

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

Research

Project management, experimental design, data management, statistical analysis and modeling, scientific writing, delivery of reports and presentation of results to specialized and lay audiences.

Laboratory

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

Programming

R, Python, ImageJ Macro Language (IJM), HTML, Markdown, \LaTeX

Software

Microsoft Office Suite, Adobe Creative Suite, ImageJ/FIJI, RStudio

Languages

English (fluent), Spanish (native)

Research Experience

University of Victoria

Victoria, BC, Canada

POSTDOCTORAL FELLOW

Aug. 2020 - Present

- **Advisors:** Leigh Anne Swayne, PhD., Laura Arbour, MSc, MD, MSc, FRCPC, FCCMG
- **Area of Study:** Neural and cardiac developmental biology and physiology, Ion channels, Cytoskeleton, Physiology modelling, Medical Genetics, Community Genetics

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

Let's Talk Science - UVic

Victoria, BC, Canada

VOLUNTEER

Oct 2018 - PRESENT

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

CIHR Brain Bee - Victoria Chapter

Victoria, BC, Canada

CO-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.

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.

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. Liased and recruited keynote speakers for seminar lectures.

Honors & Awards

Michael Smith Foundation for Health Research - Research Trainee Award , 2021	MSFHR
International Gap Junction Conference NB Gilula Star Award , 2019	IGJC2019
John & Myrtle Tilley Graduate Scholarship , 2019	UVic-FGS
BC Regenerative Medicine Travel Award , 2018	BCREGMED
Donald Wagg Graduate Scholarship , 2017 2018	UVic-FGS
Vera Allen Travel Award for Medical Sciences , 2016 2017 2018 2019	UVic-FGS
University of Victoria Student Travel Grant , 2016	UVic-FGS
James A. & Laurette Agnew Memorial Scholarship & Award , 2015 2016 2017 2018 2019	UVic-FGS
University of Victoria Graduate Award , 2015 2017 2018 2019	UVic-FGS
University of Victoria Fellowship Award , 2015	UVic-FGS
Universidad del Valle - School of Medicine Dean's List , 2007 2009 2013 2014	Univalle
Public High School Academic Excellence Scholarship , 2006	Infivalle-Colombia

Publications

JOURNAL ARTICLES

A systematic, open-science framework for quantification of cell-types in mouse brain sections using fluorescence microscopy

Juan C. Sanchez-Arias, Micael Carrier, Simona D. Frederiksen, Olga Shevtsova, Chloe Mckee, Hai Lam Nguyen, Elisa Gonçalves De Andrade, Penelope A Young, Emma Van Der Slagt, Marie-Ève Tremblay
Frontiers in Neuroanatomy (OCT. 2021) P. 95. FRONTIERS IN NEUROANATOMY

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

Juan C. Sanchez-Arias, 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, **Juan C. Sanchez-Arias**, 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

Juan C. Sanchez-Arias, 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

Juan C. Sanchez-Arias, 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, **Juan C. Sanchez-Arias**, 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
eNeuro 6.3 (MAY 22, 2019) ENEURO.0503-18.2019. SOCIETY FOR NEUROSCIENCE, DOI: 10.1523/ENEURO.0503-18.2019

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

DATASETS

PFAIA - Pipeline for Image Analysis of Cell Density in Mouse Brain Sections - Test Image Files and Associated Scripts
Juan C. Sanchez-Arias, Micaël Carrier, Simona D. Frederiksen, Olga Shevtsova, Chloe McKee, Hai Lam Nguyen, Elisa Gonçalves Andrade, Penelope A. Young, Emma Slagt, Marie-Ève Tremblay, Leigh Anne Swayne
(JUNE 2021). SCHOLARS PORTAL DATAVERSE, DOI: 10.5683/SP2/KRGFTC

Presentations

ORAL PRESENTATIONS

UBC 2nd 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

Active	Member , Canadian Association for Neuroscience	2015 - Present
Active	Member , Society for Neuroscience	2016 - Present
Active	Member , Colegio Colombiano de Neurociencias	2021 - Present
Active	Member , Trainee Steering Committee - BC Regenerative Medicine Network	2017 - Present