

CURRICULUM VITAE

1. General information

(a) Name: Chih-Cheng Chen (陳志成), Ph.D.
(b) Gender: Male
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2. Current position:

Research Fellow
Institute of Biomedical Sciences, Academia Sinica
128 Academia Road, Section 2
Taipei, Taiwan

3. Research Interest:

My basic research interest is to understand the molecular mechanism and genetic control of pain sensation and neurosensory mechanotransduction. In past years, I have accomplished works relating to molecular cloning and functional characterization of sensory neuron-specific ion channels, including ATP-gated ion channels (P2X3), acid-sensing ion channels (ASICs), and stretch-activated ion channels. I am actively engaged in work ranging from molecular biology to electrophysiology to animal behaviors. My laboratory is currently pursuing several different lines of research:

A major interest is in pain mechanism, especially the pain associated with tissue acidosis. Muscle pain is our current focus. The long-range goal is to understand and control the intractable chronic musculoskeletal pain, such as fibromyalgia, myofascial pain syndromes, complex regional pain syndromes, etc.

A second major interest of the lab is related to neurosensory mechanotransduction. While sensory neurons are known to respond to chemical, thermal, and electrical stimulation, the effect of mechanics on these highly sensitive cells is still not known. Mechanoreceptors of sensory neurons diversely localize in specialized nerve terminals, which make a challenging for distinguishing, approaching, and mechanical stimulation. To conquer this difficulty, we have developed a novel method of analyzing mechanotransduction of neurite via localized elastomeric matrix control and electrophysiology. We aim to identify the stretch-activated ion channels that contribute to movement disorder and chronic pain in peripheral neuropathies.

4. Professional appointments

2019-present Deputy Director, IBMS, Academia Sinica
2016-present Research Fellow, IBMS, Academia Sinica

2018-present	Chair Professor, Institute of Acupuncture, China Medical University, Taiwan
2011-2016	Associate Research Fellow, IBMS, Academia Sinica
2003-2011	Assistant Research Fellow, IBMS, Academia Sinica
2003-present	Adjunct Assistant Professor, Institute of Neuroscience, National Yang-Ming University
2003-present	Adjunct Assistant Professor, Department of Life Science, National Taiwan University

5. Education:

1998-2003	Postdoctoral fellow, National Institute of Mental Health, NIH, Bethesda, USA (Supervisors: Andreas Zimmer, Michael Brownstein)
1994-1997	Ph.D., Department of Anatomy (Neurobiology), University College London, UK (Supervisor: John N. Wood)
1988-1990	M. Sc., Institute of Zoology, National Taiwan University, Taiwan
1984-1988	B. Sc., Department of Zoology, National Taiwan University, Taiwan

6. Pass and Current Trainees:

Post-doctors:

Ravi Chandra Kopparaju	2019-2020
Yu-Chia Chuang	2018-present
Shing-Hong Lin	2015-2016
Current position: Postdoctoral fellow, Harvard University, USA	
Sitt-Wai Fong	2015-present
Wei-Nan Chen	2014-2014
Current position: senior manager in a trade company	
Chia-Ching John Lin	2012-2012
Current position: Postdoctoral fellow, Baylor Medical College, USA	
Cheng-Han Lee	2011-present
Wei-Li Wu	2010-2012
Current position: Assistant Professor, Department of Physiology, National Cheng-Kung University, Taiwan	
Yi-Wen Lin	2005-2009
Current position: Professor, Institute of Acupuncture, Chinese Medical University, Taichung, Taiwan	

Ph.D. students:

Robert Midence	AS-TIGP (Neuroscience)	2018-
Chih-Hsien Hung	Kaohsiung Medical University	2015-2020 (awarded)
Jiann-Her Lin	Taipei Medical University	2013-2017 (awarded)
Ravi Chandra	AS-TIGP (Neuroscience)	2013-2018 (awarded)
Ya-Chih Chien	National Yang-Ming University	2012-

Yuan-Ren Cheng	National Taiwan University	2010-
Yu-Chia Chuang	AS-TIGP (Molecular Medicine)	2009-2018 (awarded)
Shing-Hong Lin	National Defense Medical Center	2009-2015 (awarded)
Wei-Nan Chen	National Defense Medical Center	2006-2014 (awarded)
Wei-Li Wu	National Defense Medical Center	2005-2010 (awarded)
Chia-Ching Lin	AS-TIGP (Molecular Medicine)	2004-2011 (awarded)
Cheng-Han Lee	National Yang-Ming University	2004-2011 (awarded)
Shy-Jer Huang	National Defense Medical Center	2004-2008 (awarded)

Master students:

Po-Yang Chiang	National Taiwan University	2016-2018 (awarded)
Chu-Ting Chang	National Taiwan University	2015-2017 (awarded)
I-Ching Wang	National Taiwan University	2013-2015 (awarded)
Min-Tze Wu	National Taiwan University	2010-2012 (awarded)
Chia-Wen Wong	National Taiwan University	2010-2012 (awarded)
Yuan-Ren Cheng	National Taiwan University	2008-2010 (awarded)
Chien-Ju Chen	National Taiwan University	2007-2009 (awarded)
I-Lun Chen	National Taiwan University	2006-2008 (awarded)
Yi-Ting Yen	National Taiwan University	2005-2007 (awarded)
Hung-Chin Wang	National Taiwan University	2005-2007 (awarded)
Chien-Hung Liu	National Taiwan University	2004-2006 (awarded)

7. Grant Support:

- * Compound with analgesic effect for use in prevention and treatment of pain. MOST 109-3111-Y-001-002. NTD 1,455,000. 2020/06/01-2021/05/31.
- * Taiwan Mouse Clinic and Animal Consortium – National Comprehensive Mouse Phenotyping and Drug Testing Center. MOST 109-2740-B-001-004. NTD 22,900,000. 2020/05/01-2021/04/30.
- * Molecular and neurobiological basis of itch relief via scratching. MOST 108-2320-B-001-021-MY3. NTD 5,160,000. 2019/08/01-2022/07/31.
- * Study the somatosensory circuitry through brain science and linguistics. MOST 108-2321-B-001-028-MY2. NTD 16,000,000. 2019/06/01-2020/12/31.
- * Taiwan Mouse Clinic and Animal Consortium – National Comprehensive Mouse Phenotyping and Drug Testing Center. MOST 108-2319-B-001-003. NTD 24,530,000. 2019/05/01-2020/04/30.
- * Probing the bio-signature of soreness and pain in fibromyalgia and radiculopathy (3/4). MOST 108-2321-B-001-005. NTD 7,064,000. 2019/01/01-2019/12/31.
- * Animal Consortium – National Comprehensive Mouse Phenotyping and Drug Testing Center. MOST 107-2319-B-001-002. NTD 29,630,000. 2018/05/01-2019/04/30.
- * Probing the bio-signature of soreness and pain in fibromyalgia and radiculopathy (2/4). MOST 107-2321-B-001-020. NTD 8,779,000. 2018/01/01-2018/12/31.
- * Probing the bio-signature of soreness and pain in fibromyalgia and radiculopathy (1/4). MOST 106-2321-B-001-044. NTD 8,779,000. 2017/01/01-2017/12/31.

