



UNIVERSITY of MARYLAND
CENTER TO ADVANCE CHRONIC PAIN RESEARCH



CACPR NEWSLETTER

Relieving Pain in America

FEBRUARY 2022



CACPR Member Spotlight: Introducing Jiale Yang, PhD

[Dr. Jiale Yang, Ph.D.](#) works as a research associate in the Department of Neural and Pain Science at the University of Maryland, School of Dentistry. He earned a Ph.D. in Neuroscience at Fudan University, China. After graduating from Fudan, he joined the research team at the University of Maryland, Baltimore in 2014 as a postdoctoral fellow.

Before coming to the UMB, his research focused on the study of analgesic effect of gabapentin and its peripheral and central mechanism. He and his colleagues found that as a γ -amino butyric acid analogue anticonvulsant, systematic injection of gabapentin effectively inhibits the activity of alpha 2 delta 1 subunit of voltage-gated calcium channels (VGCC) expressed in dorsal root ganglia (DRG) neurons and blocks CX3CL1-CX3CR1 signaling pathways in the spinal dorsal horn, producing anti-hyperalgesia in animal pain models. He published several articles in collaboration with other scientists on the spinal cord mechanism of glial cells involved in peripheral neuropathic pain and inflammatory pain. He also received a travel award at the 35th annual meeting of the Japan Neuroscience Society.

Since Dr. Yang joined the UMB, he has been involved in two research projects funded by NIH R01 grants: 1. Conducting optogenetic/chemogenetic manipulation and adapting in vivo calcium imaging in free moving transgenic mice to determine the role of descending serotonergic neurons in the development and maintenance of persistent pain; and 2. Exploring a new hypothalamus-rostral ventromedial medulla (RVM) neuronal circuit mediating central mechanisms of stress-induced long-lasting comorbid visceral pain in animals with trigeminal neuropathic pain, a preclinic model of comorbid pain conditions including temporomandibular disorders (TMD) and irritable bowel syndrome (IBS). Dr. Yang's research uses popular experimental techniques, such as microinjection in the brains of mice and rats, optogenetic, chemogenetic, calcium imaging recording in vivo by miniscope.

In addition, Dr. Yang is collaborating with Drs. Feng Wei and Ke Ren, studying the contribution of supraspinal immune-neuronal interaction to maintain neuropathic pain conditions. He is also enjoying the opportunity to work with other laboratories at the UMB, including Drs. Man-Kyo Chung, Richard Traub, or at the Johns Hopkins University, including Dr. Xinzhong Dong. Dr. Yang hopes to continue making an impact through his collaborative efforts and future research plans.

New Grant Spotlights

Akerman S, PhD, Salvemini D, PhD, **Romero-Reyes M**, DDS, PhD

1R01NS120930-01A1 Akerman (PI), Salvemini (SLU; MPI) and Romero-Reyes (co-PI) (NIH-NINDS)

Title: Molecular basis for adenosine A3 receptor agonists in the treatment of migraine

\$2,390,600.00 over 5 years

12/01/2021-11/30/2026

Project: The major goal of this project is to evaluate the efficacy of adenosine A3 receptor agonists in preclinical models of migraine headache and medication overuse headache, and to dissect their underlying molecular and neuropharmacological therapeutic mode of action.

To view the press release, [please click here](#).

Man-Kyo Chung, DMD, PhD & Chung Lab

R01 DE031477 (PI: Yu Shin Kim; MPI: Man-Kyo Chung)

Title: Functional peripheral and central vagal neural circuits of interoception inhibiting pain

\$2,703,165 DC; \$3,652,910 total

12/30/2021-12/31/2026

NIDCR/NIH

Project: The major goal of this project is to determine the peripheral and central mechanisms vagal modulation of pain from temporomandibular joints. Dr. Chung is serving as a multi-PI.

CACPR Member Laurels

Highlights of recent publications and presentations.

