

PATRICK THOMAS RONALDSON, PH.D

***CURRICULUM VITAE***

**CHRONOLOGY OF EDUCATION**

**Sept 1995 – April 2000**                      **Honors Bachelor of Science (with Distinction), Pharmacology**  
Faculty of Arts and Sciences  
University of Toronto, Toronto, Ontario, Canada  
Degree conferred June 2000

**Jan 2001 – Nov 2007**                      **Doctor of Philosophy, Pharmaceutical Sciences**  
Department of Pharmaceutical Sciences  
Leslie Dan Faculty of Pharmacy  
University of Toronto, Toronto, Ontario, Canada  
Degree conferred November 2007

*Thesis Supervisor:* Dr. Reina Bendayan  
*Thesis Title:* Functional Expression of ATP-Binding Cassette (ABC) Transporters in Brain Cellular Compartments and in Glial Cells exposed to HIV-1 Viral Proteins.

**CHRONOLOGY OF EMPLOYMENT**

**Nov 2007 - June 2008**                      **Postdoctoral Fellow**  
Department of Pharmaceutical Sciences  
Leslie Dan Faculty of Pharmacy  
University of Toronto, Toronto, Ontario, Canada  
*Supervisor:* Dr. Reina Bendayan

**June 2008 – Oct 2009**                      **Postdoctoral Fellow**  
Department of Pharmacology  
College of Medicine  
University of Arizona, Tucson, Arizona, USA  
*Supervisor:* Dr. Thomas P. Davis

**Oct 2009 – Feb 2011**                      **Research Assistant Professor**  
Department of Pharmacology  
College of Medicine  
University of Arizona, Tucson, Arizona, USA

**Feb 2011 – Apr 2017**                      **Assistant Professor, Tenure-eligible**  
Department of Pharmacology  
College of Medicine  
University of Arizona, Tucson, Arizona, USA

**Apr 2017 – Present**                      **Associate Professor, Tenured**  
Department of Pharmacology  
College of Medicine  
University of Arizona, Tucson, Arizona, USA

**PATRICK THOMAS RONALDSON, PH.D**

**HONORS AND AWARDS**

- Apr 2002**                                 **Piafsky Memorial Trainee Award**  
Canadian Society for Clinical Pharmacology (CSCP)
- Apr 2003**                                 **Certificate of Excellence, Top Research Abstract**  
American Association of Pharmaceutical Scientists (AAPS)
- Oct 2003**                                 **Graduate Student Research Poster Award**  
Association of Faculties of Pharmacy of Canada (AFPC)
- June 2006**                                **Canadian Student Health Research Forum Poster Award**  
Canadian Institutes of Health Research (CIHR)
- Feb 2007**                                **Gordon Cressy Leadership Award**  
University of Toronto Alumni Association  
University of Toronto Division of University Advancement
- June 2007**                                **Graduate Student Research Achievement Award**  
Association of Faculties of Pharmacy of Canada (AFPC)  
GlaxoSmithKline Canada Inc.
- Oct 2007**                                **Postdoctoral Travel Award**  
American Association of Pharmaceutical Scientists (AAPS)
- Oct 2011**                                **New Investigator Award**  
Pharmacokinetics, Pharmacodynamics and Drug Metabolism (PPDM) Section, American Association of Pharmaceutical Scientists (AAPS)
- May 2013**                                **Young Investigator Award**  
International Society of Cerebral Blood Flow and Metabolism (ISCBFM)
- Nov 2016**                                **PPDM Service Award**  
Pharmacokinetics, Pharmacodynamics, and Drug Metabolism (PPDM) Section, American Association of Pharmaceutical Scientists (AAPS).

**SERVICE/OUTREACH**

**1) Local/State Outreach**

- June 2013 – July 2013**                                **Summer Institute on Medical Ignorance (SIMI)**  
College of Medicine, University of Arizona  
Student Supervised: Alyssa Antone (Tohono O'odham High School)

**PATRICK THOMAS RONALDSON, PH.D**

**2) National/International Outreach**

<b>Oct 2010 – Nov 2012</b>	<b>Steering Committee Member, Drug Transport Focus Group</b> American Association of Pharmaceutical Scientists (AAPS)
<b>Jan 2011 – Present</b>	<b>Member</b> American Society for Pharmacology and Experimental Therapeutics (ASPET)
<b>Nov 2012 – Nov 2014</b>	<b>Chair-Elect, Drug Transport Focus Group</b> American Association of Pharmaceutical Scientists (AAPS)
<b>May 2013 – Nov 2014</b>	<b>Member, Electronic Program Development Committee (EPDC)</b> American Association of Pharmaceutical Scientists (AAPS)
<b>Oct 2014</b>	<b>Member, Focus on Brain Review Committee</b> Brain Canada
<b>Nov 2014 – Oct 2015</b>	<b>Chair-Elect, Electronic Program Development Committee (EPDC)</b> American Association of Pharmaceutical Scientists (AAPS)
<b>Nov 2014 – Oct 2016</b>	<b>Chair, Drug Transport Focus Group</b> American Association of Pharmaceutical Scientists (AAPS)
<b>Oct 2015 – Sept 2018</b>	<b>Chair, Electronic Program Development Committee (EPDC)</b> (Note: EPDC has been rebranded as the eLearning Committee) American Association of Pharmaceutical Scientists (AAPS)
<b>Oct 2015 – Present</b>	<b>Reviewer, Czech Health Research Council</b> Ministry of Health, Czech Republic
<b>Oct 2015 – Present</b>	<b>Member, Brain 1 Peer Review Committee</b> American Heart Association
<b>Oct 2015 – Oct 2017</b>	<b>Ad Hoc Member, Drug Discovery for the Nervous System (DDNS) Study Section</b> National Institutes of Health (NIH)
<b>Dec 2015 – Present</b>	<b>Reviewer, Biological and Medical Sciences</b> Austrian Science Fund (FWF)
<b>Apr 2016</b>	<b>Chair, AAPS/ITC Joint Workshop on Drug Transport in ADME: From the Bench to the Bedside</b> American Association of Pharmaceutical Scientists (AAPS)
<b>Oct 2017 – June 2019</b>	<b>Member, Drug Discovery for the Nervous System (DDNS) Study Section</b> National Institutes of Health (NIH)

