

**Luis Fernando Queme Cobar, M.D., Ph.D.**

Instructor

Cincinnati Children's Medical Center, Department of Anesthesia

Division of Pain Management Research Lab

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**Research Interests**

Neurophysiology of pain, ischemic myalgia, peripheral and central mechanisms of pain, musculoskeletal and myofascial pain, animal models of pain, chronic pain models, role of neurotrophic factors in the development of muscular pain, peripheral mechanisms of cardiovascular reflexes regulation, role of ion channels on nociception, role of purinergic receptors in pain development, mechanisms of mechano-transduction, delayed onset muscle soreness

**Education**

- 2008-2013 Doctor of Philosophy, Ph D.  
Cell Information Medicine, focus on "pain neurophysiology"  
Nagoya University, Graduate School of Medicine, (Nagoya, Japan)  
Dissertation: "Muscular Mechanical and Heat Sensitivity in Humans and Rats After Lengthening Contraction"  
Advisor: Kazue Mizumura M.D., D.Sc.
- 1999-2007 Doctor of Medicine, MD  
Francisco Marroquin University (Guatemala City, Guatemala)  
Thesis: "Absolute and Relative Adrenal Insufficiency in Children with Septic Shock"  
Bachelor of Science, BS (Joint degree with MD)  
Francisco Marroquin University (Guatemala City, Guatemala)

**Certifications**

Educational Commission for Foreign Medical Graduates Certification (ECFMG)

**Work Experience**

- 2019- Instructor, Cincinnati Children's Hospital Medical Center, Department of Anesthesia, Division of Pain Management Research Lab
- 2018-2019 Research Associate, Cincinnati Children's Hospital Medical Center, Department of Anesthesia, Division of Pain Management Research Lab  
Principal Investigator: Michael P Jankowski, Ph.D.
- 2014-2018 Post-doctoral Fellow, Cincinnati Children's Hospital Medical Center, Department of Anesthesia, Division of Pain Management Research Lab  
Principal Investigator: Michael P Jankowski, Ph.D.

## Research Experience

- 2019- Cincinnati Children's Hospital Medical Center  
Instructor, 2019 – present  
My current research explores the role of repeated injuries and stress in the development of chronic muscle pain. My focus is in exploring the changes in gene expression in the peripheral nervous system in different models of repeated muscle tissue injuries and how background stressors can be potential modulators of the development of chronic pain.
- 2018-2019 Cincinnati Children's Hospital Medical Center  
Research Associate, 2018 – 2019  
I studied how repeated ischemia with reperfusion injuries in the development of chronic pain. And how primary muscle afferents show sex differences in dynamic gene regulation after repeated injuries.
- 2014-2018 Post-doctoral Research Fellow, 2014 - 2018  
During my postdoctoral fellowship I studied the dual modulation of nociception and cardiovascular reflexes by primary muscle afferents during peripheral ischemia in a mouse brachial artery occlusion model. I used a multidisciplinary approach, involving behavioral assays, electrophysiology recordings of primary sensory neurons in an ex-vivo muscle nerve, DRG, spinal cord preparation and multiple molecular biology techniques.
- 2009 Aalborg University  
Guest Researcher, Nov-Dec 2009  
During this graduate fellowship, I contributed to the design and execution of a protocol to research on healthy human volunteers the effects of heat sensitization on muscle pain using delayed onset muscle soreness as a model.
- 2008-2013 Nagoya University  
Ph. D. Student, 2009-2013  
During my graduate training I studied the role of TRPV1 ion channels on mechanical hyperalgesia and the role of NGF in muscle pain using *in vitro* single fiber recordings and animal models of acute and chronic pain.  
I also performed studies analyzing the expression of pERK in the DRGs of rats exposed to repeated cold stress (as a model of chronic myofascial pain), using immunohistochemistry.
- Research Student, 2008-2009  
My initial work as a graduate student focused on the effect of NGF in mechanical hyperalgesia using behavioral experiments and Delayed Onset Muscle Soreness (DOMS) as a model of muscle pain in rats.

## Mentoring and Teaching Experience

- 2020- University of Cincinnati. Instructor for the Fundamentals of Neuroscience course laboratory.  
My responsibilities include teaching and supervising the gross anatomy laboratories for the course.

- 2016- University of Cincinnati/Cincinnati Children's Hospital Summer Undergraduate Research Fellowship (SURF) Program mentor  
During the summer semester I mentored and trained undergraduate students in basic research techniques and in developing a short project for capstone presentations.
- 2016- University of Cincinnati Biomedical Research and Mentoring Program (RaMP)  
I mentor and train undergraduate students and directly supervised their work in the laboratory. In this program students learn how to keep research records, perform basic molecular biology experiments and present their results at a capstone session.

