

# RACHEL J. CHURCH, PhD

3311 Kerr Hall CB#7569, Chapel Hill, NC 27599

Cell: (919) 244-4085

Email: rchurch@unc.edu

---

## EDUCATION

**Ph.D., Genetics and Molecular Biology** May 2012  
The University of North Carolina, Chapel Hill, NC 27599  
PI: Bev Koller

**B.S., Biological Sciences; Minor, Genetics** May 2003  
North Carolina State University, Raleigh, NC 27625

## POST-GRADUATE TRAINING

**Clinical Pharmacology Research Fellow** August 2014-May 2016  
The University of North Carolina  
Chapel Hill, NC  
PI: Paul Watkins

**Postdoctoral Research Fellow** April 2012-August 2014  
The Hamner-UNC Institute for Drug Safety Sciences  
The Hamner Institutes for Health Sciences  
RTP, NC  
PI: Alison Harrill 4/2012-9/2013  
PI: Paul Watkins 9/2013-8/2014

## PROFESSIONAL EXPERIENCE-PRESENT

**Research Assistant Professor** February 2016-Present  
Division of Pharmacotherapy and Experimental Therapeutics  
Eshelman School of Pharmacy  
The University of North Carolina  
Chapel Hill, NC

**Director** August 2014-Present  
The UNC Organ Injury Biomarker Core  
The University of North Carolina  
Chapel Hill, NC

## PROFESSIONAL EXPERIENCE-PAST

**Research Investigator** August 2014-December 2015  
Hamner-UNC Institute for Drug Safety Sciences  
The Hamner Institutes for Health Sciences  
RTP, NC

**Graduate Research Assistant** August 2005-April 2012  
The University of North Carolina  
Chapel Hill, NC

**Research Technician II**  
The Center for Human Genetics, Duke University  
Duke University  
Durham, NC

June 2003-August 2005

### **PROFESSIONAL SERVICE**

IQ-DILI Committee Academic Co-Leader Committee: Biomarkers	2017-Present
PharmSci Conference Session Chair Session: Novel Pharmacologic and Phenotypic Approaches to Precision Medicine	2017
UNC Eshelman School of Pharmacy PharmSci Conference Planning Committee	2016-2017

### **AWARDS AND HONORS**

<b>John R. Senior Outstanding DILI Poster Award</b> The AASLD/FDA DILI Conference	2019
<b>Junior Faculty Development Award</b> University of North Carolina at Chapel Hill	2017
<b>Best paper published in <i>Toxicological Sciences</i></b> The Society of Toxicology Annual Meeting For: "A Systems Biology Approach Utilizing a Mouse Diversity Panel Identifies Genetic Differences Influencing Isoniazid-Induced Microvesicular Steatosis"	2016
<b>Travel Award</b> The Society of Toxicology Contemporary Concepts in Toxicology Meeting	2016
<b>Emil A. Pfitzer Drug Discovery Postdoctoral Poster Competition- 2<sup>nd</sup> Place</b> The Society of Toxicology Annual Meeting	2014
<b>The Perry J. Gehring Postdoctoral Risk Assessment Award</b> The Society of Toxicology Annual Meeting	2014
<b>Emil A. Pfitzer Drug Discovery Postdoctoral Poster Competition- 2<sup>nd</sup> Place</b> The Society of Toxicology Annual Meeting	2013
<b>The Risk Assessment SS John Doull Award</b> The Society of Toxicology Annual Meeting	2013
<b>Podium Presentation Award- Second Place</b> RTP Drug Metabolism Discussion Group Winter Symposium	2013
<b>Summa Cum Laude</b> North Carolina State University	2003
<b>Valedictorian</b> North Carolina State University	2003

