Stanford



Vivianne Tawfik

Associate Professor of Anesthesiology, Perioperative and Pain Medicine (Adult Pain)

CLINICAL OFFICE (PRIMARY)

- **Pain Management Clinic**

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Bio

BIO

Vivianne Tawfik, MD, PhD is a board certified Anesthesiologist and Pain Medicine physician who specializes in the treatment of complex chronic pain disorders including chronic post-operative pain, complex regional pain syndrome and peripheral nerve injury.

She obtained her MD and PhD in Neuroscience, with a focus on basic pain mechanisms, at Dartmouth Medical School before joining the Stanford Department of Anesthesiology, Perioperative & Pain Medicine as an anesthesiology resident in the Fellowship in Anesthesia Research and Medicine (FARM) program, of which she now serves as the Director. After completion of her subspecialty fellowship training in Pain Medicine, Dr. Tawfik joined the faculty at Stanford and continues to research the immune contribution to persistent pain while treating patients suffering from chronic pain.

She enjoys science, sushi and snowboarding in her free time.

CLINICAL FOCUS

- Pain Medicine
- Pain Management

ACADEMIC APPOINTMENTS

- Associate Prof-Univ Med Line, Anesthesiology, Perioperative and Pain Medicine
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Associate Director Medical-Scientist Training Program, Stanford School of Medicine, (2024- present)
- Vice-Chair for Research- Basic Science, Department of Anesthesiology, Perioperative & Pain Medicine, (2022- present)
- Director, Fellowship in Anesthesia Research & Medicine (FARM), Department of Anesthesiology, Perioperative & Pain Medicine, (2018- present)

- Assistant Director, Fellowship in Anesthesia Research & Medicine (FARM), Department of Anesthesiology, Perioperative and Pain Medicine, (2015-2018)

HONORS AND AWARDS

- Award in Pain, Rita Allen Foundation (2019-2022)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- President-Elect Board of Directors, International Anesthesia Research Society (2025 - present)

PROFESSIONAL EDUCATION

- Board Certification: Pain Management, American Board of Anesthesiology (2026)
- Fellowship: Stanford University School of Medicine (2015) CA
- Fellowship, Stanford Hospital and Clinics , Pain Medicine (2015)
- Fellowship, Stanford Hospital and Clinics , Research (2014)
- Board Certification: Anesthesiology, American Board of Anesthesiology (2014)
- Residency, Stanford Hospital and Clinics , Anesthesiology (2013)
- M.D./Ph.D., Dartmouth Medical School , Pharmacology/Neuroscience (2009)
- Internship: Dartmouth Hitchcock Medical Center (2010) NH

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My overall research interest is to understand how the immune system interacts with the nervous system after injury to promote the transition from acute to chronic pain. In my clinical practice I care for patients with persistent pain that often occurs after minor trauma such as fracture or surgery. Using basic science approaches including whole system immune phenotyping with mass cytometry and genetic manipulation of peripheral and central immune cells, we seek to dissect the temporal and tissue-specific contribution of these cells to either promotion or inhibition of healing.

Teaching

COURSES

2025-26

- Cellular/Molecular Neuroscience Laboratory: NEPR 288 (Aut)

STANFORD ADVISEES

Med Scholar Project Advisor

Jenny Kim

Postdoctoral Faculty Sponsor

Michelle Cahill, Amy Nippert, Richard Perez, Anahis Tena

Doctoral Dissertation Co-Advisor (NonAC)

Sabrina Bond, Makenna Fluegel, Riley Merkel

Doctoral Dissertation Reader (NonAC)

Cal Bridges, Cheyanne Lewis, Kamsi Nwangwu, Emma O'Connell

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Anesthesia (Fellowship Program)
- Neurosciences (PhD Program)
- Pain Management (Fellowship Program)