### Mentored Students

Name	Affiliation	Dates	Current Affiliation
Jessica Ross PhD	University of Cincinnati	02/2014 - 06/2017	Stanford University
Bhavana Katragadda	University of Cincinnati	02/2015 - 05/2016	University of Cincinnati
Evan Purvis	Xavier University	05/2016 - 08/2016	Southern Illinois University School of Medicine
Alex Weyler	University of Cincinnati	01/2017 -08/2018	University of Cincinnati
Adam Dourson BS	University of Cincinnati	09/2017 - Present	University of Cincinnati
Ally Butterfield	University of Cincinnati	01/2019 - 03/2020	University of Cincinnati
Irati Mitxelena	University of Cincinnati	01/2019 - 03/2020	University of Cincinnati

### Awards and Honors

- 2018 American Pain Society Young Investigator Travel Award to attend the Annual Scientific Meeting
- 2018 International Association for the Study of Pain (IASP) travel award to attend the World Congress on Pain
- 2018 International Association for the Study of Pain (IASP) special interest group on non-human pain poster presentation award
- 2016 International Association for the Study of Pain (IASP) travel award to attend the World Congress on Pain
- 2016 North American Pain School (NAPS) 2016 selected trainee.
- 2015 American Pain Society Young Investigator Travel Award to attend the Annual Scientific Meeting

### Service

#### Ad hoc Referee/Reviewer

PLoS ONE  
Molecular Pain  
Neuroscience Letters  
Life Sciences  
Pain  
Journal of Pain  
Journal of Neurophysiology  
Neurochemical Research  
Biology of Sex Differences

### Professional Organizations

2020- US Association for the Study of Pain (USASP)  
2014- Society for Neuroscience (SFN)  
2014- Society for Neuroscience (SFN) – Ohio-Miami Valley (OMV) Chapter member  
2014- American Heart Association (AHA)  
2014-2019 American Pain Society (APS)  
2010- International Association for the Study of Pain (IASP)  
2008-2013 The Physiological Society of Japan (PSJ)

### Research Funding

Science, Technology (MEXT) Scholarship Queme LF [PI] 04/2008 - 04/2013  
Japan Ministry of Education.  
¥12,600,000 (~\$118,000USD)

16POST29750004 Queme LF [PI] 07/2016 - 06/2018  
American Heart Association  
Role of GDNF in the Dual Modulation of Nociception and Cardiovascular Reflexes during Peripheral Ischemia  
\$102,550

Anesthesia Innovation and Pilot (AIP) Award Queme LF [PI] 07/2020- 06/2021  
Cincinnati Children's Hosp.  
Department of Anesthesiology  
\$20,630

### Invited Talks

Mechanisms of Ischemic Muscle Pain and How to Target Them for Treatment. - *International Association for the Study of Pain (IASP) Pain Research Forum (painresearchforum.org) Weekly Seminar Series* – August 2020 (Webinar format: <https://www.painresearchforum.org/forums/webinar/148070-prf-seminar-mechanisms-ischemic-muscle-pain-and-how-target-them-treatment>).

### Publications

Nagaraja S, **Queme LF**, Hofmann M, Tewari SG, Jankowski MP, Reifman J. In silico Identification of Key Factors Driving the Response of Muscle Sensory Neurons to Noxious Stimuli. *Front Neurosci.* 2021, In press

**Queme LF**, Jankowski MP. Single unit Electrophysiological Recordings of Primary Muscle Sensory Neurons using a Novel Ex-vivo Preparation. In: *Contemporary approaches to the study of pain: from molecules to neural networks*. Seal RP editor. Springer Nature. (Book Chapter in press)

Yang L, Slone J, Li Z, Lou X, Hu YC, **Queme LF**, Jankowski MP, Huang T. Systemic Administration of AAV-Slc25a46 mitigates mitochondrial neuropathy in Slc25a46<sup>-/-</sup> mice. *Hum Mol Genet.* 2020 Jan, DOI: [10.1093/hmg/ddz277](https://doi.org/10.1093/hmg/ddz277)

**Queme LF**, Weyler AA, Cohen ER, Hudgins RC, Jankowski MP. A role for peripheral GDNF signaling in ischemic myalgia development. *Proc Natl Acad Sci.* 2020 Jan, 117 (1) 698-707; DOI: [10.1073/pnas.1910905116](https://doi.org/10.1073/pnas.1910905116)

**Queme LF**, Jankowski MP. Sex differences and mechanisms of muscle pain. *Curr Opin Physiol.* 2019 Oct; 11:1-6. DOI: [10.1016/j.cophys.2019.03.006](https://doi.org/10.1016/j.cophys.2019.03.006) Epub 2019 Apr 2

