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Behavioral and Brain Sciences
The University of Texas at Dallas
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Chronology of Education:

1993-1997 Bachelors of Science
University of Texas at Dallas
Mentor: Alice J. O'Toole, Ph.D.
Field of Study: Neuroscience

1997-2003 Doctor of Philosophy
University of Texas Health Science Center at San Antonio
Mentor: Christopher M. Flores, Ph.D.
Field of Study: Pharmacology

2003-2004 Postdoctoral Fellow
University of Texas Health Science Center at San Antonio
Mentor: Kenneth M. Hargreaves, D.D.S., Ph.D.
Field of Study: Pharmacology

2004-2007 Postdoctoral Fellow
McGill University
Mentor: Fernando Cervero, M.D., Ph.D., D.Sc.
Field of Study: Anesthesiology

Doctoral Dissertation: The Neuronal Localization and Neuromodulatory Function of Cannabinoid-Responsive Receptors in the Trigeminal
Advisor: Christopher M. Flores, Ph.D. Associate Professor of Pharmacology

Chronology of Employment

2007 – 2012 Assistant Professor
Department of Pharmacology
College of Medicine
University of Arizona

2012 – 2014 Associate Professor
Department of Pharmacology
College of Medicine
University of Arizona

2014 – present Associate Professor
School of Behavior and Brain Sciences
University of Texas at Dallas

Honors and Awards

- College Honors List (University of Texas at Dallas), 1994 Spring, 1996 Spring and Fall.
- Nortel Scholar (University of Texas at Dallas), 1995
- Runner-up Alamo Chapter for Neuroscience poster contest, 1999
- Committee for Graduate Studies UTHSCSA Student Representative, 2002-2003
- Cover Art for *Neuroscience* Vol 120(1), 2003
- McGill Pain Day Organizing Committee, 2006-2007
- Vice President, Quebec Network of Junior Pain Investigators, 2006-2007
- American Pain Society Future Leaders in Pain Research, 2006-2007
- AAAS/Science Program for Excellence in Science Award Recipient, 2007
- First Prize, McGill Anesthesia Research Day, 2007
- American Pain Society Nominating Committee (elected position), 2008-2009
- American Pain Society Basic Science SIG Co-Chair (elected position), 2009-2011
- American Pain Society John C. Liebeskind Early Career Scholar Award, 2011
- Louis J Kettel Faculty Mentor Award from Department of Surgery, 2011
- University of Texas at Dallas Buhrmester Rising Star Award, 2012
- Vernon and Virginia Furrow Award for Graduate Education, University of Arizona, 2012
- Patrick D. Wall Young Investigator Award, International Association for the Study of Pain 2014
- Member, Somatosensory and Chemosensory Study Section: 2015 - 2021

Service Outreach

National / International

- Member, Society for Neuroscience
- Member, American Pain Society
- Member, International Association for the Study of Pain
- Founding Member, Quebec Network of Junior Pain Investigators
- Contributing Editor: *European Journal of Neuroscience*, 2008-present
- Associate Editor: *Pain*, 2008-present
- IASP small grants review panel, 2008
- Wellcome Trust Review Panel, 2009
- NIH / NIDA CEBRA study section ad hoc reviewer November 2009
- NIH / NIAAA study section ad hoc reviewer April 2010
- The Louise and Allen Edwards Foundation (Montreal) grant reviewer, 2010 - present
- American Pain Society 2011 (Austin, TX) Conference Planning Committee
- American Pain Society Public Policy Committee, 2010 - present
- NIH / NIDCR SEP for RFA-DE-11-001, October 2010
- NIH / NCCAM Centers for Excellence in Pain Research Program Project, November 2010
- NIH / NIDA CEBRA study section reviewer March 2012
- NIH / NIDCR SEP March 2012
- NIH SCS Study Section Oct 2012, Jan 2014, June 2014
- NIH/NIDA CEBRA reviewer January 2013, Jan 2014, October 2014
- NIH SEP June 2013
- Academic Editor, *PLoS One*: 2012-2017
- Editorial Board, *Molecular Pain*: 2012-present
- Pharmacology Section Editor, *European Journal of Pain*: 2013-present
- Chair of IASP Futures Task Force: 2013

- Member Organizing Committee IASP Buenas Aires 2014 Congress
- Co-chair APS Organizing Committee, Tampa 2014 Congress
- IASP Steering Committee for Strategic Plan: 2014
- Chair APS Organizing Committee, Palm Springs 2015 Congress
- IASP Committee for launch of new open access journal: Pain Reports 2015
- IASP Governance Committee 2015
- Co-chair, National Pain Strategy Transition to Chronic Pain Working Group: 2016 - 2017
- American Pain Society Board of Directors: Elected 2016
- Associate Editor, Journal of Neuroscience, 2017 - present

Publications / Creative Activity

(H-index = 35)