Publications

PUBLICATIONS

- **Ethological profiling defines pain behaviors and parses analgesia from drug side effects in a mouse model of complex regional pain syndrome.** *Pain*
  Muwanga, G. P., Tena, A. C., Pang, A., Ewbank, S. N., Siliezar-Doyle, J., Nippert, A. R., Airan, R. D., Tawfik, V. L.
  2026; 167 (6): 1453-1469
- **Research recommendations for the HEAL Initiative: a path forward for pain research.** *The journal of pain*
  Gereau, R. W., Sutherland, S. P., Baker, T., Campbell, C. M., Cruz-Almeida, Y., DeBar, L. L., Falcon, M., Farrar, J. T., George, S. Z., Haythornthwaite, J., Kashikar-Zuck, S., Letzen, J. E., Markman, et al
  2026: 106301
- **Comparative transcriptomic meta-analysis reveals elevated TCL1A expression in human circulating immune cells across chronic pain conditions.** *British journal of anaesthesia*
  Perez, R. K., Tawfik, V. L.
  2025
- **Aging and injury drive neuronal senescence in the dorsal root ganglia.** *Nature neuroscience*
  Donovan, L. J., Brewer, C. L., Bond, S. F., Laslavic, A. M., Pena Lopez, A., Colman, L., Jordan, C. E., Hansen, L. H., González, O. C., Pujari, A., de Lecea, L., Quarta, M., Kauer, et al
  2025; 28 (5): 985-997
- **Repopulated spinal cord microglia exhibit a unique transcriptome and contribute to pain resolution.** *Cell reports*
  Donovan, L. J., Bridges, C. M., Nippert, A. R., Wang, M., Wu, S., Forman, T. E., Haight, E. S., Huck, N. A., Bond, S. F., Jordan, C. E., Gardner, A. M., Nair, R. V., Tawfik, et al
  2024; 43 (2): 113683
- **Microglial Modulation as a Target for Chronic Pain: From the Bench to the Bedside and Back.** *Anesthesia and analgesia*
  Haight, E. S., Forman, T. E., Cordonnier, S. A., James, M. L., Tawfik, V. L.
  2019; 128 (4): 737–46
- **Longitudinal TSPO-PET imaging of peripheral and central myeloid cells in a mouse model of complex regional pain syndrome.** *Pain*
  Cropper, H. C., Johnson, E. M., Haight, E. n., Cordonnier, S. A., Chaney, A. M., Forman, T. E., Biswal, A. n., Stevens, M. Y., James, M. L., Tawfik, V. L.
  2019
- **Library Docking for Cannabinoid-2 Receptor Ligands.** *Journal of medicinal chemistry*
  Rachman, M. M., Iliopoulos-Tsoutsouvas, C., Sacco, M. D., Xu, X., Wu, C. G., Santos, E., Glenn, I. S., Paris, L., Cahill, M. K., Ganapathy, S., Tummino, T. A., Moroz, Y. S., Radchenko, et al
  2026
- **Translatome profiling of spinal cord astrocytes reveals distinct gene signatures associated with acute and chronic pain.** *iScience*
  Siliezar-Doyle, J., Perez, R. K., Stauffenberg, E., Nippert, A. R., Tawfik, V. L.
  2026; 29 (5): 115719
- **Library docking for Cannabinoid-2 Receptor ligands.** *bioRxiv : the preprint server for biology*
  Rachman, M. M., Iliopoulos-Tsoutsouvas, C., Sacco, M. D., Xu, X., Wu, C. G., Santos, E., Glenn, I. S., Paris, L., Cahill, M. K., Ganapathy, S., Tummino, T. A., Moroz, Y. S., Radchenko, et al
  2026
- **Investigating Characteristics of Senescent Primary Sensory Neurons in Young and Aged Mice In Vitro**
  Rimorin, J. T., Lee, K. Y., Merkel, R., Donovan, L. J., Tawfik, V. L.

