

CURRICULUM VITAE

Mei-Ying Liang MD

Associate Professor
Department of Anesthesiology
Division of Clinical

OFFICE ADDRESS:

Froedtert Hospital
9200 W Wisconsin Ave
Milwaukee, WI 53226

EDUCATION:

09/1985 - 06/1991 M.D., Shanghai Medical University, Shanghai, P. R. China
09/1992 - 08/1996 Ph.D., Anatomy & Neurobiology, Medical College of Ohio, Toledo

POSTGRADUATE TRAINING AND FELLOWSHIP APPOINTMENTS:

09/1991 - 07/1992 Resident, Transitional, Shanghai Changhang Hospital, Shanghai, P. R. China
1992 - 1996 Predoctoral Fellowship Award, Medical College of Ohio, Toledo, OH
1993 - 1994 Teaching Assistant, Medical Gross Anatomy, Medical College of Ohio, Toledo, OH
09/1996 - 06/1997 Postdoctoral Fellow, Department of Anatomy & Cell Biology, The University of Kansas Medical Center, Kansas City, KS
07/1997 - 04/2000 Postdoctoral Fellow, Department of Cell Biology & Anatomy, Medical College of Wisconsin, Milwaukee, WI
07/2002 - 06/2003 Intern, Aurora Sinai Medical Center, Milwaukee, WI
07/2003 - 06/2006 Resident, Department of Anesthesiology, Medical College of Wisconsin, Milwaukee, WI
08/2006 - 07/2007 Fellowship, Pain Management, Department of Anesthesiology, Medical College of Wisconsin, Milwaukee, WI

Clinical:

Research:

FACULTY APPOINTMENTS:

09/2007 - 06/2018 Assistant Professor, Department of Anesthesiology, Medical College of Wisconsin
07/2018 - Present Associate Professor, Department of Anesthesiology, Medical College of Wisconsin

HOSPITAL AND CLINICAL ADMINISTRATIVE APPOINTMENTS:

2007 - Present Staff Anesthesiologist, Anesthesiology, Milwaukee VA Medical Center, Milwaukee, WI

HOSPITAL STAFF PRIVILEGES:

09/2007 - Present Froedtert Memorial Lutheran Hospital
09/2007 - Present Wheaton Franciscan Healthcare St. Joseph Hospital, Milwaukee, WI
09/2007 - Present Clement J. Zablocki VA Medical Center
Milwaukee, WI
Milwaukee, WI

SPECIALTY BOARDS AND CERTIFICATION:

<u>Board Certified</u>	<u>Issue Date</u>	<u>Expiration</u>
American Board of Anesthesiology	04/24/2009	12/31/2030
ABA Pain Medicine	10/23/2010	12/31/2030
American Board of Medical	06/2013	06/2024

Acupuncture

<u>Certificates</u>	<u>Issued By</u>	<u>Issue Date</u>	<u>Expiration</u>
BLS	AHA	02/2018	02/2020
ACLS	AHA	03/04/2020	03/31/2022

<u>Licensure</u>	<u>Number</u>	<u>Issue Date</u>	<u>Expiration</u>
Wisconsin License	46358-020	12/18/2003	10/31/2021

MEMBERSHIPS IN HONORARY AND PROFESSIONAL SOCIETIES:

1993 - 2009 Society for Neuroscience
1995 - 1996 Society for Neuroscience (Toledo Chapter)
1997 - 2000 American Association for the Advancement of Science
1998 - 2000 Association for Research in Vision and Ophthalmology
2002 - Present American Society of Anesthesiologists
2012 - Present American Academy of Medical Acupuncture
2013 - Present Board Member (International Journal of Clinical Anesthesiology)
2013 - Present British Journal of Anesthesia
2015 - Present Elected as Fellow (American Board of Medical Acupuncture)

EDITORIAL BOARDS/JOURNAL REVIEWS

Editorial Board:

Journal Review:

EDITORSHIPS/EDITORIAL BOARDS/JOURNAL REVIEWS:

Editorial Board

01/01/2013 - Present International Journal of Clinical Anesthesiology

RESEARCH GRANTS/AWARDS/CONTRACTS/PROJECTS:

Active

Peer Review

Title:	Comparing US guided SI injections to Standard Fluoro
Role:	Co-investigator
PI:	Thomas Ebert
Dates:	02/06/2020 - Present

INVITED LECTURES/WORKSHOPS/PRESENTATIONS:

Local

Pain Fellow lecture series-Epidural, Pain fellow lecture series, VA pain clinic, 07/08/2019

Acupuncture for PONV, workshop at Froedtert, Froedtert hospital, 11/04/2019

Meiying Liang, Acupuncture, Pain Fellow lecture Series, Milwaukee VA Medical Center, 05/27/2020 - Present

Acupuncture lecture for pain fellows, Acupuncture in pain management, pain Fellow lecture series, VA pain clinic, 05/27/2020

Mei-Ying Liang, "The Reign of Pain is Mainly in the Brain!!"

