

# Juan C. Sanchez-Arias

POSTDOCTORAL FELLOW

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*"Any man could, if he were so inclined, be the sculptor of his own brain." Santiago Ramon y Cajal*

## Education

### University of Victoria

Victoria, BC, Canada

#### PHD IN NEUROSCIENCE

Jan. 2015 - April. 2020

- **Dissertation:** Pannexin 1 regulates dendritic spine formation.
- **GPA:** 8.2/9.0.
  - **Relevant Coursework:** Developmental neurobiology, Tools for the study of ion channels.

### Universidad del Valle - School of Medicine

Cali, Valle, Colombia

#### DOCTOR OF MEDICINE

Aug. 2007 - Oct. 2014

- **Pre-Diploma Rotatory Internship:** Hospital Universitario del Valle ESE - Universidad del Valle. Cali, Valle, Colombia.
- **Research Internship:** Centro de Estudios Cerebrales (Centre for Brain Studies). Universidad del Valle. Cali, Valle, Colombia
  - **Area of study:** Cerebral cortex cytoarchitectonics, functional neuronatomy, diffuse traumatic brain injury and ischemic stroke models in rats.
  - Supervisors: Prof. Hernan Pimienta, Prof. Marhta Escobar, and Prof. Efrain Buritica.
- **Observership:** Functional Neurosurgery. Department of Neurosurgery. University of Illinois Hospital & Health Sciences System. University of Illinois at Chicago. Chicago, IL, USA. Supervisor: Dr. Konstantin Slavin.
- **Professional elective:** Neurosurgery and Neurocritical Care. Department of Neurosurgery. Hospital Universitario del Valle ESE - Universidad del Valle. Cali, Valle, Colombia.
- **GPA:** 4.4/5.0.
  - **Relevant Coursework:** Functional Neuroanatomy, Cerebral cortex cytoarchitectonics, Scientific Integrity, Bio-statistics, Addiction and Pharmacology, Systems Pathology

## Skills

<b>Research</b>	Project management, experimental design, data management, statistical analysis and modeling, scientific writing, delivery of reports and presentation of results to specialized and lay audiences.
<b>Laboratory</b>	Confocal and Stimulated-emission-depletion (STED, super-resolution) microscopy, live cell microscopy, cell culture and transfection (cell lines and primary neurons), immunocyto(histo)chemistry, transgenic mouse colony management and generation of conditional knockouts (Cre-Lox), rodent surgery (stroke induction and viral vector injection), rodent behavioural testing
<b>Programming</b>	R, Python, ImageJ Macro Language (IJM), HTML, Markdown, $\LaTeX$
<b>Software</b>	Microsoft Office Suite, Adobe Creative Suite, ImageJ/FIJI, RStudio
<b>Languages</b>	English (fluent), Spanish (native)

## Research Experience

### University of Victoria

Victoria, BC, Canada

#### POSTDOCTORAL FELLOW

Aug. 2020 - Aug. 2022

- Advisors: Leigh Anne Swayne, PhD., Laura Arbour, MSc, MD, MSc, FRCPC, FCCMG
- Area of Study: dendritic spine plasticity, synapse and neuronal network formation, channel trafficking, cytoskeleton in neurons and cardiomyocytes,  $Ca^{2+}$  dynamics in neurons and cardiomyocytes
  - ★ Investigating the role of pannexin 1 (PANX1) and PANX1 blockers in the regulation of the neuronal cytoskeleton
  - ★ Application of advanced microscopy (fixed and live) for cell biology
  - ★ Established immunocyto(histo)chemistry protocols that preserve the neuronal cytoskeleton.

## University of Victoria

Victoria, BC, Canada

### GRADUATE FELLOW IN NEUROSCIENCE

Jan. 2015 - Apr. 2020

- Advisor: Leigh Anne Swayne, PhD.
- Area of Study: Pannexin 1 channels, dendritic spine plasticity, synapse formation, channel trafficking, neuronal cytoskeleton dynamics, neural stem cells, advanced microscopy for cell biology.
  - ★ Generated conditional and conditional-inducible knockout models for the study of cerebral cortex development.
  - ★ Optimized protocols to generate primary neuronal cultures from neonatal mice suitable for network analysis.
  - ★ Developed methods to visualize dendritic spines and filopodia in tissue sections and living primary neurons.
  - ★ Established immunocyto(histo)chemistry protocols that preserve the neuronal cytoskeleton.