Vinita Agarwal, PhD

Agarwal, V. (2021). Mimetic Self-Reflexivity and Intersubjectivity in Complementary and Alternative Medicine Practices: The Mirror Neuron System in Breast Cancer Survivorship. *Front. Hum. Neurosci.* 15:641219. doi: 10.3389/fnint.2021.641219

Breast cancer survivors (BCS) receiving chemotherapy and radiation exhibit peritraumatic dissociative symptoms. Neuroscientific findings on the mirror neuron system (MNS) have examined how humans experience themselves as a subject in relationship with others and suggest empathy facilitates reciprocal resonance. In the therapeutic setting, the experience of another's pain is imprecise and mediated through its simulated expression (e.g., language) rather than grasped as a direct representational experience. Examining complementary and alternative medicine (CAM) providers' intentional, self-and-other-directed healing processes, the study furthers understandings of the MNS' role in imitation and empathy as it informs mimetic self-reflexivity and intersubjectivity in the therapeutic BCS pain management relationship. Extending work on self-recognition and self-other discrimination, the study seeks to interpret the imitation paradigm in the therapeutic space of BCS pain management and invites future research on the provider-patient relationship as a diachronic mimetic self-reflexive and imaginative mimetic intersubjective phenomenon.

To read more, [please click here.](#)

Man-Kyo Chung, DMD, PhD

Nociceptor Neurons Magnify Host Responses to Aggravate Periodontitis
S Wang, X Nie, Y Siddiqui, X Wang, V Arora, X Fan, V Thumbigere-Math, **M K Chung** J Dent Res. 2022. doi: 10.1177/00220345211069956.

Periodontitis is a highly prevalent chronic inflammatory disease that progressively destroys the structures supporting teeth, leading to tooth loss. In this study, we showed that TRPV1-expressing afferents increase bone destruction in periodontitis by promoting hyperactive host responses in the periodontium. We suggest that specific targeting of neuroimmune and neuroskeletal regulation can offer promising therapeutic targets for periodontitis supplementing conventional treatments.

Luana Colloca, MD, PhD, MS

Calabrese L, **Colloca L.** Long COVID-19 and the Role of the Patient-Clinician Interaction in Symptom Management.
J Patient Exp. 2022 Feb 9;9:23743735221077514. doi:
10.1177/23743735221077514. eCollection 2022. PMID: 35155749 Free PMC article. No abstract is available.

This is an opinion piece to discuss the burden of long-COVID and potential implications for daily clinical practice.

Kelleher SA, Fisher HM, Winger JG, Miller SN, Amaden GH, Somers TJ, **Colloca L**, Uronis HE, Keefe FJ. Virtual reality for improving pain and pain-related symptoms in patients with advanced-stage colorectal cancer: A pilot trial to test feasibility and acceptability. Palliat Support Care. 2022 Jan 26:1-11. doi: 10.1017/S1478951521002017. Online ahead of print.

This is a pilot trial on Virtual reality in advanced-stage colorectal cancer patients. Virtual reality improved several outcomes.

Junfang Wu, BM, PhD

Li Y, Ritzel RM, Lei Z, Cao T, He J, Faden AI, **Wu J.** Sex dimorphism in neurological function after SCI is associated with disrupted neuroinflammation in both injured spinal cord and brain. Brain, Behavior, and Immunity. 2021 Dec 23;101:1-22. doi: 10.1016/j.bbi.2021.12.017. Online ahead of print. PMID: 34954073.

We demonstrated that age at the time of SCI and time post-injury can differentially affect the long-term outcomes in a sex-dependent manner. Young males showed increased expression of genes associated with glial function, cytokine signaling, and apoptosis during acute SCI, including greater functional activation of microglia. Females exhibited acute attenuation and chronic exacerbation of neuroinflammation which correlated with the temporal course of functional recovery. We observed deficits in learning and memory and mood behavior in both sexes at very late stages of injury which were associated with sex-specific neuroinflammatory processes in the cerebral cortex.

Zou L, He J, Gu L, Shahrer RA, Li Y, Cao T, Zhu J, Wang S, Fan X, **Wu J**, Chao W. Brain Innate Immune Response via Extracellular miRNA-TLR7 Sensing during Polymicrobial Sepsis. *Brain, Behavior, and Immunity*. 2022 Feb;100:10-24. doi: 10.1016/j.bbi.2021.11.007. Epub 2021 Nov 19. PMID: 34808293. (# correspondent)

In a mouse model of polymicrobial sepsis, we demonstrated acute and chronic brain inflammation and long-term impairment of neurological function. Activation of extracellular miR-146a-5p → TLR7 signaling was sufficient to stimulate microglia, astrocytes, and intact brain to promote a potent innate immune response in the CNS. Taking a loss-of-function approach, we identified a contributory role of endogenous miR-146a and TLR7 sensing in animal SAE. Hence, our study suggested extracellular miRNA sensing via TLR7 as a possible link of neuroinflammation within the brain microenvironment during polymicrobial sepsis.