And "Pain Management: Treatment Options". Lectures given as part of VA Medical Center Chronic Pain Seminar for Veterans, Clement J. Zablocki Medical Center, 9/2010, Milwaukee, WI

Mei-Ying Liang, "Medical Management and Team Approach to Treatment of Chronic Pain" Concordia University Milwaukee, Physical Therapy students. Lecture repeated in 2010 and 2011, Milwaukee, WI

National

ASA Acupuncture workshop, ASA, Orlando, FL, 10/21/2019

October 2016, Chicago, IL
October 2015, San Diego, CA
October 2014, New Orleans, LA
Mei-Ying Liang, "Acupuncture Workshop", Presented at the American Society of Anesthesiology Annual Meeting
October 2013, San Francisco, CA

International

Mei-Ying Liang, "Anesthesia" Alliance for Smiles 2015 Shanghai China Symposium (an organization that provides free comprehensive treatment for cleft lip and palate children), Shanghai, China, 4/2015,

PEER REVIEWED WORKSHOPS/PRESENTATIONS:

Local

Meiying Liang, Epidurals, Introductory Series for new fellows, VA MC pain clinic, 07/29/2020 - Present
Meiying Liang/Jeff Kirsch, Acupuncture workshop for Postoperative nausea vomiting, Workshop, Froedtert, 04/19/2021 - Present
Meiying Liang, Acupuncture in pain management, Pain fellow lecture series, VA pain clinic, 05/24/2021 - Present

Regional

Yu Chiu, Meiying Liang, Case report, MARC, 02/03/2020 - Present

National

Liang MY, Zoga V, Kawano T, Gemes G, McCallum JB, Weihrauch D, Hogan Q, Sarantopoulos C. Sulfonyleurea receptor 1 subunit immunofluorescence in rat primary afferents after painful nerve injury. Society for Neuroscience Annual Meeting, Washington DC, 2008
Liang MY, Zoga V, Kawano T, Sikka J, McCallum JB, Hogan Q, Wells C, Sarantopoulos C. Schmidt-Lanterman incisures in mammalian peripheral sensory axons are altered after painful nerve injury. Society for Neuroscience Annual Meeting, Chicago, 2009

COMMITTEE SERVICE:

Hospital

01/01/2017 - Present Member, VA hospital Interdisciplinary Pain Committee, Milwaukee VA Hospital

MEDICAL COLLEGE TEACHING ACTIVITIES:

Community/Lay Public

09/2010 - Present Lecturer for Chronic Pain Seminar for Veterans
2012 - Present Regular contributor to the Clement J. Zablocki VA Medical Center pain newsletter
Lecturer for Pain Awareness Month series, Clement J. Zablocki VA Medical Center, Clement J. Zablocki VA Medical Center, 9/2012

Medical Student Education

2007 - 2012 Lecturer at Anesthesiology workshop for the Medical Student Anesthesia Interest Group (includes anesthesia monitoring, intravenous catheter insertion, and airway management)
2007 - Present Teach medical students in the OB suite/operating room and pain clinic. I personally teach an average of one medical student per week, including airway management in the operating room and interventional pain procedures in the pain clinic; this is an opportunity to show medical students what we do in anesthesia and pain medicine to motivate their interest)

Resident and Fellow Education

2007 - Present Resident and fellow instruction in the OR, OB suite, and pain clinic, including hands-on teaching of airway management, anesthesia for the patients in the OR, interventional pain procedures, and medical management of patients with chronic pain
2013 - Present Designed and taught monthly acupuncture mini-workshop for fellows, residents, and

medical students. This workshop is an important part of their pain clinic rotation/education because they are not exposed to acupuncture during the medical school didactic program. After completing the workshop residents are able to use acupuncture as an alternative treatment to treat post-operative nausea/vomiting in the recovery room

2013 - Present Resident Preceptor, Pharmacy and Neurosurgery Physician Assistant program, during OR and pain clinic rotations. The pain clinic often shares patients with neurosurgery; by teaching these Physician Assistant residents, they become familiar with interventional procedures we perform for chronic pain patients

EXTRAMURAL TEACHING:

Community/Lay Public

11/2010 - 11/2012 Concordia University, Milwaukee, WI, Physical Therapy,
FELLOW MENTORING
Pain Management, "Intervention"
Lecture/workshops
Pain Management, "Introduction to Stepped Care Model"

