# Juan C. Sanchez-Arias

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*Research Interests include*: Translational Research, Dendritic Spine Plasticity, Synapse and Neuronal Network Formation, and CNS & PNS Endogenous Repair Mechanisms.

## Education

### Academic Qualifications

- **PhD in Neuroscience** — **University of Victoria**
  *Victoria, BC. Canada* — *2015–2020 (expected)*
  - Dissertation title *(tentative)*: *Pannexin 1 regulates cortical dendritic spine formation*
  - GPA: 8.2/9.0
- **Doctor of Medicine** — **Universidad del Valle**
  *Cali, Valle. Colombia* — *2007–2014*
  - Internship: Hospital Universitario del Valle ESE - Universidad del Valle. Cali, Valle. Colombia.
  - Observership: Functional Neurosurgery. Department of Neurosurgery. University of Illinois Hospital. Chicago, IL. USA
  - Research Internship: Centro de Estudios Cerebrales (Centre for Brain Studies). Universidad del Valle
    - Area of study: Cerebral cortex cytoarchitectonics diffuse traumatic brain injury models, MCAO model in rats.
  - 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

- **University of Victoria**
  Developmental neurobiology, Tools for the study of ion channels.
- **Universidad del Valle**
  Functional Neuroanatomy, Cerbral cortex cytoarchitectonics, Scientific Integrity, Bio-statistics, Addictions and Pharmacodependence, Systems Pathology

## Technical and Personal skills

- **Laboratory skills:** Confocal microscopy, Super-resolution microscopy (STED), Live cell microscopy, Calcium imaging, Cell culture (HEK cells, N2a cells, primary cortical neurons), Transfection in cell lines and primary neurons, Immunohistochemistry and Immunocytochemistry, Brain sectioning (vibrotome, cryostat), Mouse handling (advanced), Photothrombotic stroke induction, Transgenic mouse colony management.
- **Software:** MS Office products (Advanced), GraphPad (Advanced), Adobe Creative Suite (Advanced), ImageJ (Advanced), MATLAB (Beginner). Experience with managing and analyzing large datasets and semi-automating image analysis pipelines.

- **Languages:** English (Fluent). Spanish (Native).
- **Programming languages:** R (Intermediate), LaTeX(Intermediate), Markdown (intermediate), HTML (Intermediate), Python (Beginner), MATLAB (Beginner).

## Research experience

- **Graudate Fellow** — **University of Victoria**
  *Victoria, BC. Canada* — *2015–present*
  - Advisor: Dr. Leigh Anne Swayne, PhD.
  - Area of study: Pannexin channels, dendritic spine and synapse formation.
    - *In vivo*: Generation of conditional knockouts (Cre-Lox system), brain sectioning, immunohistochemistry, lipophilic dye tracing, sensorimotor behavioural testing. *Model*: Mouse
    - *In vitro*: Cell culture (lines and primary), transfection, immunocytochemistry.
    - *Imaging*: Confocal microscopy, live cell microscopy, $Ca^{2+}$ imaging
- **Research Intern in Biomedical Sciences-Neuroscience Concentration** — **Universidad del Valle**
  *Cali, Valle. Colombia* — *Jan-July, 2014*
  - Advisor: Prof. Martha Escobar, MSc; Prof. Hernan Pimienta, MSc; Prof. Efrain Buritica, PhD.
  - Area of study: Cerebral cortex, traumatic brain injury, stroke, neuroprotection
    - *In vivo*: Severe diffuse traumatic brain injury models, organotypic slice culture, evaluation of the neuroprotective properties of metformin in stroke using a MCAO model. Microsurgery in rats, carotid artery dissection and ligation. Immunohistochemstry *Model*: rats.
- **Research Elective** — **Universidad del Valle**
  *Cali, Valle. Colombia* — *2010–2011*
  - Advisor: Dr. Enrique A. Estevez, MD; Dr. Elsa P. Muñoz, MD, MPH
  - Area of study: Cardiovascular risk factor assessment in spinal cord injured patient assisting to a tertiary-level hospital.
    - *Research*: Creation of databases, study design, data recording, data management (large datasets), statistical analysis.
    - *Clinical*: Neurological evaluation of patients with spinal cord injury, spasticity assessment, rehabilitation prescription, follow-up and ancillary tests (X-rays, CT scans, MRI, kidney and bladder function), case discussion with attendings and residents.