CHURCHILL LIVINGSTONE.2026

- **Pain signaling via sensory neurons drives breast cancer progression through neuropeptide release and κ-opioid counter-regulation.** *Pharmacological research*
  Makabe, H., Narita, M., Nagumo, Y., Fujiwara, M., Hamada, Y., Takise, J., Yoshizawa, T., Sano, S., Iizuka, S., Asaba, E., Suda, Y., Mori, T., Saitoh, et al
  2026: 108113

- **No evidence of immediate or persistent analgesic effect from a single dose of psilocybin in three mouse models of pain.** *Nature communications*
  Gregory, N. S., Girard, T. E., Ram, A., Casey, A. B., Malenka, R. C., Tawfik, V. L., Heifets, B. D.
  2026

- **Identification of peripheral pain generators with sigma-1 receptor Positron Emission Tomography/Magnetic Resonance Imaging in complex regional pain syndrome: initial study in a prospective trial.** *Pain*
  Baal, J. D., Ghimire, P., Wagle, S., Lewis, M., Xu, Y., Tawfik, V. L., Davidzon, G., McCurdy, C. R., Biswal, S., Yoon, D.
  2026

- **Psilocybin has no immediate or persistent analgesic effect in acute and chronic mouse pain models.** *bioRxiv : the preprint server for biology*
  Gregory, N. S., Girard, T. E., Ram, A., Casey, A. B., Malenka, R. C., Tawfik, V. L., Heifets, B. D.
  2025

- **Treatment of occult radiculopathy in complex regional pain syndrome by anterior cervical discectomy and fusion following localization by [18F]fluorodeoxyglucose radioligand and PET/MRI: illustrative case.** *Journal of neurosurgery. Case lessons*
  Schonfeld, E., Haider, G., Tawfik, V., Jin, M. C., Yoo, K., Marianayagam, N. J., Biswal, S., Veeravagu, A.
  2024; 8 (26)

- **Quantitative Profiling of the Effects of Subanesthetic Ketamine on Naturalistic Behavior and Brain Microstructure**
  Ewbank, S., Hart, A., Muwanga, G., Gopal, D., Roy, K., Yu, B., Laurent, R., Tawfik, V., Rodriguez, C., Mcnab, J., Airan, R.
  SPRINGERNATURE.2024: 104

- **Chronic pain and complex regional pain syndrome are associated with alterations to the intestinal microbiota in both humans and mice. An observational cross-sectional study.** *Neurobiology of pain (Cambridge, Mass.)*
  Crock, L. W., Rodgers, R., Huck, N. A., Schriefer, L. A., Lawrence, D., Wang, L., Muwanga, G. P., Tawfik, V. L., Baldridge, M. T.
  2024; 16: 100173

- **Deciphering the Translatomic Perturbations Associated with Acute and Chronic Pain in Mouse Spinal Cord Astrocytes**
  Perez, R., Siliezar-Doyle, J., Tawfik, V.
  LIPPINCOTT WILLIAMS & WILKINS.2024: 505

- **Schwann cell-secreted PGE2 promotes sensory neuron excitability during development.** *Cell*
  Kantarci, H., Elvira, P. D., Thottumkara, A. P., O'Connell, E. M., Iyer, M., Donovan, L. J., Dugan, M. Q., Ambiel, N., Granados, A., Zeng, H., Saw, N. L., Brosius Lutz, A., Sloan, et al
  2024

- **Comprehensive overview of the anesthesiology research landscape: A machine Learning Analysis of 737 NIH-funded anesthesiology primary Investigator's publication trends.** *Heliyon*
  Ghanem, M., Espinosa, C., Chung, P., Reincke, M., Harrison, N., Phongpreecha, T., Shome, S., Saarunya, G., Berson, E., James, T., Xie, F., Shu, C. H., Hazra, et al
  2024; 10 (7): e29050

- **In Response.** *Anesthesia and analgesia*
  Emala, C. W., Tawfik, V. L., Lane-Fall, M. B., Toledo, P., Wong, C. A., Vavilala, M. S., Fleisher, L. A., Wood, M.
  2024; 138 (4): e16-e17

- **Determining the Functional Profile of Dorsal Root Ganglion Neurons Driving Osteoarthritis Pain**
  Brewer, C. L., Donovan, L. J., Kauer, J. A., Tawfik, V. L.
  CHURCHILL LIVINGSTONE.2024: 11

- **Senescence of Primary Sensory Neurons as a Driver of Pain in Aging**
  Donovan, L. J., Bond, S. F., Lopez, A. P., Hansen, L., Jordan, C. E., Ram, A., Tawfik, V. L.

