ALEJANDRO PARGA BECERRA, MD PhD

Department of Neurology, University of Washington
Veterans Affairs Puget Sound Health Care System
1660 S. Columbian Way Bldg 1 #615 Seattle, Washington 98108
aparga@gmail.com
alejandro-parga.github.io
(480)244-5947

Career Objective

As a neuro-electrophysiologist with medical training and advanced research skills in in/ex-vivo recordings and opoto/chemogenetics, I am an expert on the synaptic plasticity of neuronal circuits and their alterations in functional brain disorders. In my research, I bring together electrophysiological tools to investigate the function of neuronal networks. My strengths are in the interpretation of neuro-anatomical studies and the biophysics involved in hippocampal neuronal circuits. My goal is to understand the function of neuronal ensembles that is relevant to cognitive function and translate this knowledge into concrete applications that potentiate technology to modulate neuronal networks.

Education

12/2014 Doctor of Philosophy (Ph.D.) Neuroscience
Barrow Neurological Institute - Arizona State University
Dissertation: Cortical auditory functional activation by cortico-striato-thalamo-cortico circuits: An endogenous mechanism of the brain to activate the auditory cortex, relevant to the neuronal basis of auditory hallucinations.
Committee: Co-chair: Co-chair: Janet Neisewander, Neuroscience. Ronald Hammer, Neuroscience & Pharmacology. Amelia Gallitano-Mendel, Psychiatry. Jim McLoone, Psychiatry. Jie Wu, Electrophysiology.

06/2005 Doctor of Medicine (M.D.) Neurophysiology
National University of Colombia – College of Medicine, Bogotá Colombia
Emphasis: Developmental Neurophysiology

Academic Appointments

Senior Fellow
05/2017 – Present Dr. Christopher B. Ransom, Epilepsy Center of Excellence and Neurology Service, VA Puget Sound Department of Neurology, University of Washington, Seattle

- Regulation of Extra-synaptic GABA-A Receptors in Health and Disease

Postdoctoral Research Associate
01/2015 – 12/2016 Dr. Trent Anderson, Department of Basic Medical Sciences
University of Arizona, College of Medicine, Phoenix

- Neurosteroid action on Cortical Spreading Depression (CSD) through differential Gabaergic signal onto pyramidal neurons
- Optogenetic regulation of CSD using targeted pyramidal inhibition and activation.
- Effects of CSD in intracranial pressure (ICP) as a model of migraine headache.

Research Experience
Research Associate
02/2008 – 11/2014 Dr. Ronald Hammer, Neuroscience and Pharmacology
University of Arizona, College of Medicine, Phoenix,

- Retrograded trans-synaptical tracing of auditory neuronal circuits using pseudorabies virus-152.
- Dopamine-induced auditory cortical activation and attenuation by D2-like receptor-selective antagonist in the caudatoputamen of the rat

04/2013 – 07/2013 Dr. Federico Sanabria, Department of Psychology
Arizona State University, Tempe

- Correlation between dopamine-induced auditory activation and sound perception during sound discrimination task

08/2009 – 12/2009 Dr. Athina Markou, Department of Psychiatry
University of California, San Diego

- Phencyclidine and clozapine effects on the 5-choice serial reaction time task and regional brain zif268 mRNA expression

03/2010 – 06/2010 Dr. Amelia Gallitano-Mendel, Department of Basic Medical Sciences
The University of Arizona, College of Medicine, Phoenix

- Detection 5-HT 2A receptor messenger RNA using *in situ* hybridization histochemistry on brains from EGR3 recombinant mice.

01/2000 – 12/2000 Dr. Jairo Zuluaga. Physiology Department
National University of Colombia

- Motor development and Epilepsy rotation. Neurodevelopment program. Central league against epilepsy.

Bilingual Interviewer, Group Leader
08/2007 – 12/2007 Dr. Mark Roosa, Department of Psychology
Arizona State University, Tempe

- Interviewed Mexican-American families and their children for The Family Project collecting socio-economic data.

