

YANGMIAO ZHANG

(Young-meow Djung)

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SUMMARY

I am a versatile and dedicated biologist inspired to find treatments for neurological disorders, and to progress the knowledge of humanity. I have extensive research experience in neuroscience, pharmacology, cellular and molecular biology, as well as animal behavioral models. With 10 years of experience in training personnel and managing a research laboratory, I value quality and collective productivity, and always look for better solutions to advance the science, reach the next goal, and help the people in need.

KEY TECHNICAL SKILLS

In Vivo: *In vivo* pharmacology • Animal models • Stereotaxic procedures • *In vivo* electrophysiology • PK/PD • Behavioral assays • Optogenetics • Chemogenetics • Calcium Imaging

In Vitro / Ex Vivo: Cell culture • Cellular & molecular assays • Western blot • Immunohistochemistry • PCR • Flow cytometry • Electrophoresis • Microscopy

Others Statistical analysis • Scientific writing (23+ publications) • Data presentation (30+ conference abstracts) • Teaching and mentoring • Team management • Project management

EDUCATION

Washington State University, WA	Ph.D.	Neuroscience	2015
Nanjing University, Nanjing, China	M.S.	Inorganic Chemistry	2010
Nanjing University, Nanjing, China	B.S.	Chemistry	2007

WORK EXPERIENCE

Senior Research Associate 2020 – present
Oregon Health & Science University, Portland OR

- Perform operant behavioral tests, tissue collection and analysis, IHC in rodent *in vivo* pharmacological studies.
- 2 solo and 5 collaborative studies on CNS mechanisms of alcohol use disorder and empathy for pain.
- 2 publications and 4 conference presentations, with 2 more pending manuscripts.
- Managed team projects and daily operations for 2.5 years, and trained and mentored 3 students.
- Contributed to writing major NIH research proposals as principal personnel.

Post-doctoral Researcher 2015 – 2020
Oregon Health & Science University, Portland OR

- Performed stereotaxic procedures, behavioral and PD assessment, and optogenetic manipulations in *in vivo* single-unit electrophysiological studies.
- 3 solo and 1 collaborative studies on pain modulation in the brainstem.
- 1 publication, 2 pending manuscripts, and 4 conference presentations.
- Trained and mentored 6 junior lab members.

Ph.D. Candidate 2010 – 2015
Washington State University, Pullman WA

- Performed behavioral tests, PK/PD, multi-routes dosing, stereotaxic surgery, and tissue analyses for biomarkers.
- 2 solo and 10+ collaborative studies on the efficacy of medical gases in mitigating pain and drug withdrawal.
- 8 publications and 19 conference presentations.
- Managed team, projects, and daily operations for 4.5 years.
- Trained and mentored 30 students, and advised their research/thesis projects.

Research Assistant

2005 – 2010

Nanjing University, Nanjing, China

- Performed cell culture, cellular and molecular assays to isolate, characterize, and analyze DNA/RNA, protein, and other molecules.
- 1 solo and 9 collaborative studies to assess *in vitro* pharmacological effects of novel small molecules.
- 10 publications and 1 conference presentation.

OTHER PROFESSIONAL EXPERIENCE

- **Instructor** of senior or graduate level neuroscience courses at 3 universities 2014, 2020, 2022
- **Invited speaker** at NW NogginFest 2022, Portland OR 2022
- **Peer reviewer** for 10+ academic journals in the field of neuroscience and pharmacology 2015 – present
- **Category and Finalist Judge** at Annual Intel Northwest Science Expo, Portland OR 2016 – 2019

HONORS AND AWARDS

- N.L. Tartar Trust Research Fellowship, Oregon Health & Science University 2017 – 2018
- Nominee for the Association for Faculty Women's Harriet B. Rigas Award 2015
 - To recognize the academic achievements and professional potential of Washington State University graduate student
- Travel Grant Awards, Washington State University 2011 – 2015