- * A chemo-optogenetic approach to probe the neurobiological basis of ongoing pain and evoked pain in mice. MOST 105-2320-B-001-018-MY3. 2016/08/01-2019/07/31. NTD 5,340,000.
- * Taiwan Mouse Clinic – National Comprehensive Mouse Phenotyping and Drug Testing Center – AM1-1. MOST 105-2325-B-001-013-B4. 2016/06/01-2017/04/30. NTD 9,794,000.
- * Taiwan Mouse Clinic – National Comprehensive Mouse Phenotyping and Drug Testing Center VI. MOST 105-2325-B-001-010. 2016/05/01-2017/04/30. NTD 25,000,000
- * Taiwan Mouse Clinic-National Comprehensive Mouse Phenotyping and Drug Testing Center – AM1. MOST 104-2325-B-001-014-B4. 2015/09/01-2016/08/31. NTD 8,563,943.
- * Taiwan Mouse Clinic-National Comprehensive Mouse Phenotyping and Drug Testing Center V. MOST 104-2325-B-001-011. 05/01/2015-04/30/2016. NTD 26,500,000
- * Investigate the role of ASIC4 in stress-related pain syndromes (II). MOST 103-2321-B-001-037. 2014/08/01-2015/07/31. NTD 2,250,000
- * Taiwan Mouse Clinic-National Comprehensive Mouse Phenotyping and Drug Testing Center IV. MOST 103-2325-B-001-015. 2014/05/01-2015/04/30. NTD 25,031,000
- * Taiwan Mouse Clinic-National Comprehensive Mouse Phenotyping and Drug Testing Center – AM1. NSC 102-2325-B-001-045-B4. 2013/12/01-2014/11/30. NTD 3,218,306.
- * The role of proton-sensing ion channels and neuroplastic change of muscle nociceptors in the transition from acute to chronic pain. NSC102-2320-B-001-021-MY3. 2013/08/01-2016/07/31. NTD 5,580,000.
- * Investigate the role of ASIC4 in stress-related pain syndromes (I). NSC102-2321-B-001-056. 2013/08/01-2014/07/31. NTD 2,113,000.
- * Taiwan Mouse Clinic-National Comprehensive Mouse Phenotyping and Drug Testing Center III. NSC102-2325-B-001-042. 2013/05/01-2014/04/30. NTD 24,620,000.
- * Taiwan Mouse Clinic—National Comprehensive Mouse Phenotyping and Drug Testing Center – AM1-1. NSC 101-2325-B-001-042-B4. 2012/12/01-2013/11/30. NTD 7,056,000.
- * Taiwan Mouse Clinic—National Comprehensive Mouse Phenotyping and Drug Testing Center II. NSC101-2325-B-001-028. 2012/05/01-2013/04/30. NTD 19,004,000
- * Understanding stretch-activated ion channels on sensory nerves (III). NSC-100-2321-B-001-018. NTD 1,500,000
- * Understanding stretch-activated ion channels on sensory nerves (II). NSC-99-2321-B-001-022. NTD 1,500,000
- * Understanding stretch-activated ion channels on sensory nerves (I). NSC-98-2321-B-001-043. NTD 1,650,000
- * Research into the role of ASIC3 in chronic inflammatory pain. NSC 98-2320-B-001-019-MY3. 2009/08/01-2012/07/31. NTD 2,988,000
- * Research into the clinical and functional implications of Nav1.7 channel mutation, which is responsible for primary erythromelalgia. IBMS-CRC96-P03. 2007/01/01-2009/12/31. NTD 7,501,042. Co-PI with Dr Ming-Jen Lee at NTU

- * The clinical and functional research into the Nav1.7 channel, which causes familial primary erythromelalgia. IBMS-CRC. 2006/01/01-2006/12/31. NTD 807,500. Co-PI with Dr Ming-Jen Lee at NTU
- * Sensitization as a common mechanism of pain and memory- T-type calcium channel in peripheral sensitization of musculoskeletal and diabetic origin. NSC 96-2311-B-001-041-MY2. 2007/08/01-2009/07/31. NTD 2,000,000
- * Functional genomics of ion channel genes in acid-sensitive nociceptive neurons. NSC 95-2320-B-001-045. 2006/08/01-2007/07/31. NTD 1,120,000
- * Molecular and genetic screening of genes involved in acidosis signaling and acid-induced nociception (II); NSC 94-2320-B-001-039. 2005/08/01-2006/07/31. NTD 900,000
- * Molecular and genetic screening of genes involved in acidosis signaling and acid-induced nociception (I); NSC 93-2320-B-001-047. 2004/08/01-2005/07/31. NTD 1,050,000
- * The role of acid-sensing ion channel (ASIC3) in cardiac pain; IBMS-CRC. 2004/01/01-2004/12/31. NTD 950,000 with Dr Ching-Feng Cheng.
- * Molecular mechanism and cloning of genes involved in acid-induced nociception and anti-nociception; NSC 92-2321-B-001-021. 2003/10/01-2004/07/31. NTD 700,000

8. Professional activity:

Membership: The Chinese Physiological Society (since 2003), Society for Neuroscience (since 2005), Taiwan Neuroscience Society (since 2009), International Association for the Study of Pain (since 2010)

Professional activities:

Board member, Taiwan Fibromyalgia Advisory Board (2020)
 Chair, Taiwan Neuroscience Alliance & Taiwan Society for Neuroscience (TSfN)
 President of Taiwan Neuroscience Society (2019-2020)
 Board member of Taiwan Neuroscience Society (2017-2018)