Resident and Fellow Education

07/24/2019 - Present VA pain clinic, Monthly Acupuncture Workshop for residents and fellows rotating through va pain clinic
12/09/2019 VA pain clinic, Discussing of Epidural: Technique and contrast spread pattern
12/11/2019 - Present VA pain clinic, Interventional Pain practice: Needle techniques
02/19/2020 VA pain clinic, Transforaminal Epidural

Postdoctoral Fellow Education

2007 - 2010 Research Mentor to Vicky Zoga
Ms. Zoga was a laboratory postdoctoral fellow. I taught Vicky tissue preparation and processing, immunohistochemistry staining, Western blot, fluorescent microscopic imaging, and data analysis. This collaboration led to 8 abstracts and presentations at the Neuroscience annual meeting (see reference abstract # 8-15) and publications of 4 journal articles (see publications #6-9)

PROGRAMMATIC DEVELOPMENTS:

Clinical Programs

2007 - 2009 Characterizing KATP Channels in dorsal root ganglion neurons using immunohistochemistry techniques.
2009 - Present Foundation for Anesthesia Education and Research (FAER) grant proposal, "Nuclear KATP channels in normal and injured dorsal root ganglion neurons". (unfunded)
2009 - Present Committee member, Equipment Evaluation Committee
2009 - Present Associate Director, Implantable Pain Management Division, Clement J. Zablocki VA Medical Center
2012 - Present Director, Acupuncture Clinic, Clement J. Zablocki VA Medical Center
2014 - Present Collaborative project with Weidong Gu (Shanghai, China), "Effects of brachial plexus nerve block on modulation of brain functional network and therapeutic function of HeGu (LI-4) acupuncture".

RESEARCH SCHOLARSHIP ACTIVITIES

Trialed and evaluated fluoroscopy equipment for VA pain clinic. I was actively involved and played an important role in the trial of new fluoroscopy machines and the decision-making process for purchase. New clinical equipment evaluation

With the increasing demands from the veterans for alternative treatment options as well as to reduce opioid usage in the management of these chronic pain patients, I established a new acupuncture clinic. Development of protocols, policies, and standards for implantable pain management devices (intrathecal morphine or baclofen infusion pumps, spinal cord stimulators) at the Zablocki VA Medical Center.

BIBLIOGRAPHY

Refereed Journal Publications/Original Papers

1. Burmeister M, Novak J, Liang MY, Basu S, Ploder L, Hawes NL, Vidgen D, Hoover F, Goldman D, Kalnins VI, Roderick TH, Taylor BA, Hankin MH and McInnes RR. Ocular retardation mouse caused by Chx10 homeobox null allele: impaired retinal progenitor proliferation and bipolar cell differentiation. *Nat Genet.* 1996;12:376-84.
2. Hollander BA, Liang MY, Besharse JC. Linkage of a nucleolin-related protein and casein kinase II with the detergent-stable photoreceptor cytoskeleton. *Cell Motil Cytoskeleton.* 1999;43:114-27.
3. Green CB, Liang MY, Steenhard BM, Besharse JC. Ontogeny of Circadian and Light Regulation of Melatonin Release in *Xenopus laevis* Embryos. *Brain Res Dev Brain Res.* 1999;117:109-16.
4. Bone-Larson C, Basu S, Radel JD, Liang MY, Perozek T,
5. Kapousta-Bruneau NV, Green D, Burmeister M, Hankin MH. Partial rescue of the ocular retardation phenotype by genetic modifiers. *J Neurobiol.* 2000;42:232-47.
6. Liang MY, Hanko E, and Dhamee M S. Anesthetic Management of a Patient with Ehlers-Danlos Syndrome Type IV. *Middle East Journal of Anesthesiology,* 2006;18:1185-9.
7. Kawano T, Zoga V, McCallum JB, Wu HE, Gemes G, Liang MY, Abram S, Kwok WM, Hogan Q, Sarantopoulos C. ATP-sensitive potassium currents in rat primary afferent neurons: Biophysical, pharmacological properties, and alterations by painful nerve injury. *Neuroscience* 2009;162:431-43.
8. Kawano T, Zoga V, Kimura M, Liang MY, Wu HE, Gemes G, McCallum JB, Kwok WM, Hogan QH, Sarantopoulos CD. Nitric oxide activates ATP-sensitive potassium channels in mammalian sensory neurons: action by direct S-nitrosylation. *Mol Pain.* 2009;5:12.
9. Kawano T, Zoga V, Gemes G, McCallum JB, Wu HE, Pravdic D, Liang MY, Kwok WM, Hogan Q, Sarantopoulos C. Suppressed $Ca^{2+}/CaM/CaMKII$ -dependent KATP channel activity in primary afferent neurons mediates hyperalgesia after axotomy. *Proc Natl Acad Sci USA.* 2009;106:8725-30.
10. Zoga V, Kawano T, Liang MY, Bienengraeber M, Weihrauch D, McCallum B, Gemes G, Hogan Q, Sarantopoulos C. KATP channel subunits in rat dorsal root ganglia: alterations by painful axotomy. *Mol Pain* 2010;6:6.
11. Liang MY, Pagel PS. Bilateral interhemispheric subdural hematoma after inadvertent lumbar puncture in a parturient. *Can J Anesth.* 2012;59:389-93.
12. BOOKS/CHAPTERS/REVIEWS
13. Liang MY, Pagel PS: Failed back surgery syndrome, *Pain: A Review Guide.* Edited by Abd-Elsayed A, Basel, Switzerland, Springer International Publishing AG, 2018. (Accepted)