MEMBERSHIP

Society for Neuroscience

International Association for the Study of Pain

Golden Key International Honour Society

The Rho Chi Society

PUBLICATIONS

1. Potretzke S., **Zhang Y.**, Li J., Fecteau K., Erickson D., Hibert M., and Ryabinin A.E. (2022) Male-selective effects of oxytocin agonism on alcohol intake: Behavioral assessment in socially housed prairie voles and involvement of RAGE. *Neuropsychopharmacology*, *Accepted*.
2. Ryabinin A.E. and **Zhang Y.** (2021) Barriers and breakthroughs in targeting the oxytocin system to treat alcohol use disorders. *Frontiers in Psychiatry*, 13:842609.
3. Emmanouil D.E., Klein E.D., Chen K., Brewer A.L., **Zhang Y.**, and Quock R.M. (2020) Nitrous oxide-induced impairment of spatial working memory requires activation of GABAergic pathways. *Current Psychopharmacology*, 9(1), 68-78(11).
4. **Zhang Y.**, Brewer A.L., Nelson J.T., Smith P.T., Shirachi D.Y., and Quock R.M. (2019) Hyperbaric oxygen produces a nitric oxide synthase-regulated anti-allodynic effect in rats with paclitaxel-induced neuropathic pain. *Brain Research*, 1711, 41-47.
5. Buhler A., Sean T., **Zhang Y.**, and Quock R.M. (2018) nNOS immunoreactivity co-localizes with GABAergic and cholinergic neurons, and associates with beta-endorphinergic and met-enkephalinergic opioidergic fibers in rostral ventromedial medulla and A5 of the mouse. *Brain Res.*, 1698, 170-178.
6. Chen Q., Roeder Z., Li M.-H., **Zhang Y.**, Ingram S., and Heinricher M.M. (2017) Optogenetic evidence for a direct circuit linking nociceptive transmission through the parabrachial complex with pain-modulating neurons of the rostral ventromedial medulla (RVM). *eNeuro*, 4(3), e0202-17.2017, 1-16.
7. Nicoara D., **Zhang Y.**, Nelson J.T., Brewer, A.L., Maharaj P., DeWald S.N., Shirachi D.Y., and Quock R.M. (2016) Hyperbaric oxygen treatment suppresses withdrawal signs in morphine-dependent mice. *Brain Research*, 1648, 434-437.
8. **Zhang Y.**, Stolz P.A., Shirachi D.Y., and Quock R.M. (2014) Reduced antinociceptive responsiveness to hyperbaric oxygen in opioid-tolerant mice. *European Journal of Pain*, 18, 1032-1039.
9. Heeman J.H., **Zhang Y.**, Shirachi D.Y., and Quock R.M. (2013) Involvement of spinal cord opioid mechanisms in the acute antinociceptive effect of hyperbaric oxygen in mice. *Brain Research*, 1540, 42-47.
10. Gibbons C.R., Liu S., **Zhang Y.**, Sayre C.L., Leyitch B., Moehlmann S., Shirachi D.Y., and Quock R.M. (2013) Involvement of brain opioid receptors in the antiallodynic effect of hyperbaric oxygen (HBO₂) in rats with sciatic nerve crush-induced neuropathic pain. *Brain Research*, 1537, 111-116.
11. Guo W.*, **Zhang Y.***, Zhang L., Huang B., Tao F., Chen W., Guo Z., Xu Q., and Sun Y. (2013) Novel monofunctional platinum(II) complex Mono-Pt induces apoptosis-independent autophagic cell death in human ovarian carcinoma cells, distinct from cisplatin. *Autophagy*, 9(7), 1-13.
(* Co-first authors)
12. Sayre C.L., **Zhang Y.**, Martinez S., Takemoto J.K., and Davies N.M. (2013) Stereospecific Analytical Method Development and Preliminary *in vivo* Pharmacokinetic Characterization of Pinostrobin in the Rat. *Biomedical Chromatography*, 27(5), 548-550.
13. Yan L., Wang X., Wang Y., **Zhang Y.**, Li Y., and Guo Z. (2012) Cytotoxic palladium (II) complexes of 8-aminoquinoline derivatives and the interaction with human serum albumin. *Journal of Inorganic Biochemistry*, 106(1), 46-51.
14. Xing R., Wang X., Zhang C., Wang J., **Zhang Y.**, Song Y., and Guo Z. (2011) Superparamagnetic magnetite nanocrystal clusters as potential magnetic carriers for the delivery of platinum anticancer drugs. *Journal of Materials Chemistry*, 21(30), 11142-11149.
15. Lin M., Wang X., Zhu J., Fan D., **Zhang Y.**, Zhang J., and Guo Z. (2011) Cellular and biomolecular responses of human ovarian cancer cells to cytostatic dinuclear platinum (II) complexes. *Apoptosis*, 16(3), 288-300.
16. Dong X., Wang X., He Y., Yu Z., Lin M., Zhang C., Wang J., Song Y., **Zhang Y.**, Liu Z., Li Y., and Guo Z. (2010) Reversible DNA condensation induced by a tetranuclear nickel(II) complex. *Chemistry (Weinheim an der Bergstrasse, Germany)*, 16(47), 14181-14189.
17. Mao J., **Zhang Y.**, Zhu J., Zhang C., and Guo Z. (2009) Molecular combo of photodynamic therapeutic agent silicon(IV) phthalocyanine and anticancer drug cisplatin. *Chemical Communication*, 908-910.
18. Xu Z., **Zhang Y.**, Xue Z., Yang X., Wu Z., and Guo Z. (2009) DNA-binding property and antitumor activity of a cyclam bridged dinuclear platinum(II) complex. *Inorganic Chimica Acta*, 362(7), 2347-2352.
19. Jiang Q., Zhu J., **Zhang Y.**, Xiao N., and Guo Z. (2009) DNA binding property, nuclease activity and cytotoxicity of