Teaching Experience
Teaching Associate
School of Life Sciences, Arizona State University, Tempe

01/2013 - 05/2013. Human Physiology and Anatomy Laboratory (BIO202)
- Taught human anatomy and dissecting techniques on human cadaver preparations
- Held laboratory sessions using a systemic perspective to assist students integrate anatomical and physiological concepts about the human body
- Developed students' learning skills via one-on-one interaction, using hypothesis testing through laboratory activities, and kept online support for the class

08/2008 - 12/2012. Animal Physiology Laboratory (BIO361)
- Implemented surgical procedures and paradigms for animal preparation in laboratory experimentations to expose the physiology of the nervous, circulatory, renal, and respiratory systems
- Provided training to students of the Assistant Teaching Associate Program for the development of their teaching skills. Created and managed online support for this training program.
- Taught physiological concepts for the classification of pathological disorders

06/2012-07/2012. Animal Physiology Lecture (BIO360)
- Developed and taught the Neurophysiology component of the lecture; held study sessions to answer students' questions

06/2010-07/2010. General Biology I (BIO201)
- Taught the scientific method and basic concepts of evolution in the biological sciences

06/2009-07/2009. General Biology II (BIO202)
- Taught fundamentals for scientific writing, proper citation formats, and online databases search used in reports, assignments, and the scientific literature
- Encouraged critical thinking through the analysis of the data obtained in laboratory sessions

Students Training

2016	Z. Killeen	Medical Student	Live slice work for optogenetics
2015	J. Nichols	Graduate student	Post-Hoc Testing
2013	A. Hoffman	Graduate student	In-situ hybridization histochemistiry
2012	R. Bastle	Graduate student	DNA oligonucleotide probe radio-labeling
2011	A. Maple	Graduate student	DNA ribonucleotide probe radio-labeling
2011	J. Huang	Graduate student	ANOVA and regression analysis
2010	M. Lacagnina	Undergraduate student	Stereotaxic intracranial surgeries in rodents
2009	W. Chu	Undergraduate student	Tissue sectioning with cryostat

Publications and Works in Progress

A. Parga, A. F. Logsdon, W. A. Banks & C. Ransom (2021). Traumatic brain injury broadly affects GABAergic signaling in dentate gyrus granule cells. eNeuro. doi: 10.1523/ENEURO.0055-20.2021

A. Parga & T. Anderson. Targeted optogenetic pyramidal neurons to regulate cortical spreading depression. In preparation.

A. Parga & T. Anderson. Neurosteroids facilitate cortical spreading depression. *Journal of Neurophysiology.* Submitted for publication.

A. Parga, G. Muñoz & R. P. Hammer (2016) Excessive striatal dopamine activates auditory cortex via striato-thalamo-cortical projections in the rat. *Biological Psychiatry* 77(9), 62S. http://doi.org/10.1016/j.biopsych.2015.03.006

A. N. Hoffman, **A. Parga**, P. Paode, L. R. Watterson, E. M. Nikulina, R. P. Hammer, Jr., and C. D. Conrad (2015). Chronic stress-enhanced fear memories are associated with induced amygdala zif268 expression and are resistant to reconsolidation. *Neurobiology of Learning and Memory*, 120, 61-8. http:// doi: 10.1016/j.nlm.2015.02.004.

A. Parga & R. P Hammer (2012). Auditory cortical activation after dopamine infusion in caudal caudatoputamen of the rat. *Biological Psychiatry*, 71(8), 312S. http://doi.org/10.1016/j.biopsych.2012.02.014

Presentations and Awards

American Epilepsy Society Annual Meeting - 2020
Poster: GABA-B receptor dysfunction in dentate gurus granule cells after experimental TBI (Controlled cortical impact).

48th Annual Meeting of the Society for Neuroscience – 2018
Poster: Modulation of extrasynaptic $GABA_A$ receptor function in dentate gyrus granule cells by $GABA_B$ receptors and severe TBI.

Department of Physiology and Biophysics Seminar, University of Washington – 2017
Presentation: Targeted optogenetic stimulation of cortical pyramidal neurons to regulate cortical spreading depression

46th Annual Meeting of the Society for Neuroscience – 2016
Poster: Neurosteroids selectively disinhibit the cortex and facilitate cortical spreading depression

45th Annual Meeting of the Society for Neuroscience – 2015
Poster: Cortical spreading depression induced by targeted optogenetic activation of cortical pyramidal neurons

70th Annual Scientific Convention of the Society of Biological Psychiatry – 2015
Presentation: Excessive striatal dopamine activates auditory cortex via striato-thalamo-cortical projections in the rat

Arizona State University Graduate College Dissertation Fellowship - 2013
Award: Cortical auditory functional activation by cortico-striato-thalamo-cortico circuits: How excessive dopaminergic transmission in the caudatoputamen activates sound-like cortical patterns.

