

Curriculum Vitae

Personal data

LAST NAME: ZHANG

First Name: Yanbo

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Nationality: Canadian Citizen

Languages: Mandarin Chinese (Native), Professional fluent in English

Website:http://medicine.usask.ca/department/clinical/psychiatry.php?utm_source=psychiatry&utm_medium=redirect&utm_campaign=2017-07-10_archive

Google Scholar: <https://scholar.google.ca/citations?user=bTtQIW0AAAAJ&hl=en>

Education

2004 Ph.D. The Institute of Mental Health, Peking University, Health Science Center, Beijing, China, *The genetic association study of FZD3, FGF2 and NRG1 genes in the patients of schizophrenia in Chinese Han Population.*

1999 M.D. Peking University, Health Science Center (Beijing Medical University), Beijing, China

Postgraduate Training

2011.07-2016.06 Resident, Department of Psychiatry, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada

2014.07 -2014.09 Resident, elective, Department of Psychiatry, Faculty of Medicine and Dentistry, University of Alberta, Canada

2007.10-2008.04 Postdoctoral Fellow, Department of Psychiatry, Faculty of Medicine, University of Manitoba, Winnipeg, MB, Canada

2004.09-2007.09 Postdoctoral Fellow, Neuropsychiatry Research Unit, Department of Psychiatry, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada

Credentials and Practice Permits

2020.04-present Alberta PRAC ID No. 7447-21308

2020.03-present College of Physicians and Surgeons of Alberta (CPSA), License No.023986

2016.07-present Fellow of The Royal College of Physicians and Surgeons of Canada (FRCPC), No. 2315854

2016.07-present College of Physicians and Surgeons of Saskatchewan (CPSS), License No.11298

2011.07-2016.06 College of Physicians and Surgeons of Saskatchewan (CPSS), License No.110884

2014.07-2014.09 College of Physicians and Surgeons of Alberta, License (CPSA), No.023986

2012.12 Licentiate of the Medical Council of Canada (LMCC), No. 120754

Recognitions

2020.01-present Fellow of The American Psychiatric Association (FAPA)

2019 World Psychiatry Association (WPA) Early Career Psychiatrist Fellowship, Lisbon, Portugal

2017 Iver Joyce Graham Indiana Small professorship in Psychiatry, College of Medicine, University of Saskatchewan, Canada

2016 The 1939 Resident Teacher Award in Medicine, College of Medicine, University of Saskatchewan, Canada

2016 Resident Teaching Award, Department of Psychiatry, University of Saskatchewan

2015 Junior Investigator Research Colloquium Travel Award, The 65th Annual Conference of

- the Canadian Psychiatric Association, Vancouver, BC, Canada
- 2014 Intramural Research Award- Alfred E. Molstad Trust, Department of Psychiatry, University of Saskatchewan, Canada
- 2014 Resident Teaching Award, Department of Psychiatry, University of Saskatchewan
- 2014 Canadian College of Neuro-psychopharmacology (CCNP) W.G. Dewhirst Travel Award, Banff, AB, Canada
- 2009 Travel Research Award, International Society of Neurochemistry, Busan, S. Korea
- 2007 Best Paper Award, 2nd Place, The 57th Annual Conference of the Canadian Psychiatric Association, Montreal, QC, Canada

Work Experiences

- 2020.07-Present Adjunct faculty, Department of pharmacology, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada
- 2020.07-Present Adjunct faculty, Department of Psychiatry, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada
- 2020.04-2020.06 Consultant Psychiatrist, Peak Medical Speciality Centres, #125, 4611 Bowness Road NW, Calgary, AB, T3B0B2, Canada
- 2018.07-2020.06 Assistant professor, Department of pharmacology, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada
- 2016.07-2020.06 Assistant Professor, Department of Psychiatry, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada
- 2016.07-2020.06 Assistant Professor, College of Graduate Studies and Research, University of Saskatchewan, Saskatoon, SK, Canada
- 2016.07-2020.06 Consultant Psychiatrist, Student Wellness Center, University of Saskatchewan, Saskatoon, SK, Canada
- 2016.07-2020.06 Consultant Psychiatrist, Saskatoon Health Region, Saskatoon, SK, Canada
- 2011.07-2016.06 Resident, Department of Psychiatry, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada
- 2008.05-2012.05 Research Associate, Department of Psychiatry, Faculty of Medicine, University of Manitoba, Winnipeg, MB, Canada

