Cherrington NJ, Klaassen CD, Manautou JE. Induction of Mrp3 and Mrp4 transporters during acetaminophen hepatotoxicity is dependent on Nrf2. *Toxicol Appl Pharmacol*. 2008; 226:74-83.
  41. Beilke LD, Besselsen DG, Cheng Q, Kulkarni S, Slitt AL, Cherrington NJ. Minimal role of hepatic transporters in the hepatoprotection against LCA-induced intrahepatic cholestasis. *Toxicol Sci*. 2008; 102:196-204.
  42. Cheng Q, Aleksunes LM, Manautou JE, Cherrington NJ, Scheffer GL, Yamasaki H, Slitt AL. Drug-metabolizing enzyme and transporter expression in a mouse model of diabetes and obesity. *Mol Pharm*. 2008; 5:77-91.
  43. Das PC, Streit TM, Cao Y, Rose RL, Cherrington N, Ross MK, Wallace AD, Hodgson E. Pyrethroids: cytotoxicity and induction of CYP isoforms in human hepatocytes. *Drug Metabolism and Drug Interactions*. 2008; 23:211-36.
  44. Das PC, Cao Y, Roset RL, Cherrington N, Hodgson E. (2008) Enzyme induction and cytotoxicity in human hepatocytes by chlorpyrifos and N,N-diethyl-m-toluamide (DEET). *Drug Metabolism and Drug Interactions*. 2008; 23:237-60.
  45. Merrell MD, Augustine LM, Slitt AL, Cherrington NJ. Induction of drug metabolism enzymes and transporters by oltipraz in rats. *J Biochem Mol Toxicol*. 2008; 22:128-35.
  46. Augustine LM, Fisher CD, Lickteig AJ, Aleksunes LM, Slitt AL, Cherrington NJ. Gender divergent expression of Nqo1 in Sprague Dawley and August Copenhagen x Irish rats. *J Biochem Mol Toxicol*. 2008; 22:93-100.
  47. Merrell MD, Jackson JP, Augustine LM, Fisher CD, Slitt AL, Maher JM, Huang W, Moore DD, Zhang Y, Klaassen CD, Cherrington NJ. The Nrf2 activator oltipraz also activates the constitutive androstane receptor. *Drug Metab Dispos*. 2008; 36:1716-21.