**PATRICK THOMAS RONALDSON, PH.D**

- Dec 2018 – Present**                      **Member, Approaches for Understanding Disease Mechanisms and Improving Outcomes in TB Meningitis (TBM) Study Section (ZRG1 IDM-T 50)**  
National Institutes of Health
- June 2019 – Present**                      **Vice-Chair Elect, Pharmacokinetics, Pharmacodynamics, and Drug Metabolism (PPDM) Community**  
American Association of Pharmaceutical Scientists (AAPS)
- June 2019 – Present**                      **Chair, Drug Discovery for the Nervous System (DDNS) Study Section**  
National Institutes of Health (NIH)

**3) Departmental Committees**

- Feb 2011 – Present**                      **AZMed Committee**  
Department of Pharmacology  
College of Medicine  
University of Arizona
- Nov 2013 – Present**                      **Graduate Program Admissions Committee**  
Department of Pharmacology  
College of Medicine  
University of Arizona
- Jan 2014 – Aug 2018**                      **Director, Graduate Program in Medical Pharmacology**  
Department of Pharmacology  
College of Medicine  
University of Arizona
- Feb 2017 – Present**                      **Space Committee**  
Department of Pharmacology  
College of Medicine  
University of Arizona

**4) College Committees**

- Sept 2013 – Dec 2013**                      **External Member, Faculty Search Committee**  
College of Pharmacy  
University of Arizona
- Jan 2014 – Aug 2018**                      **Graduate Program Advisory Council**  
College of Medicine  
University of Arizona
- June 2014 – Present**                      **Dean's Research Council**  
College of Medicine  
University of Arizona

**PATRICK THOMAS RONALDSON, PH.D**

**June 2015 – Present**                      **Dean’s Council on Faculty Affairs**  
College of Medicine  
University of Arizona

**5) University Committees**

**Nov 2012 – Apr 2015**                      **Admissions Committee**  
Graduate Interdisciplinary Program in Physiological Sciences  
University of Arizona

**Nov 2013 – Aug 2018**                      **Admissions Committee**  
Arizona Biosciences and Biomedical Sciences (ABBS) Graduate  
Program  
University of Arizona

**Dec 2018 – Present**                      **Admissions Committee**  
Neuroscience Graduate Interdisciplinary Program  
University of Arizona

**Dec 2019 – Present**                      **Executive Committee**  
Neuroscience Graduate Interdisciplinary Program  
University of Arizona

**6) Journal Editorial Boards**

**June 2012 – Apr 2014**                      **Executive Guest Editor**  
Current Pharmaceutical Design, Bentham Science Publishers, Inc.  
Special Issue: Targeting Transporters for CNS Drug Delivery

**Aug 2016 – Present**                      **Editorial Board Member**  
Fluids and Barriers of the CNS

**Jan 2017 – Present**                      **Editorial Board Member**  
Hypoxia

**March 2018 – Present**                      **Editorial Board Member**  
BMC Pharmacology

**March 2019 – Jan 2020**                      **Executive Guest Editor**  
Pharmaceutics, MDPI  
Special Issue: Drug Delivery to the Brain

**Jan 2020 – Present**                      **Editorial Board Member**  
Pharmaceutics

**PATRICK THOMAS RONALDSON, PH.D**

**7) Journal Peer-Reviewing**

<b>Feb 2011 – Present</b>	<b>Molecular Pharmacology</b> Highwire Press, Redwood City, CA, USA.
<b>Mar 2011 – Present</b>	<b>Laboratory Investigation</b> Nature Publishing Group, New York, NY, USA.
<b>Mar 2011 – Present</b>	<b>European Journal of Pharmacology</b> Elsevier Inc., Waltham, MA, USA.
<b>May 2011 – Present</b>	<b>Journal of Cerebral Blood Flow and Metabolism</b> Nature Publishing Group, New York, NY, USA.
<b>June 2011 – Present</b>	<b>International Journal of Nanomedicine</b> Dove Medical Press, Princeton, NJ, USA.
<b>Sept 2011 – Present</b>	<b>Pharmacological Research</b> Elsevier Inc., Waltham, MA, USA.
<b>Sept 2011 – Present</b>	<b>Brain Research Bulletins</b> Elsevier Inc., Waltham, MA, USA.
<b>Mar 2012 – Present</b>	<b>BMC Neuroscience</b> Biomed Central, London, UK.
<b>June 2012 – Present</b>	<b>Journal of Pharmacology and Experimental Therapeutics</b> Highwire Press, Redwood City, CA, USA.
<b>Aug 2012 – Present</b>	<b>Molecular Pharmaceutics</b> American Chemical Society Publications, Washington, DC, USA.
<b>Nov 2012 – Present</b>	<b>Cellular and Molecular Neurobiology</b> Springer, New York, NY, USA.
<b>Dec 2012 – Present</b>	<b>Medicinal Research Reviews</b> John Wiley and Sons, Ltd., Malden, MA, USA.
<b>May 2013 – Present</b>	<b>Therapeutic Delivery</b> Future Science Ltd., London, UK.
<b>June 2013 – Present</b>	<b>Experimental Gerontology</b> Elsevier Inc., Waltham, MA, USA.
<b>July 2013 – Present</b>	<b>Fluids and Barriers of the CNS</b> Biomed Central, London, UK.