Nasu T, Kubo A, **Queme LF**, Mizumura K. A single administration of Neurotrophin reduced the elongated immobility time in the forced swimming test of rats exposed to repeated cold stress. *Behav Pharmacol.* 2019 Jun 10. DOI: [10.1097/FBP.0000000000000488](https://doi.org/10.1097/FBP.0000000000000488)

He X, Zhang L, **Queme LF**, Liu X, Lu A, Waclaw RR, Dong X, Zhou W, Kidd G, Yoon SO, Buonanno A, Rubin JB, Xin M, Nave KA, Trapp BD, Jankowski MP, Lu QR. A histone deacetylase 3-dependent pathway delimits peripheral myelin growth and functional regeneration. *Nat Med.* 2018 Mar;24(3):338-351. DOI: [10.1038/nm.4483](https://doi.org/10.1038/nm.4483)

Ross JL, **Queme LF**, Lamb JE, Green KJ, Jankowski MP. Sex differences in primary muscle afferent sensitization following ischemia and reperfusion injury. *Biol Sex Differ.* 2018 Jan 3;9(1):2. DOI:[10.1186/s13293-017-0163-5](https://doi.org/10.1186/s13293-017-0163-5)

Ross JL, **Queme LF**, Lamb JE, Green KJ, Ford ZK, Jankowski MP. Interleukin 1 $\beta$  inhibition contributes to the antinociceptive effects of voluntary exercise on ischemia/reperfusion-induced hypersensitivity. *Pain.* 2018 Feb;159(2):380-392. DOI:[10.1097/j.pain.0000000000001094](https://doi.org/10.1097/j.pain.0000000000001094)

**Queme LF**, Ross JL, Jankowski MP. Peripheral Mechanisms of Ischemic Myalgia. *Front Cell Neurosci.* 2017 Dec 22;11:419. DOI: [10.3389/fncel.2017.00419](https://doi.org/10.3389/fncel.2017.00419)

Li Z, Peng Y, Hufnagel RB, Hu YC, Zhao C, **Queme LF**, Khuchua Z, Driver AM, Dong F, Lu QR, Lindquist DM, Jankowski MP, Stottmann RW, Kao WWY, Huang T. Loss of SLC25A46 causes neurodegeneration by affecting mitochondrial dynamics and energy production in mice. *Hum Mol Genet.* 2017 Oct 1;26(19):3776-3791. 2. DOI: [10.1093/hmg/ddx262](https://doi.org/10.1093/hmg/ddx262)

Liu X, Green KJ, Ford ZK, **Queme LF**, Lu P, Ross JL, Lee FB, Shank AT, Hudgins RC and Jankowski MP. Growth hormone regulates the sensitization of developing peripheral nociceptors during cutaneous inflammation. *Pain.* 2017 Feb;158(2):333-346. DOI: [10.1097/j.pain.0000000000000770](https://doi.org/10.1097/j.pain.0000000000000770)

Lu P, Hudgins RC, Liu X, Ford ZK, Hoffmann MC, **Queme LF**, Jankowski MP. Upregulation of P2Y1 in neonatal nociceptors regulates heat and mechanical sensitization during cutaneous inflammation. *Mol Pain.* 2017 Jan-Dec;13:1744806917730255. DOI: [10.1177/1744806917730255](https://doi.org/10.1177/1744806917730255)

Ross JL, **Queme LF**, Cohen ER, Green KJ, Lu P, Shank AT, An S, Hudgins RC and Jankowski MP. Muscle IL1 $\beta$  drives ischemic myalgia via ASIC3-mediated sensory neuron sensitization. *J Neurosci.* 2016; 36(26):6857-71. DOI: [10.1523/JNEUROSCI.4582-15.2016](https://doi.org/10.1523/JNEUROSCI.4582-15.2016)

**Queme LF**, Ross JL, Lu P, Hudgins RC and Jankowski MP. Dual modulation of nociception and cardiovascular reflexes during peripheral ischemia through P2Y1 receptor dependent sensitization of muscle afferents. *J Neurosci.* 2016; 36(1):19-30. DOI:[10.1523/JNEUROSCI.2856-15.2016](https://doi.org/10.1523/JNEUROSCI.2856-15.2016)

Ross JL, **Queme LF**, Shank AT, Hudgins RC, Jankowski MP. Sensitization of group III and IV muscle afferents in the mouse after ischemia and reperfusion injury. *J Pain.* 2014; 15(12):1257-70. DOI: [10.1016/j.jpain.2014.09.003](https://doi.org/10.1016/j.jpain.2014.09.003)