48. Fisher CD, Jackson JP, Lickteig AJ, Augustine LM, Cherrington NJ. Drug metabolizing enzyme induction pathways in experimental non-alcoholic steatohepatitis. *Arch Toxicol.* 2008; 82:959-64
49. Champion SN, Johnson R, Aleksunes LM, Goedken MJ, van Rooijen N, Scheffer GL, Cherrington NJ, Manautou JE. Hepatic Mrp4 Induction Following Acetaminophen Exposure is Dependent on Kupffer Cell Function. *Am J Physiol Gastrointest Liver Physiol.* 2008; 295:G294-304
50. Lickteig AJ, Cheng X, Augustine LM, Klaassen CD, Cherrington NJ. Tissue distribution, ontogeny and induction of the transporters Multidrug and toxin extrusion (MATE) 1 and MATE2 mRNA expression levels in mice. *Life Sci.* 2008; 83:59-64.
51. Aleksunes LM, Augustine LM, Scheffer GL, Cherrington NJ, Manautou JE. Renal xenobiotic transporters are differentially expressed in mice following cisplatin treatment. *Toxicology.* 2008; 250:82-8.
52. Fisher CD, Lickteig AJ, Augustine LM, Besselsen DG, Erickson RP, and Cherrington NJ. Experimental non-alcoholic fatty liver disease results in decreased hepatic uptake transporter expression and function in rats. *Eur J Pharmacol.* 2009; 613:119-27.
53. Beilke LD, Aleksunes LM, Holland R, Besselsen DG, Beger RD, Klaassen CD, and Cherrington NJ. Car-mediated changes in bile acid composition contributes to hepatoprotection from LCA-induced cholestasis in mice. *Drug Metab Dispos.* 2009; 37:1035-45.
54. Beilke LD, Aleksunes LM, Olson ER, Besselsen DG, Klaassen CD, Dvorak K, and Cherrington NJ. Decreased apoptosis in car-mediated hepatoprotection of lithocholic acid-induced cholestasis in mice. *Tox Lett.* 2009; 188:38-44
55. Champion SN, Tatis-Rios C, Augustine LM, Goedken MJ, van Rooijen N, Cherrington NJ, and Manautou JE. Effect of allyl alcohol on hepatic transporter expression: zonal patterns of expression and role of Kupffer cell function. *Toxicol Appl Pharmacol.* 2009; 236:49-58.
56. Fisher CD, Lickteig AJ, Augustine LM, Ranger-Moore J, Jackson JP, Ferguson SS, Cherrington NJ. Hepatic cytochrome P450 enzyme alterations in humans with progressive stages of non-alcoholic fatty liver disease. *Drug Metab Dispos.* 2009; 37:2087-94.
57. Genter MB, Krishan M, Augustine LM, Cherrington NJ. Drug transporter expression and localization in rat nasal respiratory and olfactory mucosa and olfactory bulb. *Drug Metab Dispos.* 2010; 38:1644-7.
58. Hardwick RN, Fisher CD, Canet MJ, Lake A, and Cherrington NJ. Diversity in antioxidant response enzymes in progressive stages of human non-alcoholic fatty liver disease. *Drug Metab. Dispos.* 2010; 38:2293-301.
59. Cheng Q, Taguchi K, Aleksunes LM, Manautou JE, Cherrington NJ, Yamamoto M, Slitt AL. Constitutive activation of nuclear factor-E2-related factor 2 induces biotransformation enzyme and transporter expression in livers of mice with hepatocyte-specific deletion of Kelch-like ECH-associated protein 1. *J Biochem Mol Toxicol.* 2011; 25:320-9.
60. Merrell MD, Cherrington NJ. Drug metabolism alterations in nonalcoholic fatty liver disease. *Drug Metab Rev.* 2011; 43:317-34.
61. Lake AD, Novak P, Fisher CD, Jackson JP, Hardwick RN, Billheimer DD, Klimecki WT, Cherrington NJ. Analysis of Global and ADME Gene Expression In the Progressive Stages of Human Non-Alcoholic Fatty Liver Disease. *Drug Metab Dispos.* 2011; 39:1954-60.

62. Hardwick RN, Fisher CD, Canet MJ, Scheffer GL, Cherrington NJ. Variations in ABC-transporter regulation during the progression of human nonalcoholic fatty liver disease. *Drug Metab Dispos.* 2011; 39:2395-402.
63. Jelinek DA, Maghsoodi B, Borbon IA, Hardwick RN, Cherrington NJ, Erickson RP. Genetic variation in the mouse model of Niemann Pick C1 affects female, as well as male, adiposity, and hepatic bile transporters but has indeterminate effects on caveolae. *Gene.* 2012; 491:128-34
64. Hardwick RN, Fisher CD, Street SM, Canet MJ, Cherrington NJ. Molecular mechanism of altered ezetimibe disposition in nonalcoholic steatohepatitis. *Drug Metab Dispos.* 2012; 40:450-60.
65. Clarke JD, Cherrington NJ. Genetics or environment in drug transport: the case of organic anion transporting polypeptides and adverse drug reactions. *Expert Opin Drug Metab Toxicol.* 2012; 8:349-60.
66. Hardwick RN, Cherrington NJ. Measuring altered disposition of xenobiotics in experimental models of liver disease. *Current Protocols* 2012; Chapter 23:Unit23.1
67. Canet MJ, Hardwick RN, Lake AD, Kopplin MJ, Scheffer GL, Klimecki WT, Gandolfi AJ, Cherrington NJ. Altered arsenic disposition in experimental nonalcoholic fatty liver disease. *Drug Metab Dispos.* 2012; 40:1817-24.
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#### BOOK CHAPTERS:

Merrell MD and Cherrington NJ. The Constitutive Androstane Receptor: Pharmacological and Toxicological Interactions. *Xenobiotic Metabolizing Enzymes and Xenobiotic Receptors. Pharmacological and Toxicological Aspects.* Ed. G.E. Azuela Transworld Research Network, Kerala, India 2010.