**PATRICK THOMAS RONALDSON, PH.D**

<b>July 2013 – Present</b>	<b>PLOS One</b> PLOS, San Francisco, CA, USA.
<b>Oct 2013 – Present</b>	<b>Journal of Cellular and Molecular Medicine</b> John Wiley and Sons, Ltd., Malden, MA, USA.
<b>Oct 2013 – Present</b>	<b>Journal of Pain Research</b> Dove Medical Press, Princeton, NJ, USA.
<b>Dec 2013 – Present</b>	<b>International Journal of Medical Sciences</b> Ivyspring International Publishers, Sydney, Australia
<b>Jan 2014 – Present</b>	<b>ACS Chemical Neuroscience</b> American Chemical Society Publications, Washington, DC, USA.
<b>Feb 2014 – Present</b>	<b>Journal of Pharmacy and Pharmacology</b> John Wiley and Sons, Ltd., Malden, MA, USA.
<b>Apr 2014 – Present</b>	<b>Advances in Pharmacology</b> Elsevier Inc., Waltham, MA, USA.
<b>May 2014 – Present</b>	<b>Journal of Neuroscience Research</b> John Wiley and Sons, Ltd., Malden, MA, USA.
<b>Sept 2014 – Present</b>	<b>Stroke</b> Lippincott, Williams & Wilkins, Hagerstown, MD, USA.
<b>Feb 2015 – Present</b>	<b>Expert Opinion on Drug Metabolism and Toxicology</b> Taylor & Francis, London, UK
<b>Apr 2015 – Present</b>	<b>Pharmaceutical Research</b> Springer, New York, NY, USA.
<b>Apr 2017 – Present</b>	<b>Translational Stroke Research</b> Springer, New York, NY, USA.
<b>Apr 2018 – Present</b>	<b>Pharmaceutics</b> MDPI, Basel, Switzerland.
<b>Oct 2018 – Present</b>	<b>Brain, Behavior, and Immunity</b> Elsevier Inc., Waltham, MA, USA.

**TEACHING INVOLVEMENT**

**Medical Pharmacology Graduate Program**

**Sept 2010 – Present**

**PHCL601C – Pharmacology of Cardiovascular, Respiratory, GI, and CNS Drugs.**

**Course Description:** This course covers the action of chemical agents upon living material at all levels of organization with an emphasis on mechanisms of action of prototype drugs used to treat diseases/disorders of the cardiovascular, pulmonary, gastrointestinal and nervous systems. The course provides a foundation for a rational approach to human therapeutics and toxicology. This course was previously designated PHCL501A.

**Role in Course:** Instructor

**Teaching Methods:** Didactic Lectures

**Topics:** Gastrointestinal Pharmacology (1.5 hours)  
Parkinson's Disease/Antianxiety drugs (1.5 hours)

**Feb 2011 – Present**

**PHCL553 – Neuropharmacology**

**Course Description:** This course provides an introductory overview of the field of neuropharmacology. Topics that will be covered include principles of synaptic neurotransmission as well as the anatomy/physiology of specific neurotransmitter systems. These neurotransmitter systems will include major transmitters such as dopamine, serotonin etc. as well as atypical transmitters such as endovanilloids, nucleotides, and nitric oxide. Also covered in this course is the basic pathology of disease states that are related to specific neurotransmitter systems such as Parkinson's disease and mood disorders. Finally, the course will cover pharmacological agents that manipulate these neurotransmitter systems either for the treatment of disease or for their abuse potential.

**Role in Course:** Instructor

**Teaching Methods:** Didactic Lectures

**Topics:** Physiology of the Blood-Brain Barrier (1.5 hours)  
Methods to Study the Blood-Brain Barrier (1.5 hours)



**PATRICK THOMAS RONALDSON, PH.D**

**Oct 2012**

**PHCL520 – Principles of Pharmacology**

**Course Description:** Students will be introduced to the principles of drug actions and intracellular communications. Students will learn drug-receptor theory that will include radioligand binding, second messenger assays, and drug response. Students will interpret and construct dose-response curves as well as learn the basics of pharmacokinetics (i.e., absorption, distribution, metabolism, elimination).

**Role in course:** Instructor

**Teaching Methods:** Didactic Lectures

**Topics:** Introduction to Drug Transporters (1.5 hours)

**Jan 2014 – Present**

**PHCL551A – Molecular Targets for Drug Discovery**

**Course Description:** This course presents the most cutting edge approaches for studying the molecular pharmacology of intracellular signaling pathways and drug transport mechanisms. A particular emphasis is placed on rational drug design and the discovery and validation of novel drug targets. Currently marketed drugs will be discussed in detail to demonstrate how efficacious concentrations are achieved in a target tissue and to understand how drugs work at the molecular level. Additionally, pathological aspects of various diseases (i.e., stroke, pain, traumatic brain injury) are discussed and associated pharmacological approaches to treat these diseases are examined in detail.

**Role in course:** Instructor and Course Director

**Teaching Methods:** Seminar Format via Open Discussion of Scientific Papers

**Topics:** Molecular Basis of Drug Discovery (13 hours)  
Intracellular Signaling Pathways (3.5 hours)  
Mechanisms of Drug Transport (3.5 hours)  
Neuropharmacology (6.0 hours)  
Molecular Pharmacology of Human Disease (13 hours)

**Aug 2017 – Present**

**PCOL602A – General and Systems Toxicology**

**Course Description:** This course provides students with a comprehensive overview of principles of toxicology with an emphasis on specific organ systems. Mechanisms of cellular injury by a variety of toxicants are discussed and acute/chronic effects of toxicant exposure are outlined in detail.

