

CURRICULUM VITAE

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EDUCATION

- 1995-1999 PhD, Division of Anatomy, Cell and Human Biology, GKT School of Biomedical Science, King's College London, U.K.
- 1988-1992 BSc, Department of Agricultural Chemistry, National Taiwan University, Taiwan

PROFESSIONAL EXPERIENCE

- 2019-present **Professor**, Department of Life Sciences & Institute of Genome Sciences, National Yang-Ming University, Taipei, Taiwan
- 2016-2019 **Professor**, Department of Life Sciences, National Central University, Jhongli, Taoyuan City, Taiwan
- 2016-2019 **Joint appointment of Professor**, Department of Biomedical sciences and Engineering, National Central University, Jhongli, Taoyuan City, Taiwan
- 2011-2016 **Associate professor**, Department of Life Sciences, National Central University, Jhongli, Taoyuan City, Taiwan
- 2011-2016 **Joint appointment of Associate professor**, Institute of systems biology and bioinformatics, National Central University, Jhongli, Taoyuan City, Taiwan
- 2007-2011 **Joint appointment of assistant professor**, Institute of systems biology and bioinformatics, National Central University, Jhongli, Taoyuan City, Taiwan
- 2003-2011 **Assistant professor**, Department of Life Sciences, National Central University, Jhongli, Taoyuan City, Taiwan
- 2001-2003 **Postdoctoral fellow**, Laboratory of Genetics, National Institute of Mental Health, National Institutes of Health, U.S.A. (Supervisor: Dr. Michael J. Brownstein)
- 1999-2001 **Postdoctoral fellow**, Laboratory of Molecular Growth Regulation, National Institute of Child Health and Human Development, National Institutes of Health, U.S.A. (Supervisor: Dr. Melvin L. DePamphilis)
- 1997-1998 **Research Associate**, The Randall Institute, King's College London, U.K. (Supervisor: Dr. Robert F. Brooks)
- 1993-1994 **Research Assistant**, Department of Food Science and Nutrition, Iowa State University, U.S.A. (Supervisor: Dr. Patricia Murphy)
- 1992-1993 **Research Assistant**, Department of Pathology, National Taiwan University Hospital, Taiwan (Supervisor: professor Hey-Gi Hsu)

ACADEMIC SERVICES

Editor for *Scientific Reports*, 2018
Editorial board for *International Journal of Animal Anatomy and Physiology (IJAAP)*, 2016
Evaluation of faculty promotion for the National Taiwan University, 2018
Evaluation of faculty promotion for the Chung Yuan University, 2017
Evaluation of faculty promotion for the National Defense Medical College, 2016
Evaluation of faculty promotion for the Tzu-Chi University, 2014
Grant proposal reviewer for the National Science Council/Ministry of Science and Technology, Taiwan 2005-2015
Grant proposal reviewer for the National Agency for Research in France (ANR), 2011, 2012
Institutional Review Board (IRB) for Clinical Research in the Landseed Hospital, 2012-2013
Reviewer for Journals (Neuroscience, Mol pain, Chinese Journal of physiology, glia, JMII, NRR, International J. Genomics, Neuroscience Letter, Molecular Neurobiology, Molecular medicine) 2009-2014
Executive Member of Taiwan Neutron Science Society (TWNSS) 2010
Poster Reviewer for the conference, 2006
Section Chairman for the conference, 2006

MEMBERSHIPS

The Society for Neuroscience (SfN), 2005- present
Neuroscience Society of Taiwan, 2011-present
Taiwan Neutron Science Society (TWNSS), 2009-2013

HONORS AND AWARDS

Silver Medal Award, Taiwan Innotech Expo Invention contest, Taiwan, 2018
Excellent Research Award, National Central University, 2017
Excellent Patent Award, National Central University, 2017
University Outstanding Teaching Award, National central University, 2016
University Outstanding Mentorship Award, National Central University, 2014
College Outstanding Teaching Award, National Central University, Taiwan 2011
Top Research Article Awards, Science College, National Central University, 2010, 2012
Overseas Research Students Awards, King's College London, U.K., 1995-1999
Book Coupon Awards, National Taiwan University, Taiwan, 1990-1991

SPECIALTIES

G-protein coupled receptors, signal transduction, Molecular Nociception, Neuroscience, Molecular Biology, Cell Biology,

LIST OF PUBLICATIONS

Peer-reviewed papers:

1. *Sun WH and Dai SP (2018) Tackling pain associated with rheumatoid arthritis. *Adv Exp Med Biol.* 1099:49-64.