43rd Annual Meeting of the Society for Neuroscience - 2013
Trans-synaptic retrograde tracing of an auditory cortico-striato-thalamic-cortico circuit with PRV-152

68th Annual Scientific Convention of the Society of Biological Psychiatry – 2013
Presentation: Attenuation of striatal dopamine-induced auditory cortical activation by D1 or D2 receptor-selective antagonist in the rat
Nominated for best poster presentation

4th BNI-ASU Research Symposium - 2012
Poster: Sound-like functional pattern of auditory activation induced by dopamine in caudal caudatoputamen

67th Annual Scientific Convention of the Society of Biological Psychiatry - 2012
Poster: Auditory Cortical Activation after Dopamine Infusion in Caudal Caudatoputamen of the Rat

41st Annual Meeting of the Society for Neuroscience - 2011
Poster: Effects of repeated PCP and chronic clozapine treatment on the 5-choice serial reaction time task and regional brain zif268 expression

Medical Experience
Emergency Physician

La Arandia Military Base (supported by the United States), National Army of Colombia
08/2005 – 05/2006
Emergency Medical Services

- Provided medical emergency care for privates of anti-narcotics battalions I, II, and III, including helicopter supported evacuations and emergency transfers
- Attended to in/out patients and developed and maintained clinical records for a billeted population of 1500 soldiers (both Colombian and American)
- Physician in charge of the Military Base's Medical Health Center coordinating surgical medical brigades and the emergency personnel, including 16 registered nurses

Hospital Management and Training Activities

- Organized pharmacy budget and ordered pharmacy supplies for La Arandia Military Base's dispensary according to epidemiological data

- Trained nurses in first aid care and resuscitation protocols according to the American Heart Association's (AHA) Advanced Cardiovascular Life Support course (ACLS)

Tropical Diseases Services
- Supervised Leishmaniasis and Malaria treatment for 100+ patients
- Compiled, coded, and reported epidemiologic and demographic data to the Ministry of Health according to morbidity and mortality statistics

Postgraduate Medical Training
12/2012 *Advanced cardiovascular life support provider (ACLS program)*
American Heart Association, Safety On Site Training, Phoenix

Emergency Physician (Clerkship)
07/2004 – 10/2004 Gyneco-Obstetric Services, San Rafael Hospital, Colombia
- Provided medical care in obstetrics emergencies, birth assistance and neonatal adaptations for 25+ obstetric emergency visits per shift

10/2004 – 05/2005 Emergency, Surgery, Internal Medicine and Pediatric Services, Ramon Gonzalez Valencia Hospital, Colombia
- Maintained patients' clinical records. Examined and reported on anamneses and physical examinations
- Interpreted and reported on laboratory assessments to chief medical specialists. Ordered, collected and verified medical orders for chief medical staff
- Assisted appointments of specialized medical cases. In charge of patients' follow up throughout surgical and post-surgical procedures

05/2005 – 08/2005 Psychiatric Services, San Camilo Hospital, Colombia
- Researched and proposed treatment alternatives for medical cases at the emergency department for 10+ psychiatric emergencies per shift
- Documented and reported literature reviews on psychiatric conditions to chief medical specialists

Memberships
Society for Neuroscience

Skills
Research procedures: Ex vivo and in vivo electrophysiology recordings of neurons, confocal and multiphoton microscopy, transynaptic retrograde tracing of neuronal circuits using pseudorabies virus, Intrisic Optical Signal imaging, stereotaxic intracranial surgeries in rodents, fluorogold iontophoretc infusions, *in situ* hybridization histochemistry, immunohistochemistry.

Medical procedures: Cesarean section, labor assistance and neonatal adaptation, thoracic chest tube insertion, upper and lower extremity block, skin closure, surgical debridement, spinal tap

Analytic Software: Python, NiE, PolyScan2, Axon Imaging Workbench, Clampex, Stereoinvestigator, Neurolucida, SPSS, SAS, STATA, Blackboard 9, Canvas, LabScribe, Biopac, Blaise, CDISC

Languages
English – native proficiency
Spanish – native proficiency

References

Dr. Christopher Ransom, M.D., Ph. D.
Assistant Professor of Neurology
Department of Neurology
University of Washington
VA Puget Sound Health Care System
1660 S Columbian Way Building 1 room 616
Seattle, WA 98108
cbr5@UW.edu
(206) 764-2021

Dr. Trent Anderson, Ph. D.
Professor of Neuroscience
Department of Basic Medical Science
College of Medicine
University of Arizona
425 N. Fifth Street Building 1
Phoenix, Arizona 85004-2157
andersot@email.arizona.edu
(602) 827-2158

Dr. Ron Hammer, Ph.D.
Professor, Co-Director, Clinical Translational Sciences-Phoenix
Department of Basic Medical Sciences
University of Arizona
PO Box 245019
AZ Biomedical Collaborative 1 room 424
475 N. 5th St.
Phoenix, AZ 85004
ron.hammer@arizona.edu
(602) 827-2112