#### ABSTRACTS:

1. Ryu, D.Y., Cherrington, N.J., Levi, P.E., and Hodgson, E. Induction of cytochrome P450 in mouse liver by 3 methylenedioxyphenyl compounds. Burroughs Wellcome NCSU Symposium, Pesticide Interaction: Biochemistry to Molecular Biology. Research Triangle Park, N.C. 1995
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3. Cherrington, N.J., Falls, J.G., Campbell, M., Clements, K.M., Rose, R.L., Levi, P.E., and Hodgson, E. Isolation, sequence, and expression of FMO1, 3, and 5 from a mouse liver cDNA library. *Drug Metabolism Reviews* 7th North American ISSX meeting, San Diego, CA 1996

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- acetaminophen-induced acute liver failure cases. *Drug Metabolism Reviews*, 14th North American ISSX meeting, Rio Grande, Puerto Rico 2006,
52. Aleksunes LM, Slitt AL, Maher JM, Augustine LM, Goedken M, Chan JY, Cherrington NJ, Klaassen CD, and Manautou JE. Induction of hepatic Mrp3 and Mrp4 transporters by acetaminophen treatment: role of the transcription factor NRF2. *The Toxicologist*, Society of Toxicology annual meeting, Charlotte, NC 2007
  53. Barnes SN, Johnson R, Aleksunes LM, Augustine LM, Van Rooijen N, Scheffer GL, Cherrington NJ, and Manautou JE. Hepatic Mrp4 induction following acetaminophen exposure is dependent on Kupffer cell function. *The Toxicologist*, Society of Toxicology annual meeting, Charlotte, NC 2007
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  60. Khailova L, Cherrington NJ, Hosseini DM, Reynolds CA, Arganbright K, Dvorak B, and Halpern MD. Hepatic bile acid transporters are down regulated in experimental necrotizing enterocolitis. American Gastroenterology Association Meeting, Bethesda, MD 2007
  61. Champion SN, Augustine LM, Goedken MJ, Cherrington NJ, and Manautou JE. Centrilobular Induction of MRP4 during allyl alcohol toxicity is not dependent on Kupffer cell function. *The Toxicologist*, Society of Toxicology annual meeting, Seattle, WA, 2008
  62. Fisher CD, Lickteig AJ, Augustine LM, and Cherrington NJ. Hepatic transporter and drug metabolizing enzyme expression in humans with non-alcoholic fatty liver disease. *The Toxicologist*, Society of Toxicology annual meeting, Seattle, WA, 2008
  63. Beilke LD, Slitt AL, and Cherrington NJ. Mechanisms of hepatoprotection during LCA-induced cholestasis: role of apoptotic signaling. *The Toxicologist*, Society of Toxicology annual meeting, Seattle, WA, 2008
  64. Cheng Q, Aleksunes LM, Manautou JE, Cherrington NJ, Taguchi K, Yamamoto M, and Slitt AL. Hepatocyte-specific deletion of KEAP1 alters expression of hepatic drug metabolizing enzymes and transporters. *The Toxicologist*, Society of Toxicology annual meeting, Seattle, WA, 2008
  65. Merrell MD, Jackson JP, Augustine LM, Fisher CD, Slitt AL, Maher JM, Huang W, Moore DD, Klaassen CD, and Cherrington NJ. The Nrf2 activator oltipraz also activates the constitutive androstane receptor. *The Toxicologist*, Society of Toxicology annual meeting, Seattle, WA, 2008
  66. Merrell MD, Fisher CD, Lickteig AJ, Augustine LM, Hassan HH, Erickson RP, and Cherrington NJ. Plasma levels of acetaminophen-glucuronide in children with non-alcoholic fatty liver disease. Mountain West Regional Society of Toxicology Meeting, Salt Lake City, UT 2008