Academia program:

Coordinator, Neuroscience Program of Academia Sinica (2021-2025)

Core facility:

Taiwan Mouse Clinic (since 2013): Director
 Electrophysiology Core in Academia Sinica (2010-2015, since 2020): Founder & coordinator

Editorial board:

Cells (guest editor, 2020)
 Frontiers in Physiology (guest editor, 2021)
 Pain (associate editor, 2019~2022)
 World Journal of Anesthesiology (2013-02-08 to 2021-12-31)

International grant review:

AFM Telethon (3)
MRC UK (1)
Multiple Sclerosis Research Australia (1)
Orthopaedic Research UK (1)
Research Infrastructures of the Czech Republic (3)
Swiss National Science Foundation (1)

International prize review:

Gottfried Wilhelm Leibniz Prize (2014-2016)

Outside reviewer for tenure:

UTHSCSA, USA (2018)

Peer review service: The number in parentheses indicates the number of articles reviewed for the journal in the year.

2021 Biomedical Journal (1)
2020 Biomedical Journal (1)
Journal of Biomedical Science (1)
Molecular Pain (3)
Neuropharmacology (1)
Pain (13)
2019 Ann NY Acad Sci (1)
BioMed Research International (1)
Brain Research (2)
International Journal of Molecular Sciences (3)
Journal of Biomedical Science (4)
Journal of Comparative Physiology A (2)
European Journal of Pain (2)
Laboratory Animals (1)
Molecular Brain (3)
Molecular Pain (2)
Neuropharmacology (1)
Neuroscience Letter (1)
Pain (10)
2018 Brain Research (1)
Journal of Biomedical Science (3)
Molecular Neurobiology (4)
Neuropharmacology (2)
Pain (10)
Scientific Reports (2)
World J Anesthesiol (1)
2017 Advances in Pharmacology (1)
British J Pharmacology (2)

European J Pharmacology (1)
 Fibromyalgia: Open Access (3)
 Journal of Dermatological Science (2)
 Journal of Neurotrauma (1)
 Journal of Pain Research (1)
 Journal of Pharmacology and Experimental Therapeutics (2)
 Journal of Physiology (1)
 Molecular Neurobiology (1)
 Neuropharmacology (3)
 Neuroscience (3)
 Pain (2)
 Scientific Reports (5)
 World Journal of Gastroenterology (1)

2016 Acupuncture in Medicine (1)
 British J Pharmacology (1)
 Fibromyalgia: open access (3)
 International Journal of Molecular Sciences (2)
 Journal of Traditional and Complimentary Medicine (2)
 Neuropharmacology (2)
 Neuroscience Letters (1)
 Oncotarget (1)
 Pain (5)
 Scientific Reports (3)
 World J Anesthesiol (2)

2015 British Journal of Medicine and Medical Research (1)
 British J Pharmacology (2)
 EMBO J (2)
 Frontiers in Systems Neuroscience (1)
 Integrated Pharmacy Research and Practice (1)
 International Journal of Molecular Sciences (2)
 Journal of Pain Research (3)
 Molecular Pain (1)
 Molecular Pharmacology (1)
 Neuroscience Letters (1)
 Oncotarget (1)
 OncoTargets and Therapy (1)
 Pain (3)
 Pharmacology, Biochemistry, Behavior (2)
 Pharmacology Research & Perspectives (1)
 Physiology (1)
 Recent Patents on Biotechnology (1)
 Scientific Reports (1)
 World J Anesthesiol (3)

2014 Arthritis Disorders (2)
 Bio- and Medical Informatics and Cybernetics (2)

Biophysics (1)
 Cardiology and Angiology (2)
 Clinical Interventions in Aging (1)
 Experimental Dermatology (2)
 Frontiers in Systems Neuroscience (1)
 Journal of Biomedical Materials Research (1)
 Journal of International Research in Medical and Pharmaceutical Sciences (1)
 Journal of Pain Research (1)
 Molecular Autism (2)
 Molecular Neurobiology (1)
 Molecular Pharmacology (1)
 Neuroscience Letters (1)
 World J Neurology (2)
 World J Orthopedics (1)
 2013 Current Neuropharmacology (2)
 Eur J Neurosci (2)
 International Journal of Biological Sciences (3)
 Neuroscience Letter (2)
 Nucleic Acids Research (1)
 World J Anesthesiol (1)
 World J Gastroenterol (3)
 2012 Bio- and Medical Informatics and Cybernetics (1)
 Biophysics Journal (2)
 BMC Cardiovascular Disorders (1)
 Cellular and Molecular Bioengineering (2)
 Journal of Biomedical Sciences (3)
 Marine Drugs (1)
 Neuroscience Letter (3)
 WIREs Membrane Transport and Signaling (1)
 高雄醫學科學雜誌 (2)
 2010 Brain Research Bulletin (1)
 Current Nanoscience (1)
 J Pharmacology and Experimental Therapeutics (2)
 2009 Current Medicinal Chemistry (5)
 J Pharmacology and Experimental Therapeutics (1)
 2008 EMBO J (1)
 2006 Acta Anaesthes Taiw (1)
 2005 J Molecular Endocrinology (1)

9. Honors:

2013	Academia Sinica Significant Research Achievements
2017	Academia Sinica Significant Research Achievements
2017	MOST outstanding research award

10. Publications: H index, 27; i10 index, 50; all citation 4063

(a) Research articles: (* corresponding author)