1. **Price TJ**, O'Toole AJ, Dambach KC. (1998) A moving cast shadow diminishes the Pulfrich phenomenon. *Perception*, 27(5): 591-3.
2. O'Toole AJ, **Price TJ**, Vetter T, Bartlett JC, Blanz V. (1999) 3D shape and 2D surface textures of human faces: the role of "averages" in attractiveness and age. *Image And Vision Computing*, 18 (1): 9-19.
3. **Price TJ**, Helesic G, Parghi D, Hargreaves KM, Flores CM. (2003) Cannabinoid receptor type one (CB1) expression and distribution in the trigeminal ganglion of the rat. *Neuroscience*, 120(1): 155-62.
4. Dussor GO, Leong AS, Gracia NB, Kilo S, **Price TJ**, Hargreaves KM, Flores CM. (2003) Potentiation of Evoked CGRP Release from Oral Mucosa: A Potential Basis for the Pro-Inflammatory Effects of Nicotine. *European Journal of Neuroscience*, 18(9) 2515-26.
5. Dussor GO, **Price TJ**, Flores CM. (2003) Activating transcription factor 3 (ATF3) mRNA is up-regulated in primary cultures of trigeminal ganglion neurons. *Molecular Brain Research*, 118(1-2) 156-9.
6. **Price TJ**, Patwardhan A, Akopian A, Hargreaves KM, Flores CM. (2004) Modulation of trigeminal sensory neuron activity by the dual cannabinoid-vanilloid agonists anandamide (AEA), N-arachidonoyl-dopamine (NADA) and arachidonyl-2-chloroethylamide (ACEA). *British Journal of Pharmacology* 141(7) 1118-30.
7. **Price TJ**, Patwardhan A, Akopian A, Hargreaves KM, Flores CM. (2004) Cannabinoid receptor-independent actions of the aminoalkylindole cannabinoid WIN 55,212-2 on trigeminal sensory neurons. *British Journal of Pharmacology*. 142 (2) 257-66.
8. **Price TJ**, Louria MD, Candelario-Soto D, Dussor GO, Jeske NA, Patwardhan AM, Diogenes A, Trott A, Hargreaves KM, Flores CM. (2005) Treatment of trigeminal ganglion neurons in vitro with NGF, GDNF and BDNF: effects on neuronal survival, neurochemical properties and TRPV1-mediated neuropeptide secretion. *BMC Neuroscience* 6(1): 4.
9. **Price TJ**, Patwardhan AM, Flores CM, Hargreaves KM (2005). A role for the anandamide membrane transporter in TRPV1-mediated neurosecretion from trigeminal nociceptors. *Neuropharmacology* 49(1) 25-39.
10. **Price TJ**, Cervero F, DeKonick Y (2005) Role of cation-chloride cotransporters in pain and hyperalgesia. *Current Topics in Medicinal Chemistry*. 5(6) 547-555.
11. **Price TJ**, Jeske NA, Flores CM, Hargreaves KM (2005) Pharmacological interactions between calcium/calmodulin-dependent kinase II α and TRPV1 receptors in rat trigeminal sensory neurons. *Neuroscience Letters*. 389(2) 94-8.

12. **Price TJ**, Flores CM, Cervero F, Hargreaves KM (2006). The RNA binding and transport proteins staufen and fragile x mental retardation protein are expressed by rat primary afferent neurons and localize to peripheral and central axons. *Neuroscience*. 141(4) 2107-2116.
13. Patwardhan AM, Jeske NA, **Price TJ**, Akopian AN, Hargreaves KM (2006) The cannabinoid WIN 55,212 inhibits transient receptor potential vanilloid 1 (TRPV1) and evokes peripheral antihyperalgesia via calcineurin. *Proceedings of the National Academy of Sciences (USA)*. 103(30) 11393-8.
14. **Price TJ**, Hargreaves KM, Cervero F (2006) Protein expression and mRNA cellular distribution of the NKCC1 cotransporter in the dorsal root and trigeminal ganglia of the rat. *Brain Research*. 1112(1) 146-158.
15. Jeske NA, Patwardhan AM, Gamper N, **Price TJ**, Akopian AN, Hargreaves KM. (2006) Cannabinoid WIN 55,212-2 regulated TRPV1 phosphorylation in sensory neurons. *Journal of Biological Chemistry*. 281(43) 32879-32890.
16. **Price TJ**, Flores CM (2006) Critical evaluation of colocalization of putative nociceptive markers in primary sensory ganglia: differences between the dorsal root (DRG) and trigeminal (TG) ganglia. *Journal of Pain*. 8(3) 263-72.
17. Pitcher MH, **Price TJ**, Entrena JM, Cervero F. (2007) Spinal NKCC1 blockade inhibits TRPV1-dependent referred allodynia. *Molecular Pain*. 3(17).
18. **Price TJ**, Rashid M, Millicamps M, Sanoja R, Entrena JM, Cervero F. (2007) Decreased nociceptive sensitization in mice lacking the fragile X mental retardation protein: role of mGluR1/5 and mTOR. *Journal of Neuroscience*. 27(51) 13958-67.
19. **Price TJ**, Cervero F, Gold MS, Hammond DL, Prescott SA. (2009) Chloride regulation in the pain pathway. *Brain Research Reviews*. 60(1) 149-70.
20. Walczak JS, **Price TJ**, Cervero F. (2009) Cannabinoid CB1 receptors are expressed in the mouse urinary bladder and their activation modulates afferent bladder activity. *Neuroscience*. 159(3) 1154-63.
21. **Price TJ**, Geranton SM. (2009) Translating nociceptor sensitivity: the role of axonal protein synthesis in nociceptor physiology. *European Journal of Neuroscience*. 29(12) 2253-2263.
22. Porreca F and **Price TJ**. (2009) When Pain Lingers. *Scientific American Mind*. 20, 34-41.
23. Sanoja R, Tortorici V, Fernandez C, **Price TJ**, Cervero F. (2010) Role of RVM neurons in capsaicin-evoked visceral nociception and referred hyperalgesia. *European Journal of Pain*. 14(2) 120e1-9.
24. Asiedu MN, Ossipov M, Kaila K, **Price TJ**. (2010) Acetazolamide and Midazolam act synergistically to inhibit neuropathic allodynia. *Pain*. 148(2) 302-208.
25. Vardanyan M, Melemedjian OK, **Price TJ**, Ossipov MH, Lai J, Roberts E, Boos TL, Deschamps JR, Jacobson AE, Rice KC, Porreca F. (2010) Reversal of pancreatitis-induced pain by an orally available, small molecule interleukin-6 receptor antagonist. *Pain*. 151(2) 257-265.
26. Melemedjian OK, Asiedu MN, Tillu DV, Peebles K, Yan J, Ertz N, Dussor G, **Price TJ**. (2010) IL-6- and NGF-induced rapid control of protein synthesis and nociceptive plasticity via convergent signaling to the eIF4F complex. *Journal of Neuroscience*. 30(45) 15113-23.
27. Boitano S, Flynn AN, Schulz SM, Hoffman J, **Price TJ**, Vagner J. (2011) Potent agonists of the Protease Activated Receptor 2 (PAR₂). *Journal of Medicinal Chemistry*. 10; 54(5) 1308-13.
28. Asiedu MN, Tillu DV, Melemedjian OK, Shy A, Bodell B, Sanoja R, Ghosh S, Porreca F, **Price TJ**. (2011) Spinal PKM ζ underlies the maintenance mechanism of persistent nociceptive sensitization. *Journal of Neuroscience*. 31(18) 6646-53. *Featured article*