CHURCHILL LIVINGSTONE.2024: 43

- **Astrocyte Homeostatic Gene Expression Is Altered Across Pain States**
  Nippert, A. R., Tawfik, V. L.
  CHURCHILL LIVINGSTONE.2024: 7
- **Deciphering the Mouse Spinal Cord Astrocyte Translatome at Acute and Chronic Timepoints of Complex Regional Pain Syndrome**
  Lugo, J., Perez, R. K., Nippert, A. R., Wu, S., Tawfik, V. L.
  CHURCHILL LIVINGSTONE.2024: 11
- **Astrocytes: Dual Roles in Chronic Pain and Memory Formation.** *Anesthesiology*
  Tawfik, V. L.
  2024; 140 (3): 358-360
- **The Anesthesiology Physician-Scientist Pipeline: Current Status and Recommendations for Future Growth-An Initiative of the Anesthesia Research Council.** *Anesthesia and analgesia*
  Emala, C. W., Tawfik, V. L., Lane-Fall, M. B., Toledo, P., Wong, C. A., Vavilala, M. S., Fleisher, L. A., Wood, M.
  2023; 137 (4): 728-742
- **Impact of Adding Carpal Tunnel Release or Trigger Finger Release to Carpometacarpal Arthroplasty on Postoperative Complications".** *Plastic and reconstructive surgery*
  Trinh, P., Luan, A., Tawfik, V. L., Sheckter, C., Rochlin, D., Fox, P., Curtin, C.
  2023
- **Clinical Assessments of Fracture Healing and Basic Science Correlates: Is There Room for Convergence?** *Current osteoporosis reports*
  Lopas, L. A., Shen, H., Zhang, N., Jang, Y., Tawfik, V. L., Goodman, S. B., Natoli, R. M.
  2022
- **Successful epidural fibrin glue patch to treat intracranial hypotension in a patient with bacteraemia and malignancy.** *BJA open*
  Gupta, A., Madriz, V. C., Carroll, I. R., Tawfik, V. L.
  2022; 4: 100091
- **Sex-distinct microglial activation and myeloid cell infiltration in the spinal cord after painful peripheral injury.** *Neurobiology of pain (Cambridge, Mass.)*
  Huck, N. A., Donovan, L. J., Shen, H., Jordan, C. E., Muwanga, G. P., Bridges, C. M., Forman, T. E., Cordonnier, S. A., Haight, E. S., Dale-Huang, F., Takemura, Y., Tawfik, V. L.
  2022; 12: 100106
- **The Tibial Fracture-Pin Model: A Clinically Relevant Mouse Model of Orthopedic Injury.** *Journal of visualized experiments : JoVE*
  Muwanga, G. P., Siliezar-Doyle, J., Ortiz, A. A., Kaslow, J., Haight, E. S., Tawfik, V. L.
  2022
- **Migraine and peripheral pain models show differential alterations in neuronal complexity.** *Headache*
  Bertels, Z., Mangutov, E., Conway, C., Siegersma, K., Asif, S., Shah, P., Huck, N., Tawfik, V., Pradhan, A. A.
  2022
- **Mechanical Conflict-Avoidance Assay to Measure Pain Behavior in Mice.** *Journal of visualized experiments : JoVE*
  Gaffney, C. M., Muwanga, G., Shen, H., Tawfik, V. L., Shepherd, A. J.
  2022
- **Morphine Tolerance and Reward is Regulated by Aldehyde Dehydrogenase-2 in Mice**
  Zambelli, V., Salgado, J. S., Heifets, B. D., Tawfik, V., Gross, E. R.
  LIPPINCOTT WILLIAMS & WILKINS.2021: 626-627
- **Temporal contribution of myeloid-lineage TLR4 to the transition to chronic pain: A focus on sex differences.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Huck, N. A., Siliezar-Doyle, J., Haight, E. S., Ishida, R., Forman, T. E., Wu, S., Shen, H., Takemura, Y., Clark, J. D., Tawfik, V. L.
  2021
- **Neurovascular, muscle, and skin changes on [18F]FDG PET/MRI in complex regional pain syndrome of the foot: A Prospective Clinical Study.** *Pain medicine (Malden, Mass.)*