67. Hardwick R, Fisher CD, and Cherrington NJ. Antioxidant response in progressive stages of human non-alcoholic fatty liver disease. Mountain West Regional Society of Toxicology Meeting, Salt Lake City, UT 2008
68. Cherrington NJ, Fisher CD, Lickteig AJ, Merrell MD, Jackson JP, Ferguson SS, and Augustine LM. Changes in the Expression of Drug Metabolizing Enzymes and Transporters During Fatty Liver Disease. *The Toxicologist*, Society of Toxicology annual meeting, Baltimore, MD 2009
69. Manautou JE, and Cherrington NJ. Regulation of drug transporters in disease states and its toxicological and clinical implications. *The Toxicologist*, Society of Toxicology annual meeting, Baltimore, MD 2009
70. Hardwick RN, Fisher CD, and Cherrington NJ. Antioxidant response enzymes in progressive stages of human NAFLD. *The Toxicologist*, Society of Toxicology annual meeting, Baltimore, MD 2009
71. Augustine LM, Fisher CD, Lickteig AJ, Ranger-Moore J, Jackson JP, Ferguson SS, and Cherrington NJ. Hepatic cytochrome P450 enzyme alterations in humans with progressive NAFLD. *The Toxicologist*, Society of Toxicology annual meeting, Baltimore, MD 2009
72. Merrell MD, Lickteig AJ, Fisher CD, Augustine LM, Campion SB, Manautou JE, A-Kader HH, Erickson RP, and Cherrington NJ. Acetaminophen disposition: metabolomic biomarker for NAFLD. *The Toxicologist*, Society of Toxicology annual meeting, Baltimore, MD 2009
73. Cherrington NJ. ADME in metabolic syndrome: increased risk of drug-induced toxicity. *The Toxicologist*, Society of Toxicology annual meeting, Salt Lake City, UT 2010
74. Genter MB, Augustine LM, Cherrington NJ. Transporter expression in rat nasal olfactory and respiratory epithelia. *The Toxicologist*, Society of Toxicology annual meeting, Salt Lake City, UT 2010
75. Lake AD, Merrell MD, Hardwick RN, Augustine LM, Klimecki W, Novak P, Billheimer D, and Cherrington NJ. Analysis of global gene expression alterations in the progressive stages of non-alcoholic fatty liver disease. *The Toxicologist*, Society of Toxicology annual meeting, Salt Lake City, UT 2010
76. Hardwick RN, Fisher CD, Canet MJ, and Cherrington NJ. Altered expression and regulation of efflux drug transporters in the progression of human non-alcoholic fatty liver disease. *The Toxicologist*, Society of Toxicology annual meeting, Salt Lake City, UT 2010
77. Merrell MD, Canet MJ, Zhao F, Wu T, and Cherrington NJ. Mechanistic involvement of the Nrf2/Keap1 anti-oxidant response in the regulation of human ABCB3. *The Toxicologist*, Society of Toxicology annual meeting, Washington, DC 2011
78. More VR, Lu Z, Cherrington NJ, and Slitt AL. Affects of alcohol cirrhosis and diabetes on drug transporter expression in human liver. *The Toxicologist*, Society of Toxicology annual meeting, Washington, DC 2011
79. Hardwick RN, Fisher CD, Street SM, Canet MJ, and Cherrington NJ. Molecular mechanisms of altered ezetimibe disposition in non-alcoholic steatohepatitis. *The Toxicologist*, Society of Toxicology annual meeting, Washington, DC 2011
80. Lake AD, Novak P, Hardwick RN, and Cherrington NJ. Analysis of the Endoplasmic Reticulum Stress Response Pathway in Progressive Human Non-Alcoholic Fatty Liver Disease. *Drug Metabolism Reviews, 17th North American ISSX meeting, Atlanta, GA 2011*
81. Hardwick RN, Fisher CD, Street SM, Canet MJ, and Cherrington NJ. Molecular mechanisms of altered ezetimibe disposition in non-alcoholic steatohepatitis. *Drug Metabolism Reviews, 17th North American ISSX meeting, Atlanta, GA 2011*
82. Klein DM, Evans KK, Hardwick RN, Dantzer WH, Wright SH, and Cherrington, NJ. Transporter-mediated mechanism of nucleoside transepithelial penetration of the blood-testis barrier. Mountain West Regional Society of Toxicology Meeting, Breckenridge, CO 2011
83. Canet MJ, Hardwick RN, Lake AD, Kopplin MJ, Gandolfi AJ, and Cherrington, N.J. Altered arsenic disposition in experimental nonalcoholic fatty liver disease. Mountain West Regional Society of Toxicology Meeting, Breckenridge, CO 2011