29. Flynn AN, Tillu DT, Asiedu MN, Hoffman J, Vagner J, **Price TJ**, Boitano S. (2011) The protease-activated receptor-2 specific agonists, 2-aminothiazol-4-yl-LIGRL and 6-aminonicotinyl-LIGRL stimulate multiple signaling pathways to induce physiological responses in vitro and in vivo. *Journal of Biological Chemistry*. 286(21) 19076-88.
30. De Felice M, Sanoja R, Wang R, Vera-Portocarrero L, Oyarzo J, King T, Ossipov M, Vanderah TW, Lai J, Dussor G, Fields HL, **Price TJ**[#], Porreca F[#]. (2011) Engagement of descending inhibition from the rostral ventromedial medulla protects against chronic neuropathic pain. *Pain*. 152(12) 2701-9. [#]co-corresponding authors
31. Melemedjian OK, Asiedu MN, Tillu DV, Sanoja R, Yan, J, Lark A, Khoutorsky A, Johnson J, Peebles KA, Lepow T, Sonenberg N, Dussor G, **Price TJ**. (2011) Targeting adenosine monophosphate-activated protein kinase (AMPK) in preclinical models reveals a potential mechanism for the treatment of neuropathic pain. *Molecular Pain*. 7:70.
32. Peebles KA, **Price TJ**. (2012) Self-injurious behavior in intellectual disability syndromes: evidence for aberrant pain signaling as a contributing factor. *Journal of Intellectual Disability Research*. 56(5) 441-52.
33. Melemedjian OK, **Price TJ**. (2012) Dendritic spine plasticity as an underlying mechanism of neuropathic pain. *Experimental Neurology*. 233(2) 740-4.
34. Tillu DV, Melemedjian OK, Asiedu MN, Qu N, De Felice M Dussor G, **Price TJ**. (2012) Resveratrol engages AMPK to attenuate ERK and mTOR signaling in sensory neurons and inhibits incision-induced acute and chronic pain. *Molecular Pain*. 8:5.
35. **Price TJ** and Melemedjian OK, Fragile X Mental Retardation Protein (FMRP) and the Spinal Sensory System. In: Modeling the Fragile X Syndrome; Results and Problems in Cell Differentiation. Robert Denman, editor. Springer-Verlag Books. 2012.
36. Bowden K, Woulllet A, Patwardhan A, **Price TJ**, Lawall J, Annabi J, Barker S, Annabi E. (2012) Transforaminal blood patch for the treatment of chronic headache from intracranial hypotension: a case report and review. *Anesthesiology Research and Practice*. 2012:923904.
37. Stidd DA, Wuollet AL, Bowden K, **Price TJ**, Patwardhan A, Barker S, Weinand ME, Annabi J, Annabi E (2012) Peripheral nerve stimulation for trigeminal neuropathic pain. *Pain Physician*. 15(1) 27-33.
38. Yan J, Melemedjian OK, **Price TJ**, Dussor G. (2012) Sensitization of dural afferents underlies migraine-related behavior following meningeal application of interleukin-6 (IL-6). *Molecular Pain*. 8:6.
39. King T, Qu C, Okun A, Melemedjian OK, Mandell E, Maskaykina I, Navratilova E, Dussor G, Ghosh S, **Price TJ**[#], Porreca F[#]. (2012) Contribution of PKM ζ dependent and independent amplification to components of experimental neuropathic pain. *Pain*. 153(6) 1263-73 [#]co-corresponding authors
40. Asiedu MN, Mejia G, Ossipov MK, Malan TP, Kaila K, **Price TJ**. (2012) Modulation of spinal GABAergic analgesia by inhibition of chloride extrusion capacity in mice. *Journal of Pain*. 13(6) 546-54.
41. Patwardhan A, Edelmayer R, Annabi E, **Price TJ**, Malan P, Dussor G. (2012) Receptor specificity defines algogenic properties of propofol and fospropofol. *Anesthesia and Analgesia*. 115(4) 837-840.
42. Hoffman J, Flynn A, Tillu DV, Zhang Z, Patek R, **Price TJ**, Vagner J, Boitano S. (2012) Lanthanide labeling of a potent protease activated receptor-2 agonist for time resolved fluorescence analysis. *Bioconjugate Chemistry*. 23(10) 2098-2104.