**Role in course:** Instructor

**Teaching Methods:** Didactic lectures

**Topics:** Neurotoxicology (3 hours)

**Doctor of Medicine Program**

**Sept 2011 – Present**

**Foundations Block**

**Course Description:** The Foundations Block provides students with background knowledge in the core sciences fundamental to an understanding of Medicine, including Anatomy, Histology, Cell Biology, Biochemistry, Physiology, Pathology, Immunology, Microbiology, Pharmacology, Genetics and Embryology. It also begins to train students in ‘threads’ that are critical to a competent practice of Medicine: Evidence in Medicine, Health and Society, and The Individual and Health. In addition, the Foundations Block includes most content relating to skin as an organ system (some skin content is covered in the Advanced Topics Block). A solid knowledge of the material taught in Foundations gives students essential background for every other block as well as for passing USMLE Step I, and ultimately for clinical practice.

**Role in Course:** Instructor

**Teaching Methods:** Didactic Lectures & Team Learning Workshop

**Topics:** Pharmacokinetics (2.5 hours)  
Drug Metabolism (1.0 hours)  
Pharmacodynamics (2.0 hours)  
Team Learning Review (3.0 hours)

**Feb 2011 – May 2015**

**Case-Based Instruction (CBI): Cardiovascular, Pulmonary, and Renal Block**

**Course Description:** The CBI component of the Cardiovascular, Pulmonary, and Renal Block provides students with an applied understanding of diseases and medical treatment. Students are expected to identify the key pathophysiological features of a medical case, determine which basic science principles are most relevant, and apply basic science concepts to solve medical problems. Students will discuss their final diagnoses in small groups.

**Role in Course:** Group Facilitator

**Teaching Methods:** Facilitation of Small Student Groups

**Topics:** Hypertension (2.0 hours)  
Atrial Fibrillation (2.0 hours)

## **PATRICK THOMAS RONALDSON, PH.D**

Myocardial Infarction (2.0 hours)

Heart Failure (2.0 hours)

Chest Pain (2.0 hours)

Pulmonary Edema (2.0 hours)

Pulmonary Hypertension (2.0 hours)

Nephritis (2.0 hours)

Idiopathic Pulmonary Fibrosis (2.0 hours)

**Oct 2012 – Dec 2014**

### **Case-Based Instruction (CBI): Nervous System Block**

**Course Description:** The CBI component of the Nervous System Block provides students with an applied understanding of diseases and medical treatment. Students are expected to identify the key pathophysiological features of a medical case, determine which basic science principles are most relevant, and apply basic sciences concepts and diagnostic tools to solve medical problems. Students will discuss their final diagnoses in small groups.

**Role in Course:** Group Facilitator

**Teaching Methods:** Facilitation of Small Student Groups

**Topics:** Craniocerebral Trauma (3.0 hours)

Headache (3.0 hours)

Brainstem Dysfunction (6.0 hours)

Abnormal Movement (3.0 hours)

Head Injury (3.0 hours)

Parkinson's Disease (3.0 hours)

**Mar 2016 – May 2018**

### **Clinical Reasoning through Case-Based Instruction**

**Course Description:** Clinical Reasoning through Case-Based Instruction provides students with an applied understanding of diseases and medical treatment. Students are expected to identify the key pathophysiological features of a medical case, determine which basic science principles are most relevant, and apply basic science concepts to solve medical problems. The Clinical Reasoning Course is based upon a reflective pedagogy. Therefore, students are prompted to consider what they need to know and how new information might change their provisional diagnoses or their approach to the case. Students are encouraged to consider peer ideas and how peers conceptualize a problem or approach its resolution to inform their own thinking process. Students may revise their work at any time.

**Role in Course:** Group Facilitator

**Teaching Methods:** Facilitation of Small Student Groups

## **PATRICK THOMAS RONALDSON, PH.D**

**Topics:** Hypertension (2.0 hours)

Atrial Fibrillation (2.0 hours)  
Myocardial Infarction (2.0 hours)  
Heart Failure (2.0 hours)  
Chest Pain (2.0 hours)

Pulmonary Edema (2.0 hours)  
Pulmonary Hypertension (2.0 hours)  
Nephrotic Syndrome (2.0 hours)  
Idiopathic Pulmonary Fibrosis (2.0 hours)

### **Undergraduate Bachelor of Science**

**Aug 2012 – Aug 2018**      **PHCL412/512 – Introduction to Pharmacology**

**Course Description:** Students will learn the history of pharmacology, along with the principles of how drugs act to produce changes within the body. Lectures include the anatomy of physiology of body structures, with special emphasis on the processes that govern drug absorption, distribution, metabolism, and excretion. Other lectures will include the processes that establish and maintain intracellular electrical charge (i.e., membrane potential), nerve impulse conduction, how excitable tissue becomes excited or inhibited, and the mechanism(s) of drug action on such tissues. Students will learn detailed information about the autonomic nervous system and the cardiovascular system.