- Zn(II) complexes of terpyridine derivatives. *Biometals*, 22, 297-305.
- Xin R., Wang X., Zhang C., **Zhang Y.**, Wang Q., Yang Z., and Guo Z. (2009) Characterization and cellular uptake of platinum anticancer drugs encapsulated in apoferritin. *Journal of Inorganic Biochemistry*, 103, 1039-1044.
 - Shi P., Lin M., Zhu J., **Zhang Y.**, and Jiang Q. (2009) DNA-binding affinity and nuclease activity of two cytotoxic copper terpyridine complexes. *Journal of Biochemical and Molecular Toxicology*, 23(4), 295-302.
 - Jiang Q., Wu Z., **Zhang Y.**, Hotze A.C.G., Hannon M.J., and Guo Z. (2008) Effect of adenine moiety on DNA binding property of copper(II)-terpyridine complexes. *Dalton Transactions*, 3054-3060.
 - Shi P., Jiang Q., Zhao Y., **Zhang Y.**, Lin J., Lin L., Ding J., and Guo Z. (2006) DNA binding properties of novel cytotoxic gold(III) complexes of terpyridine ligands: the impact of steric and electrostatic effects. *Journal of Biological Inorganic Chemistry*, 11, 745-752.

MEETING ABSTRACTS

- Zhang Y.**, Ryabinin A.E. Analysis of volatile organic compounds in soiled bedding that contributes to olfactory modulation of nociception in CFA-treated C57BL/6 mice. The 51st Annual Meeting of the Society for Neuroscience, November 12-16, 2022. *Society for Neuroscience Abstract* (2022)
- Zhang Y.**, Potretzke S., Ryabinin A.E. The role of oxytocin receptor in alcohol consumption in socially housed prairie voles. The 45th Annual Research Society on Alcoholism Scientific Meeting, Orlando, Florida, June 25-29, 2022.
- Zhang Y.**, Ryabinin A.E. Contribution of main olfactory system to mechanical hyperalgesia in mice exposed to bedding from CFA-treated conspecifics. The 50th Annual Meeting of the Society for Neuroscience (Virtual), November 8-11, 2021. *Society for Neuroscience Abstract* (2021)
- Zhang Y.**, Ryabinin A.E. Female mice exhibit persistent hyperalgesia while housed with CFA-treated stranger conspecifics or their bedding. *SfN Global Connectome*, January 11-13, 2021.
- Zhang Y.**, Martenson M.E., and Heinricher M.M. Local administration of a CB1 antagonist reveals endocannabinoid tone regulating pain-modulating neurons in the rostral ventromedial medulla. The 49th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 19-23, 2019. *Society for Neuroscience Abstract* (2019)
- Zhang Y.**, and Heinricher M.M. Disinhibition of rostral insular cortex produces pronociceptive activity in brainstem pain-modulating neurons and behavioral hyperalgesia. The 48th Annual Meeting of the Society for Neuroscience, San Diego, CA, November 3-7, 2018. *Society for Neuroscience Abstracts* (2018)
- Zhang Y.**, Martenson M.E., Lassetter A.P., and Heinricher M.M. Medullary pain-modulating neurons show enhanced responses to light in rodent model of migraine headache. The 47th Annual Meeting of the Society for Neuroscience, Washington D.C., November 11-15, 2017. *Society for Neuroscience Abstracts* (2017)
- Chen Q., Roeder, Z., **Zhang Y.**, Li, M., Ingram, S.L., and Heinricher, M.M. The parabrachial complex links pain transmission to pain modulation. The 46th Annual Meeting of the Society for Neuroscience, San Diego, CA, November 12-16, 2016. *Society for Neuroscience Abstracts* (2016)
- Zhang Y.**, Shirachi D.Y., and Quock R.M. Hyperbaric oxygen suppresses paclitaxel-induced neuropathic pain through the rostral ventromedial medulla (RVM). The 45th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 17-21, 2015. *Society for Neuroscience Abstracts* (2015)
- Klein E.D., Emmanouil D., **Zhang Y.**, Shirachi D.Y., and Quock R.M. A mechanistic study of the effects of nitrous oxide on spatial working memory in mice. The 45th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 17-21, 2015. *Society for Neuroscience Abstracts* (2015)
- Smith P.T., Brewer A.L., **Zhang Y.**, Shirachi D.Y., and Quock R.M. Investigating the antinociceptive effect of hyperbaric oxygen in an animal model of fibromyalgia: role of nitric oxide. The 45th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 17-21, 2015. *Society for Neuroscience Abstracts* (2015)
- Stoudt A.C., **Zhang Y.**, Shirachi D.Y., and Quock R.M. Hyperbaric oxygen produces antinociception in mice by activating CB1 cannabinoid receptors. The 45th Annual Meeting of the Society for Neuroscience, Chicago, IL, October 17-21, 2015. *Society for Neuroscience Abstracts* (2015)
- Tidd A., Brewer A.L., **Zhang Y.**, Shirachi D.Y., and Quock R.M. Role of serotonin in the acute antinociceptive effect of hyperbaric oxygen (HBO₂) in mice. The 34th Annual Scientific Meeting of the American Pain Society Meeting, Palm Springs, CA, May 13-16, 2015. *Journal of Pain* 16(4), S60. (2015)
- Zhang Y.**, Nelson J.T., Shirachi D.Y., and Quock R.M. Acute antinociceptive tolerance to hyperbaric oxygen (HBO₂)