1. Chi HH, Lee JC, Chen CC, Chen SK, Yen CT (2020) An index combining lost and remaining nerve fibers correlates with pain hypersensitivity in mice. **Cells** 9(11): 2414
2. Hung CH, Lee CH, Tsai MH, Chen CH, Lin HF, Hsu CY, Lai CL, Chen CC* (2020) Activation of acid-sensing ion channel 3 by lysophosphatidylcholine 16:0 mediates psychological stress-induced fibromyalgia-like pain. **Annals of the Rheumatic Diseases** 79(12):1644-1656 (featured by Nature Reviews Rheumatology)
3. Sakai K, Sanders K, Lin SH, Pavlenko D, Funahashi H, Lozada T, Hao S, Chen CC, Akiyama T (2020) Low-threshold mechanosensitive VGLUT3-lineage sensory neurons mediate spinal inhibition of itch by touch. **J Neurosci** 40(40): 7688-7701
4. Kuo CC, Hsieh JC, Tsai HC, Kuo YS, Yau HJ, Chen CC, Chen RF, Yang HW, Min MY (2020) Inhibitory interneurons regulate phasic activity of noradrenergic neurons in the mouse locus coeruleus and functional implications. **J Physiol** 598(18): 4003-4029.
5. Chang K, Hung CH, Sun WZ, Wu WT, Lai CL, Han DS*, Chen CC* (2020) Evaluation soreness symptoms of fibromyalgia: establishment and validation of the revised fibromyalgia impact questionnaire with integration of soreness assessment. **J Formos Med Assoc** 119(7): 1211-1218.
6. Chang CT, Fong SW, Lee CH, Chuang YC, Lin SH*, Chen CC* (2019) Involvement of acid-sensing ion channel 1b in the development of acid-induced chronic muscle pain. **Front Neurosci** 13: 1247.
7. Hsu WH, Lee CH, Chao YM, Kuo CH, Ku WC, Chen CC*, Lin YL* (2019) ASIC3-dependent metabolomics profiling of serum and urine in a mouse model of fibromyalgia. **Sci Rep** 9: 12123.
8. Chang KV, Wu WT, Chen MC, Chiu YC, Han DS*, Chen CC* (2019) Smartphone application with virtual reality goggles for the reliable and valid measurement of active craniocervical range of motion. **Diagnostics** 9(3): E71.
9. Wu WL, Cheng SJ, Lin SH, Chuang YC, Huang EYK, Chen CC* (2019) Effect of ASIC3 knockout on corticostriatal circuit and mouse self-grooming behavior. **Front in Cell Neurosci** 13:86.
10. Han DS, Hsieh YD, Lee CH, Chen CC* (2019) Involvement of substance P in the analgesic effect of low-level laser therapy in a mouse model of chronic widespread muscle Pain. **Pain Medicine** 20(10): 1963-1970.
11. Chuang YC, Lee CH, Sun WH, Chen CC* (2018) Involvement of advillin in somatosensory neuron subtype-specific axon regeneration and neuropathic pain. **Proc Natl Acad Sci USA** 115(36): E8557-E8566 (highlighted In This Issue).
12. Lin JH, Hsieh YC, Chen YC, Wang Y, Chen CC, Chiang YH (2017) Diagnostic accuracy of standardized qualitative sensory tests in the detection of lumbar lateral stenosis involving the L5 nerve root. **Sci Rep** 7: 10598.
13. Reimers C, Lee CH, Kalbacher H, Tian Y, Hung CH, Schmidt A, Prokop L, Kaufenstein S, Mebs D, Chen CC, Grunder S (2017) Identification of a cono-

- RFamide from the venom of *Conus textile* that targets ASIC3 and enhances muscle pain. **Proc Natl Acad Sci USA** 114 (17): E3507-E3515
14. Wang IC, Chung CY, Liao F, Chen CC*, Lee CH* (2017) Peripheral sensory neuron injury contributes to neuropathic pain in experimental autoimmune encephalomyelitis. **Sci Rep** 7: 42304
 15. Lin SH, Steinhoff M, Ikoma A, Chang YC, Cheng YR, Kopparaju RC, Ishii S, Sun WH*, Chen CC* (2017) Involvement of TRPV1 and TDAG8 in pruriception associated with noxious acidosis. **J Invest Dermatol** 137: 170-178.
 16. Lin SH, Cheng YR, Banks RW, Min MY, Bewick GS, Chen CC* (2016) Evidence for the involvement of ASIC3 in sensory mechanotransduction in proprioceptors. **Nat Commun** 7: 11460 (Highlighted in F1000)
 17. Fong SW, Lin HC, Wu MF, Chen CC, Huang YS (2016) CPEB3 deficiency elevates TRPV1 expression in dorsal root ganglia neurons to potentiate thermosensation. **PLoS One** 11(2): e0148491.
 18. Lee CW, Jang LL, Pan HJ, Chen YR, Chen CC, Lee CH (2016) Membrane roughness as a sensitive parameter reflecting the status of neuronal cells in response to chemical and nanoparticle treatments. **J Nanobiotech** 14:9
 19. Su YS, Chiu YY, Lin SY, Chen CC, Sun WH (2016) Serotonin receptor 2B mediates mechanical hyperalgesia by regulating transient potential vanilloid 1. **J Mol Neurosci** 59(1): 113-125.
 20. Chiang PH, Chien-TC, Chen CC, Yanagawa Y, Lien CC (2015) ASIC-dependent LTP at multiple glutamatergic synapses in amygdala network is required for fear memory. **Sci Rep** 5: 10143.
 21. Tsai SC, Jheng YH, Wang CY, Chen YW, Lin YF, Chen CC, Chang PC (2015) Osseous wound repair under inhibition of the axis of advanced glycation end-products and the advanced glycation end-products receptor. **J Formos Med Assoc** 114(10): 973-980.
 22. Lin SH, Chien YC, Chiang WW, Liu YZ, Lien CC, Chen CC* (2015) Genetic mapping of ASIC4 and contrasting phenotypes to ASIC1a in modulating innate fear and anxiety. **Eur J Neurosci** 41: 1553-1568 (Cover story).
 23. Lin YW, Chen CC* (2015) Electrophysiological characteristics of IB4-negative TRPV1-expressing muscle afferent DRG neurons. **Biophysics** 11: 9-16 (Editors' Choice Award).
 24. Wang CY, Tsai SC, Yu MC, Lin YF, Chen CC, Chang PC (2015) Light-emitting diode promotes donor site wound healing of the free gingival graft. **J Periodont** 86(5): 674-681.
 25. Chao YC, Chen CC, Lin YC, Breer H, Fleicher J, Yang RB (2015) Receptor guanylyl cyclase-G is a novel thermosensory protein activated by cool temperatures. **EMBO J** 34: 294-306.
 26. Chen WN, Lee CH, Lin SH, Wong CW, Sun WH, Wood JN, Chen CC* (2014) Roles of ASIC3, TRPV1, and Nav1.8 in the transition from acute to chronic pain in a mouse model of fibromyalgia. **Mol Pain** 10: 40 (highly accessed)
 27. Chen WN, Chen CC* (2014) Acid mediates a prolonged antinociception via substance P signaling in acid-induced chronic widespread pain. **Mol Pain** 10: 30