Leaderships

- 2018-present Member, Research Metrics Task Force Committee, College of Medicine, University of Saskatchewan
- 2017-present Secretary-Treasurer, The Foundation of the Canadian Psychiatric Association (CPA)
- 2017-present Secretary-Treasurer, Canadian Psychiatric Association (CPA)
- 2017-present Executive member, The Board of Directors, Canadian Psychiatric Association (CPA)
- 2017-present Director of Saskatchewan, The Board of Directors, Canadian Psychiatric Association (CPA)
- 2017-present Committee member, Psychiatry Academic day, Department of Psychiatry, College of Medicine, University of Saskatchewan
- 2017-2019 Quality improvement committee, Student Health Service, University of Saskatchewan
- 2017-2019 Executive committee, Neuroscience Cluster, College of Medicine, University of Saskatchewan
- 2015 Academic chief resident, Department of Psychiatry, University of Saskatchewan
- 2014 Administrative chief resident, Department of Psychiatry, University of Saskatchewan

Editorial Board

- 2019.01-current Guest Associate Editor for Psychopathology. Frontiers in Psychology, Frontiers in

Psychiatry

2019.01-current Editor, Clinical and Experimental Pharmacology and Physiology (CEPP).

Research: Grants and Fellowships

- 2019-2021 NSERC Discovery Grant. The impact of Low Field Magnetic Stimulation (LFMS) on neuron-glia network. (Pending)
- 2019-2020 Low Frequency Magnetic Stimulation (LFMS): Non-Invasive and Low Cost Option for Treating Post-Stroke Depression. SHRF Collaborative Innovation Development Grants. (Awarded, \$50,000, Co-I)
- 2019-2020 A Pilot Clinical Study of Gamma-LFMS in Treating Treatment Resistant Depression. ComRad Grant, College of Medicine, University of Saskatchewan. (Awarded \$29,696, PI)
- 2019-2020 Effect of LFMS on Dopaminergic Neurons in an experimental model of Parkinson's Disease. ComRad Grant, College of Medicine, University of Saskatchewan. (Awarded, \$30,000 Co-I)
- 2019-2021 Industry Research Fund. Synergistic Effects of New Cannabidiols. (Awarded \$200,000, PI)
- 2019-2020 Mitacs accelerate fellowship. Cannabidiols a potential treatment for PTSD, a preclinical study. (\$30,000, Jacob Cohen, M.sc, recipient) (Awarded, Supervisor)
- 2019-2020 Effect of Low Field Magnetic Stimulation (LFMS) on Restoring Dopaminergic Neurons, Cognitive and Motor Functions in an experimental model of Parkinson's Disease. SHRF Collaborative Innovation Development Grant. (Awarded, \$50,000, Co-I)
- 2018-2019 Cannabidiols as a treatment for PTSD: a preclinical study. Department of Psychiatry Intramural Award and Kripa Thaur Memorial Award \$17,500 (Jacob Cohen) (Supervisor, Co-I)
- 2018-2021 The effects of low-field magnetic stimulation on neuroprotection, microglia modulation and myelin repair: a potential therapy for cognitive impairment and depression in multiple sclerosis. SHRF Establishment Grant. (Awarded, \$120,000, PI)
- 2017 DMS as a potential treatment for ischemic stroke: preclinical study. ComRad Grant, College of Medicine, University of Saskatchewan. (Awarded, \$30,000, co-PI)
- 2017 Low Field Magnetic Stimulation (LFMS) for treatment resistant depression, RCT trial. ComRad Grant, College of Medicine, University of Saskatchewan (Awarded, \$24,500, PI)
- 2017 Major Mental Illness: Early Intervention and Psychiatric Rehabilitation, with Special Consideration for Marginalized Populations. Saskatchewan Health Research Foundation (SHRF) Connection Grant. (Awarded, \$5,000, PI)
- 2016-2021 Iver and Joyce Graham Small Indiana Professorship in Psychiatry, University of Saskatchewan. Low Field Magnetic Stimulation (LFMS) for mood and memory, from bench to bedside. (Awarded, \$165,000, PI)
- 2016 Intramural Research Award- Alfred E. Molstad Trust, Department of Psychiatry, University of Saskatchewan (Awarded, \$9,000, PI)
- 2016-2019 Faculty Recruitment and Retention Program. The effects of varying levels of stress and cuprizone treatment on behavioural and myelin pathology in the live brain and cells. (Awarded, \$600,000, PI)
- 2013-2015 The therapeutic mechanisms of rTMS in psychiatric disorders: white matter dysfunction as a target. Rx&D Health Research Foundation (HRF) Young Minds Clinical Fellowship (Awarded, \$100,000, PI)
- 2014 Intramural Research Award- Alfred E. Molstad Trust, Department of Psychiatry, University of Saskatchewan (Awarded, \$9,000, PI)
- 2010-2013 China (MOST)-Canada (CIHR) Collaborative Teams in Health Research CIHR.