## **SPEAKING PRESENTATIONS**

- Pharmaceutical & Bioscience Society Symposium: Fundamentals and Emerging Trends  
In Translational Research: Identifying Right Target, Right Drug, Right Dose, and Right  
Patient 2018  
Boston, Massachusetts  
“Candidate Biomarkers of Drug-Induced Liver Injury: Performance in Healthy  
Volunteers and Patients.”
- Centre for Drug Safety Sciences Department Seminar 2018  
University of Liverpool. Liverpool, United Kingdom  
“Candidate Liver Safety Biomarkers: Lessons in Healthy Volunteers and DILI Patients.”
- World Preclinical Congress: Optimizing Leads and Predicting Drug Toxicity 2017  
Lisbon, Portugal  
“The Emerging Role of MicroRNAs in Toxicity Testing”
- AASLD National Meeting 2017  
Washington DC  
“Candidate Liver Safety Biomarkers Provide Prognostic and Mechanistic Insights in  
Patients with Drug-Induced Liver Injury”
- AASLD National Meeting 2017  
Washington DC  
“Serum MicroRNA-122 Levels Are Highly Variable in a Cohort of Healthy Volunteers”
- miR-122 An Exploratory Biomarker of Liver Injury: An Industry Perspective on the State 2017  
of the Science and Experiences Pre-Clinically and Clinically  
Webinar  
“miR-122: More Than Just Your Average Leakage Biomarker”
- microRNA as Biomarkers and Diagnostics 2016  
Boston, MA  
“MicroRNA Profiling Identifies Potential Biomarkers of Hepatobiliary Injury  
Following Exposure to Several Toxicants in the Rat”
- Drug-Induced Liver Injury Conference XVI 2016  
Bethesda, MD  
“Transformative DILI Biomarkers- DILIN/SAFE-T Collaboration”
- RTP Drug Metabolism Discussion Group Winter Symposium 2013  
RTP, NC  
“Identification of Genomic Regions Linked to Epigallocatechin Gallate  
Induced Liver Toxicity Using the Diversity Outbred Stock”

## **POSTER PRESENTATIONS**

- AASLD National Meeting 2019  
Boston, MA  
“Mechanistic Modeling Aids in the Interpretation of Alanine Aminotransferase Elevations  
Associated with Clinical Ischemic Liver Injury”

AASLD/FDA DILI Conference Bethesda, MD "Hepatocyte-Derived Exosomes Promote Liver Immune Tolerance: Possible Implications for Idiosyncratic Drug-Induced Liver Injury"	2019
SOT Annual Meeting Baltimore, MD "Hepatocyte-Derived Exosomes Promote Liver Immune Tolerance: Possible Implications for Idiosyncratic Drug-Induced Liver Injury"	2019
AASLD National Meeting San Francisco, CA "Identification of Exosomal Valosin Containing Protein (VCP) as a Potential Biomarker of Idiosyncratic Drug-Induced Liver Injury."	2018
SOT Annual Meeting San Antonio, TX "Candidate Serum Biomarkers Provide Novel Insights in Drug-Induced Liver Injury"	2018
SOT Annual Meeting Baltimore, MD "GLDH Outperforms ALT as a Biomarker of Hepatotoxicity in a Rat Model of Acetaminophen Toxicity"	2017
SOT Annual Meeting New Orleans, LA "MicroRNA Profiling Identifies Potential Biomarkers of Hepatobiliary Injury Following Exposure to Several Toxicants in the Rat"	2016
Contemporary Concepts in Toxicology New Orleans, LA "MicroRNA Profiling Identifies Potential Biomarkers of Hepatobiliary Injury Following Exposure to Several Toxicants in the Rat"	2016
SOT Annual Meeting San Diego, CA "Time-Dependent Release and Expression of microRNAs Occurs Following A-Naphthylisothiocyanate Exposure in the Rat"	2015
SOT Annual Meeting Phoenix, AR "Doxorubicin-Induced Glomerular Injury is Associated with Urinary MicroRNA Alterations in the Rat"	2014
SOT Annual Meeting San Antonio, TX "Identification of Genomic Regions Linked to Epigallocatechin Gallate Induced Liver Toxicity using the Diversity Outbred Stock"	2013
NC SOT Spring Meeting "Identification of Genomic Regions Linked to Epigallocatechin Gallate Induced Liver Toxicity using the Diversity Outbred Stock"	2013