**Role in course:** Instructor

**Teaching Methods:** Didactic Lectures

**Topics:** Introduction to Pharmacokinetics (2.0 hours)  
Introduction to Pharmacodynamics (1.0 hour)

### **STUDENT MENTORING ACTIVITIES**

#### **Postdoctoral Fellows**

**Apr 2015 – April 2018**      Dr. Hrvoje Brzica, Ph.D.  
Department of Pharmacology  
College of Medicine  
University of Arizona

**Nov 2019 – Present**      Dr. Dinusha Maheepala Mudalige, Ph.D.  
Department of Neurology  
College of Medicine  
University of Arizona

## **PATRICK THOMAS RONALDSON, PH.D**

### **Direct Student Advising – Graduate Students**

<b>Apr 2011 – May 2014</b>	Brandon J. Thompson, Ph.D. Doctor of Philosophy Program Graduate Interdisciplinary Program in Physiological Sciences College of Medicine University of Arizona
<b>June 2014 – July 2017</b>	Kathryn Ibbotson, M.S. Department of Pharmacology and Toxicology College of Pharmacy University of Arizona
<b>Apr 2015 – Dec 2018</b>	Wazir Abdullahi, Ph.D. Doctor of Philosophy Student Department of Pharmacology College of Medicine University of Arizona
<b>June 2016 – Aug 2017</b>	Nicholas Hirsch, M.S. Master of Science Student Perfusion Sciences Program Department of Pharmacology College of Medicine University of Arizona
<b>May 2018 – Present</b>	Junzhi Yang Doctor of Philosophy Student Department of Pharmacology and Toxicology College of Pharmacy University of Arizona
<b>Apr 2019 – Present</b>	Erica Williams Doctor of Philosophy Student Department of Pharmacology College of Medicine University of Arizona
<b>Aug 2019 – Present</b>	Ayman Sami Master of Science Student Department of Pharmacology College of Medicine University of Arizona

## **PATRICK THOMAS RONALDSON, PH.D**

**Aug 2019 – Present** Raul Nava  
Master of Science Student  
Physiological Sciences GIDP  
College of Medicine  
University of Arizona

**Aug 2019 – Present** Robert D. Betterton  
Master of Science Student  
Applied Biosciences Graduate Interdisciplinary Program  
College of Science  
University of Arizona

**April 2019 – Present** Qianying He  
Doctor of Philosophy Student  
Department of Neurology  
College of Medicine  
University of Arizona

**Aug 2019 – Present** Nina Fitchett  
Master of Science Student  
Department of Neurology  
College of Medicine  
University of Arizona

### **Direct Student Advising – Undergraduate Students**

**May 2014 – July 2015** Joshua M. Yell  
Bachelor of Science Student  
Undergraduate Biology Research Program  
Major: Neuroscience  
University of Arizona

**May 2017 – Present** Bianca G. Reilly  
Bachelor of Science Student  
Major: Biochemistry  
University of Arizona

**Aug 2017 – June 2018** Corbin R. Pinter  
Bachelor of Science Student  
Major: Cellular and Molecular Medicine  
University of Arizona

**Aug 2018 – Aug 2019** Robert D. Betterton  
Bachelor of Science Student  
Major: Biochemistry  
University of Arizona

## **PATRICK THOMAS RONALDSON, PH.D**

**Aug 2018 – Aug 2019** Samantha Serna  
Bachelor of Science Student  
Major: Biochemistry  
University of Arizona

**June 2019 – Present** Joshua Stanton  
Bachelor of Science Student  
Major: Neuroscience  
University of Arizona

### **Thesis and Dissertation Advisory Committees**

**Jan 2010 – Dec 2011** Jeffrey J. Lochhead, Ph.D.  
Doctor of Philosophy Program  
Graduate Interdisciplinary Program in Neuroscience  
University of Arizona

**Feb 2011 – June 2015** Lucy Martinez-Guerrero, Ph.D.  
Doctor of Philosophy Program  
Graduate Interdisciplinary Program in Physiological Sciences  
College of Medicine  
University of Arizona

**Feb 2011 – Dec 2013** Lucy Sanchez-Covarrubias, Ph.D.  
Doctor of Philosophy Program  
Department of Pharmacology  
College of Medicine  
University of Arizona

**June 2011 – June 2015** Joshua Strom, Ph.D.  
Doctor of Philosophy Program  
Department of Pharmacology  
College of Medicine  
University of Arizona

**Feb 2012 – Oct 2015** David Klein, Ph.D.  
Doctor of Philosophy Program  
Department of Pharmacology and Toxicology  
College of Pharmacy  
University of Arizona

**Apr 2013 – June 2014** Jason Singh, M.S.  
Master of Science Program  
Graduate Interdisciplinary Program in Physiological Sciences  
College of Medicine  
University of Arizona

**PATRICK THOMAS RONALDSON, PH.D**

- Feb 2014 – June 2017** Phillip Sandoval  
Doctor of Philosophy Candidate  
Graduate Interdisciplinary Program in Physiological Sciences  
College of Medicine  
University of Arizona
- Mar 2014 – Aug 2017** Joseph Tillotson  
Doctor of Philosophy Candidate  
Department of Pharmacology and Toxicology  
College of Pharmacy  
University of Arizona
- Apr 2016 – Present** Yuanzhang Yang  
Doctor of Philosophy Student  
Department of Cellular and Molecular Medicine  
College of Medicine  
University of Arizona
- June 2016 – Aug 2019** Erica Toth  
Doctor of Philosophy Student  
Department of Pharmacology and Toxicology  
College of Pharmacy  
University of Arizona
- June 2016 – July 2018** Willie Mohammed Johnson  
Master of Science Program  
Department of Cellular and Molecular Medicine  
College of Medicine  
University of Arizona
- April 2018 – Feb 2020** David Duron  
Doctor of Philosophy Program  
Department of Pharmacology  
College of Medicine  
University of Arizona
- April 2019 – Present** Siannah Miller  
Doctor of Philosophy Program  
Department of Pharmacology and Toxicology  
College of Pharmacy  
University of Arizona
- April 2019 – Present** Kayla Lee Frost  
Doctor of Philosophy Program  
Department of Pharmacology and Toxicology  
College of Pharmacy  
University of Arizona



## **PATRICK THOMAS RONALDSON, PH.D**

### **PUBLICATIONS**

#### **Chapters in Scholarly Books and Monographs**

**Ronaldson PT**, Babakhanian K, Bendayan R; \*Drug Transport in the Brain; pp 411-462; In Drug Transporters: Molecular Characterization and Role in Drug Disposition; John Wiley & Sons; New York, NY; 2007; You G and Morris M eds.