43. Flynn AN, Hoffman J, Tillu DV, Sherwood CL, Zhang Z, Patek R, Asiedu MN, Vagner J, **Price TJ**, Boitano S. (2013) Development of highly potent protease-activated receptor 2 agonists via synthetic lipid tethering. *FASEB Journal*. 27(4): 1498-510.
44. **Price TJ** and Ghosh S. (2013) ZIPping to pain relief: the role (or not) of PKMzeta in chronic pain. *Molecular Pain*. 22; 9(1): 6.
45. Melemedjian OK, Khoutorsky A, Sorge RE, Yan J, Asiedu MN, Valdez A, Ghosh S, Dussor G, Mogil JS, Sonenberg N, **Price TJ**. (2013) mTORC1 inhibition induces pain via IRS1-dependent feedback activation of ERK. *Pain*. 154(7): 1080-91.
46. Melemedjian OK, Tillu DV, Asiedu MN, Mandell EK, Moy JK, Blute VM, Taylor CJ, Ghosh S, **Price TJ**. (2013) BDNF regulates atypical PKC at spinal synapses to initiate and maintain a centralized chronic pain state. *Molecular Pain*. 9(1): 12.
47. Melemedjian OK, Yassine H, Shy A, **Price TJ**. (2013) Proteomic and functional annotation analysis of injured peripheral nerves reveals ApoE as a protein upregulated by injury that is modulated by metformin treatment. *Molecular Pain*. 9(1): 14.
48. **Price TJ**, Dussor G (2013) AMPK: An emerging target for modification of injury-induced pain plasticity. *Neuroscience Letters*. S0304-3940(13) 607-1.
49. Gao Y, Romero-Aleshire MJ, Cai Q, **Price TJ**, Brooks HL. (2013) Rapamycin inhibition of mTORC1 reverses lithium-induced proliferation of renal collecting duct cells. *American Journal of Physiology Renal Physiology*. 305(8) F1201-8.
50. Parker SS, Mandell EK, Hapak SM, Maskaykina IY, Kusne Y, Kim JY, Moy JK, St John P, Wilson JM, Gothard KM, **Price TJ**[#], Ghosh S[#]. (2013) Competing molecular interactions of aPKC isoforms regulate neuronal polarity. *PNAS*. 110(35) 14450-5. [#] co-corresponding authors.
51. Taylor A, Westveld A, Szkudlinska M, Guruguri P, Annabi E, Patwardhan A, **Price TJ**[#], Yassine H[#]. (2013) The use of metformin is associated with decreased lumbar radiculopathy pain. *Journal of Pain Research*. Dec 9 (6) 755-63. [#] co-corresponding authors.
52. Melemedjian OK[#], Mejia GL, Lepow TS, Zoph OK, **Price TJ**[#]. (2014) Bidirectional regulation of P body formation mediated by eIF4F complex formation in sensory neurons. *Neuroscience Letters*. 563 169-174. [#] co-corresponding authors
53. Asiedu MN, Mejia GL, Hubner CA, Kaila K, **Price TJ**. (2014) Inhibition of carbonic anhydrase augments GABA_A receptor-mediated analgesia via a spinal mechanism of action. *Journal of Pain*. S1526-5900(14) 00019-4.
54. Boitano S[#], Hoffman J, Tillu DV, Asiedu MN, Zhang Z, Sherwood CL, Wang Y, Dong X, **Price TJ**[#], Vagner J[#]. (2014) Development and evaluation of small peptidomimetic ligands to protease-activated receptor-2 (PAR₂) through the use of lipid tethering. *PLoS ONE*. 9(6) e99140. [#] co-corresponding authors
55. **Price TJ**, Dussor G. (2014) Evolution: the advantage of 'maladaptive' pain plasticity. *Current Biology*. 24(10) R384-6.
56. Kusne Y, Goldberg EL, Parker SS, Hapak SM, Maskaykina IY, Chew WM, Limesand KH, Brooks HL, **Price TJ**, Nikolich-Zugich J, Ghosh S. (2014) Contrasting effects of chronic, systemic treatment with mTOR inhibitors rapamycin and metformin on adult neural progenitors in mice. *Age*. 36(1) 199-212.
57. Mao-Ying QL, Kavelaars A, Krukowski K, Zhuo W, **Price TJ**, Cleeland C, Heijnen CJ. (2014) The antidiabetic drug metformin protects against chemotherapy-induced peripheral neuropathy in a mouse model. *PLoS One*. 9(6) e100701.

58. Melemedjian OK, Tillu DV, Moy JK, Asiedu MN, Mandell EK, Ghosh S, Dussor G, **Price TJ**. (2014) Local translation and retrograde axonal transport of CREB regulates IL-6-induced nociceptive plasticity. *Molecular Pain*. 10:45.
59. Kaila K, **Price TJ**, Payne JA, Puskarjov M, Voipio J. (2014) Cation-chloride cotransporters in neuronal development, plasticity and disease. *Nature Reviews Neuroscience*. 15(10) 637-54.
60. Sherwood CL, Daines MO, **Price TJ**, Vagner J, Boitano S. (2014) A highly potent agonist to protease-activated receptor-2 (PAR₂) reveals apical activation of the airway epithelium resulting in Ca²⁺-regulated ion conductance. *American Journal of Physiology: Cell Physiology*. 307(8) 718-26
61. Gereau RW, Sluka KA, Maixner W, Savage SR, **Price TJ**, Murinson BB, Sullivan MD, Fillingim RB. (2014) A pain research agenda for the 21st century. *Journal of Pain*. 15(12) 1203-14.
62. Gkogkas CG, Khoutorsky A, Cao R, Jafarnejad SM, Prager-Khoutorsky M, Giannakas N, Kaminari A, Fragkouli A, Nader K, **Price TJ**, Konicek BW, Graff JR, Tzinia AK, Lacaille JC, Sonenberg N. (2014) Pharmacogenetic inhibition of eIF4E-dependent MMP9 mRNA translation reverses fragile X syndrome-like phenotypes. *Cell Reports*. S2211-1247(14) 00933-4.
63. Wei X, Yan K, Tillu DV, Asiedu MN, Weinstein N, Melemedjian OK, **Price TJ**, Dussor G (2015) Meningeal norepinephrine produces headache behaviors in rats via actions both on dural afferents and fibroblasts. *Cephalalgia*. 35(12) 1054-64.
64. **Price TJ**, Prescott SA (2015) Inhibitory regulation of the pain gate and how its failure causes pathological pain. *Pain*. 156(5) 789-92.
65. Tillu DV, Hassler SN, Burgos-Vega C, Quinn TL, Sorge RE, Dussor G, Boitano S, Vagner J, **Price TJ** (2015) Protease activated receptor 2 (PAR₂) activation is sufficient to induce the transition to a chronic pain state. *Pain*. 156(5) 859-67.
66. **Price TJ**, Inyang KE (2015) Commonalities between pain and memory mechanisms and their meaning for understanding chronic pain. In: *The Molecular and Cellular Biology of Pain: Progress in Molecular Biology and Translational Science*. Price and Dussor Editors. Elsevier Press, Oxford UK. 131, 409-34.
67. Kim JV, Tillu DV, Quinn TL, Mejia GL, Shy A, Asiedu MN, Murad E, Schumann AP, Totsch SK, Sorge R, Mantyh PW, Dussor G, **Price TJ** (2015) Spinal dopaminergic projections control the transition to pathological pain plasticity via a D1/D5-mediated mechanism. *Journal of Neuroscience*. 35(16) 6307-6317.
68. Kandasamy R, **Price TJ** (2015) The pharmacology of nociceptor priming. *Handbook of Experimental Pharmacology*. 227, 15-37.
69. Boitano S, Hoffman J, Flynn AN, Asiedu MN, Tillu DV, Zhang Z, Sherwood CL, Rivas CM, DeFea K, Vagner J, **Price TJ** (2015) The novel PAR₂ ligand C391 blocks multiple PAR₂ signaling pathways in vitro and in vivo. *British Journal of Pharmacology*. 172(18) 4535-4545.
70. Lipovka Y, Chen H, Vagner J, **Price TJ**, Tsao TS, Konhilas JP (2015) Estrogen receptors interact with the alpha catalytic subunit of AMP-activated protein kinase. *Bioscience Reports*. 35(5) e00264.
71. **Price TJ**, Das V, Dussor G (2016) Adenosine monophosphate-activated protein kinase (AMPK) activators for the prevention, treatment and potential reversal of pathological pain. *Current Drug Targets*. 17(8) 908-920.
72. Andrews NA, Latremoliere A, Basbaum AI, Mogil JS, Porreca F, Rice AS, Woolf CJ, Currie GL, Dworkin RH, Eisenach JC, Evans S, Gewandter JS, Gover TD, Handwerker H, Huang W, Iyengar S, Jensen MP, Kennedy JD, Lee N, Levine J, Lidster K, Machin I, McDermott MP,