- in opioid-pretreated mice. The 44th Annual Meeting of the Society for Neuroscience, Washington D.C. (Nov. 15-19, 2014). *Society for Neuroscience Abstracts* (2014)
15. **Zhang Y.**, Nelson J.T., Shirachi D.Y., and Quock R.M. Hyperbaric oxygen (HBO₂) suppresses paclitaxel (PAC)-induced cold allodynia in rats. Experimental Biology 2014, San Diego, CA (Apr. 26-30, 2014). *FASEB Journal* 28:1061.2 (2014)
 16. Nicoara D., **Zhang Y.**, Nelson J.T., Brewer A.L., Shirachi D.Y., and Quock R.M. Hyperbaric oxygen (HBO₂) treatment suppresses the withdrawal symptoms in opioid dependent mice. Experimental Biology 2014, San Diego, CA (Apr. 26-30, 2014). *FASEB Journal* 28:659.12 (2014)
 17. Church J., **Zhang Y.**, Shirachi D.Y., and Quock R.M. The involvement of supraspinal and spinal adrenergic pathway in hyperbaric oxygen (HBO₂)-induced antinociceptive effect. American Pain Society 33rd Annual Scientific Meeting, Tampa, FL. (Apr. 30 – May 3, 2014). *Journal of Pain* 15(4), S49. (2014)
 18. **Zhang Y.**, Stolz P.A., Brewer A.L., Shirachi D.Y., and Quock R.M. Cross-tolerance to hyperbaric oxygen (HBO₂)-induced antinociception in opioid-tolerant mice. The 43rd Annual Meeting of the Society for Neuroscience, San Diego, CA (Nov. 9-13, 2013). *Society for Neuroscience Abstracts* (2013)
 19. Brewer A.L., **Zhang Y.**, Buhler A.V., Shirachi D.Y., and Quock R.M. Investigation of the cumulative antinociceptive effect of multiple hyperbaric oxygen (HBO₂) exposures. The 43rd Annual Meeting of the Society for Neuroscience, San Diego, CA (Nov. 9-13, 2013). *Society for Neuroscience Abstracts* (2013)
 20. **Zhang Y.**, Brewer A.L., Shirachi D.Y., and Quock R.M. Hyperbaric oxygen (HBO₂) antinociception in chronic pain is blocked by neuronal nitric oxide synthase (nNOS) inhibitor. The 4th International Congress on Neuropathic Pain, Toronto, Canada (May 23-26, 2013). *Abstract for the International Association for the Study of Pain* (2013)
 21. **Zhang Y.**, Koh D.W., and Quock R.M. Nitrous oxide (N₂O) exposure increases neuronal nitric oxide synthase (nNOS) expression in mouse brain. Experimental Biology 2013, Boston, MA (Apr. 20-24, 2013). *FASEB Journal* 27:654.21 (2013)
 22. Heeman J., **Zhang Y.**, Shirachi D.Y., and Quock R.M. Role of spinal cord endogenous opioid peptides in the antinociceptive effect of hyperbaric oxygen (HBO₂). Experimental Biology 2013, Boston, MA (Apr. 20-24, 2013). *FASEB Journal* 27:885.8 (2013)