Witt KA, **Ronaldson PT**, Sandoval KE, Davis TP; CNS delivery of peptides across the blood-brain barrier; pp 233-248; In Drug Delivery to the Central Nervous System; Humana Press Inc., Totowa, NJ; 2009; Jain KK ed.

Ashraf T, **Ronaldson PT**, Bendayan R; Drug Transport in the Brain; In Drug Transporters: Molecular Characterization and Role in Drug Disposition, 2<sup>nd</sup> Edition; John Wiley & Sons; New York, NY; 2013; You G and Morris M eds.

**Ronaldson PT**, Davis TP; Glial Support of Blood-Brain Barrier Integrity: Molecular Targets for Novel Therapeutic Strategies in Stroke; In Non-Neuronal Mechanisms of Brain Damage and Repair in Stroke; Springer; New York, NY; 2016; Chen J, Zhang J, and Hu X eds.

**Ronaldson PT**, Davis TP; Mechanisms of Endothelial Injury and Blood-Brain Barrier Dysfunction in Stroke; In Caplan Primer on Cerebrovascular Diseases, 2<sup>nd</sup> Edition; Elsevier Inc.; Philadelphia, PA; 2016; Lo EH ed.

#### **Refereed Journal Articles, Published or Accepted in Final Form**

**Ronaldson PT**, Bendayan R; \*Renal drug transport and drug-drug interactions; Journal of Pharmacy Practice; 2002; 15(6): 490-503.

**Ronaldson PT**, Bendayan M, Gingras D, Piquette-Miller M, Bendayan R; \*Cellular localization and functional expression of P-glycoprotein in rat astrocyte cultures; Journal of Neurochemistry; 2004; 89(3): 788-800.

Dallas S, **Ronaldson PT**, Bendayan M, Bendayan R; \*Multidrug resistance protein-1-mediated transport of saquinavir in microglia; NeuroReport; 2004; 15(7): 1183-1186.

**Ronaldson PT**, Lee G, Dallas S, Bendayan R; \*Involvement of P-glycoprotein in the transport of saquinavir and indinavir in rat brain microvessel endothelial and microglial cell lines; Pharmaceutical Research; 2004; 21(5): 811-818.

Cheung RY, Rauth AM, **Ronaldson PT**, Bendayan R, Wu XY; \*In vitro toxicity to breast cancer cells of microsphere-delivered mitomycin C and its combination with doxorubicin; European Journal of Pharmaceutics and Biopharmaceutics; 2005; 62(3): 321-331.

**Ronaldson PT**, Bendayan R; \*HIV-1 viral envelope glycoprotein gp120 triggers an inflammatory response in cultured rat astrocytes and regulates the functional expression of P-glycoprotein; Molecular Pharmacology; 2006; 70(3): 1087-1098.

## **PATRICK THOMAS RONALDSON, PH.D**

Bendayan R, **Ronaldson PT**, Gingras D, Bendayan M; \*In situ localization of P-glycoprotein (ABCB1) in human and rat brain; *Journal of Histochemistry and Cytochemistry*; 2006; 54(10): 1159-1167.

**Ronaldson PT**, Bendayan R; \*HIV-1 envelope glycoprotein gp120 produces oxidative stress and regulates the expression of multidrug resistance protein-1 (Mrp1) in glial cells; *Journal of Neurochemistry*; 2008; 106(3): 1298-1313.

**Ronaldson PT**, Persidsky Y, Bendayan R; \*Regulation of ABC membrane transporters in glial cells: relevance to the pharmacotherapy of brain HIV-1 infection; *Glia*; 2008; 56(16): 1711-1735.

Zastre JA, Chan GN, **Ronaldson PT**, Ramaswamy M, Couraud PO, Romero IA, Weksler B, Bendayan M, Bendayan R; \*Up-regulation of P-glycoprotein by HIV protease inhibitors in a human brain microvessel endothelial cell line; *Journal of Neuroscience Research*; 2009; 87(4): 1023-1036.

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## **PATRICK THOMAS RONALDSON, PH.D**

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## **PATRICK THOMAS RONALDSON, PH.D**

### **CONFERENCE AND SCHOLARLY PRESENTATIONS**

**Ronaldson PT.** Involvement of transforming growth factor- $\beta$  (TGF- $\beta$ ) signaling on the regulation of tight junction proteins at the blood-brain barrier during inflammatory pain. Invited Presentation. Gordon Research Conference on Barriers of the CNS. New London, NH, June 21, 2010.

**Ronaldson PT.** Ouch, there goes my blood-brain barrier: How inflammatory pain in the periphery modulates drug delivery to the CNS. Invited Webinar Presentation. American Association of Pharmaceutical Scientists' Drug Transport Focus Group. November 10, 2010.

**Ronaldson PT.** Peripheral inflammatory pain alters blood-brain barrier functional integrity: Implications for CNS drug delivery. Invited Presentation. 22<sup>nd</sup> Annual Spring Brain Conference, Tucson, AZ, March 19, 2011.

**Ronaldson PT.** Modulation of blood-brain barrier functional integrity by pain/inflammation. Invited Presentation. American Society for Neurochemistry Annual Meeting, St. Louis, MO, March 20, 2011.

**Ronaldson PT.** Targeting organic anion transporting polypeptide 1a4 (Oatp1a4) at the blood-brain barrier for optimization of CNS drug delivery. Invited Presentation. Gordon Research Conference on Barriers of the CNS, New London, NH, June 20, 2012.