2. Chung YC, Lee CH, **Sun WH**, Chen CC. (2018) Involvement of advillin in somatosensory neuron subtypes-specific axon regeneration and neuropathic pain. *PNAS* 115:E8557-8566.
3. Madda R, Lin SC, ***Sun WH**, ***Huang SL**. (2018) Differential expressions of plasma proteins in systemic lupus erythematosus patients identified by proteomic analysis. *J Microbiol Immunol Infect.* pii:S1684-1182 (103CGH-NCU-A4)
4. Madda R, Lin SC, ***Sun WH**, ***Huang SL**. (2018) Plasma proteomic analysis of systemic lupus erythematosus patients using liquid chromatography/tandem mass spectrometry with label-free quantification. *Peer J* 6: e4730 (MOST 106-2320-B-008-004-MY3)
5. **Sun WH** (2018) Tackling pain associated with rheumatoid arthritis: proton-sensing receptors in Abstracts of the 7th Asian Pain Symposium. *Mol Pain* 14, 24
6. Su YS, Mei HR, Wang CH, ***Sun WH**. (2018) Peripheral 5-HT₃ mediates mirror-image pain by a cross-talk with acid-sensing ion channel 3. *Neuropharmacology* 130: 92-104 (MOST 104-2320-B-008-001, MOST 106-2320-B-008-004-MY3)
7. Su YS, Huang YF, Wong J, Lee CW, Hsieh WS, ***Sun WH**. (2018) G2A as a threshold regulator of inflammatory hyperalgesia modulates chronic hyperalgesia. *J Mol Neurosci.* 64: 39-50 (MOST105-2320-B-008-003)
8. Hsieh WS, Kung CC, Huang SL, Lin SC and ***Sun WH**. (2017) TDAG8, TRPV1, and ASIC3 involved in establishing hyperalgesic priming in experimental rheumatoid arthritis. *Scientific Reports* 7:8870 (MOST104-2745-B-008-001; 103CGH-NCU-A4)
9. Dai SP, Huang YH, Chang CJ, Huang YF, Hsieh WS, Tabata Y, Ishii S, and ***Sun WH**. (2017) TDAG8 involved in initiating inflammatory hyperalgesia and establishing hyperalgesic priming in mice. *Scientific Reports* 7:41415 (MOST103-2321-B-008-001; MOST104-2321-B-008-001)
10. Lin SH, Steinhoff M, Ikoma A, Chang YC, Cheng YR, Chandra Kopparaju R, Ishii S, ***Sun WH**, ***Chen CC**. (2017) Involvement of TRPV1 and TDAG8 in pruriception associated with noxious acidosis. *J Invest Dermatol* 137:170-178 (MOST 104-2320-B-008-001)
11. Su YS, ***Sun, WH**. (2016) Commentary: Serotonin Receptor 2B Mediates Mechanical Hyperalgesia by Regulating Transient Receptor Potential Vanilloid 1. *J Neurol Neuromed* (2016) 1(6): 23-26.
12. Huang YH, Su YS, Chang CJ, and ***Sun, WH**. (2016) Heteromerization of OGR1 and G2A enhances proton sensitivity and proton-induced calcium signals. *J Recept Signal Transduct Res* 36:633-644. (NSC102-2321-B-008-001; MOST 103-2321-B-008-001)
13. Lee CC, Chen CL, Liu FL, Chiou CY, Chen TC, Wu CC, **Sun WH**, Chang DM, and Huang HS. (2016) Development of 1-Amino-4-(phenylamino)anthraquinone-2-sulfonate Sodium Derivatives as a New Class of Inhibitors of RANKL-Induced Osteoclastogenesis Development of 1-Amino-4-(phenylamino)anthraquinone-2-sulfonate Sodium Derivatives as a New Class of Inhibitors of RANKL-Induced Osteoclastogenesis. *Arch. Pharm. Chem. Life Sci.* 349(5):342-55.
14. Su YS, Chiu YY, Lin SY, Chen CC and ***Sun WH**. (2016) Serotonin receptor 2B mediates mechanical hyperalgesia by regulating transient receptor potential vanilloid 1 in isolectin B4-negative neurons. *J Mol Neurosci.* 59:113-125 (NSC992320-B-008-001-MY3, NSC102-2321-B-008-001)
15. Sun WH and Chen CC. (2016) Roles of Proton-Sensing Receptors in the Transition from Acute to Chronic Pain. *J Dent Res* 95: 135-142 (MOST103-2321-B-008-001)
16. Huang WY, Dai SP, Chang YC, ***Sun WH** (2015) Acidosis Mediates the Switching of Gs-PKA and Gi-PKC ϵ Dependence in Prolonged Hyperalgesia Induced by Inflammation. *PLoS One* 10(5): e0125022 (NSC101-2321-B-008-001 and NSC102-2321-B-008-001)
17. Lin SH, **Sun WH**, Chen CC (2014) Genetic exploration of the role of acid-sensing ion channels. *Neuropharmacology* 94:99-118
18. 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(1):40.
19. Su YS, **Sun WH**, Chen CC (2014) Molecular mechanism of inflammatory pain. *World Journal of Anesthesiology* 3:71-81 (NSC 101-2321-B-008-001 equal contribution to the first two authors)