## Centro de Estudios Cerebrales - Universidad del Valle

Cali, Valle, Colombia

### RESEARCH INTERN IN BIOMEDICAL SCIENCES - NEUROSCIENCE CONCENTRATION

Feb. 2014 - Jun. 2014

- Advisors: Prof. Martha Escobar, MSc; Prof. Hernan Pimienta, MSc, Prof. Efrain Buritica, PhD.
- Area of study: functional neuroanatomy, cerebral cortex organization, traumatic brain injury, stroke, neuroprotection.
- Performed carotid ligation in Whistar rats using microsurgery techniques.
- Used the weight-drop model of diffuse traumatic brain injury to generate organotypic slice cultures from rats.
- Optimized immunohistochemistry for neuronal and astrocytic markers in thick rat brain tissue sections.

## School of Public Health - Universidad del Valle

Cali, Valle, Colombia

### STUDENT RESEARCHER

Aug. 2010 - Feb. 2011

- Advisors: Enrique A. Estevez, MD and Elsa P. Muñoz, MD, MPH
- Area of study: cardiovascular risk factor assessment in spinal cord injured patient assisting to a tertiary-level hospital.
  - Prepared a research project proposal, liaised with ethical boards, and established a network of collaborators to complete using a standardized survey.
  - Prepared reports and presentations to share project results in local and national meetings.
  - Created a database in EpiInfo 7 for data collection, data management, and statistical analysis.
  - Contributed to the assessment and management of patients with chronic spinal cord injury, including prescribing rehabilitation plans and ordering of radiological and laboratory ancillary tests. Discussed cases with Physical Medicine and Rehabilitation attendings and residents.

## Teaching Experience

### University of Victoria - Division of Medical Sciences

Victoria, BC, Canada

#### TEACHING ASSISTANT

Spring 2017, Fall 2018, Spring 2020

- Course: Foundations of Medical Practice I and II
- Program: Island Medical Program - University of British Columbia
  - ★ MEDD412 - Neuroanatomy Bootcamp #1 (Year 1).
  - ★ MEDD412 - Neuroanatomy Lab on Cranial Nerves V & VII and Pain (Year 1).
  - ★ MEDD412 - Neuroanatomy Lab on Eye Movements and Brainstem (Year 1).
  - ★ MEDD421 - Neuroanatomy Lab on Cerebral Cortex, Functional Areas, and Blood Supply (Year 2).
  - ★ MEDD421 - Neuroanatomy Lab on Control of Movement and Cerebellum (Year 2).
  - ★ MEDD422 - Neuroanatomy Lab on Limbic System/Dementia (Year 2).

## Service & Leadership

### BC Regenerative Network (BCREGMED)

Victoria & Vancouver, BC, Canada

#### TRAINEE STEERING COMMITTEE

Feb. 2017 - PRESENT

- Co-editor for the BC Regenerative Medicine Network Newsletter.
- Member of the BCREGMED Symposium Organizing and Scientific committee.

### CIHR Brain Bee - Victoria Chapter

Victoria, BC, Canada

#### ORGANIZER

2017 - PRESENT

- Organized and coordinated social media for the Victoria Brain Bee. Mentored high school students from the Greater Victoria Area who participated in the Brain Bee competition.
- Secured funding to sponsor Victoria Brain Bee winners traveling to the CIHR National Brain Bee.

### Neuroscience Graduate Student Association (NGSA)

Victoria & Vancouver, BC, Canada

#### STUDENT MEMBER

2017 - 2020

- Student Representative - Division of Medical Sciences 2017-2018.
- Member of the Organizing Committee for the Neuroscience Graduate Program Kick-Off. Liaised and recruited keynote speakers for seminar lectures.

- Involved in Neuroscience Outreach talks and high school science excursions at the University of Victoria - Division of Medical Sciences.

