

CURRICULUM VITAE
RACHEL D. CROUCH, Pharm.D., Ph.D.
October 2021

PERSONAL

Residence

110 31st Avenue North, Unit 405
Nashville, TN 37203

University

Lipscomb University
College of Pharmacy and Health Sciences
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EDUCATION

Vanderbilt University School of Medicine

Nashville, TN

Doctor of Philosophy, Pharmacology

Mentor: J. Scott Daniels, Ph.D.

2012 – 2016

Dissertation Title: Aldehyde Oxidase Drug Metabolism: Evaluation of Drug Interaction Potential and Allometric Scaling Methods to Predict Human Pharmacokinetics

Lipscomb University College of Pharmacy

Nashville, TN

Doctor of Pharmacy

2008 – 2012

Lipscomb University

Nashville, TN

Bachelor of Arts, Applied Biochemistry / Spanish

2004 – 2008

RESEARCH INTERESTS

Drug metabolism and pharmacokinetics; aldehyde oxidase-mediated drug metabolism; drug discovery

PROFESSIONAL EXPERIENCE

- 1/2018 – Adjunct Assistant Professor of Pharmacology
- Dept. of Pharmacology, Vanderbilt University, Nashville, TN
 - Department Chair: Ege Kavalali, Ph.D.
- 11/2017 – Assistant Professor of Pharmaceutical Sciences
- Lipscomb University College of Pharmacy, Nashville, TN
 - Department Chair: W. Scott Akers, Pharm.D., Ph.D.
- 1/2017-Oct 2017 Postdoctoral Research Fellow
- Vanderbilt Center for Neuroscience Drug Discovery, Vanderbilt University, Nashville, TN
 - Supervisor: Craig Lindsley, Ph.D.
- 7/2012 – 12/2016 Graduate Research Assistant
- Dept. of Pharmacology, Vanderbilt University, Nashville, TN
 - Supervisor: J. Scott Daniels, Ph.D.
- 7/2011- 9/2011 Student Pharmacist Intern (Research)
- Dept. of Pharmacology, Vanderbilt University, Nashville, TN
 - Supervisor: J. Scott Daniels, Ph.D.
- 9/2009 – 4/2011 Student Pharmacist Intern (Community Pharmacy)
- Kroger Pharmacy, Nashville, TN,
 - Supervisor: Fred Rachide, R.Ph and Anupam Paul, Pharm.D.
- 5/2010 – 8/2010 Summer Research Assistant
- Dept. of Pharmacology, Vanderbilt University, Nashville, TN
 - Supervisor: Alan Brash, Ph.D.
- 5/2009 – 8/2009 Organic Chemistry Lab Instructor
- Dept. of Chemistry and Biochemistry, Lipscomb University, Nashville, TN
 - Supervisor: Kent Clinger, Ph.D.
- 5/2009 – 8/2009 Summer Research Assistant
- Dept. of Pharmaceutical Sciences, Lipscomb University College of Pharmacy Nashville, TN
 - Supervisor: Susan Mercer, Ph.D. and Michael Fowler, Ph.D.
- 5/2008 – 8/2008 Organic Chemistry Lab Instructor
- Dept. of Chemistry and Biochemistry, Lipscomb University, Nashville, TN
 - Supervisor: Kent Clinger, Ph.D.
- 5/2008 – 8/2008 Summer Research Assistant
- Dept. of Chemistry, Lipscomb University, Nashville, TN
 - Supervisor: Kent Clinger, Ph.D.

- 5/2007-8/2007 Pharmacy Technician
- Outpatient Pharmacy, Vanderbilt Children's Hospital, Nashville, TN
 - Supervisor: Ron Eatherly, D.Ph.
- 8/2006 – 5/2007 Spanish Tutor
- Learning Enhancement Program, David Lipscomb High School, Nashville, TN
 - Supervisor: Mary Little
- 5/2006 – 8/2006 General Chemistry Tutor
- Dept. of Chemistry and Biochemistry, Lipscomb University, Nashville, TN
 - Supervisor: William Tallon, Ph.D.