**Upcoming Guest Lecture sponsored by the
Center to Advance Chronic Pain Research (CACPR)**



UNIVERSITY of MARYLAND
CENTER TO ADVANCE CHRONIC PAIN RESEARCH



Dr. Leonard Calabrese, DO

***“The Epidemic of Long COVID-19:
Implications for placebo and nocebo
science.”***

**Thursday, March 31, 2022
12 PM – 1 PM**

You may [click here](#) to access the zoom link.

Announcements

The Program in Neuroscience (PIN) Journal Club is pleased to host the Baltimore Brain Series, a Baltimore-wide talk series organized by graduate students and postdoctoral fellows to highlight exciting work being done by graduate students and postdoctoral fellows in the Baltimore area.

Please see the flyers below for upcoming virtual seminars.



Baltimore Brain Series



Virtual Seminar, Tuesday March 29, 12:00 – 1:00 PM

**Herpes viruses in the Baltimore longitudinal study of aging:
Associations with brain volumes, cognitive performance
and plasma biomarkers**

Michael R. Duggan, Ph.D., National Institute of Drug Abuse



**Noradrenergic signaling directly regulates calcium
dynamics in oligodendrocyte precursor cells
in the mouse cortex**

Tsai-Yi Lu, Ph.D., Johns Hopkins University






Hosted by University of Maryland Baltimore



Baltimore Brain Series

Virtual Seminar, Tuesday April 26, 12:00 – 1:00 PM

Investigating the distinct pharmacodynamic profile of oliceridine in vivo
Emilya Ventriglia, National Institute of Drug Abuse

Early retinal deprivation crossmodally alters spontaneous and sound-evoked activity in the auditory cortex of newborn mice
Didhiti Mukherjee, Ph.D., Johns Hopkins University

Hosted by University of Maryland Baltimore



You may [click here](#) to access the zoom link for both virtual seminars.

The Pain Journal Club

The Pain Journal Club consists of students, postdocs, and faculty from the UMB Schools of Dentistry, Medicine, and Nursing, whose research interests include mechanisms of pain in animal models and humans. A pain-related scientific article is presented by a volunteer and everyone discusses the findings of the article. The Pain Journal Club will be held virtually every **Wednesday at 8:30 am through May 2022.**

Below is the reoccurring Zoom link for the Pain Journal Club meeting.
[Please click here to access the Pain Journal Club zoom meetings.](#)

To view the full schedule for Pain Journal Club meetings, please [click here.](#)

PIG (Pain Interest Group)

The Center to Advance Chronic Pain Research (CACPR) is delighted to announce the 2021-2022 Pain Interest Group (PIG) meeting series. PIG meetings are informal meetings for labs with an interest in Pain research to present what they are working on. The meetings are meant as a sounding board for new ideas or a place to present preliminary data to get feedback. It can also be used to give graduate students and postdocs practice at organizing and presenting their projects. It is a low-key meeting that is not meant to be intimidating, allowing people to talk through innovative ideas that

might turn into something. Having attendance from people across campus can be a springboard to new collaborations. The meetings will be given remotely to favor attendance. Consider joining us to listen to the new research advances of our teams and faculty. We look forward to meeting you.

If you want to be included on the mailing list or for more information about the PIG meetings, contact Dr. Wei Guo at wguo@umaryland.edu or Dr. Luana Colloca at colloca@umaryland.edu.

To view the full schedule for Pain Interest Group (PIG) meetings, please [click here](#).

The UM Center to Advance Chronic Pain Research (CACPR) is a multidisciplinary center composed of nationally and internationally renowned clinical and preclinical translational scientists whose principle research focus is on the physiological, genetic, and psychosocial underpinnings of the development and persistence of debilitating chronic pain conditions.



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