## Honors & Awards

<b>International Gap Junction Conference NB Gilula Star Award</b> , 2019	IGJC2019
<b>John &amp; Myrtle Tilley Graduate Scholarship</b> , 2019	UVic-FGS
<b>BC Regenerative Medicine Travel Award</b> , 2018	BCREGMED
<b>Donald Wagg Graduate Scholarship</b> , 2017 2018	UVic-FGS
<b>Vera Allen Travel Award for Medical Sciences</b> , 2016 2017 2018 2019	UVic-FGS
<b>University of Victoria Student Travel Grant</b> , 2016	UVic-FGS
<b>James A. &amp; Laurette Agnew Memorial Scholarship &amp; Award</b> , 2015 2016 2017 2018 2019	UVic-FGS
<b>University of Victoria Graduate Award</b> , 2015 2017 2018 2019	UVic-FGS
<b>University of Victoria Fellowship Award</b> , 2015	UVic-FGS
<b>Universidad del Valle - School of Medicine Dean's List</b> , 2007 2009 2013 2014	Univalle
<b>Public High School Academic Excellence Scholarship</b> , 2006	Infivalle-Colombia

## Publications

### JOURNAL ARTICLES

Purinergic signaling in nervous system health and disease: Focus on pannexin 1

**Sanchez-Arias, Juan C.** Emma Slagt, Haley A. Vecchiarelli, Rebecca C. Candlish, Nicole York, Penelope A. Young, Olga Shevtsova, Afnan Juma, Marie-Ève Tremblay, Leigh Anne Swayne

*Pharmacology & Therapeutics* (MAR. 2021) P. 107840. DOI: 10.1016/j.pharmthera.2021.107840

ATP Triggers Macropinocytosis That Internalizes and Is Regulated by PANX1

Andrew K. J. Boyce, Emma Slagt, **Sanchez-Arias, Juan C.** Leigh Anne Swayne

*bioRxiv* (DEC. 8, 2020) P. 2020.11.19.389072. COLD SPRING HARBOR LABORATORY, DOI: 10.1101/2020.11.19.389072

Pannexin 1 Regulates Dendritic Protrusion Dynamics in Immature Cortical Neurons

**Sanchez-Arias, Juan C.** Rebecca C. Candlish, Emma Slagt, Leigh Anne Swayne

*eNeuro* 7.4 (JULY 31, 2020). SOCIETY FOR NEUROSCIENCE, DOI: 10.1523/ENEURO.0079-20.2020

PANX1 in Inflammation Heats up: New Mechanistic Insights with Implications for Injury and Infection

**Sanchez-Arias, Juan C.** Leigh E. Wicki-Stordeur, Rebecca C. Candlish, Emma Slagt, Irina Paci, Praveen P. N. Rao, Brian A. MacVicar, Leigh Anne Swayne

*Cell Calcium* 90 (JULY 13, 2020) P. 102253. ELSEVIER, DOI: 10.1016/j.ceca.2020.102253

Consideration of Pannexin 1 Channels in COVID-19 Pathology and Treatment

Leigh Anne Swayne, Scott R. Johnstone, Chen Seng Ng, **Sanchez-Arias, Juan C.** Miranda E. Good, Silvia Penuela, Alexander W. Lohman, Abigail G. Wolpe, Victor E. Laubach, Michael Koval, Brant E. Isakson

*American Journal of Physiology-Lung Cellular and Molecular Physiology* 319.1 (JUNE 30, 2020) PP. L121-L125. AMERICAN PHYSIOLOGICAL SOCIETY, DOI: 10.1152/AJPLUNG.00146.2020

Ankyrin-B p.S646F undergoes increased proteasome degradation and reduces cell viability in the H9c2 rat ventricular cardiomyoblast cell line

Lena Chen, Catherine S. W. Choi, **Juan C. Sanchez-Arias**, Laura T. Arbour, Leigh Anne Swayne

*Biochemistry and Cell Biology* (DEC. 2019). DOI: 10.1139/bcb-2019-0082

Ankyrin B and Ankyrin B variants differentially modulate intracellular and surface Cav2.1 levels

Catherine S. W. Choi, Ivana A. Souza, **Juan C. Sanchez-Arias**, Gerald W. Zamponi, Laura T. Arbour, Leigh Anne Swayne

*Molecular Brain* 12.1 (SEPT. 2, 2019) P. 75. DOI: 10.1186/s13041-019-0494-8

A novel motif in the proximal C-terminus of Pannexin 1 regulates cell surface localization

Anna L. Epp, Sarah N. Ebert, **Juan C. Sanchez-Arias**, Leigh E. Wicki-Stordeur, Andrew K. J. Boyce, Leigh Anne Swayne

*Scientific Reports* 9.1 (JULY 5, 2019) P. 9721. DOI: 10.1038/s41598-019-46144-5

Exploring the Pannexin 1 interactome: In silico cross-analyses with postsynaptic proteins and neuropsychiatric disorder susceptibility genes