 23. **Zhang Y.**, Buhler A.V., Larson B., Melander J., Koh D.W., Shirachi D.Y., Quock R.M. Localization of hyperbaric oxygen (HBO₂)-induced changes in the expression of neuronal nitric oxide synthase (nNOS) by western blotting and immunohistochemistry (IHC). The 42nd Annual Meeting of the Society for Neuroscience, New Orleans, LA (Oct. 13-17, 2012). *Society for Neuroscience Abstracts* (2012)
 24. Gibbons C., Liu S., Sayre C.L., Levitch B., Moehlmann S., **Zhang Y.**, Shirachi D.Y., and Quock R.M. Possible involvement of opioid receptors in the antiallodynic effect of hyperbaric oxygen (HBO₂) in rats with sciatic nerve crush-induced neuropathic pain. The 42nd Annual Meeting of the Society for Neuroscience, New Orleans, LA (Oct. 13-17, 2012). *Society for Neuroscience Abstracts* (2012)
 25. **Zhang Y.**, Gibbons C.R., Howlader S., Son M.C., Yeon J., Shirachi D.Y., and Quock R.M. Suppression of paclitaxel-induced neuropathic pain by hyperbaric oxygen. Experimental Biology 2012, San Diego, CA (Apr. 21-25, 2012). *FASEB Journal* 26:662.9 (2012)
 26. Dupic C.M., **Zhang Y.**, Shirachi D.Y., and Quock R.M. Pharmacological differences between two mechanistically similar drug effects, nitrous oxide- and hyperbaric oxygen-induced antinociception in mice. Experimental Biology 2012, San Diego, CA (Apr. 21-25, 2012). *FASEB Journal* 26:662.7(2012)
 27. Buhler A.V., Sinit R., **Zhang Y.**, and Quock R.M. Hyperbaric oxygen treatment induces increased expression of neuronal nitric oxide synthase in pain modulatory brainstem regions of the mouse. The 31st Annual Meeting of the American Pain Society, Honolulu, HI (May 16-19, 2012). *Journal of Pain* 13, S46 (2012)
 28. Vaughn L.K., Zhang Y., Liu M., **Zhang Y.**, and Quock R.M. Endo-cannabinoid mechanisms are involved in nitrous oxide-induced antinociception. The 21st Annual Symposium of the International Cannabinoid Research Society, St. Charles, IL (Jul. 5-10, 2011). *Abstracts of the International Cannabis Research Society* (2011)
 29. **Zhang Y.**, Zhang Y., Liu M., Nelson-Brown S.N., Vaughn L.K., and Quock R.M. Involvement of endocannabinoid mechanisms in the antinociceptive effect of nitrous oxide in mice. The 41st Annual Meeting of the Society for Neuroscience, Washington, DC (Nov. 12-16, 2011). *Society for Neuroscience Abstracts* 37:582.15 (2011)
 30. **Zhang Y.**, Mao J., and Guo Z. Mechanism study of molecular combo of Si(IV) phthalocyanine and cisplatin. Proceedings of the 4th Asian Biological Inorganic Chemistry Conference, Jeju, South Korea, (Nov. 10 – 13, 2008) *Abstract*