**Ronaldson PT.** Targeting organic anion transporting polypeptides (Oatps) at the blood-brain barrier for optimization of CNS drug delivery. Invited Presentation. American Association of Pharmaceutical Scientists' Annual Meeting and Exposition, Chicago, IL, October 14, 2012.

**Ronaldson PT.** Blood-brain barrier transporters: Role in Drug-Drug Interactions and in CNS Drug Delivery. University of Arizona Department of Pharmacology Seminar, April 24, 2013.

**Ronaldson PT.** Utility of in situ brain perfusion to study mechanisms of transporter activity and regulation at the blood-brain barrier. Invited Presentation. XXVIth International Symposium on Cerebral Blood Flow, Metabolism, and Function, Shanghai, China, May 20, 2013.

**Ronaldson PT.** Targeting organic anion transporting polypeptides to treat pain and hypoxia/reoxygenation stress. Submitted Presentation. XXVIth International Symposium on Cerebral Blood Flow, Metabolism, and Function, Shanghai, China, May 22, 2013.

**Ronaldson PT.** The blood-brain barrier under hypoxic/reoxygenation stress. Invited Presentation. Arizona Health Sciences Center Department of Neurosurgery Didactic Conference, College of Medicine, University of Arizona, Tucson, Arizona, September 25, 2013.

**Ronaldson PT.** Targeting blood-brain barrier transporters to treat Hypoxia/Reoxygenation Stress, Invited Presentation. Frontiers in Medical Research Seminar Series, College of Medicine, University of Arizona, October 29, 2013.

**Ronaldson PT.** Drug Delivery to the Ischemic Brain. Invited Presentation. 20<sup>th</sup> Annual Blood-Brain Barrier Consortium Meeting, Sunriver, Oregon, March 21, 2014.

**Ronaldson PT.** Targeting transporters to treat hypoxia/reoxygenation stress. Invited Presentation. University of Georgia College of Pharmacy, Athens, Georgia, August 20, 2014.

## **PATRICK THOMAS RONALDSON, PH.D**

**Ronaldson PT.** Utility of in situ brain perfusion to study mechanisms of transporter activity and regulation at the blood-brain barrier. Invited Presentation. American Association of Pharmaceutical Scientists' Annual Meeting and Exposition, San Diego, California, November 2, 2014.

**Ronaldson PT.** Targeting blood-brain barrier transporters: Implications for treatment of cerebral hypoxia/reoxygenation stress. Invited Presentation. Graduate Interdisciplinary Program in Neuroscience and Department of Neuroscience, School of Mind, Brain & Behavior Colloquium, University of Arizona, Tucson, Arizona, December 8, 2015.

**Ronaldson PT.** Blood-brain barrier transporters in ischemic stroke. Invited Presentation. 2016 International Stroke Conference, Los Angeles, California, February 17, 2016.

**Ronaldson PT.** Targeting Organic Anion Transporting Polypeptide 1a4 (Oatp1a4) at the Blood-Brain Barrier: Implications for CNS Drug Delivery. Invited Presentation. School of Pharmacy, Texas Tech University Health Sciences Centre, Amarillo, Texas, February 1, 2017.

**Ronaldson PT.** Targeting Blood-Brain Barrier Transporters for CNS Drug Delivery. Invited Presentation. 12<sup>th</sup> International Conference on Cerebral Vascular Biology. Melbourne, Australia, November 29, 2017.

**Ronaldson PT.** Regulation of Oatp1a4 Functional Expression by Transforming Growth Factor-Beta Signaling at the Blood Brain Barrier. Invited Presentation. American Association of Pharmaceutical Scientists' Workshop on Drug Transporters in ADME: From the Bench to the Bedside. Herndon, VA, April 16, 2018.

**Ronaldson PT.** Targeting Blood-Brain Barrier Transporters for CNS Drug Delivery: Role of Transforming Growth Factor-Beta Signaling. American Society for Pharmacology and Experimental Therapeutics Annual Meeting at Experimental Biology 2018. San Diego, CA, April 23, 2018.

**Ronaldson PT.** Targeting Blood-Brain Barrier Transporters to Treat Ischemic Stroke. Stroke Translational Research Advancement Workshop 2018. Lexington, KY, October 25, 2018.

**Ronaldson PT.** Pericytes and Transporters: Focus on Drug Delivery to the Ischemic Brain. International Stroke Conference 2019. Honolulu, HI, February 6, 2019.

**Ronaldson PT.** Targeting the Blood-Brain Barrier for Delivery of Neuroprotective Drugs in Ischemic Stroke. American Society of Pharmacology and Experimental Therapeutics Annual Meeting 2019. Orlando, FL, April 9, 2019.

**Ronaldson PT.** Endogenous Blood-Brain Barrier Transporters are Critical Determinants of Statin Neuroprotective Effects in Stroke. Center for Natural Products, Drug Discovery, and Development Seminar Series, University of Florida College of Pharmacy, Gainesville, FL, April 10, 2019.

**Ronaldson PT.** Transporter-mediated Uptake of Small Molecules at the Blood-Brain Barrier. American Association of Pharmaceutical Scientists' Workshop on Novel Approaches Targeting Brain Barriers for Effective Delivery of Therapeutics. Herndon, VA, April 29, 2019.

## **PATRICK THOMAS RONALDSON, PH.D**

**Ronaldson PT.** Blood-Brain Barrier Transporters in Ischemic Stroke: Focus on Organic Anion Transporting Polypeptides (Oatps). Solvo Biotechnology Meet the Experts Transporter Conference 2019. Cambridge, MA, September 4, 2019.