LICENSURES AND CERTIFICATIONS

- 2019 – Basic Life Support Provider (CPR and AED)
- Issued by the American Heart Association
- 2012 – Pharmacist Licensure (#37017)
- Issued by the Tennessee Board of Pharmacy
- 2008 APhA Pharmacy-Based Immunization Certification
- Issued by the American Pharmacists Association

TEACHING ACTIVITY

Lipscomb University College of Pharmacy and Health Sciences (PharmD Curriculum)

- 2022 – Pharmacological Basis of Therapeutics I (PHSC 1613)
- 2021 – Biomolecular Chemistry (PHSC 1213)
- 2020 – Research in Pharmaceutical Sciences (PHSC392V)
- 2019 – Advanced Biopharmaceutics and Pharmacokinetics (PHSC 2433)
- 2018 – Integrated Biomedical Sciences Laboratory I&II (PHSC 1512, 1522)
- 2018 – Biopharmaceutics (PHSC 1423)
- 2018 – Physiological Basis of Therapeutics II (PHSC 1123)
- 2018 – Applied Christian Values I, II, & III (PHAD 1111, 2111, 3111)

Vanderbilt University (Pharmacology Graduate Training Program)

2018 - 2019 Drug Metabolism and Pharmacokinetics (PHAR 320)

ADVISING ACTIVITY

Lipscomb University College of Pharmacy and Health Sciences

2021 – Student Research Mentor, Tri Do (Student Pharmacist)

2021 – Student Research Mentor, Ashley Dougherty (Student Pharmacist)

2021 – Student Research Mentor, Shaniya Pleasant (Student Pharmacist)

2021 – Student Research Mentor, Shaoyun Yang (Student Pharmacist)

2021 Student Research Mentor, Nadia Omar (Student Pharmacist)

2021 – Student Research Mentor, Lily Price (Student Pharmacist)

2019 – Student Research Mentor, Paige Barnes (Student Pharmacist)

2019 – Student Research Mentor, Taylor Thompson (Student Pharmacist)

2019 Student Research Mentor, Andrew Sweeton (Student Pharmacist)

2019 Student Research Mentor, Michelle Liang (Student Pharmacist)

2019 – 2020 Student Research Mentor, Jennifer Bissada (Undergraduate)

RESEARCH FUNDING AND TRAINING SUPPORT

7/1/2015 – 6/30/2017 NIH Loan Repayment Program Award in Clinical Research (Crouch, RD)

- “Establishing a Model of Human Clearance for Compounds with a Mixed Aldehyde Oxidase/cytochrome P450 Clearance Phenotype”
- The goal of this project was to determine the impact of incorporating P450-mediated metabolism into AO substrates, such that the compound possesses a mixed AO/P450 clearance phenotype, on the ability to predict their clearance in humans.
- Role: Awardee

- 2/1/2015 - 12/31/2016 PhRMA Pre-Doctoral Fellowship in Pharmacology/Toxicology (Crouch, RD)
- “Allometric Scaling Methods to Predict Human Pharmacokinetics of Aldehyde Oxidase Substrates”
 - The goal of this project was to evaluate the utility of allometric scaling methods to predict the clearance of AO-metabolized drugs.
 - Role: Pre-Doctoral Fellow
- 7/1/2012 - 06/30/2014 NIH T32 GM07628 (Barnett, JV)
- “Training in Pharmacological Sciences”
 - This grant supported my graduate training in the Department of Pharmacology at Vanderbilt University.
 - Role: Trainee