Simona D. Frederiksen, Leigh E. Wicki-Stordeur, **Juan C. Sanchez-Arias**, Leigh Anne Swayne

*bioRxiv* (OCT. 11, 2019) P. 801563. COLD SPRING HARBOR LABORATORY, DOI: 10.1101/801563

Pannexin 1 Regulates Network Ensembles and Dendritic Spine Development in Cortical Neurons

**Juan C. Sanchez-Arias**, Mei Liu, Catherine S. W. Choi, Sarah N. Ebert, Craig E. Brown, Leigh Anne Swayne

## Probenecid Disrupts a Novel Pannexin 1-Collapsin Response Mediator Protein 2 Interaction and Increases Microtubule Stability

Xiaoxue Xu, Leigh E. Wicki-Stordeur, **Juan C. Sanchez-Arias**, Mei Liu, Maria S. Weaver, Catherine S. W. Choi, Leigh A. Swayne  
*Frontiers in Cellular Neuroscience* 12 (MAY 11, 2018). DOI: 10.3389/FNCEL.2018.00124

## Upregulation of inflammatory mediators in the ventricular zone after cortical stroke

Adrianna N. Gunton, **Sanchez-Arias, Juan C.** Esther O. Carmona-Wagner, Leigh E. Wicki-Stordeur, Leigh Anne Swayne  
*PROTEOMICS – Clinical Applications* 11.9 (MAY 15, 2017) P. 1600092. DOI: 10.1002/PRCA.201600092

## Perspectives on the role of Pannexin 1 in neural precursor cell biology

**Juan C. Sanchez-Arias**, Leigh E. Wicki-Stordeur, Leigh Anne Swayne  
*Neural Regeneration Research* 11.10 (NOV. 4, 2016) PP. 1540–1544. DOI: 10.4103/1673–5374.193221

## What Are Neural Stem Cells, and Why Are They Important?

Leigh Anne Swayne, **Juan C. Sanchez-Arias**, Agbay Andrew, Stephanie M. Willerth  
*Frontiers for Young Minds* 4.20 (SEPT. 22, 2016) P. 7. FRONTIERS, DOI: 10.3389/FRYM.2016.00020

## Pannexin 1 Differentially Affects Neural Precursor Cell Maintenance in the Ventricular Zone and Peri-Infarct Cortex

Leigh E. Wicki-Stordeur, **Juan C. Sanchez-Arias**, J. Dhaliwal, Esther O. Carmona-Wagner, Valery I. Shestopalov, Diane C. Lagace, Leigh Anne Swayne  
*Journal of Neuroscience* 36.4 (JAN. 27, 2016) PP. 1203–1210. DOI: 10.1523/JNEUROSCI.0436–15.2016

# Presentations

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## ORAL PRESENTATIONS

### UBC 2<sup>nd</sup> Annual Tri-Cluster Research Day: The Future of Health

Virtual

Top 10 Submissions Lighting Round: PANNEXIN 1 REGULATES DENDRITIC PROTRUSION DYNAMICS IN DEVELOPING CORTICAL NEURONS

November 4, 2020

### International Gap Junction Conference

Victoria, BC, Canada

Star Award Talk: PANNEXIN 1 REGULATES NEURONAL NETWORKS AND DENDRITIC SPINE FORMATION IN CORTICAL NEURONS

July 27–31, 2019

### University of Victoria - Neuroscience Graduate Program Kick-Off

Victoria, BC, Canada

PANNEXIN 1 REGULATES CORTICAL DENDRITIC SPINE FORMATION

September 14, 2018

### BC Regenerative Medicine Symposium

Vancouver, BC, Canada

PANNEXIN 1 IN NEURONAL DEVELOPMENT

May 10, 2017

### XV Health Sciences Research Symposium: Disability and Life Cycle - Universidad del Valle

Cali, Colombia

BEHAVIOURAL RISK FACTORS ASSOCIATED WITH CARDIOVASCULAR DISEASE IN CHRONIC SPINAL CORD INJURY

Oct. 14, 2013

### XXI Colombian Student´s Congress of Medical Research (CECIM)

Bucaramanga, Colombia

A PILOT FOR THE ASSESSMENT OF BEHAVIOURAL RISK FACTORS ASSOCIATED WITH CARDIOVASCULAR DISEASE IN SPINAL CORD INJURY

May. 5, 2010

## POSTER PRESENTATIONS

### Pannexin 1 regulates dendritic protrusion dynamics in developing cortical neurons

Juan C. Sanchez-Arias, Rebecca C. Candlish, Emma Slagt, Leigh Anne Swayne  
*SfN Global Connectome 2021*, 2021, Jan., Virtual