Yoon, D., Xu, Y., Cipriano, P. W., Alam, I. S., Mari Aparici, C. A., Tawfik, V. L., Curtin, C. M., Carroll, I. R., Biswal, S.
2021

- **Characteristics of Patients With Complex Limb Pain Evaluated Through an Interdisciplinary Approach Utilizing Magnetic Resonance Neurography** *Frontiers in Pain Research*
  Johnson, E. M., Yoon, D., Biswal, S., Curtin, C., Fox, P., Wilson, T. J., Carroll, I., Lutz, A., Tawfik, V.
  2021
- **The Neuroimmunology of Chronic Pain: From Rodents to Humans.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Grace, P. M., Tawfik, V. L., Svensson, C. I., Burton, M. D., Loggia, M. L., Hutchinson, M. R.
  2020
- **Of mice, microglia, and (wo)men: a case series and mechanistic investigation of hydroxychloroquine for complex regional pain syndrome.** *Pain reports*
  Haight, E. S., Johnson, E. M., Carroll, I. R., Tawfik, V. L.
  2020; 5 (5): e841
- **A Guide to Understanding "State-of-the-Art" Basic Research Techniques in Anesthesiology.** *Anesthesia and analgesia*
  Obal, D., Wu, S., McKinstry-Wu, A., Tawfik, V. L.
  2020
- **18F-FDG PET/MRI of patients with chronic pain alters management.**
  Cipriano, P., Yoon, D., Carroll, I., Curtin, C., Tawfik, V., Xu, Y., Biswal, S.
  SOC NUCLEAR MEDICINE INC.2020
- **Modeling Complex Orthopedic Trauma in Rodents: Bone, Muscle and Nerve Injury and Healing.** *Frontiers in pharmacology*
  Shen, H., Gardner, A. M., Vyas, J., Ishida, R., Tawfik, V. L.
  2020; 11: 620485
- **Systematic Immunophenotyping Reveals Sex-Specific Responses After Painful Injury in Mice.** *Frontiers in immunology*
  Tawfik, V. L., Huck, N. A., Baca, Q. J., Ganio, E. A., Haight, E. S., Culos, A. n., Ghaemi, S. n., Phongpreecha, T. n., Angst, M. S., Clark, J. D., Aghaeepour, N. n., Gaudilliere, B. n.
  2020; 11: 1652
- **Longitudinal translocator protein-18 kDa-positron emission tomography imaging of peripheral and central myeloid cells in a mouse model of complex regional pain syndrome** *PAIN*
  Cropper, H. C., Johnson, E. M., Haight, E. S., Cordonnier, S. A., Chaney, A. M., Forman, T. E., Biswal, A., Stevens, M. Y., James, M. L., Tawfik, V. L.
  2019; 160 (9): 2136–48
- **Predictors of post-anaesthesiology residency research productivity: preliminary report.** *British journal of anaesthesia*
  Haight, E. S., Chen, F., Tanaka, P., Brock-Utne, J. G., Macario, A., Sun, E. C., Tawfik, V. L.
  2019
- **Cell-specific overexpression of COMT in dopaminergic neurons of Parkinson's disease.** *Brain : a journal of neurology*
  Kuzumaki, N., Suda, Y., Iwasawa, C., Narita, M., Sone, T., Watanabe, M., Maekawa, A., Matsumoto, T., Akamatsu, W., Igarashi, K., Tamura, H., Takeshima, H., Tawfik, et al
  2019; 142 (6): 1675–89
- **18F-FDG PET/MRI of patients with chronic pain alters management.**
  Cipriano, P., Yoon, D., Carroll, I., Curtin, C., Tawfik, V., Xu, Y., Biswal, S.
  SOC NUCLEAR MEDICINE INC.2019
- **Musculoskeletal changes on [18F]FDG PET/MRI from complex regional pain syndrome in foot**
  Yoon, D., Xu, Y., Cipriano, P., Tawfik, V., Curtin, C., Carroll, I., Biswal, S.
  SOC NUCLEAR MEDICINE INC.2019
- **Musculoskeletal changes on [18F]FDG PET/MRI from complex regional pain syndrome in foot**
  Yoon, D., Xu, Y., Cipriano, P., Tawfik, V., Curtin, C., Carroll, I., Biswal, S.
  SOC NUCLEAR MEDICINE INC.2019