84. Hardwick RN, Lake AD, Canet MJ, Merrell MD, and Cherrington NJ. Increased susceptibility to drug-induced toxicity in nonalcoholic steatohepatitis. *The Toxicologist*, Society of Toxicology annual meeting, San Francisco, CA 2012
85. Lake AD, Shipkova P, Aranibar N, Robertson D, Reily MD, Novak P, Lehman-McKeeman LD, and Cherrington NJ. Hepatic bile acid composition in progressive human nonalcoholic fatty liver disease. *The Toxicologist*, Society of Toxicology annual meeting, San Francisco, CA 2012
86. Canet MJ, Hardwick RN, Lake AD, Kopplin MJ, Gandolfi AJ, and Cherrington NJ. Altered arsenical disposition in experimental nonalcoholic fatty liver disease. *The Toxicologist*, Society of Toxicology annual meeting, San Francisco, CA 2012
87. Clarke J, Novak P, Lake AD, Shipkova P, Aranibar N, Robertson D, Reily MD, Lehman-McKeeman LD, and Cherrington NJ. Characterization of hepatocellular carcinoma related genes and metabolites in human nonalcoholic fatty liver disease. *The Toxicologist*, Society of Toxicology annual meeting, San Francisco, CA 2012
88. Klein DM, Evans KK, Hardwick RN, Dantzler WH, Wright SH, and Cherrington, NJ. Transporter-mediated mechanism of nucleoside transepithelial penetration of the blood-testis barrier. ASPET Experimental Biology Meeting, San Diego, CA 2012

INVITED SEMINARS:

June 1997	Mayo Clinic, Rochester, MN
August 1997	University of Kansas Medical Center, Kansas City, KS
October 1997	North Carolina State University, Raleigh, NC
March 2000	Society of Toxicology Ancillary Meeting, Philadelphia, PA
December 2000	Idaho State University, Pocatello, ID
January 2002	Brigham Young University, Provo, UT
February 2002	University of Arizona, Tucson, AZ
March 2002	Purdue University, West Lafayette, IN
September 2002	University of Kansas Medical Center, Kansas City, KS
March 2003	Brigham Young University, Provo, UT
October 2003	University of Arizona, Tucson, AZ
April 2004	Northern Arizona University
May 2004	Risk Assessment Colloquia, University of Arizona
November 2004	Brigham Young University
January 2005	North Carolina State University, Raleigh, NC
November 2005	University of Utah, Salt Lake City, UT
January 2006	University of Texas Medical Branch, Galveston, TX
February 2006	University of Utah, Salt Lake City, UT
March 2006	NIEHS, Research Triangle Park, NC
March 2007	Randy L. Rose Memorial Symposium, Raleigh, NC
April 2007	Oklahoma Health Sciences Center, Oklahoma City, OK
April 2007	Vanderbilt University, Nashville, TN
May 2007	University of Michigan, Ann Arbor, MI
August 2007	LDS Life Science Research Symposium, Snowbird, UT
May 2008	Seoul National University, Seoul, South Korea
February 2009	Frontiers in Medicine, University of Arizona, Tucson, AZ
March 2009	National Society of Toxicology Meeting, Baltimore, MD
May 2009	Korean Society of Toxicology, Seoul, South Korea
May 2009	Chung-Ang University, Seoul, South Korea