## PUBLICATIONS

### PEER REVIEWED BOOK CHAPTERS

**Church, RJ.** MicroRNAs as novel glomerular injury biomarkers in rats. Chapter 33. Drug discovery toxicology: from target assessment to translational biomarkers. Will, McDuffie, Olaharski, Jeffy (eds). Wiley 2016

### PEER REVIEWED REVIEW ARTICLES

**Church, RJ.** and Paul Watkins. Serum biomarkers of drug-induced liver injury: current status and future directions. J Dig Dis. 2019. 20(10): 2-10.

**Church, RJ.** and Paul Watkins. *In silico* modeling to optimize interpretation of liver safety biomarkers in clinical trials. Exp Biol Med. 2018 24(3): 300-307

**Church, RJ.** and Paul Watkins. The transformation in biomarker detection and management of drug-induced liver injury. Liver Int. 2017 37(11): 1582-90

### PEER REVIEWED JOURNAL ARTICLES

Roth, S; Avigan, M; Bourdet, D; Brott, D; **Church, RJ**; Dash, A; Keller, D; Sherratt, P; Watkins, PB; Westcott-Baker, L; Lentini, S; Merz, M; Ramaiah, S; Stanley, AM; Marcinak, J. Next generation DILI biomarkers: prioritization of biomarkers for qualification and best practices for biospecimen collection in drug development. Clin Pharmacol Ther. 2019 *epub ahead of print*

Holman, NS; **Church, RJ**; Nautiyal, M; Rose, KA; Thacker, SE; Otieno, MA; Wolf, KK; LeCluyse, E; Watkins, PB; Mosedale, M. Hepatocyte-Derived Exosomes Promote Liver Immune Tolerance: Possible Implications for Idiosyncratic Drug-Induced Liver Injury. Toxicol Sci. 2019 170(2): 499-508

**Church, RJ**; Kullak-Ublick, GA; Aubrecht, J; Bonkovsky, HL; Chalasani, N; Fontana, RJ; Goepfert, JC; Hackman, F; King, NMP; Kirby, S; Kirby, P; Marcinak, J; Ormarsdottir, S; Schomaker, S; Schuppe-Koistinen, I; Wolenski, F; Arber, N; Merz, M; Sauer, JM; Andrade, RJ; van Bommel, F; Poynard, T; Watkins, PB. Candidate biomarkers for the diagnosis and prognosis of drug induced liver injury: an international collaborative effort. Hepatology. 2019. 69(2): 760-773

Snouwaert, JN\*; **Church, RJ**\*; Jania, L; Nguyen, M; Wheeler, M; Saintsing, A; Mieczkowski, P; Pardo-Manuel de Villena, F; Armao, D; Moy, SS; Lorenzo, DN; Koller, BH. A mutation in the Borcs7 subunit of the lysosome regulatory BORG complex results in motor deficits and dystrophic axonopathy in mice. Cell Reports. 2018 24(5): 1254-1265

\*co-first authors

Dong,OM; Howard, RM; **Church, RJ**; Cottrell, M; Forrest, A; Innocenti, F; Mosedale, M; Kashuba, A; Gonzalez, D; Wiltshire, T. Challenges and solutions for future pharmacy practice in the era of precision medicine. Am J Pharm Educ. 2018 82(6) 6652

Woodhead, JL; Brock, WJ; Roth, SE; Shoaf, S; Brouwer, KLR; **Church, RJ**; Grammatopolous, T; Stiles, L; Siler, SQ; Howell, BA; Mosedale, M; Watkins, PB; Shoda, LKM. Application of a mechanistic model to evaluate putative mechanisms of Tolvaptan drug-induced liver injury and identify patient susceptibility factors. Toxicol Sci. 2017 155(1): 61-74