28. Cheng CF, Kuo TBJ, Chen WN, Lin CC, Chen CC* (2014) Abnormal cardiac autonomic regulation in mice lacking ASIC3. **Biomed Res Int** 2014: 709159
29. Chang PC, Tsai SC, Jheng YH, Lin YF, Chen CC (2014) Soft-tissue wound healing by anti-advanced glycation end-products agents. **J Dent Res** 93(4): 388-393.
30. Huang YH, Chang CY, Chen CC, Yang CD, Sun WH (2013) Distinct expression of Mas1-related G-protein-coupled receptor B4 in dorsal root and trigeminal ganglia-implications for altered behaviors in acid-sensing ion channel 3-deficient mice. **J Mol Neurosci** 51: 820-834.
31. Su PH, Chen CC, Chang YF, Wong ZR, Chang KW, Huang BM, Yang HY (2013) Identification and cytoprotective function of a novel nestin isoform, Nes-S, in dorsal root ganglia neurons. **J Biol Chem** 288(12): 8391-8404.
32. Wu MZ, Cheng PY, Chen CC*, Lee MJ* (2013) A novel SCN9A mutation responsible for primary erythromelalgia and is resistant to the treatment of sodium channel blockers. **PLoS One** 8(1): e55212.
33. Wu CY, Chen YF, Wang CH, Kao CH, Zhuang HW, Chen CC, Chen LK, Kirby R, Wei YH, Tsai SF, Tsai TF (2012) A persistent level of Cisd2 extends healthy lifespan and delays aging in mice. **Hum Mol Genet** 21: 3956-3968.
34. Cheng YC, Hsiao FC, Yeh EC, Lin WJ, Tang CY, Tseng HC, Wu HT, Liu CK, Chen CC, Chen YT, Yao A (2012) VarioWatch: providing large-scale and comprehensive annotations or variants in the next generation sequencing era. **Nucleic Acids Res** 40: W76-81.
35. Lin CCJ, Chen WN, Chen CJ, Lin YW, Zimmer A, Chen CC* (2012) An antinociceptive role for substance P in acid-induced chronic muscle pain. **Proc Natl Acad Sci USA** 109: E76-E83 (highlighted In This Issue).
36. Chou SY, Cheng CM, Chen CC*, LeDuc PR* (2011) Localized neurite outgrowth sensing via substrates with alternative rigidities. **Soft Matter** 7: 9871-9877.
37. Wu Y, Wang HY, Lin CC, Lu HC, Cheng SJ, Chen CC, Yang HW, and Min MY (2011) GABAB receptor-mediated tonic inhibition of noradrenergic A7 neurons in the rat. **J Neurophysiol** 105(6): 2715-28.
38. Lee CH, Sun SH, Lin SH, and Chen CC* (2011) The role of acid-sensing ion channel 3 in blood volume control. **Circ J** 75: 874-883 (editorial highlight).
39. Cheng SJ, Chen CC, Yang HW, Chang YT, Bai SW, Chen CC, Yen CT, Min MY (2011) Role of extracellular signal-regulated kinase in synaptic transmission and plasticity of a nociceptive input on capsular central amygdaloid neurons in normal and acid-induced muscle pain mice. **J Neurosci** 31: 2258-2270.
40. Cheng CF, Chen IL, Cheng MH, Lian WS, Lin CC, Kuo TBJ, and Chen CC* (2011) Acid-sensing ion channel 3, but not capsaicin receptor TRPV1, plays a protective role in isoproterenol-induced myocardial ischemia in mice. **Circ J** 75: 174-178.
41. Anangi R, Chen CC, Lin YW, Cheng YR, Cheng CH, Chen YC, Chu YP, and Chuang WJ (2010) Expression in *Pichia pastoris* and characterization of APETx2, a specific inhibitor of acid sensing ion channel 3. **Toxicon** 56: 1388-1397.
42. Chen WK, Liu YC, Chang YT, Chen YC, Chen CC, Yen CT, Shin HS, and Chen CC (2010) Cav3.2 T-type calcium channel dependent activation of ERK in paraventricular thalamus modulates acid-induced chronic muscle pain. **J Neurosci** 30: 10360-10368.

43. Wu S, Hsu LA, Chou HH, Teng MS, Chang HH, Yeh KH, Chen CC, Chang PY, Cheng CF, and Ko YL (2010) Association between an ASIC3 gene variant and insulin resistance in Taiwanese. **Clin Chim Acta** 411(15-16): 1132-1136.
44. Wu WL, Lin YW, Min MY, and Chen CC* (2010) Mice lacking Asic3 show reduced anxiety-like behavior on the elevated plus maze and reduced aggression. **Genes Brain Behav** 9: 603-614.
45. Cheng CM, Lin YW, Bellin RM, Steward Jr RL, Cheng YR, LeDuc PR, and Chen CC* (2010) Probing localized neural mechanotransduction through surface-modified elastomeric matrices and electrophysiology. **Nat Protoc** 5(4): 714-724.
46. Wu WL, Wang CH, Huang EYK, and Chen CC* (2009) Asic3(-/-) female mice with hearing deficit affects social development of pups. **PLoS One** 4(8): e6508.
47. Chen CH, Hsu YT, Chen CC, Huang RC (2009) Acid-sensing ion channels in neurons of the rat suprachiasmatic nucleus. **J Physiol** 587: 1727-1737.
48. Lin YW, Cheng CM, LeDuc PR, and Chen CC* (2009) Understanding sensory nerve mechanotransduction through localized elastomeric matrix control. **PLoS One** 4(1): e4293
49. Yen YT, Tu PH, Chen CJ, Lin YW, Hsieh ST, and Chen CC* (2009) Role of acid-sensing ion channel 3 in sub-acute-phase inflammation. **Molecular Pain** 5: 1 (highly accessed).
50. Ko YL, Hsu LA, Wu S, Teng MS, Chang HH, Chen CC, and Cheng CF (2008) Genetic variation in the ASIC3 gene influences blood pressure levels in Taiwanese. **J Hypertens** 26(11): 2154-2160.
51. Tseng TJ, Chen CC, Hsieh YL, and Hsieh ST (2008) Influences of surgical decompression on the dorsal horn after chronic constriction injury: changes in peptidergic and δ -opioid receptors (+) nerve terminals. **Neuroscience** 156: 758-768.
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54. Huang CW, Tzeng JN, Chen YJ, Tsai WF, Chen CC, and Sun WH (2007) Nociceptors of dorsal root ganglion express proton-sensing G protein-coupled receptors. **Mol Cell Neurosci** 36: 195-210.
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56. Tsai ML, Huang JJ, Chen CC, and Chen CC. (2007) External output connector and cable for wire electrode recording in freely moving mouse. **Biomedical Engineering Applications, Basis, and Communications** 19: 1-5.
57. Chen CC, Zimmer AM, Sun WH, Hall JE, Brownstein MJ, and Zimmer A (2002) A role for ASIC3 in the modulation of high-intensity pain stimuli. **Proc Natl Acad Sci USA** 99: 8992-8997.
58. Akopian AN, Chen CC, Ding YN, Cesare P, and Wood JN (2000) A new member of the acid-sensing ion channel family. **Neuroreport** 11: 2217-2222.