- McMahon SB, **Price TJ**, Ross SE, Scherrer G, Seal RP, Sena ES, Silva E, Stone L, Svensson CI, Turk DC, Whiteside G (2016) Ensuring transparency and minimization of methodological bias in preclinical pain research: Precise considerations. *Pain*. 157(4) 901-909.
73. Kim JY, Megat S, Moy JK, Asiedu MN, Mejia GL, Vagner J, **Price TJ** (2016) Neuroligin 2 regulates spinal GABAergic plasticity in hyperalgesic priming, a model of the transition from acute to chronic pain. *Pain*. 157(6) 1314-24.
74. Barragan-Iglesias P, Oineda-Farias JB, Bravo-Hernandez M, Cervantes-Duran C, **Price TJ**, Murbartian J, Granados-Soto V (2016) Predominant role of spinal P2Y1 receptors in the development of neuropathic pain in rats. *Brain Research*. 1636 43-51
75. Davidson S, Golden JP, Copits BA, Ray PR, Vogt SK, Valtcheva MV, Schmidt RE, Ghetti A, **Price TJ**, Gereau RW (2016) Group II mGluRs suppress hyperexcitability in mouse and human nociceptors. *Pain*. 157(9) 2081-8.
76. Pember SO, Mejia GL, **Price TJ**, Pasteris RJ (2016) Piperidiny l thiazole isoxazolines: A new series of highly potent, slowly reversible FAAH inhibitors with analgesic properties. *Bioorganic & Medicinal Chemistry Letters*. 26(12) 2965-73.
77. Mejia GL, Asiedu MN, Hitoshi Y, Dussor G, **Price TJ** (2016) The potent, indirect adenosine monophosphate-activated protein kinase activator R419 attenuates mitogen-activated protein kinase signaling, inhibits nociceptor excitability and reduces pain hypersensitivity in mice. *Pain Reports*. 1(1) e562.
78. Burgos-Vega C, Quigley L, Avona A, **Price TJ**, Dussor G (2016) Dural stimulation in rats causes BDNF-dependent priming to subthreshold stimuli including a migraine trigger. *Pain*. 157(12) 2722-2730.
79. Park SI, Shun G, McCall JG, Al-Hasani R, Norris A, Xia L, Brenner DS, Noh KN, Bang SY, Bhatti, DL, Jang K, Kang K, Mickle AD, Dussor G, **Price TJ**, Gereau RW, Bruchas MR, Rogers JA (2016) Stretchable multi-channel antennas in soft wireless optoelectronic implants for optogenetics. *PNAS*. 113(50) 8169-8177.
80. Asiedu MN, Dussor G, **Price TJ** (2016) Targeting AMPK for the alleviation of pathological pain. *EXS*. 107, 257-285.
81. Li X, Che Z, Mazhar K, **Price TJ**, Qin Z (2016) Ultrafast near infrared light-triggered intracellular uncaging to probe cell signaling. *Advanced Functional Materials*. 27 1605778-1605778.
82. Asiedu MN, Han C, Dib-Hajj SD, Waxman SG, **Price TJ**, Dussor G (2016) The AMPK activator A769662 blocks voltage-gated sodium channels: discovery of a novel pharmacophore with potential utility for analgesic development. *PLoS One*. 12(1) e0169882.
83. **Price TJ**, Gold MS (2017) From mechanism to cure: renewing the goal to eliminate the disease of pain. *Pain Medicine*. *In press*.
84. Hanamura K, Washburn HR, Sheffler-Collins SI, Xia N, Henderson N, Tillu DV, Hassler S, Spellman DS, Zhang G, Neubert TA, **Price TJ**, Dalva MB (2017) Extracellular phosphorylation of a receptor tyrosine kinase controls synaptic localization of NMDA receptors and regulates pathological pain. *PLoS Biology*. 15(7) e2002457.
85. Sahn JJ, Mejia GL, Ray PR, Martin SF[#], **Price TJ**[#] (2017) Sigma 2 receptor / Tmem97 agonists produce long lasting anti-neuropathic pain effects in mice. *ACS Chemical Neuroscience*. 8(8) 1801-1811. [#] co-corresponding authors
86. Moy, JK, Khoutorsky A, Asiedu MN, Black, BJ, Kuhn JL, Barragan-Iglesias P, Megat S, Burton MD, Burgos-Vega CC, Melemedjian OK, Boitano S, Vagner J, Gkogkas CG, Pancrazio JJ, Mogil JS, Dussor G, Sonenberg N, **Price TJ** (2017) The MNK-eIF4E signaling axis contributes