## Teaching experience

- **Foundations of Medical Practice II** — **Island Medical Program - University of British Columbia**
  *Victoria, BC. Canada* — *2017–2018*
  - 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)

## Awards

- University of Victoria Fellowship Award — Jan-Aug, 2015
- University of Victoria Student Travel Grant — March, 2016
- University of Victoria Graduate Award — 2015, 2017, 2018, 2019
- James A. & Laurette Agnew Memorial Scholarship & Award — 2015, 2016, 2017, 2018

- Vera Allen Travel Award for Medical Sciences 2016, 2017, 2018
- Donald Wagg Graduate Scholarship 2017, 2018
- BC Regenerative Medicine Travel Award 2018
- International Gap Junction Conference NB Gilula Star Award 2019

## Publications

- **Sanchez-Arias, J. C.**, Liu, M., Choi, C.S.W., Ebert, S.N., Brown, C.E., Swayne, L.A. Pannexin 1 regulates network ensembles and dendritic spine formation in cortical neurons (2019). eNeuro. 22 May 2019. ENEURO.0503-18.2019; PMID: 31118206; DOI: https://doi.org/10.1523/ENEURO.0503-18.2019
- Choi, C.S.W., Souza I., **Sanchez-Arias J.C.**, Zamponi G.W., Arbour L., Swayne L.A.Ankyrin B and Ankyrin B variants differentially modulate intracellular and surface Cav2.1 levels. Molecular Brain *(conditionally accepted pending revisions)*. Revised manuscript submitted on Aug 13. MBRJ-D-19-00100R1.
- Epp, A., Ehbert, S.N., **Sanchez-Arias, J. C.**, Wicki-Stordeur, L. E., Boyce, A.K.J., Swayne, L. A. A novel motif in the proximal C-terminus of Pannexin 1 regulates cell surface localization (2019). Scientific Reports, 9, 9721. 05 July 2019. PMID: 31278290 https://doi.org/10.1038/s41598-019-46144-5
- Xu, X., Wicki-Stordeur, L. E., **Sanchez-Arias, J. C.**, Liu, M., Weaver, M. S., Choi, C. S. W., Swayne, L. A. (2018). Probenecid Disrupts a Novel Pannexin 1-Collapsin Response Mediator Protein 2 Interaction and Increases Microtubule Stability. Frontiers in Cellular Neuroscience, 12, 124. PMID: 29867357 https://doi.org/10.3389/fncel.2018.00124
- Gunton A.N., **Sanchez-Arias, J. C.**, Carmona-Wagner E.O., Wicki-Stordeur L.E, Swayne L.A. (2017). Upregulation of inflammatory mediators in the ventricular zone after cortical stroke. Proteomics Clinical Applications. 2017 May 15. PMID: 28508575. https://doi.org/10.1002/prca.201600092
- **Sanchez-Arias, J. C.**, Wicki-Stordeur L.E., Swayne L.A. Perspectives on the role of Pannexin 1 in neural precursor cell biology (2016). Neural Regeneration Research. 2016 Oct;11(10):1540-1544. PMID: 27904473. http://doi.org/10.4103/1673-5374.193221
- Swayne L.A., **Sanchez-Arias, J. C.**, Agbay A., Willerth S.M. What are brain 'stem' cells, and why are they important?. 2016. Frontiers for Young Minds. 4:20. http://doi.org/10.3389/frym.2016.00020
- Wicki-Stordeur, L.E., **Sanchez-Arias, J. C.**, Dhaliwal, J., Carmona-Wagner, E.O., Shestopalov, V.I., Lagace, D.C., Swayne, L.A. (2016). Pannexin 1 Differentially Affects Neural Precursor Cell Maintenance in the Ventricular Zone and Peri-Infarct Cortex. Journal of Neuroscience, 27 January 2016, 36 (4) 1203-1210. PMID: 26818508. https://doi.org/10.1523/JNEUROSCI.0436-15.2016

## Patent

- Swayne, L.A., **Sanchez-Arias, J. C.**, Wicki-Stordeur, L.E. Provisional Patent application: COLLAPSIN RESPONSE MEDIATOR 2 (CRMP2) PEPTIDES FOR TREATMENT OF NEUROLOGICAL DISORDERS. No. 62/767,806. Filed November 15, 2018.