20. Huang YH, Chang CY, Chen CC, Yang CD and ***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 (NSC 101-2321-B-008-001, NCU-LSH-101-A-002 SCI)
21. Wu WL, Cheng CF, **Sun WH**, Wong CW, Chen CC (2012) Targeting ASIC3 for pain, anxiety, and insulin resistance. *Pharmacol & Therapeut* 134, 127-138
22. Lin SY, Chang WJ, Lin CS, Huang CY, Wang HF and ***Sun WH**. (2011) Serotonin receptor 5-HT_{2B} mediates serotonin-induced mechanical hyperalgesia. *J Neurosci*. 31, 1410-1418 (*corresponding authors) (NSC 95-2311-B-008-004 and NSC 99-2320-B-008-001-MY3)
23. Chen, YJ, Huang, CW, Lin, CS, Chang, WH and ***Sun, WH**. (2009) Expression and function of proton-sensing G protein-coupled receptors in inflammatory pain. *Molecular Pain* 5, 39 (*corresponding authors) (NSC 96-2311-B-008-005-MY2) (highly accessed article)
24. 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 (*corresponding authors) (NSC93-2311-B-008-007)
25. Fang YC, ***Sun WH**, Wu LC, Huang HD, Juan HF, and ***Hornig JT**. (2006) RINGdb: An integrated database for G-protein-coupled receptors and regulators of G protein signaling. *BMC genomics* 7: 317 (*corresponding authors) (NSC 92-2321-B-008-001)
26. Chen CC, Zimmer A, **Sun WH**, Hall J, Brownstein MJ, Zimmer A. (2002). A role for ASIC3 in the modulation of high-intensity pain stimuli. *PNAS* 99, 8892-8897.
27. **Sun WH**, and Coleman T, and DePamphilis M. (2002). Cell cycle-dependent regulation of the association between origin recognition proteins and somatic cell chromatin. *EMBO J* 21,1437-1446
28. Brooks RF and **Sun WH** (2001). Meeting abstract. *Cell Prolif.* 34, 162
29. **Sun WH**, Hola, M., Baldwin, N., Pedley, K., and Brooks, R.F. (2001). Heterogeneity in nuclear transport does not affect the timing of DNA synthesis in quiescent mammalian nuclei induced to replicate in *Xenopus* egg extracts. *Cell prolifer.* 34, 55-67
30. Natale D, Li CJ, **Sun WH**, and DePamphilis M. (2000). Selective instability of Orc1 protein accounts for the absence of functional origin recognition complexes during the M to G1 transition in mammals. *EMBO J* 19, 2728-2738
31. **Sun WH**, Hola M, Pedley K, Tada S, Blow JJ, Todorov IT, Kearsey SE, and Brooks RF. (2000). The replication capacity of intact mammalian nuclei in *Xenopus* egg extracts declines with quiescence, but the residual DNA synthesis is independent of *Xenopus* MCM proteins. *Journal of Cell Science* 113, 683-695
32. Longohtetou-Rella H, **Sun WH**, and Brooks RF. (2000). Induction of DNA synthesis or apoptosis in mammalian nuclei by *Xenopus* egg extracts unable to support the replication of sperm chromatin. *Cell Biology International* 24, 129-134