**Ronaldson PT.** Blood-Brain Barrier Transporters Determine Effects of Statins in Ischemic Stroke. University of Mississippi Medical Center, Jackson, MS, February 11, 2020.

## **RESEARCH SUPPORT**

### **ONGOING RESEARCH SUPPORT**

#### **Federal**

**R01 NS084941** Ronaldson (PI) 07/01/2014 – 02/28/2025

*Targeting blood-brain barrier transporters to treat Ischemic Stroke*

This grant studies putative blood-brain barrier transporters (i.e., organic anion transporting polypeptides) under conditions of focal cerebral ischemia. Specifically, this grant aims to understand how such transporters can be targeted for CNS drug delivery or for protection of blood-brain barrier integrity, efforts that will point towards novel therapies for treatment of ischemic stroke.

Role: Principal Investigator

**R56 AG062620** Chang (PI) 09/15/2019 – 06/30/2021

*Predictive networks-based in silico approach for precision medicine repurposing for Alzheimer's Disease.*

This grant takes a multidisciplinary approach to discover novel therapeutic targets for Alzheimer's Disease treatment. Specifically, *in silico* approaches will be used to identify potential molecular targets that will be tested experimentally using state-of-the-art *in vivo* animal models of Alzheimer's Disease. This project will lead to discovery of novel pharmacological approaches to advance development of more effective therapies for Alzheimer's Disease.

Role: Co-Investigator

#### **State**

**ABRC #000036665** Ronaldson (PI) 03/01/2017 – 2/28/2020

*Effect of Aging in Transporter Functional Expression at the Blood-Brain Barrier: Relevance to the Treatment of Hypoxia/Reoxygenation Stress*

This grant examines the role of aging on expression of endogenous blood-brain barrier uptake transporters involved in CNS delivery of neuroprotective drugs. Specifically, regulation and functional expression of organic anion transporting polypeptide and organic cation transporters will be studied in an effort to develop precision medicine approaches to treat diseases with a hypoxia/reoxygenation component such as ischemic stroke.

Role: Principal Investigator

## **PATRICK THOMAS RONALDSON, PH.D**

### **Private Foundation**

**AHA 19TPA34910113**

Ronaldson (PI)

07/01/2019 – 06/30/2022

*Statins require Endogenous Blood-Brain Barrier Transporters to Confer Neuroprotective Effects in Stroke.*

This grant examines the involvement of blood-brain barrier transporters on pharmacokinetic and pharmacodynamic properties of statin drugs in the brain. Specifically, this grant assesses the utility of transporters as key determinants of neuroprotective effects for drugs in the setting of ischemic stroke.

Role: Principal Investigator

### **COMPLETED RESEARCH SUPPORT**

#### **Federal**

**R01 DA011271**

Davis and Ronaldson (PIs)

09/30/2009 – 08/31/2017

*Blood-to-CNS Drug Uptake in Pain*

This grant studies the uptake into the brain of opioid analgesic drugs and novel opioid analgesic peptide drugs. Specifically, this grant will examine drug transport proteins (i.e., P-glycoprotein) and regulatory pathways (i.e., nuclear receptor signaling) that govern the permeation of opioids into the CNS.

Role: Co-Principal Investigator

#### **Private Foundations**

**PhRMA Foundation**

Ronaldson (PI)

01/01/2012 – 12/31/2012

*Blood-to-CNS Delivery of Neuroprotective Drugs during Hypoxia/Reoxygenation Stress*

This award is a one-time grant that supports an early career scientist actively engaged in research in pharmacology or toxicology. Studies supported by this grant will identify and characterize endogenous blood-brain barrier transport systems that can be targeted for delivery of neuroprotective drugs to the brain. Such studies will point towards new therapeutic approaches for treatment of neurological diseases such as ischemic stroke and/or hypoxic encephalopathy.

Role: Principal Investigator

**AHA 12 BGIA9850007**

Ronaldson (PI)

01/01/2012 – 12/31/2013

*Blood-to-CNS Delivery of Statins during Hypoxia/Reoxygenation Stress*

This grant supports studies aimed at characterizing functional expression of organic anion transporting polypeptide 1a4 (Oatp1a4) at the blood-brain barrier. Specifically, this grant will determine how Oatp1a4 can facilitate CNS delivery of atorvastatin, which has recently been shown to have neuroprotective and antioxidant properties in the CNS.

Role: Principal Investigator

#### **Pending Grant Applications**

**R01 DA051812**

Ronaldson & Davis (PIs)

07/01/2020 – 06/30/2025

*Blood-to-CNS Drug Uptake: Effect of APAP and Pain*

This grant studies the mechanisms of tight junction changes at the blood-brain barrier following administration of acetaminophen (APAP), both by itself and in acute/chronic pain. Specifically, this grant will examine blood-brain barrier tight junction proteins (i.e., occludin, claudin-5) and regulatory

**PATRICK THOMAS RONALDSON, PH.D**

pathways (i.e., transforming growth factor-beta signaling) that govern permeation of opioids into the CNS. Additionally, effects of tight junction protein changes on opioid effectiveness and occurrence of opioid-associated adverse events will be studied.

Role: Co-Principal Investigator

**R01 AG070051**

Chang, Ronaldson et al. (PIs) 07/01/2020 – 06/30/2025

*Predictive Network Study of Blood-based Aging-related Metabolic Biomarker and Therapeutics for Preclinical Stage of Alzheimer's Disease.*

This grant will investigate novel molecular targets that can be targeted for development of new Alzheimer's Disease therapies. Additionally, this project will develop a new and more translationally relevant animal model of Alzheimer's Disease to use for identification of various biomarkers and testing of novel drugs.

Role: Co-Principal Investigator