HONORS AND AWARDS

- 2015 Graduate Student Travel Award
- The Graduate School, Vanderbilt University
- 2014 Graduate Student Travel Award
- The Graduate School, Vanderbilt University
- 2013- Rho Chi Academic Honor Society in Pharmacy Member, Delta Pi Chapter
- Lipscomb University College of Pharmacy
- 2012 Graduated First in Class
- Lipscomb University College of Pharmacy
- 2012 Asklepios Key Award for Excellence in Scholarship and Outstanding Achievement
- Kappa Psi Pharmaceutical Fraternity, Epsilon Lambda Chapter, Lipscomb University College of Pharmacy
- 2012 Pharmaceutical Sciences Impact Award
- Lipscomb University College of Pharmacy
- 2012- Alpha Chi National Honor Society Member, Kappa Chapter
- Lipscomb University College of Pharmacy
- 2011 AACP Wal-Mart Annual Conference Scholarship Program Award,
- American Association of Colleges of Pharmacy/Wal-Mart Stores, Inc.
- 2011 Board of Visitors Scholarship,
- Lipscomb University College of Pharmacy
- 2010 Walgreen’s Diversity Scholarship, Walgreen’s Co.
- Lipscomb University College of Pharmacy

- 2008-2012 Academic Dean's List
 - Lipscomb University College of Pharmacy
- 2008 B.A., Magna Cum Laude
 - Lipscomb University
- 2008 1st Place Award for Undergraduate Research Presentation in Chemistry/Physics
 - Tennessee Academy of Science Middle Division Meeting
- 2008 Who's Who Among Students in American Universities and Colleges
 - Lipscomb University
- 2006-2008 Academic Provost's List
 - Lipscomb University
- 2004-2006 Academic Honor Roll
 - Lipscomb University
- 2004-2008 Academic Scholarship
 - Lipscomb University
- 2004-2008 Tennessee HOPE Scholarship
 - Tennessee Education Lottery Scholarship Program, Lipscomb University

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

- 2020 – Tennessee Pharmacists Association
- 2012 – American Association of Pharmaceutical Scientists
- 2011 – American Association of Colleges of Pharmacy
- 2018 - 2020 American College of Clinical Pharmacy
- 2010 - 2012 American Society for Pharmacology and Experimental Therapeutics
- 2009 - 2011 Sigma Xi, The Scientific Research Society
- 2008 - 2012 American Pharmacists Association, Academy of Student Pharmacists
- 2008 - 2012 Tennessee Pharmacists Association, Tennessee Society of Student Pharmacists

PROFESSIONAL SERVICE ACTIVITIES

- 2020 – Manuscript Reviewer
 - Biochemical Pharmacology

INSTITUTIONAL SERVICE ACTIVITIES

Lipscomb University College of Pharmacy

2021 –	Christian Pharmacists Fellowship International, Faculty Sponsor
2020 –	Diversity and Inclusion Committee, Founding Member
2020 –	Curriculum Committee, Member
2020 –	Academic Integrity Committee, Chair
2019 – 2020	Academic Integrity Committee, Member
2019	Pharmacy Dean Search Committee, Member
2019 – 2020	Pharmacy and Health Sciences Library Committee, Member
2019 –	Scholarship and Awards Committee, Member
2018 - 2020	Academic Progressions Committee, Member
2010 - 2011	Project Heart Committee, Student Member
2010	Operation Heartburn Awareness Committee, Student Member
2009	Influenza Vaccination Services Student Volunteer Immunizer

Vanderbilt University

2018 - 2020	Pharmacology Qualifying Exam Review Instructor
2014 - 2020	Pharmacology Mock Qualifying Exam Volunteer
2015 - 2016	Student-Invited Pharmacology Forum Committee Member

COMMUNITY SERVICE ACTIVITIES

2020	Tornado Disaster Relief, Nashville, Tennessee <ul style="list-style-type: none">• Lipscomb University/Churches of Christ Disaster Relief
2018	Hurricane Michael Disaster Relief Mission Trip, Panama City, Florida <ul style="list-style-type: none">• Lipscomb University/Churches of Christ Disaster Relief
2009	Mobile Medical Disaster Relief Volunteer <ul style="list-style-type: none">• Nashville, TN

- 2009 Health Screening Services Volunteer
- Kroger Pharmacy/YMCA, Nashville, TN
- 2008 Siloam Family Health Center Volunteer
- Nashville, TN