## Science Communication

- Co-editor and contributor for the BC Regenerative Medicine Network Newsletter - Section in Translational Medicine Research Highlights.
- Cafe Scientifique: The developing brain: a shape-shifting powerhouse. UVic Center for Biomedical Research in collaboration with Hermann's Jazz Club. March 19th, 2019. Victoria, BC. Canada.
- Near-death experiences: The mind *in extremis*. Night Shift: After life. Royal BC Museum. October 27th,

2018. Victoria, BC. Canada.

## Oral presentations

- Star Award Talk: Pannexin 1 regulates neuronal networks and dendritic spine formation in cortical neurons. International Gap Junction Conference 2019. July 27 -31, 2019. Victoria, BC. Canada.
- Pannexin 1 regulates cortical dendritic spine formation. University of Victoria, Neuroscience Graduate Program Kick-Off. September 14$^{th}$, 2018. Victoria, BC. Canada.
- Pannexin 1 in neuronal development. First BC Regenerative Medicine Symposium. May 10$^{th}$, 2017. Vancouver, BC. Canada.

## Poster Presentations

- **Sanchez-Arias, J. C.**, Liu, M., Choi, C.S.W., Ebert, S.N., DeLucas-Rius, A., Brown, C.E., Swayne, L.A. Pannexin 1 regulates neuronal networks and dendritic spine formation in cortical neurons. International Gap Junction Conference 2019. July 27 -31, 2019. Victoria, BC. Canada.
- **Sanchez-Arias, J. C.**, Liu, M., Choi, C.S.W., Ebert, S.N., DeLucas-Rius, A., Brown, C.E., Swayne, L.A. Pannexin 1 regulates network ensembles and dendritic spine development in cortical neurons. Canadian Neuroscience Association Annual Meeting 2019 (CAN 2019). May 22-25, 2019. Toronto, ON. Canada
- **Sanchez-Arias, J. C.**, Shevtsova O., Liu M., Swayne L.A. Pannexin 1 regulates somatosensory pyramidal neuron dendritic spine density and sensorimotor function. Neuroscience 2018 (SfN 2018). November 3-7, 2018. San Diego, CA. USA
- **Sanchez-Arias, J. C.**, Shevtsova O., Liu M., Weaver M.S., Swayne L.A. Pannexin 1: a novel regulator of dendritic spine development in the postnatal cerebral cortex. Canadian Association for Neuroscience Annual Meeting 2018. May 13-16, 2018. Vancouver, BC. Canada.
- **Sanchez-Arias, J. C.**, Shevtsova O., Liu M., Weaver M.S., Swayne L.A. Pannexin 1: a novel regulator of dendritic spine development in the postnatal cerebral cortex. BC Regenerative Medicine Symposium. May 9, 2018. Vancouver, BC. Canada.
- **Sanchez-Arias, J. C.**, Wicki-Stordeur L. E., Swayne L. A. A novel negative regulator of neurite development in the cerebral cortex. BC Regenerative Medicine Symposium, May 10, 2017. Vancouver, BC. Canada.
- **Sanchez-Arias, J. C.**, Wicki-Stordeur L. E., Swayne L. A. Wicki-Stordeur L.E, Swayne L.A. A pannexin 1 blocker modulates the development of dendritic spines in the postnatal cerebral cortex. Inaugural UVA Pannexin Conference. October 29, 2016. Charlottesville, VA. USA.
- **Sanchez-Arias, J. C.**, Wicki-Stordeur L. E., Swayne L. A. A pannexin 1 blocker modulates the development of dendritic spines in the postnatal cerebral cortex. Neuroscience 2016 (SfN 2016). November 12-16, 2016. San Diego, CA. USA
- **Sanchez-Arias, J. C.**, Wicki-Stordeur L. E., Carmona-Wagner E. O., Swayne L. A. A Pannexin 1 blocker modulates dendrite formation in the early postnatal cerebral cortex. (Canadian Developmental Biology Conference 2016 – Satellite Symposium on Forebrain Neurogenesis: From Embryo to Adult. March 16-17, 2016. Banff, AB. Canada.
- **Sanchez-Arias, J. C.**, Wicki-Stordeur L. E., Carmona-Wagner E. O., Dhaliwal J, Gunton A, Kim M. S, Boyce A. K. J., Shestopalov V. I., Lagace D. C., Swayne L. A. Investigation of Pannexin 1 in the response of developing neurons to stroke. Canadian Association for Neuroscience Annual Meeting 2015. May 24-27, 2015. Vancouver, BC. Canada.

## Service

- BC Regenerative Medicine Symposium Organizing & Scientific Committee
- BC Regenerative Medicine Newsletter Co-editor
- Brain Bee Organizer - Victoria Chapter
- University of Victoria - Division of Medical Sciences Student Representative
- Neuroscience Graduate Program Kick-Off - Organizing Committee
- Let's Talk Science UVic Volunteer

## Society Memberships

- Society for Neuroscience
- Canadian Association for Neuroscience
- BC Regenerative Medicine Initiative Trainee Steering Committee

## References

- Leigh Anne Swayne, PhD
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