- to injury-induced nociceptive plasticity and the development of chronic pain. *Journal of Neuroscience*. 37(31) 7481-7499.
87. Burton MD, Tillu DV, Mazhar K, Mejia GL, Asiedu MN, Inyang K, Hughes T, Lian B, Dussor G, **Price TJ** (2017) Pharmacological activation of AMPK inhibits incision-evoked mechanical hypersensitivity and the development of hyperalgesic priming in mice. *Neuroscience*. 359 119-129.
 88. Barragan-Iglesias P, Oidor-Chan VH, Loeza-Alcocer E, Pineda-Farias JB, Velazques-Lagunas I, Salinas-Abarca AB, Hong E, Sanchez-Mendoza A, Delgado-Lezama R, **Price TJ**, Granados-Soto V (2017) Evaluation of the neonatal streptozotocin model of diabetes in rats: Evidence for a model of neuropathic pain. *Pharmacological Reports*. *In press*.
 89. Megat S, Shiers S, Moy JK, Barragan-Iglesias P, Pradhan G, Seal RP, Dussor G, **Price TJ** (2018) A critical role for dopamine D5 receptors in pain chronicity in male mice. *Journal of Neuroscience*. 38(2). 379-397
 90. Khoutorsky A, **Price TJ** (2017) Translational control mechanisms in persistent pain. *Trends in Neurosciences*. *In press*.
 91. Barragan-Iglesias P, Tzu-Fang L, Bhat V, Megat S, Burton M, **Price TJ**, Campbell Z (2017) Inhibition of poly(A) binding protein with a synthetic RNA mimic reduces pain sensitization in mice. *Nature Communications*. *In press*.

Scholarly Presentations

Symposia

1. *Beyond the messenger: Role of translational regulation in pain processing. American Pain Society 2007 Meeting Symposia. Washington DC. May 5, 2007.
2. Defining the role of NKCC1 in nociceptive processing. International Association for the Study of Pain World Congress. Glasgow, UK. August 21, 2008.
3. Translational control as a novel mechanism of nociceptive sensitization. University of Helsinki, Finland. Federation of Neurosciences Graduate Programs Symposia. October 6, 2008. *Invited*
4. *Translation control in pain processing. Spring Pain Research Conference. Grand Cayman Island. April 18, 2010.
5. *Emerging role of translation control in nociceptive processing. International Association for the Study of Pain World Congress. Montreal, QC. Sept 3, 2010.
6. *Novel treatment approaches for pain in areas of great clinical need. American Pain Society 2011 Meeting Symposia. Austin TX. May 19, 2011
7. *The future of drug discovery for pain. American Pain Society 2011 Dinner Symposia. Austin TX. May 20, 2011
8. Novel role for PKM ζ in pain. International Association for the Study of Pain 2012 Congress Symposia. Milan, Italy. Aug 28, 2012
9. *Targeting spinal GABAergic mechanisms to Develop Novel Analgesics. American Pain Society 2013 Meeting Symposium. New Orleans, LA. May 11, 2013.
10. *Targeting translation control for the treatment of pain. American Pain Society 2014 Meeting Symposium. Tampa, FL. May 1, 2014
11. Descending dopaminergic control of pathological pain plasticity. Winter Conference on Brain Research. Breckenridge, CO. January 26, 2016
12. *Descending dopaminergic circuits and D1/D5 receptors in the transition to chronic pain. American Pain Society. Austin, TX. May 12, 2016

13. Mechanisms of neuropathic pain from mice to human; from AMPK to transcriptomics. International Association for the Study of Pain. Yokohama, Japan. Sept 29, 2016
14. New mechanisms of latent pain sensitization and hyperalgesic priming: Clinical implications. American Pain Society. Pittsburgh, PA. May 19, 2017.
15. *The pain biography: what early life injury and hyperalgesic priming teaches us about how pain becomes chronic. Neuropathic Pain Special Interest Group Meeting (NeuPSIG). Gothenburg, Sweden. June 15, 2017
*Symposia organizer

Conferences

1. Axonal Plasticity, FMRP and pain. New Developments in Fragile X Syndrome: From Basic Mechanisms to Therapeutics. The Banbury Center, Cold Spring Harbor Laboratory, NY. April 6, 2009. *Invited*
2. IL-6-induced nociception: role of ERK – MNK – eIF4E signaling. American Pain Society Annual Meeting. San Diego, CA. May 8, 2009.
3. Decreased nociceptive sensitization in fragile X mental retardation knockout mice. The Gatlinburg Conference on Intellectual Disabilities Research. Annapolis, MD. March 19, 2010. *Invited*
4. IL-6 and NGF rapidly control gene expression in sensory neurons via signaling to translation machinery. Spring Pain Research Conference. Grand Cayman Island. April 18, 2010.
5. IL-6 and NGF rapidly control gene expression in sensory neurons via signaling to translation machinery. American Pain Society Annual Meeting. Baltimore, MD. May 8, 2010.
6. Targeting mTOR for novel opportunities for pain control. Pain Society of Oregon Annual Meeting. Portland, OR. May 21, 2010. *Invited*
7. Cytokines, growth factors and nerve injury rapidly alter gene expression in sensory neurons via mTOR and ERK signaling to elongation initiation factors. International Association for the Study of Pain World Congress. Montreal, QC. Sept 3, 2010.
8. Closing opened pain gates by regulating spinal inhibition. Reflex Sympathetic Dystrophy Association Workshop on Activated Glia. Chicago, IL. Oct 9, 2010. *Invited*
9. PKM ζ maintains persistent nociceptive sensitization. American Pain Society Annual Meeting. Austin TX. May 19, 2011.
10. Maintenance mechanisms of persistent pain states. Rita Allen Foundation Scholars Meeting. Princeton, NJ. June 22, 2011. *Invited*
11. Role of PKM ζ in the maintenance of spinal nociceptive plasticity: role of brain derived neurotrophic factor (BDNF). NeuPSIG. Toronto, ON. May 24, 2013.
12. Pharmacological strategies to mitigate limitations of GABAergic modulation for the treatment of neuropathic pain. NeuPSIG. Toronto, ON, May 26, 2013.
13. Molecular mechanisms driving chronic pain: from sea slugs to memory molecules. BIT NeuroTalk. Nanjing, China. May 17, 2014.
14. Translation control of neuropathic pain. International Association for the Study of Pain World Congress. Buenos Aires, Argentina. October 8, 2014. *Invited*
15. AMPK, an emerging target for pain. Pain and Migraine Therapeutics Summit. San Francisco, California. November 5, 2014. *Invited*