59. Chen CC, England S, Akopian AN, and Wood JN (1998) A sensory neuron-specific, proton-gated ion channel. **Proc Natl Acad Sci USA** 95: 10240-10245.
60. King B, Chen CC, Akopian AN, Burnstock G, and Wood JN (1997) A role for calcineurin in the desensitisation of P2X3. **Neuroreport** 8: 1009-1102.
61. Chen CC, Akopian AN, Sivilotti L, Colquhoun D, Burnstock G, and Wood JN (1995) A P2X purinoceptor expressed by a subset of sensory neurons. **Nature** 377: 428-431.

(b) Invited reviews:

1. Chang CT, Jiang BY, Chen CC* (2019) Ion channels involved in substance P-mediated nociception and antinociception. **Int J Mol Sci** 20:1596.
2. Lin JH, Hung CH, Han DS, Chen ST, Lee CH, Sun WZ, Chen CC* (2018) Sensing acidosis: nociception or sngception? **J Biomed Sci** 25:85.
3. Lin JH, Chen CC* (2018) Current challenges in diagnosis of lumbar radiculopathy. **World J Anesthesiol** 7(3): 20-23.
4. Cheng YR, Jiang BY, Chen CC* (2018) Acid-sensing ion channels: dual function proteins for chemo-sensing and mechano-sensing. **J Biomed Sci** 25(1): 46.
5. Sun WH, Chen CC* (2016) Roles of Proton-Sensing Receptors in the Transition from Acute to Chronic Pain. **J Dent Res** 95(2): 135-142.
6. Hung CH, Chen CC* (2015) Current challenges of research into fibromyalgia: from clinical studies to animal models. **Fibrom open** 1: e103.
7. Fong SW, Chen WN, Chen CC* (2015) Is acid painful or not? **Itch & Pain** 2: e721.
8. Lin SH, Sun WH, Chen CC* (2015) Genetic exploration of the roles of acid-sensing ion channels. **Neuropharmacology** 94: 99-118.
9. Lin JH, Chiang YH, Chen CC* (2015) Research strategies for pain in lumbar radiculopathy - focusing on acid-sensing ion channels and their toxins. **Current Topics in Medicinal Chemistry** 15: 617-630.
10. Lin JH, Chiang YH, Chen CC* (2014) Lumbar radiculopathy and its neurobiological basis. **World J Anesthesiol** 3(2): 162-173.
11. Su YS, Sun WH, Chen CC* (2014) Molecular mechanism of inflammatory pain. **World J Anesthesiol** 3(1): 71-81.
12. Chen CC*, Wong CW (2013) Neurosensory mechanotransduction through acid-sensing ion channels. **J Cell Mol Med** 17(3): 337-349.
13. Wu WL, Cheng CF, Sun WH, Wong CW, Chen CC* (2012) Targeting ASIC3 for pain, anxiety, and insulin resistance. **Pharmacol Ther** 134: 127-138.
14. Min MY, Yang HW, Yen CT, Chen CC, Chen CC, Cheng SJ (2011) ERK, synaptic plasticity and acid-induced muscle pain. **Commun Integr Biol** 4(4): 394-396.
15. Krylova O, Chen CC, Akopian A, Souslova V, Okuse K, Abson N, Ravenal S, and Wood JN (1997) Ligand-gated ion channels of sensory neurons: from purines to peppers. **Biochemical Society Transactions** 25(3): 842-844.

(c) Book chapters:

1. Sun WH, Su YS, Chen CC* (2018) The transition from acute to chronic pain. In: Wood JN, (ed) **The Oxford Handbook of the Neurobiology of Pain**.

2. Lee CH, Chen CC* (2018) Roles of ASICs in nociception and proprioception. In: Shyu BC, Tominaga M, (eds) **Adv Exp Med Biol** 1099: 37-47. Springer, Singapore
3. Sun WH, and Chen CC* (2010) ASIC3 and proton-sensing G protein-coupled receptors in nociceptors. In: **Nociceptive and Neuropathic Pain: mechanisms and treatments**, ed. Shyu BC, Research Signpost, pp. 1-20.
4. Chen CC* (2007) ASIC3 and muscle pain. In: **Novel Trends in Brain Sciences**, ed Onozuka M, and Yen CT, Springer Japan, pp. 225-231.
5. Akopian, A.N., Chen, C.-C., Souslova, V., Okuse, K., and Wood, J.N. (2000). Sensory neuron-specific ion channels and receptors. In: **Molecular Basis of Pain Induction**, ed. Wood, J.N., Wiley-Liss Inc., pp.113-128.

(d) Popular Science Articles:

1. Chih-Cheng Chen (2018) 痠痛是怎們一回事？中研院週報：第 1675 期 (2018-09-27).

(e) Correspondence:

1. Chang K, Hung CH, Sun WZ, Wu WT, Lai CL, Han DS*, Chen CC* (2020) Authors' response to the Letter to the Editor on "Clinical consideration in evaluating soreness symptoms of fibromyalgia". **J Formos Med Assoc** 119(4) 889-890

(f) Documentary films:

1. 發現新台灣- 專訪陳志成教授痠覺理論團隊(年代 MUCH 台) 2021-01-03
https://www.youtube.com/embed/MzcC6LQnp_s

(g) Patents:

1. Chih-Cheng Chen, Shyh-Jer Huang, Yi-Wen Lin (2009/10/6~2027/1/29). Treatment of insulin resistance. US Patent 7,598,039
2. Chih-Cheng Chen, Yun-Lian Lin, Jim-Ming Fang, Yijuang Chern, John Chia-Ching Lin, Wei-Nan Chen. (2013/2/11). Method and compositions for treating pain (PCT filed on Feb 11, 2013).
3. Jim-Min Fang, Yijuang Chern, Yun-Lian Lin, Jung-Hsin Lin, Chun-Jung Lin, Nai-Kuei Huang, Hung-Li Wang, Benjamin Pan-Hsien Tu, Chih-Cheng Chen (2014/10/22). Compounds for use in prevention and treatment of neurodegenerative disease and pain. US Patent App. 15/031,711; PCT/US2014061734
4. Chih-Cheng Chen, Jim-Min Fang, Cheng-Han Lee, Jen-Yao Chang. (2017/01/27). Compounds with analgesic effect for use in prevention and treatment of pain. US provision; PCT/US18/15460 filed on Jan 26, 2018.