- **Morphine Exacerbates Postfracture Nociceptive Sensitization, Functional Impairment, and Microglial Activation in Mice** *ANESTHESIOLOGY*
  Li, W., Irvine, K., Sahbaie, P., Guo, T., Shi, X., Tawfik, V. L., Kingery, W. S., Clark, J.
  2019; 130 (2): 292–308

- **Angiotensin receptor blockade mimics the effect of exercise on recovery after orthopaedic trauma by decreasing pain and improving muscle regeneration.** *The Journal of physiology*
  Tawfik, V. L., Quarta, M. n., Paine, P. n., Forman, T. E., Pajarinen, J. n., Takemura, Y. n., Goodman, S. B., Rando, T. A., Clark, J. D.
  2019

- **Chronic Pain Management in the Elderly.** *Anesthesiology clinics*
  Schwan, J. n., Sclafani, J. n., Tawfik, V. L.
  2019; 37 (3): 547–60

- **Morphine Exacerbates Postfracture Nociceptive Sensitization, Functional Impairment, and Microglial Activation in Mice.** *Anesthesiology*
  Li, W., Irvine, K., Sahbaie, P., Guo, T., Shi, X., Tawfik, V. L., Kingery, W. S., Clark, J. D.
  2018

- **Autoinflammatory and autoimmune contributions to complex regional pain syndrome** *MOLECULAR PAIN*
  Clark, J., Tawfik, V. L., Tajerian, M., Kingery, W. S.
  2018; 14

- **[EXPRESS] Autoinflammatory and Autoimmune Contributions to Complex Regional Pain Syndrome.** *Molecular pain*
  Clark, J. D., Tawfik, V., Tajerian, M., Kingery, W.
  2018: 1744806918799127

- **Functional Divergence of Delta and Mu Opioid Receptor Organization in CNS Pain Circuits** *NEURON*
  Wang, D., Tawfik, V. L., Corder, G., Low, S. A., Francois, A., Basbaum, A. I., Scherrer, G.
  2018; 98 (1): 90-+

- **TEMPORAL CONTROL OF MICROGLIAL REACTIVITY REVEALS SEX-INDEPENDENT FUNCTIONAL CONTRIBUTION OF MICROGLIA TO LONG-LASTING PAIN**
  Takemura, Y., Clark, D., Forman, T., Haight, E., Tawfik, V.
  LIPPINCOTT WILLIAMS & WILKINS.2018: 437

- **Activation of ventral tegmental area dopaminergic neurons reverses pathological allodynia resulting from nerve injury or bone cancer** *MOLECULAR PAIN*
  Watanabe, M., Narita, M., Hamada, Y., Yamashita, A., Tamura, H., Ikegami, D., Kondo, T., Shinzato, T., Shimizu, T., Fukuchi, Y., Muto, A., Okano, H., Yamanaka, et al
  2018; 14: 1744806918756406

- **Successful treatment of chronic knee pain following localization by a sigma-1 receptor radioligand and PET/MRI: a case report** *JOURNAL OF PAIN RESEARCH*
  Cipriano, P., Lee, S., Yoon, D., Shen, B., Tawfik, V., Curtin, C., Dragoo, J. L., James, M., Mccurdy, C., Chin, F., Biswal, S.
  2018; 11: 2353–56

- **Loss of mu opioid receptor signaling in nociceptors, but not microglia, abrogates morphine tolerance without disrupting analgesia** *NATURE MEDICINE*
  Corder, G., Tawfik, V. L., Wang, D., Sypek, E. I., Low, S. A., Dickinson, J. R., Sotoudeh, C., Clark, J. D., Barres, B. A., Bohlen, C. J., Scherrer, G.
  2017; 23 (2): 164-173

- **Complex management of a patient with refractory primary erythromelalgia lacking a SCN9A mutation** *JOURNAL OF PAIN RESEARCH*
  Low, S. A., Robbins, W., Tawfik, V. L.
  2017; 10: 973-977

- **(118) Physical and psychological predictors of dysfunction in complex regional pain syndrome (CRPS): a Collaborative Health Outcomes Information Registry (CHOIR) study.** *journal of pain*
  Adelus, M., Sturgeon, J., RICO, T., Tawfik, V., Mackey, S.
  2016; 17 (4S): S5-?