ATTENDED CONFERENCES

- 1/2021 Equity, Diversity, and Inclusion Institute, American Association of Colleges of Pharmacy, Virtual
- 7/2020 American Association of Colleges of Pharmacy, Virtual
- 7/2019 American Association of Colleges of Pharmacy, Chicago, IL
- 7/2018 American Association of Colleges of Pharmacy, Boston, MA
- 7/2015 Gordon Research Conference on Drug Metabolism, Holderness, NH
- 5/2014 20th International Symposium on Microsomes and Drug Oxidations, Stuttgart, Germany
- 10/2013 Academic Drug Discovery Consortium, Nashville, TN
- 7/2011 American Association of Colleges of Pharmacy, San Antonio, TX

POSTER PRESENTATIONS

Crouch RD, Hutzler JM, Daniels JS, “Predicting Human Clearance for Compounds Displaying Aldehyde Oxidase Metabolism Phenotypes.” Vanderbilt Pharmacology Departmental Retreat, Nashville, TN. October 2015.

Crouch RD, Hutzler JM, Daniels JS, “Predicting Human Clearance for Compounds Displaying Aldehyde Oxidase Metabolism Phenotypes.” Gordon Research Conference on Drug Metabolism. Holderness, NH. July 2015.

Crouch RD, Morrison RD, Emmitte KA, Daniels JS, “Evaluating Compensatory Clearance Mechanisms for Novel Heterocyclic Compounds with Mixed Aldehyde Oxidase/P450 Metabolism Phenotypes.” 20th International Symposium on Microsomes and Drug Oxidations. Stuttgart, Germany. May 2014.

Crouch RD, Klein MT, Bridges TM, Conn JP, Daniels JS. “Biotransformation of M₄ Positive Allosteric Modulators to Pharmacologically Distinct Active Metabolites.” Vanderbilt Pharmacology Departmental Retreat, Nashville, TN. October 2013.

Crouch RD, Kulkarni K, Daniels JS. “Role of *in vitro* Transport Assays in Pharmacokinetic Studies and the Drug Discovery Process.” Lipscomb University College of Pharmacy Research Day, Lipscomb University College of Pharmacy, Nashville, TN. October 2011.

Stephens RD*, Boeglin WE, Brash AR. “Metabolism of Very Long-Chain Fatty Acids by Cytochrome P450 4F11.” Lipscomb University College of Pharmacy Research Day, Lipscomb University College of Pharmacy, Nashville, TN. October 2010

Nickel JP, **Stephens RD***, Fowler MW, Mercer SL. “Determination of the Abuse Potential of Daytrana® Transdermal Patches.” Lipscomb University College of Pharmacy Research Day, Lipscomb University College of Pharmacy, Nashville, TN. January 2010

ORAL PRESENTATIONS

Research Presentations:

“Interaction Between the Aldehyde Oxidase Inhibitor Hydralazine and Glutathione” Vanderbilt Enzymology Meeting, Vanderbilt University, Nashville, TN. February 2021

“Challenges in Predicting Human Aldehyde Oxidase Metabolism: Species Differences and Extra-Hepatic Expression” Vanderbilt Enzymology Meeting, Vanderbilt University, Nashville, TN. February 2020

“Strategies and Challenges in Evaluating Aldehyde Oxidase Metabolism.” Invited Presentation, Department of Chemistry and Biochemistry, Lipscomb University, Nashville, TN. April 2018.

“Aldehyde Oxidase Drug Metabolism: Evaluation of Drug Interaction Potential and Allometric Scaling Methods to Predict Human Pharmacokinetics.” Dissertation Defense, Department of Pharmacology, Vanderbilt University, Nashville, TN. November 2016.

“Predicting Human Clearance of Aldehyde Oxidase Substrates.” Pharmacology Internal Seminar of Works in Progress. Department of Pharmacology, Vanderbilt University, Nashville, TN. April 2015.

“Metabolic Shunting Induced in vivo by Inhibition of Metabolism of a Compound with a Mixed Aldehyde Oxidase/P450 Clearance Phenotype.” Lipscomb University College of Pharmacy Invited Presentation, Nashville, TN. November 2014.