## Published as Queme F:

**Queme F**, Taguchi T, Mizumura K, Graven-Nielsen T. Muscular Heat and Mechanical Pain Sensitivity After Lengthening Contractions in Humans and Animals. *J Pain*. 2013 Nov;14(11):1425-36. DOI: [10.1016/j.jpain.2013.07.010](https://doi.org/10.1016/j.jpain.2013.07.010)

Murase S, Terazawa E, Hirate K, Yamanaka H, Kanda H, Noguchi K, Ota H, **Queme F**, Taguchi T, Mizumura K. Upregulated Glial Cell Line-derived Neurotrophic Factor Through Cyclooxygenase-2 Activation in the Muscle is Required for Mechanical Hyperalgesia After Exercise in Rats. *J Physiol*. 2013 Jun 15;591(12):3035-48. DOI: [10.1113/jphysiol.2012.249235](https://doi.org/10.1113/jphysiol.2012.249235)

Murase S, Terazawa E, **Queme F**, Ota H, Matsuda T, Hirate K, Kozaki Y, Katanosaka K, Taguchi T, Urai H, Mizumura K. Bradykinin and Nerve Growth Factor Play Pivotal Roles in Muscular Mechanical Hyperalgesia After Exercise (Delayed-onset Muscle Soreness). *J Neurosci*. 2010 Mar 10;30(10):3752-61. DOI: [10.1523/JNEUROSCI.3803-09.2010](https://doi.org/10.1523/JNEUROSCI.3803-09.2010)

## Presentations

**Queme LF**, Weyler AA, Jankowski MP. Muscle GDNF signaling to neurons modulates peripheral sensitization after ischemic injury through a CREB/CBP interaction. - *Society for Neuroscience Annual Meeting 2019* – Chicago, USA (Abstract/Poster)

**Queme LF**, Weyler AA, Hudgins RC, Jankowski MP. GDNF/GFR $\alpha$ 1 mediated upregulation of acid sensing ion channels and P2X receptors modulates muscle pain-related behaviors and exercise pressor reflexes after ischemia-reperfusion injury. - *17th World Congress on Pain (IASP)* - Boston, USA, 2018 (Abstract/Poster)

**Queme LF**, Weyler AA, Ross JL, Jankowski MP. Ischemia and reperfusion injury induces acute and chronic muscle pain-related behaviors through increased expression of the GFR $\alpha$ 1 receptor. - *American Pain Society annual meeting 2018* - Anaheim, CA PA, USA (Abstract/Poster)

**Queme LF**, Purvis EC, Weyler AA, Ross JL, Hudgins RC, Jankowski MP. Increased pain related behaviors and cardiovascular responses to exercise after ischemia and reperfusion injuries are regulated by enhanced GDNF dependent signaling in muscle afferents. - *Society for Neuroscience Annual Meeting 2017* – Washington DC, USA (Abstract/Poster)

**Queme LF**, Ross JL, Hudgins RC, Seal RP, Jankowski MP. VGLUT3 containing primary muscle afferents are a unique subpopulation that respond to innocuous metabolites. - *American Pain Society annual meeting 2017* – Pittsburgh, PA, USA (Abstract/Poster)

**Queme LF**, Ross JL, Ford AK, Katragadda BK, Green KJ, Hudgins RC, Jankowski MP. Upregulation of GDNF family receptor  $\alpha$ 1 in the dorsal root ganglia regulates pain-related behaviors and the cardiovascular response to exercise after ischemia with reperfusion injury. - *16th World Congress on Pain (IASP)* - Yokohama, Japan, 2016 (Abstract/Poster)

**Queme LF**, Ross JL, Hudgins RC, Jankowski MP. The ADP-responsive P2Y1 receptor modulates phenotypic changes in muscle afferents during chronic ischemic injury. - *Society for Neuroscience Annual Meeting 2014* – Washington DC, USA (Abstract/Poster)

**Queme F**, Mizumura K. Muscular Nociceptor Heat Sensitivity in Rats After Lengthening Contraction and NGF. - *90th Physiological Society of Japan (PSJ) Meeting* - Tokyo, Japan, 2013 (Abstract/Poster)

**Queme F**, Nie H, Mizumura K, Graven-Nielsen T. Experimental Muscle Pain and Muscle Hyperalgesia After Intramuscular Injections of Heated Saline or Capsaicin. - *13th World Congress on Pain (IASP)* - Montreal, Canada, 2010 (Abstract/Poster)

Murase S, **Queme F**, Taguchi T, Mizumura K. COX-2-GDNF Pathway to Delayed Onset Muscle Soreness in Rats. - *The 13th World Congress on Pain (IASP)* - Montreal, Canada, 2010 (Abstract/Poster)