Book Chapters:

1. **Sun WH**, Su YS, Chen CC (2019) The transition from acute to chronic pain. In the *Neurobiology of pain*. Ed by Wood J. Oxford University press DOI: 10.1093/oxfordhb/9780190860509.013.28
2. **Sun, WH** and Chen, CC. (2010) ASIC3 and proton-sensing G protein-coupled receptors. In *Nociceptive and Neuropathic pain: mechanisms and treatments*. Ed. by Shyu B.C. and Chien CC. Research Signpost p33-52. (ISBN: 978-81-308-0368-5) (NSC93-2311-B-008-007)
3. **Sun, W.H.**, and DePamphilis, M. (2004) Methods for detecting cells in S phase. In *Methods Mol Biol* 241, 37-53. Edited by Lieberman, H.B. Humana Press Inc., Totowa, NJ.

Patents:

1. 孫維欣、黃雪莉、黃旭山. 蔥醌[2,1-c][1,2,5]噻二唑-6,11-二酮化合物緩解疼痛的應用. Taiwan patent No: I533869, 2016/5/21-2034/3/10 (NSC 102-2321-B-008-001)
2. 孫維欣、黃雪莉、黃旭山. 萘并[2,3-f]喹啉-7,12-二酮化合物緩解疼痛的應用. Taiwan patent No: I 533871, 2016/5/21-2034/3/10 (NSC 102-2321-B-008-001)
3. **Sun WH**, Huang SL, Huang HS. Indication of naphtho[2,3-f]quinoxaline-7,12-dione compound in alleviating pain. USA patent No: US9284281, 2016/3/15~2034/10/23 (NSC 102-2321-B-008-001)
4. **Sun WH**, Huang SL, Huang HS. Indication of anthra[2,1-c][1,2,5] thiadiazole-6,11-dione compound in alleviating pain. USA patent No: US9192602 B2, 2015/11/24~2034/9/16 (NSC 102-2321-B-008-001)
5. Huang SL, Lin SC, **Sun WH**. Use of tumor necrosis factor (tnf) receptor-associated factor 7 (traf7) as biomarker for systemic lupus erythematosus (sle), method and kit for detecting of human with SLE. Japan patent No:6193806, 2017/8/18-2033/8/18 (103CGH-NCU-A4; 104CGH-NCU-A4)
6. 黃雪莉, 林世昌, 孫維欣 腫瘤壞死因子受體相關因子7作為紅斑性狼瘡的生物標記物之用途、偵測人體患有紅斑性狼瘡的方法以及偵測人體患有紅斑性狼瘡的套組 Taiwan patent No: I 502199, 2015/10/1- 2033/5/22 (103CGH-NCU-A4; 104CGH-NCU-A4)

Conference abstracts:

1. **Sun WH**, Teng CY, Hung TY, Huang YC (2018) ASIC3 deletion shifts ATF3-positive neuron population modulating neuropathic pain. The 11th FENS Forum of Neuroscience in Berlin, Germany (MOST 106-2320-B-008-004-MY3)
2. Lee CW and **Sun WH** (2017) Proton-sensing GPCRs, G2A and OGR1, participate in establishing hyperalgesic priming. The 47th annual meeting of the society for neuroscience in Washington DC, USA (MOST 106-2320-B-008-004-MY3)
3. Su YS, **Sun WH** (2016) 5-HT_{3A} receptor contributes to mirror-image pain induced by co-injection of 5-HT and acid through activation of satellite glial cells. The 16th world congress on pain, Yokohama, Japan (MOST 104-2320-B-008-001)
4. **Sun WH**, Xie WS, Huang YF (2016) Bilateral hyperalgesia induced by subcutaneous or joint inflammation is regulated by proton-sensing receptors. The 10th FENS forum of neuroscience in Copenhagen, Denmark (MOST 104-2320-B-008-001)
5. Lee TY, Kung, CC and **Sun WH** (2014) Changes of DRG neuron population in neuropathic pain. The 44th annual meeting of the society for neuroscience in Washington DC, USA (NSC103-2321-B-008-001)
6. **Sun WH**, Huang YH, Su YS, and Chang CJ. (2014) Heteromerization of G2A and OGR1 alters receptor location and proton-induced signaling pathway. International Biophysics Congress in Brisbane, Australia (NSC102-2321-B-008-001)
7. **Sun WH**, Kung CC, Huang, WY and Lin CY (2013) Proton-sensing G-protein-coupled receptors are involved in neuropathic pain. The 43th annual meeting of the society for neuroscience in San Diego, USA (NSC101-2321-B-008-001)
8. Chang CJ and **Sun WH** (2013) Knockdown of TDAG8 reduces inflammatory pain. The 28th Joint annual Conference of Biomedical Science. Taipei Taiwan (NSC101-2321-B-008-001, Excellent poster awards in Taiwan Society for Biochemistry and Molecular biology)

9. **Sun, WH,** Huang WY, Chang YC Huang YH (2012) Regulation of the transition from acute to chronic pain by Gs-PKA and Gi-PKC ϵ pathways. The 42th annual meeting for neuroscience in New Orleans, USA (NSC 99-2320-B-008-001-MY3 and NSC101-2321-B-008-001)
10. Yu-Shyuan Su, Lin SY and **Sun WH.** (2012) 5-HT_{2B} mediating mechanical hyperalgesia by regulating calcium signals in IB4-negative neurons. The 14th world congress on pain by the International Association for the Study of Pain. Milan, Italy (NSC 99-2320-B-008-001-MY3)
11. Yu-Shyuan Su, Chia-Wei Huang, and **Sun, WH.** (2011) Heteromerization of OGR1 and G2A enhance proton signaling. The 8th IBRO World Congress of Neuroscience Florence, Italy (NSC 99-2320-B-008-001-MY3)
12. Chang YC and **Sun, WH.** (2011) TDAG8-mediated TRPV1 sensitization is through two distinct G-protein pathways. The 8th IBRO World Congress of Neuroscience Florence, Italy (NSC 99-2320-B-008-001-MY3)
13. Huang, CW, Ying-Ju Chen, Chih-Shin Lin, Wen-Han Chang and **Sun WH.** (2009) Expression and function of proton-sensing G-protein-coupled receptors in inflammatory pain. The 39th annual meeting for neuroscience in 2009. (NSC 96-2311-B-008-005-MY2)
14. Huang, CW and **Sun WH.** (2008) Cell signaling by proton-sensing G protein-coupled receptors. The 38th annual meeting for neuroscience in Washington DC, USA. (NSC94-2311-B-008-007)
15. 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. The 37th annual meeting for neuroscience in San Diego, CA, USA. (NSC93-2311-B-008-007)
16. **Sun, W.H.,** Chen, C.C., Xiang, C. and Brownstein, M.J. (2005) Analysis of G-protein coupled receptor signaling in dorsal root ganglion. The 35th annual meeting for neuroscience in Washington DC, USA.