### Pannexin 1 regulates dendritic protrusion dynamics in developing cortical neurons

Juan C. Sanchez-Arias, Rebecca C. Candlish, Emma Slagt, Leigh Anne Swayne  
*The 2nd Annual Tri-Cluster Research Day*, 2020, Nov., Virtual

### Pannexin 1 regulates network ensembles and dendritic spine development in cortical somatosensory neurons

**Juan C. Sanchez-Arias**, Mei. Liu, Catherine S.W. Choi, Sarah N. Ebert, Ana DeLucas-Rius, Craig E. Brown, Leigh Anne Swayne  
*Canadian Association for Neuroscience Meeting*, 2019, May, Toronto, ON, Canada

### Pannexin 1 regulates neuronal networks and dendritic spine formation in cortical neurons

**Juan C. Sanchez-Arias**, Mei. Liu, Catherine S.W. Choi, Sarah N. Ebert, Ana DeLucas-Rius, Craig E. Brown, Leigh Anne Swayne  
*International Gap Junction Conference*, 2019, July, Victoria, BC, Canada

### Pannexin 1: a novel regulator of dendritic spine development in the postnatal cerebral cortex

**Juan C. Sanchez-Arias**, Olga Shetsova, Mei Liu, Weaver Maria S. Leigh Anne Swayne

*BC Regenerative Medicine Symposium, 2018, May, Vancouver, BC. Canada*

**Pannexin 1: a novel regulator of dendritic spine development in the postnatal cerebral cortex**

**Juan C. Sanchez-Arias**, Olga Shetsova, Mei Liu, Weaver Maria S. Leigh Anne Swayne

*Canadian Association for Neuroscience Meeting, 2018, May, Vancouver, BC. Canada*

**Pannexin 1 regulates somatosensory pyramidal neuron dendritic spine density and sensorimotor function**

**Juan C. Sanchez-Arias**, Olga Shetsova, Mei Liu, Leigh Anne Swayne

*The Society for Neuroscience Meeting, 2018, Nov., San Diego, CA. USA*

**A novel negative regulator of neurite development in the cerebral cortex**

**Juan C. Sanchez-Arias**, Wicki-Stordeur Leigh E. Leigh Anne Swayne

*BC Regenerative Medicine Symposium, 2017, May, Vancouver, BC. Canada*

**A pannexin 1 blocker modulates the development of dendritic spines in the postnatal cerebral cortex**

**Juan C. Sanchez-Arias**, Wicki-Stordeur Leigh E. Carmona-Wagner Esther O. Leigh Anne Swayne

*Canadian Developmental Biology Conference – Satellite Symposium on Forebrain Neurogenesis: From Embryo to Adult, 2016, Mar., Banff, AB. Canada*

**A pannexin 1 blocker modulates the development of dendritic spines in the postnatal cerebral cortex**

**Juan C. Sanchez-Arias**, Wicki-Stordeur Leigh E. Leigh Anne Swayne

*Inaugural University of Virginia Pannexin Conference, 2016, Oct., Charlottesville, VA. USA*

**A pannexin 1 blocker modulates the development of dendritic spines in the postnatal cerebral cortex**

**Juan C. Sanchez-Arias**, Wicki-Stordeur Leigh E. Leigh Anne Swayne

*The Society for Neuroscience Meeting, 2016, Nov., San Diego, CA. USA*

**Investigation of Pannexin 1 in the response of developing neurons to stroke**

**Juan C. Sanchez-Arias**, Leigh E. Wicki-Stordeur, Esther O. Carmona-Wagner, Adrianna Gunton, Michelle Kim, Andrew K.J. Boyce, J. Dhaliwal, Valery I. Shestopalov, Diane C. Lagace, Leigh Anne Swayne

*Canadian Association for Neuroscience Meeting, 2015, May, Vancouver, BC. Canada*

## Society Membership

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Active	<b>Member</b> , Canadian Association for Neuroscience	2015 - Present
Active	<b>Member</b> , Society for Neuroscience	2016 - Present
Active	<b>Member</b> , Trainee Steering Committee - BC Regenerative Medicine Network	2017 - Present