5. Chih-Cheng Chen, Yu-Chia Chuang. (2018/03/15). Methods and kits for diagnosing peripheral neuropathy. US provision/PCT/Taiwan
6. Chih-Hsien Hung, Chih-Cheng Chen. (2019/07/10) Methods and compositions for treating pain. US provision/PCT/US2041488

11. Invited Speech (since 2013):

(a) Symposium & Conferences

- | | |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 04/17/2021 | The First Taiwan Sng Pain Research Workshop
Title: Sng and Sngception |
| 04/10/2021 | Taiwan Pain Society, Taipei, Taiwan
Title: Molecular neurobiology of sng and pain |
| 01/16/2021 | Taiwan Headache Society, Taipei, Taiwan
Title: A role for ASIC3 in psychosocial stress-induced fibromyalgia-like symptoms |
| 12/05/2020 | Taiwan Neurosurgery Society, Chia-Yi, Taiwan
Title: Sng and pain: a concerto of basic neuroscience and neurosurgery |
| 08/22/2020 | Taiwan Pain Society, Taiwan, Taiwan
Title: Molecular genetic approaches to fibromyalgia-like pain in mouse models |
| 12/5~7, 2019 | 8 th Asian Pain Symposium, Songdo, Korea
Title: ASIC1b, an orphan ASIC subtype predominantly expressed in the somatosensory neurons |
| 11/30/2019 | CGMH Neuroscience Symposium 2019, New Taipei City, Taiwan
Title: Sensing acidosis: nociception or sngception? |
| 07/15/2019 | Taiwan MOST-NIH Bilateral Science and Technology Cooperation Meeting, Bethesda, Maryland, USA
Title: Nociception, proprioception, and sngception |
| 12/28/2018 | 2018 BioGroup Symposium, Taipei, Taiwan
Title: Taiwan Mouse Clinic |
| 11/20/2018 | Symposium on Systems Neuroscience, NTHU, Hinchu, Taiwan
Title: The role of advillin in axon regeneration and neuropathic pain |
| 10/03/2018 | 13 th International Conference of Neurons and Brain Diseases, Taipei, Taiwan
Title: Involvement of actin-binding protein in somatosensory neuron subtype-specific axon regeneration and neuropathic pain. |
| 09/29/2018 | Annual Meeting of Taiwan Neuroscience Society, Tainan, Taiwan
Title: Somatosensory neuron regeneration and neuropathic pain. |
| 09/12/2018 | 29 th Ion channel meeting, Sete, France
Title: Genetic exploration for roles of acid-sensing ion channels in somatosensory system. |
| 08/11/2018 | 2018 Frontiers in Molecular Neuroscience, Kaohsiung, Taiwan |

Title: Is Acid Painful?

10/27/2017 The 7th Asian Pain Symposium, Taipei, Taiwan

Title: The roles of ASICs in nociception and proprioception

09/23/2017 Annual meeting of Taiwan Neuroscience Society, Taipei, Taiwan

Title: Acid-Sensing: from molecules to behaviors

08/27/2017 2017 AMMRA/AMPC meeting, Incheon, Korea

Title: Behavioral phenotyping for pain in mouse models

05/17/2017 2017 Neuroscience symposium, Taipei Medical University, Taiwan

Title: A role for ASIC3 in sensory mechanotransduction in proprioceptors

11/18/2016 Science history saloon, Hualian, Taiwan

Title: A story of sensation: pain and proprioception

09/06/2016 Brain circuits and diseases, Taipei, Taiwan

Title: A role for ASIC3 in sensory mechanotransduction in proprioceptors

08/25/2016 The 7th drug development conference and animal pharmacology operation workshop

Title: Acid-sensing and chronic pain: a new direction for analgesic drug development

05/21/2016 2016 AMMRA/AMPC meeting, Hakone, Japan

Title: Unexpected sensory phenotypes in mice lacking proton-sensing receptors

04/24/2016 Updates in fibromyalgia research – Taiwan fibromyalgia expert meeting, Taipei, Taiwan

Title: Animal models of chronic widespread pain

12/17/2015 The Symposium of Neurodegenerative Diseases and Pain, Taipei, Taiwan

Title: The roles of acid signaling in the transition from acute to chronic pain

11/26/2015 Annual meeting of CSLAS, Taipei, Taiwan

Title: Behavioral phenotyping for mice lacking acid-sensing ion channels

11/13/2015 Discovery and Development of Drugs for Neuro-degenerative Disease & Pain, CKF symposium, Taipei, Taiwan

Title: T1-11, an active ingredient from *Gastrodia elata* for pain treatment

11/10/2015 The 6th Asian Pain Symposium, Suzhou, China

Title: Is acid painful?

12/10/2014 Annual meeting of CSLAS, Taipei, Taiwan

Title: Acid sensing and pain

10/22/2014 Asia Mouse Phenotyping Consortium, Canberra, Australia

Title: Behavioral and neurological phenotyping for the roles of acid-sensing ion channels

08/05/2014 Keynote lecture, International Biophysics Congress, Brisbane, Australia.