16. Methylglyoxal induces the integrated stress response in nociceptors to promote diabetic neuropathic pain. Mexican Academy of Physiology Meeting. Campeche, Mexico. August 17, 2016. *Invited*

Seminars

1. RNA Binding Proteins in the Pain Pathway: Perspectives on RNA Transport and Local Translation. The University of Texas Health Science Center at San Antonio. June 24, 2005. *Invited*
2. RNA Transport and Local Translation in the Peripheral Nervous System. McGill Centre for Research on Pain / Astra Zeneca Research Meeting. December 20, 2005. *Invited*
3. Translational regulation in sensory neurons and the spinal cord: Implications for pain processing. University of Arizona Health Sciences Center: Depts of Pharmacology and Physiology. February 19, 2007. *Invited*
4. Translational regulation in sensory neurons and the spinal cord: Implications for pain processing. Harvard University Medical School: Dept of Anesthesia. March 12, 2007. *Invited*
5. Translational regulation in sensory neurons and the spinal cord: Implications for pain processing. Pittsburgh University Pain Center: Neurobiology Department. March 21, 2007. *Invited*
6. Is chronic pain a memory of pain? Translational regulation in the pain pathway. University of Texas at Dallas: Dept of Brain and Behavioral Sciences. April 30, 2007. *Invited*
7. What can Self-Injurious Behavior tell us about chronic pain? University of Arizona, Department of Neurology Grand Rounds. June 27, 2008.
8. Role of NKCC1 in pain and hyperalgesia. University of Helsinki, Finland. Department of Neurosciences. October 8, 2008. *Invited*
9. What can Self-Injurious Behavior tell us about chronic pain? University of Arizona, Department of Psychiatry Grand Rounds. October 22, 2008.
10. Translational control as a novel mechanism of nociceptive sensitization. Johnson and Johnson Pharmaceuticals R&D, Spring House, PA. November 13, 2008. *Invited*
11. Role of NKCC1 in Pain Processing. NeuroTherapeutics Pharma, Miami, FL. January 24, 2009. *Invited*
12. Chronic Pain: Found in Translation? Department of Pharmacology, University of Arizona Seminar Series. Tucson, AZ. March 10, 2010.
13. Translation Control of Nociceptive Sensitization. Washington University Department of Anesthesia and Washington University Pain Center Seminar Series. St. Louis, MO. Jan 18, 2011. *Invited*
14. Metformin for Neuropathic Pain. University of Arizona School of Medicine, Department of Endocrinology. Tucson, AZ. Jan 25, 2011.
15. PAR₂ Drug Discovery. University of Arizona School of Medicine, Department of Pharmacology. Tucson, AZ. Feb 16, 2011.
16. Translation Control of Nociceptive Sensitization. Indiana University School of Medicine, Department of Pharmacology Seminar Series. Indianapolis, IN. April 12, 2011. *Invited*
17. PKM ζ in the control of persistent pain states. University of Helsinki, Department of Biological Sciences and Neurosciences Center. Helsinki, Finland. August 30, 2011. *Invited*
18. PKM ζ in the control of persistent pain states. University of Arizona, Department of Physiology. Tucson, AZ. September 23, 2011

19. What can learning and memory mechanisms tell us about chronic pain? University of Arizona, Department of Neurosurgery. Tucson, AZ. October 5, 2011.
20. What can learning and memory mechanisms tell us about chronic pain? Veterans Administration Hospital Mental Health Division. Tucson, AZ. October 14, 2011. *Invited*
21. Maintenance Mechanisms of Nociceptive Sensitization. University of Innsbruck. Innsbruck, Austria. December 13, 2011. *Invited*
22. Protease Activated Receptor Type 2 (PAR₂) Drug Discovery for the Treatment of Pain. Frontiers in Biomedical Sciences Seminar Series. University of Arizona School of Medicine. January 31, 2012.
23. Maintenance Mechanisms of Chronic Pain. Johns Hopkins University, Blaustien Pain Seminar Series. Baltimore, MD. March 9, 2012.
24. Maintenance Mechanisms of Chronic Pain. Dartmouth University, Department of Pharmacology. Hanover, NH. March 21, 2012.
25. Maintenance Mechanisms of Chronic Pain. University of Illinois, Neuroscience Program. Champaign-Urbana, IL. April 3, 2012.
26. Targeting AMPK for Chronic Pain. University of Arizona Cancer Center Collaborative Grand Rounds. Tucson, AZ. April 6, 2012.
27. Making a career of hypothesis testing. University of Texas at Dallas. Senior Launch. Dallas, TX. Sept 26, 2012
28. PKM ζ maintains chronic pain. University of Texas at Dallas. Brain and Behavior Sciences School Seminar Series. Dallas, TX. Sept 28, 2012.
29. Mechanisms of chronic pain maintenance. Gillette Children's Hospital Pain Conference. Minneapolis, MN. Nov 1, 2012
30. PAR₂ Drug Discovery. Theravance. San Francisco, CA. Nov 8, 2012
31. The role of atypical protein kinase Cs in maintenance of chronic pain states. University of Heidelberg, Heidelberg, Germany. March 2, 2013
32. AMPK as a novel target for pain. University of Heidelberg, Heidelberg, Germany. March 2, 2013
33. Plasticity mechanisms of chronic pain. University of Texas at Dallas. Brain and Behavioral Sciences School Seminar Series. Dallas, TX. March 22, 2013
34. Maintenance mechanisms of chronic pain. National Institutes of Health. Bethesda, MD. April 17, 2013
35. Targeting translation control mechanisms for the development of novel pain therapeutics. UTHSCSA. San Antonio, TX. October 25, 2013.
36. Maintenance mechanisms of chronic pain. University of Maryland School of Dentistry. Baltimore, MD. April 18, 2013
37. Targeting AMPK for chronic pain. MD Anderson Cancer Center. Houston, TX. July 26, 2013.
38. Targeting translation control mechanisms to Ease Pain. Pain Research Forum Webinar. January 14, 2014.
39. Targeting translation control mechanisms to alleviate chronic pain. Cornell Burke Rehabilitation Center. White Plains, NY. January 27, 2014.
40. Targeting AMPK for the alleviation of chronic pain. Rigel INC. South San Francisco, CA. February 12, 2014.
41. Mechanisms of chronic pain, from translation control to descending circuits. Gulf Coast Pain Consortium, MD Anderson Cancer Center. Houston, TX. April 4, 2014.