RESEARCH SUPPORT

1. **“Mechanisms of TDAG8 and ASIC3 in neuropathic pain”**
PI: Wei-Hsin Sun, PhD; Agent: the Ministry of Science and Technology (MOST 106-2320-B-008-004-MY3); Period: 2017/8/1-2020/7/31; NTD\$5,195,000
2. **“Drug development of chronic pain”**
PI: Wei-Hsin Sun, PhD; Agent: Chungwa Chemical Synthesis & Biotech, Taiwan (CCSB); Period: 2017/4/1-2018/12/31; NTD\$4,811,761
3. **“Identification of novel small molecules targeting inflammation and pain using rheumatoid arthritis animal model (III)”**
Co-PI: Wei-Hsin Sun, PhD; Agent: Taipei Veterans General Hospital-University System Taiwan (VGHUST106-G1-3-3); Type: PPG; Period: 2017/1/1-2017/12/31
4. **“Mechanisms of proton-sensing receptors in neuropathic pain”**
PI: Wei-Hsin Sun, PhD; Agent: the Ministry of Science and Technology (MOST 105-2320-B-008-003); Period: 2016/8/1-2017/7/31
5. **“Identification of novel small molecules targeting inflammation and pain using rheumatoid arthritis animal model (II)”**
Co-PI: Wei-Hsin Sun, PhD; Agent: Taipei Veterans General Hospital-University System Taiwan (VGHUST105-G1-3-3); Type: PPG; Period: 2016/1/1-2016/12/31
6. **“Chronic pain in rheumatoid arthritis”**
PI: Wei-Hsin Sun, PhD; Agent: the Ministry of Science and Technology (MOST 104-2745-B-008-001); Period: 2015/10/1-2016/9/31
7. **“The modulation of 5-HT signaling in mirror-image pain induced by inflammation”**
PI: Wei-Hsin Sun, PhD; Agent: the Ministry of Science and Technology MOST 104-2320-B-008-001); Period: 2015/8/1-2016/7/31
8. **“Identification of novel small molecules targeting inflammation and pain using rheumatoid**

arthritis animal model (I)”

Co-PI: Wei-Hsin Sun, PhD; Agent: Taipei Veterans General Hospital-University System Taiwan (VGHUST104-G1-3-3); Type: PPG; Period: 2015/1/1-2015/12/31

9. “Gene expression and proteomic analysis for autoimmune diseases”

Co-PI: Wei-Hsin Sun, PhD; Agent: Cathy General Hospital-National Central University (103CGH-NCU-A4; 104CGH-NCU-A4; 105CGH-NCU-A4); Type: PPG; Period: 2014/1/1-2016/12/31

10. “The molecular mechanism of proton-sensing G-protein-coupled receptor-mediated modulation in inflammatory pain”

PI: Wei-Hsin Sun, PhD; Agent: National Science Council (NSC 101-2321-B-008-001; NSC 102-2321-B-008-001; NSC 103-2321-B-008-001); Period: 2012/8/1-2015/7/31

11. “Biomarkers and pathogenesis of autoimmune diseases”

Co-PI: Wei-Hsin Sun, PhD; Agent: Cathy General Hospital-National Central University (101CGH-NCU-A3); Type: PPG; Period: 2012/1/1-2013/12/31

12. “Analgesic mechanisms of pulsed radiofrequency treatment on chronic low-back pain”

PI: Wei-Hsin Sun, PhD; Agent: NCU-LSH (NCU-LSH-101-A-002); Period: 2012/1/1-2012/12/31

13. “The roles of serotonin receptor 2B in pain”

PI: Wei-Hsin Sun, PhD; Agent: National Science Council (NSC 99-2320-B-008-001-MY3) Period: 2010/8/1-2013/7/31

14. “Application of Neutron scattering in biological materials”

Co-PI: Wei-Hsin Sun, PhD; Agent: National Central University (NCU); Type: PPG; Period: 2007/1/1-2007/12/31

15. “Molecular mechanisms of short-term, long-term, and neurogenic inflammatory pain”

PI: Wei-Hsin Sun, PhD; Agent: National Science Council (NSC 96-2311-B-008-005-MY2); Period: 2007/8/1-2009/7/31

16. “Genomics analysis in G-protein signaling pathway under oxidative stress and neuroinflammatory process”

Co-PI: Wei-Hsin Sun, PhD; Agent: National Central University; Type: PPG; Period: 2006/1/1-2006/12/31