July 2009	Gordon Research Conference, Plymouth, NH
March 2010	National Society of Toxicology Meeting, Salt Lake City, UT
July 2010	LDS Life Science Research Symposium, Park City, UT
March 2011	National Society of Toxicology meeting, Washington, DC
April 2011	Experimental Biology Meeting, Washington, DC
June 2011	9th International Conference on Early Toxicity Screening, Seattle, WA
October 2011	Medical Pharmacology, University of Arizona, Tucson, AZ
October 2011	RTP Drug Metabolism Discussion Group Keynote Speaker, RTP, NC
October 2011	17th North American ISSX meeting, Atlanta, GA
February 2012	Drug Discovery and Design, University of Arizona, Tucson, AZ
March 2012	University of New Mexico, Albuquerque, NM
April 2012	New Jersey Drug Metabolism Discussion Group, Somerset, NJ
September 2012	L.S. Skaggs Biomedical Research Symposium, Aurora, CO
February 2013	University of Rhode Island, Kingston, RI
March 2013	National Society of Toxicology meeting, San Antonio, TX
March 2013	AAPS Workshop on Transporters in ADME, Bethesda, MD

PROFESSIONAL SOCIETIES:

1995-Present Society of Toxicology  
 1995-Present International Society for the Study of Xenobiotics  
 2007-Present American Society for Pharmacology and Experimental Therapeutics (ASPET)

GRANT SUPPORT

TOTAL COSTS

CURRENT GRANT SUPPORT

R01 HD062489	PI: Nathan Cherrington	12/10-11/15
Title: Pediatric Adverse Drug Reactions in NASH		\$1,609,690
R01AI083927-01A1	PI: Nathan Cherrington	06/10-05/14
Title: Drug Transport at the Blood-Testis Barrier		\$1,514,584
R01 HD054485-01 NICHD	Co-PI (PI: Melissa Halpern)	09/07-06/12
Title: Bile Acids in the Pathogenesis of Necrotizing Enterocolitis		\$1,065,000
Astrazeneca Student Fellowship	PI: Nathan Cherrington	07/10-06/14
Title: The Transition from Steatosis to NASH: Significant Consequences for Pharmaceutical Efficacy and Toxicity		\$40,000
P30 ES006694	Director of Pilot Projects PI: Serrine Lau	04/12-03/17
Title: Southwest Environmental Health Sciences Center		\$7, 953,750

PREVIOUS GRANTS:

R01 DK068039-01 NIDDK	PI: Nathan Cherrington	08/05-07/11
Title: Hepatoprotective Mrp3		\$1,520,066
R01 DK069557-01 NIDDK	Co-PI (PI: Jose E. Manautou)	2005-2009

Nathan J. Cherrington, Ph.D.

Title: Transporter Expression in Response to Hepatotoxicants	subcontract	\$75,000
Health Research Alliance of Arizona	PI: Nathan Cherrington	2007-2008
Title: Altered Drug Metabolism and Disposition in Human NAFLD		\$50,000
K22 ES011646 Transition to Independent Position	PI: Nathan Cherrington	2003 - 2007
Title: Multiple Mechanisms of Hepatoprotective Mrp3 Regulation		\$324,000
Arizona Disease Control Research Commission	PI: Nathan Cherrington	2003 - 2004
Title: New Drug Target in Liver Disease		\$150,000
P30 ES006694 SWEHSC Pilot Project	PI: Nathan Cherrington	2003 - 2004
Title: Role of Transporters in the Blood-Testis Barrier		\$30,000
F32 National Research Service Award, NIEHS	PI: Nathan Cherrington	1999 - 2001
Title: Transcriptional Regulation of the ARE/EpRE		\$106,000

PENDING GRANT SUPPORT

PATENTS PENDING

Acetaminophen as a Marker of Hepatic Disorders, MBHB 09-967-PCT

UA Reference Number 08-019

Technology to diagnose patients with Steatohepatitis. Licensed by Raptor Pharmaceuticals.

*“This is a true and accurate statement of my activities and accomplishments. I understand that misrepresentation in securing promotion and tenure may lead to dismissal or suspension under ABOR Policy 6-201 J.1.b.”*

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Nathan J. Cherrington, Ph.D.