Title: Neurosensory mechanotransduction through acid-sensing ion channels

05/18/2014 Taiwan Society of Clinical Neurophysiology, Taipei, Taiwan

Title: Molecular mechanism of acid pain and analgesic drug development

01/09/2014 Indo-Taiwan Neuroscience Symposium. University of Hyderabad, Hyderabad, India

- 11/15/2013 Title: A journey to identify novel analgesic drugs for acid pain
The Hebrew University of Jerusalem, Isarel-Academia Sinica Bilateral Workshop on Nanoscience and Nanotechnology. Academia Sinica, Taipei, Taiwan
- 11/08/2013 Title: Probing localized neural mechanotransduction through surface-modified elastomeric matrices and electrophysiology
The joint symposium for Taiwan-Russian research cooperation. Tunghai University, Taichung, Taiwan
- 09/11/2013 Title: Neurite outgrowth via sensing environmental rigidity
2013 Taiwan-Swiss Biomedical Symposium. Grand Hyatt, Taipei, Taiwan.
- 05/18/2013 Title: An antinociceptive role for substance P in acid-induced chronic muscle pain
Asian Mouse Phenotyping Consortium. RIKEN, Tsukuba Institute, Ibaraki, Japan
- 03/09/2013 Title: Taiwan Mouse Clinic: National comprehensive mouse phenotyping and drug testing center
Annual Scientific Meeting of Taiwan Pain Society. Mackay Memorial hospital, Taipei, Taiwan
- 01/25/2013 Title: An antinociceptive role for substance P in acid-induced chronic muscle pain
NCKU-NPAS joint meeting, Tainan, Taiwan

(b) University & Research Centers

- 03/25/2021 Taipei Medical University, Taipei, Taiwan
Title: Neurobiology and linguistic aspects of sng and pain
- 03/24/2021 National Defense Medical Center, Taipei, Taiwan
Title: Molecular genetic approaches to fibromyalgia-like pain in mouse models
- 03/18/2021 Institute of Neuroscience, National Yang-Ming University, Taipei, Taiwan
Title: Neurobiology and Linguistic Aspect of Sng and Pain
- 04/16/2020 Institute of Physiology, National Yang-Ming University, Taipei, Taiwan
Title: An unexpected role of proprioceptors in acid-sensing
- 12/20/2019 Brain Research Center, National Yang-Ming University, Taipei, Taiwan
Title: Sensing acidosis: nociception or sngception?
- 10/17/2019 Chung Yuan Christian University, Taoyuan City, Taiwan
Title: Molecular biology of pain associated with tissue acidosis
- 05/20/2019 Chang Gung University, New Taipei City, Taiwan
Title: Sng and pain
- 05/05/2019 China Medical University, Taichun, Taiwan
Title: Molecular nociception and molecular sngception
- 02/19/2019 Kyushu University, Fukuoka, Japan
Title: Acid-sensing and chronic pain: a new direction for analgesic drug development

11/05/2018 Neuroscience Monday, National Taiwan University, Taipei, Taiwan
Title: Sng and pain

09/26/2018 National Taiwan University, Taipei, Taiwan
Title: The roles of acid signaling in nociception, pruriception, and proprioception

12/04/2017 National Tsing Hua University, Hsinchu, Taiwan
Title: Acid-sensing: from molecules to behaviors

11/08/2017 National Cheng-Kung University, Tainan, Taiwan
Title: The role of ASICs in nociception and proprioception

08/08/2017 Keelung Chang Gung Memorial Hospital, Keelung, Taiwan
Title: Is acid painful?

07/05/2017 Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan
Title: Acid-sensing: from molecules to behaviors

03/13/2017 Chang Gung University, Taoyuan City, Taiwan
Title: Is acid painful?

03/02/2017 Tzu Chi University, Hualien, Taiwan
Title: Acid sensing: from molecules to behaviors

10/21/2016 National Taiwan Normal University, Taipei, Taiwan
Title: Acid-sensing: from molecules to behaviors

09/09/2016 Taipei Medical University-Shuang Ho Hospital, New Taipei City, Taiwan
Title: The roles of ASIC3 in pain and proprioception

08/03/2016 Taipei Medical University, Taipei, Taiwan
Title: Acid sensing: from molecules to behaviors

05/12/2016 Taipei Municipal Wan-Fang Hospital, Taipei, Taiwan
Title: Is acid painful?

04/26/2016 National Cheng-Kung University, Tainan, Taiwan
Title: How is acid painful?

10/02/2015 National Cheng-Kung University, Tainan, Taiwan
Title: Acid-induced pain and the development of novel analgesics

09/30/2015 Chinese Medical University, Taichung, Taiwan
Title: Roles of Acid-sensing ion channels in pain, anxiety, and social development

08/31/2015 Institute of Biomedical Sciences, Academia Sinica
Title: Scratching the surface: Is acid painful?

06/17/2015 Chung-Shan Medical University, Taichung, Taiwan
Title: Is acid painful?

03/24/2015 National Cheng-Kung University, Tainan, Taiwan
Title: Is acid painful?

03/20/2015 National Yang-Ming University, Taipei, Taiwan
Title: Is acid painful?

02/16/2015 Chinese Medical University, Taichung, Taiwan
Title: The roles of acid signaling in the transition from acute to chronic pain

12/08/2014 National Cheng-Kung University, Tainan, Taiwan
Title: Taiwan Mouse Clinic

10/07/2014 National Yang-Ming University, Taipei, Taiwan
 Title: Mouse models for research into pain and itch

09/30/2014 National Health Research Institute, Chu-Nan, Taiwan
 Title: A journey to identify novel analgesic drugs for chronic acid pain

08/08/2014 Institute of Molecular Bioscience, the University of Queensland, Brisbane, Australia
 Title: Genetic exploration of the roles of acid-sensing ion channels

03/21/2014 Life Science, National Taiwan University, Taipei, Taiwan

10/01/2013 Neurology, Taipei Veteran Hospital, Taipei, Taiwan

09/17/2013 Institute of Brain and Mind, National Taiwan University, Taipei, Taiwan

06/17/2013 Institute of Bioengineering, Taipei Medical University, Taipei, Taiwan

01/10/2013 Institute of Neuroscience, National Yang-Ming University, Taipei, Taiwan

(c) Popular Science Talks:

08/28/2018 中研院科普演講 - 知識饗宴：痠痛是怎麼一回事？漫談痛覺分子生物學與酸的受體分子（中研院、台北市）

08/05/2017 臺大生科系友會科普演講：痠痛不痛？（台灣大學、台北市）

11/22/2016 板橋高中, New Taipei City
 Title: Pain and Proprioception: a story of a gene named ASIC3

10/31/2015 中研院院慶科普演講：痠痛是怎麼回事？（中研院生醫所、台北市）

10/07/2011 展望系列 科普演講：痠痛是怎麼一回事？（台灣大學、台北市）