42. Targeting translation control for the treatment of chronic pain. University of Cincinnati, Cincinnati, OH. April 17, 2014.
43. Mechanisms of Chronic Pain, from translation control to descending circuits. Baylor College of Dentistry, Dallas, TX. January 7, 2015.
44. Mechanisms controlling the transition to a chronic pain state. UTMB, Galveston, TX, January 28, 2015.
45. Descending Control of the Transition to a Chronic Pain State. University of Kentucky, Lexington, KY. March 4, 2015
46. Mechanisms controlling the transition to a chronic pain state. Texas Tech Health Sciences Center, Lubbock, TX. March 24, 2015.
47. Hypothalamic dopaminergic projections to the dorsal horn control the transition to chronic pain. UTSW, Division of Hypothalamic Research, Dallas, TX, July 21, 2015.
48. Translation Control of Chronic Pain. Texas Women's University, Department of Biology. Denton, TX, September 18, 2015.
49. An Update on AMPK and Pain. Rigel Pharmaceuticals, San Francisco, CA, September 6, 2015.
50. Mechanisms of the transition from acute to chronic pain. University of Calgary, Calgary, AB, Canada. February 26, 2016.
51. Targeting mRNA translation control mechanisms to understand chronic pain. Duquesne University. Department of Biology. Pittsburgh, PA, April 15, 2016.
52. Comparative transcriptomic analysis of human and mouse DRG: implications for translational research. Merck. Department of Neuroscience. West Point, PA, August 26, 2016.
53. Mechanisms of neuropathic pain; from preclinical models to human transcriptomics. University of Albany, Albany, NY, Oct 15, 2016.
54. From neuropathic pain to hyperalgesic priming to human transcriptomics: searching for novel pain targets. University of Iowa Pain Interest Group. Iowa City, IA, Nov 8, 2016.
55. Targeting pain plasticity to create next generation analgesics. Thomas Jefferson University, Department of Neuroscience. Philadelphia, PA, Dec 6, 2016.
56. Translation regulation in chronic pain: therapeutic targets and new insight from next generation sequencing. University of Maryland School of Medicine. Baltimore, MD, Feb 21, 2017.
57. Translation regulation in chronic pain: therapeutic targets and new insight from next generation sequencing. University of California San Francisco. San Francisco, CA, Mar 9, 2017.
58. Mechanisms of chronic pain: from switching circuits to human transcriptomics. University of California San Francisco. San Francisco, CA, Mar 9, 2017.
59. Translation regulation in chronic pain: therapeutic targets and new insight from next generation sequencing. University of Texas Medical Branch. Galveston, TX, Mar 21, 2017.
60. Mechanisms that promote chronic pain. University of Copenhagen. Copenhagen, Denmark, September 6, 2017.
61. Drivers and targets for neuropathic pain. Texas Tech University Health Science Center in El Paso, TX. Oct 18, 2017.
62. Mechanisms governing the transition to chronic pain. University of Connecticut Medical School and Jackson Laboratories Center for Human Genetics. Farmington, CT. Nov 30, 2017.
63. Translating Ribosome Affinity Purification (TRAP) for target identification for pain. MundiPharm. London, UK. Dec 7, 2017.

Grants and Contracts

Federal

Ongoing

9/2017 through 5/2022

R01 National Institutes of Health / NINDS R01NS098826

Protease activated receptor type 2 targeting for migraine pain

MPI: Price, Dussor, Boitano and Vagner

2/2015 through 2/2020

R13 National Institutes of Health / NINDS and NCCIH R13NS092293/R13AT009161

Young investigator travel support for the 2015 - 2020 APS annual scientific meeting

PI: Price

3/2010 through 2/2019

R01 National Institutes of Health / NINDS R01NS065926

Translation control of chronic pain

PI: Price

Completed

10/1/2000 through 9/30/2003

Individual National Research Service Award Predoctoral: NIDA

Peripheral Mechanisms of Cannabinoid Antinociception

PI: Price

3/2005 through 11/2007

Individual National Research Service Award Postdoctoral: NINDS

Cation Chloride-Cotransporters and Hyperalgesic States

PI: Price

10/2011 through 10/2016

R01 National Institutes of Health / NINDS R01NS073664

PAR-2 targeted drug discovery for the treatment of pain

MPI: Boitano, Vagner and Price

4/2013 through 2/2017

R01 National Institutes of Health / NIGMS R01GM102575

AMPK activators as a novel therapeutic for post-surgical pain

MPI: Price and Dussor

State

Completed

2/2008 through 2/2009

University of Arizona Foundation Small Grant

Carbonic Anhydrase Inhibitors as Novel Analgesics

PI: Price

Industry
Active

Completed

8/2014 through 12/2015

Rigel Pharmaceuticals

Complex I Inhibitors for the treatment of pain

MPI: Price and Dussor

12/2010 through 12/2012

MedImmune Corporation

Anti-NGF and –IL-6 therapies for pain

MPI: Price and Porreca

Private Foundations

Completed

6/2009 through 5/2012

Rita Allen Foundation / American Pain Society Scholars in Pain Award

Translation regulation as a novel paradigm for understanding nociceptor sensitization and developing analgesic targets

PI: Price

5/2010 through 5/2012

IASP Scan|Design Foundation BY INGER & JENS BRUUN travel grant

Carbonic anhydrases as novel targets for neuropathic pain

MPI: Price and Kaila (University of Helsinki)

10/2006 through 11/2007

American Pain Society Future Leaders in Pain Research Award

Role of RNA Transport and Local Translation in Nociceptive Processing

PI: Price