17. “The roles of proton-sensing G-protein coupled receptors in inflammatory pain”

PI: Wei-Hsin Sun, PhD; Agent: National Science Council (NSC94-2311-B-008-007); Period: 2005/8/1-2007/7/31

18. “The signaling pathway of proton-sensing G-protein coupled receptors in neurons”

PI: Wei-Hsin Sun, PhD; Agent: National Science Council (NSC93-2311-B-008-007); Period: 2004/8/1-2005/7/31

19. “Functional mapping of G-protein coupled receptors in mouse brain: implication for neurodegenerative diseases”

Co-PI: Wei-Hsin Sun, PhD; Agent: University System Taiwan/ Brain Research Center; Type: PPG; Period: 2004/9/1-2005/12/31

20. “The roles of proton-sensing G-protein coupled receptors in acidosis-induced nociception”

PI: Wei-Hsin Sun, PhD; Agent: National Science Council (NSC 92-2321-B-008-001); Period: 2003/12/1-2004/7/31

Autobiography

I had received the B.S. degree from the Department of Agricultural Chemistry of the National Taiwan University, Taiwan in 1992 and the PhD degree in Molecular Biology at the King's College London, UK in 1999. After that, I had done my postdoc training in the National Institutes of Health in USA from 1999 to 2003. During my PhD study and postdoc training, my research was focused on the cell cycle control regarding the establishment of pre-replicative complex of DNA replication. The results were published in *J. Cell Sci.* and *EMBO J.*

I joined the National Central University as an assistant professor in 2003 and moved to the National Yang-Ming University in 2019 as a professor. I focused on the molecular mechanisms of chronic pain, especially for the roles of GPCRs. I have cloned more than 100 GPCRs and performed the microarray analysis looking for novel receptors involved in pain and as potential targets for pain killers. Since 2003, I have published 22 papers and obtained 6 patents. 15 SCI papers was published in the past 5 years and listed as the first or corresponding author in 12 of these. My team had first discovered that proton-sensing GPCRs are involved in pain-related neurons and play important roles in chronic pain. We discovered that one of proton-sensing GPCRs, TDAG8, is important in pain and itch, which is published in *Scientific Reports* and *J Investigative Dermatology*, respectively. We also discovered serotonin receptors, 5-HT_{2B} is involved in 5-HT-induced hyperalgesia and 5-HT₃ is involved in mirror-image pain, which was published in *Journal of Neuroscience* and *Neuropharmacology*, respectively. In the meantime, I was successful in awarding research grants from MOST and other funding agencies. I not only led a team and served as a principal investigator for the integrated program project, but also collaborated with the company for development of analgesic drugs.

Research Interests

Chronic pain, when not effectively treated and relieved, may have a harmful effect on all aspects of health-related quality of life. Although opioids and cannabinoids are well-known analgesic drugs of choice for the treatment of pain, their utility is often limited by unacceptable side effects due to actions at identical receptors outside of the pain pathway. Therefore, one of the major challenges in pain research is to identify potent drug targets with no side effects. G-protein-coupled receptors (GPCRs) that represent a major class of signal transduction play important roles in modulation of acute and chronic pain, which has highlighted their potential as pain targets. **My long-term goal** is to understand the molecular mechanisms of chronic pain, and apply this knowledge to develop effective and selective analgesics in relieving a wide variety of persistent pain conditions. Current research focuses on several areas: (1) *Roles of proton-sensing G-protein-coupled receptors in chronic pain*; (2) *Roles of 5-HT receptors in inflammatory pain and mirror-image pain*; (3) *Screening of novel small molecule compounds as potential drug candidates*. I have used disease models, gene knockout or knockdown mice, pain behavioral tests, pharmacological assays, calcium imaging techniques to study mechanism of chronic pain. I have found that (1) proton-sensing receptors mediate inflammatory hyperalgesia and hyperalgesic priming; (2) 5-HT receptors mediate inflammatory hyperalgesia and mirror-image pain. (3) Novel small molecule compounds relieve acute and chronic pain.