Wells, MA; Vendrov, KC; Edin, ML; Ferslew, BC; Zha, W; Nguyen BKH; **Church, RJ**; Lih, FB; Degraff, LM; Brouwer, KLR; Barritt, AS; Zeldin, CD; Lee, CR. Characterization of the

cytochrome P450 epoxygenase pathway in non-alcoholic steatohepatitis. Prostaglandins Other Lipid Mediat. 2016 125: 19-29

**Church, RJ;** Otieno M; McDuffie JE, Singh B; Sonee M; Hall L; Watkins PB; Ellinger-Ziegelbauer H; Harrill AH. Beyond miR-122; Identification of microRNA alterations in blood during a time course of hepatobiliary injury and biliary hyperplasia in rats. Toxicol Sci. 2016 150(1): 3-14

Ma, JY; **Church RJ;** Kanerva J; Bittner A; McDuffie JE. Automated image analysis of podocyte desmin immunostaining in a rat model of sub acute doxorubicin induced glomerulopathy. JJ Biomark. 2015 1(2): 008

**Church, RJ;** Gatti, DM; Urban, TJ; Long, N; Yang, X; Shi, Q; Eaddy, JS; Mosedale, M; Ballard, S; Churchill, GA; Navarro, V; Watkins, PB; Threadgill, DW; Harrill, AH. Sensitivity to Hepatotoxicity due to Epigallocatechin Gallate is affected by Genetic Background in Diversity Outbred Mice. Food Chem Toxicol., 2015 76: 19-26

**Church, RJ;** McDuffie, JE; Sonee, M; Otieno, Ma, JY, Liu, X; Watkins, PB; Harrill, AH. MicroRNA-34c-3p is an early predictive biomarker for doxorubicin-induced glomerular injury progression in male Sprague-Dawley rats. Toxicol. Res., 2014 3(5): 384-394

**Church, RJ;** Wu H; Mosedale, M; Sumner, SJ; Pathmasiri W; Kurtz, CL; Pletcher, MT; Eaddy, JS; Pandher, K; Singer, M; Batheja A; Watkins, PB; Adkins, K; Harrill, AH. A systems biology approach utilizing a mouse diversity panel identifies genetic differences influencing isoniazid-induced microvesicular steatosis. Toxicol Sci. 2014 140(2): 481-92

**Church, RJ;** Jania, LA; Koller, BH. PGE<sub>2</sub> produced by the lung augments the effector phase of allergic inflammation. [J Immunol.](#) 2012 Apr 15; 188(8): 4093-102.

Cyphert, JM; Allen, IC; **Church, RJ;** Latour, AM; Snouwaert, JN; Coffman, TM; Koller, BH. Allergic inflammation induces a persistent mechanistic switch in thromboxane-mediated airway constriction in the mouse. Am J Physiol Lung Cell Mol Physiol. 2012 Jan;302(1):L140-51.

## **TEACHING EXPERIENCE**

<b>Biotechnology</b> (BMME 485) University of North Carolina at Chapel Hill Chapel Hill, NC	November 13, 2014
<b>Biochemical Toxicology</b> (TOXC442) University of North Carolina at Chapel Hill	September 18, 2014
<b>Genetic Analysis I Recitation</b> (GNET 112) University of North Carolina at Chapel Hill	Fall 2006

## **PROFESSIONAL MEMBERSHIPS**

IQ-DILI Committee Committee: Biomarkers	2017-Present
Predictive Safety Testing Consortium Committee: Hepatic Working Group	2014-Present
Health and Environmental Sciences Institute Committee: Nephrotoxicity	2012-Present

Society of Toxicology Member  
Specialty Sections:  
Drug Discovery  
Risk Assessment

2012-Present

2014-Present

2014-Present