- **(218) Characterization of patients with complex regional pain syndrome (CRPS) in a tertiary care pain management setting: A Collaborative Health Outcomes Information Registry (CHOIR) study.** *journal of pain*
  Adelus, M., Sturgeon, J., RICO, T., Tawfik, V., Mackey, S.
  2016; 17 (4S): S30-?

- **Electrical Synapses High-speed Communication in the Maintenance of Neuropathic Pain** *ANESTHESIOLOGY*
  Tawfik, V. L., Flood, P.
  2016; 124 (1): 13-15

- **Input- and Cell-Type-Specific Endocannabinoid-Dependent LTD in the Striatum.** *Cell reports*
  Wu, Y., Kim, J., Tawfik, V. L., Lalchandani, R. R., Scherrer, G., Ding, J. B.
  2015; 10 (1): 75-87

- **In vivo techniques to investigate the internalization profile of opioid receptors.** *Methods in molecular biology (Clifton, N.J.)*
  Pradhan, A. A., Tawfik, V. L., Tipton, A. F., Scherrer, G.
  2015; 1230: 87-104

- **Delta Opioid Receptors Presynaptically Regulate Cutaneous Mechanosensory Neuron Input to the Spinal Cord Dorsal Horn** *NEURON*
  Bardoni, R., Tawfik, V. L., Wang, D., Francois, A., Solorzano, C., Shuster, S. A., Choudhury, P., Betelli, C., Cassidy, C., Smith, K., de Nooij, J. C., Mennicken, F., O'Donnell, et al
  2014; 81 (6): 1312-1327

- **Perioperative interventions to reduce chronic postsurgical pain.** *Journal of reconstructive microsurgery*
  Carroll, I., Hah, J., Mackey, S., Ottestad, E., Kong, J. T., Lahidji, S., Tawfik, V., Younger, J., Curtin, C.
  2013; 29 (4): 213-222

- **Perioperative Interventions to Reduce Chronic Postsurgical Pain** *JOURNAL OF RECONSTRUCTIVE MICROSURGERY*
  Carroll, I., Hah, J., Mackey, S., Ottestad, E., Kong, J. T., Lahidji, S., Tawfik, V., Younger, J., Curtin, C.
  2013; 29 (4): 213-222

- **Deep Brain Stimulation Results in Local Glutamate and Adenosine Release: Investigation Into the Role of Astrocytes** *NEUROSURGERY*
  Tawfik, V. L., Chang, S., Hitti, F. L., Roberts, D. W., Leiter, J. C., Jovanovic, S., Lee, K. H.
  2010; 67 (2): 367-375

- **The Role of Astrocytes in the Modulation of Pain** *SYNAPTIC PLASTICITY IN PAIN*
  Tawfik, V. L., DeLeo, J. A.
  edited by Malcangio, M.
  2009: 387-402

- **Propentofylline-induced astrocyte modulation leads to alterations in glial glutamate promoter activation following spinal nerve transection** *NEUROSCIENCE*
  Tawfik, V. L., Regan, M. R., Haenggeli, C., Lacroix-Fralish, M. L., Nutile-McMenemy, N., Perez, N., Rothstein, J. D., DeLeo, J. A.
  2008; 152 (4): 1086-1092

- **Neuregulin 1 is a pronociceptive cytokine that is regulated by progesterone in the spinal cord: Implications for sex specific pain modulation** *EUROPEAN JOURNAL OF PAIN*
  LaCroix-Fralish, M. L., Tawfik, V. L., Nutile-McMenemy, N., DeLeo, J. A.
  2008; 12 (1): 94-103

- **Intracranial self-stimulation of the dorsal raphe sensitizes psychostimulant locomotion** *BEHAVIORAL NEUROSCIENCE*
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