“Metabolic Shunting Induced in vivo by Inhibition of Metabolism of a Compound with a Mixed Aldehyde Oxidase/P450 Clearance Phenotype.” Vanderbilt Pharmacology Departmental Retreat, Nashville, TN. October 2014.

“Inhibition of P450-Mediated Metabolism of VU0409106: Involvement of Metabolic Shunting Towards Aldehyde Oxidase-Mediated Metabolism” Vanderbilt Enzymology Meeting, Vanderbilt University, Nashville, TN. March 2014

“Role of Metabolism and Disposition in the Pharmacological Activity of M₄ Positive Allosteric Modulators.” Vanderbilt Center for Neuroscience Drug Discovery Annual Retreat. Nashville, TN October. 2013.

“Biotransformation of M₄ Positive Allosteric Modulators to Pharmacologically Distinct Active Metabolites.” Vanderbilt Pharmacology Departmental Retreat, Buchanan, TN. October 2012.

“Histidine Decarboxylase Assay by Capillary Electrophoresis” Tennessee Academy of Science Middle Division Meeting, Chemistry/Physics, Belmont University, Nashville, TN. April 2008

Journal Club Presentations:

“Pharmacologic Stimulation of Cytochrome P450 46A1 and Cerebral Cholesterol Turnover in Mice.”
Vanderbilt Pharmacology Departmental Journal Club, Vanderbilt University, Nashville, TN March. 2014.

“Using Chimeric Mice with Humanized Livers to Predict Human Drug Metabolism and a Drug-Drug Interaction.” Vanderbilt Pharmacology Departmental Journal Club, Vanderbilt University, Nashville, TN. April 2013.

PUBLICATIONS

Refereed Articles:

Han SH, Goins CM, Arya T, Shin WJ, Maw J, Hooper A, Sonawane DP, Porter MR, Bannister BE, **Crouch RD**, Lindsey AA, Lakatos G, Martinez SR, Alvarado J, Akers WS, Wang NS, Jung JU, Macdonald JD, Stauffer SR. “Structure-Based Optimization of ML300-Derived, Noncovalent Inhibitors Targeting the Severe Acute Respiratory Syndrome Coronavirus 3CL Protease (SARS-CoV-2 3CLpro).” *J Med Chem*. 2021. Epub ahead of print.

Bissada JE, Truong V, Abouda AA, Wines KJ, **Crouch RD**, Jackson KD. “Interindividual Variation in CYP3A Activity Influences Lapatinib Bioactivation.” *Drug Metabolism and Disposition*. 2019; 47(11):1257-69.

Crouch RD, Blobaum AL, Felts AS, Conn JP, Lindsley CW. “Species-Specific Involvement of Aldehyde Oxidase and Xanthine Oxidase in the Metabolism of the Pyrimidine-Containing mGlu5-Negative Allosteric Modulator VU0424238 (Auglurant).” *Drug Metabolism and Disposition*. 2017; 45(12):1245-59.

Crouch RD, Hutzler JM, and Daniels JS. “A novel In Vitro Allometric Scaling Methodology for Aldehyde Oxidase Substrates to Enable Selection of Appropriate Species for Traditional Allometry.” *Xenobiotica*. 2018; 48(3):219-231.

Crouch RD, Morrison RD, Byers FW, Lindsley CW, Emmitte KA and Daniels JS. “Evaluating the Disposition of a Mixed Aldehyde Oxidase/Cytochrome P450 Substrate in Rats with Attenuated P450 Activity.” *Drug Metabolism and Disposition*. 2016; 44(8):1296-1303.

Book Chapters:

Crouch RD, Beers JL, Jackson KD. “Case Study 11: Considerations for Enzyme Mapping Experiments: Interaction between the Aldehyde Oxidase Inhibitor Hydralazine and Glutathione.” In: Nagar S, Argikar UA, Tweedie D (eds) *Enzyme Kinetics in Drug Metabolism. Methods in Molecular Biology*. Vol 2342. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-1554-6_30

*Former name is “Stephens”