Non-Refereed Journal Publications/Original Papers

1. Liang MY. Retinal development in ocular retardation mutant mouse. Ph.D. Dissertation. Medical College of Ohio, OH, U.S.A. (1996)

Abstracts

1. Liang MY, Hankin MH. Effect of ocular retardation mutation on cell proliferation in the mouse retina. *Soc Neurosci. Abstr.* 1994;20:29.
2. McInnes RR, Basu S, Novak J, Ploder L, Liang MY, Hawes N, Taylor B, Roderick T, Goldman D, Hankin MH, Burmeister M. The ocular retardation (orJ) mouse has another mutation in the Chx10 retinal homeobox gene: direct evidence for Chx10 as a major determinant of mammalian retinal development. *Am Soc Hum Genet* 1994.
3. Liang MY, Hankin MH. Retinal ganglion cell differentiation in ocular retardation mice. *Soc Neurosci. Abstr.* 1995;21:31.
4. Liang MY, Hankin MH. Effect of ocular retardation on
5. cell proliferation and differentiation in the mouse retina. *First Annual Michigan Vision Science Research Retreat.* 1995.
6. Hankin MH, Liang MY. Ganglion cell differentiation and
7. axon guidance in the ocular retardation mouse retina. *ARVO.* 1996;37:S328.
8. Liang MY, Besharse JC. Characterization of a high molecular

9. weight glycoconjugate located in the photoreceptor connecting cilium
10. ARVO 1998; 39: S1056.
11. Besharse J, Janos M, Liang MY. Cytosolic Dynein in Ciliary Axonemes and outer segments of Photoreceptors. Cell Biology Meeting 1999.
12. Sarantopoulos C, McCallum JB, Liang MY, Kwok W, Hogan Q. Electrophysiological parameters specifically mediating neuropathic pain behavior after spinal nerve ligation in the rat. European Journal of Anesthesiology 2008; 25: 6, Best Abstract-Runner-up 2: ESAAP2-6.
13. Sarantopoulos C, McCallum B, Liang MY, Kwok W, Hogan Q. ATP-sensitive potassium (KATP) channels in peripheral sensory neurons: alterations after nerve injury that results in pain behavior in the rat. AUA 55th Annual Meeting, Duke University, North Carolina 2008.
14. McCallum JB, Liang MY, Rigaud M, Kwok WM, Hogan Q, Sarantopoulos C. Identification and distribution of ATP-sensitive potassium channels isoform subunits in rat primary afferent neurons after painful nerve injury. Br J Anaesth. 2008;100:580P.
15. Liang MY, Zoga V, Kawano T, Gemes G, McCallum JB, Weihrauch D, Hogan Q, Sarantopoulos C. Sulfonylurea receptor 1 subunit immunofluorescence in rat primary afferents after painful nerve injury. Society for Neuroscience Annual Meeting 2008.
16. Zoga V, Liang MY, Kawano T, Gemes G, Wu S, Abram S, Hogan Q, Sarantopoulos C. Sulfonylurea receptor 1 (SUR1) immunofluorescence
17. morphological distribution in DRG neurons: effect of painful nerve injury. Society for Neuroscience Annual Meeting 2008.
18. Kakashi T, Zoga V, Gemes G, McCallum JB, Liang MY, Kwok WM, Hogan Q, Sarantopoulos C. Single channel parameters of KATP current in primary afferent neurons: the effect of painful nerve injury. Society for Neuroscience Annual Meeting 2008.
19. Liang MY, Zoga V, Kawano T, Sikka J, McCallum B, Hogan Q, Wells C, Sarantopoulos C. Schmidt-Lanterman incisures in mammalian peripheral sensory axons are altered after painful nerve injury. Society for Neuroscience Annual Meeting 2009.
20. Zoga V, Kawano T, Gemes G, Liang MY, Hogan Q, Sarantopoulos C. Activation of KATP channels in intact and axotomized primary afferent neurons by NO via direct S-nitrosylation. Society for Neuroscience Annual Meeting 2009.