Oligodendrocyte dysfunction as a mechanism of schizophrenia and a target for treatment. (Awarded, \$500,000; co-investigator)

2010-2011 Canadian Institutes of Health Research (CIHR)-Bridge Funding CIHR. Oligodendrocyte dysfunction as a mechanism of schizophrenia and a target for treatment: new direction of the drug development. (Awarded, \$100,000; co-investigator)

2005-2007 Postdoctoral Fellowship, SHRF (Awarded, \$90,000)

Education: Supervision and Advisory Activities

Undergraduate (Biomedical)

2017-present Supervisor, Biomedical Undergraduate Honor project, College of Medicine, University of Saskatchewan

2017-present Supervisor, Dean's Summer Project, College of Medicine, University of Saskatchewan

2017-present Supervisor, Biomedical Summer Project, College of Medicine, University of Saskatchewan

Postgraduate (Biomedical)

2018-present Supervisor, Department of Anatomy, physiology and Pharmacology (M.Sc. & PhD), College of Medicine, University of Saskatchewan

2016-present Supervisor, Health Science Program (M.Sc. & PhD), College of Medicine, University of Saskatchewan

2016-present Academic Adviser, Health Science Program (M.Sc. & PhD), College of Medicine, University of Saskatchewan

2016-present Academic Adviser, Department of Anatomy, physiology and Pharmacology (M.Sc. & PhD), College of Medicine, University of Saskatchewan

Undergraduate (Medical)

2016-Present Clinical internship supervisor, College of Medicine, University of Saskatchewan

2016-present Examiner, Medical student formative OSCE, College of Medicine, University of Saskatchewan

2016-present Examiner, Medical student psychiatry oral exam, College of Medicine, University of Saskatchewan

2012-Present Psychiatry, Third year Psych Clinical interview and review, College of Medicine, University of Saskatchewan

2017 Non-substance addiction disorder, 3rd & 4th year lecture, College of Medicine, University of Saskatchewan

Postgraduate (Medical)

2018-present Resident training Committee (Neuropsychopharmacology panel), Department of Psychiatry, College of Medicine, University of Saskatchewan

2017-present Clinical supervisor, family resident program, Department of Psychiatry, College of Medicine, University of Saskatchewan

2017-present Clinical supervisor, shared care and addiction, Department of Psychiatry, University of Saskatchewan

2017-present Research Supervisor, Resident research projects, Department of Psychiatry, University of Saskatchewan

2017-present Psychiatry resident OSCE, Department of Psychiatry, University of Saskatchewan

2016-present Psychiatry resident Mock Oral, Department of Psychiatry, University of Saskatchewan

2016-present Psychiatry resident STACER, Department of Psychiatry, University of Saskatchewan

- 2013-present Committee member, The Canadian Resident Matching Service (CaRMS) Committee, Department of Psychiatry, College of Medicine, University of Saskatchewan
- 2007-2010 Psychiatry Resident Neuroscience sessions, Department of Psychiatry, Faculty of Medicine, University of Manitoba

Resident Research Supervision

- 2019 Mark Luba, MD, Psychiatry, Clinical study, Stimulant as a treatment option for social anxiety disorder, a clinical trial. University of Saskatchewan
- 2019 Jonathan Phang, MD, College of Medicine, Clinical studies, Efficacy of cannabis in treating post-traumatic stress disorder (PTSD): A 6-week double-blinded study. University of Saskatchewan
- 2018 Dan Huynh, Are mental health services able to keep up with the recent increase in student mental health awareness and education? An university-wide student survey study., University of Saskatchewan
- 2018 Rani C. Ojah, A Proposal to Evaluate the University of Saskatchewan Student Mental Health Strategy Part 2, University of Saskatchewan, University of Saskatchewan
- 2018 Mark Luba, Using Personalized Feedback and Fitbit Data to Promote Adherence to Physical Exercise in Patients with Major Depressive Disorder: A Pilot Study, University of Saskatchewan

Medical Student Research Summer Project

- 2018.5-8 Dylan Coupal, MD, College of Medicine, the effects of low field magnetic stimulation on white matter deficit related cognitive impairments, University of Saskatchewan
- 2018.5-8 QingYun Hua, MD, College of Medicine, Effects of Venlafaxine in Facilitating Neural Cell Proliferation, Maturation, and Development, University of Saskatchewan
- 2018.5-8 Andriy Simko, MD, College of Medicine, Low Field Magnetic Stimulation as a New Treatment for Post-traumatic stress disorder (PTSD): a Preclinical Study, University of Saskatchewan
- 2017.5-8 Codie Lavoie, MD, College of Medicine, rTMS as a treatment for depressive disorder, University of Saskatchewan

Biomedical Undergraduate

- 2019.5-8 Brandon Spink, Bachelor, Anatomy, Physiology and Pharmacology, Biomedical, Determining the effects of low-field magnetic stimulation (LFMS) on neuronal and oligodendrocyte progenitor cell survival and development. University of Saskatchewan
- 2018.5-8 David Kim, Bachelor, Pharmacology, neuroscience, Effects of THC, CBD and Their Combinations on Oligodendrocyte Proliferation, Maturation, and Development. University of Saskatchewan
- 2018.5-8 Jay Faye, Bachelor, Therapeutic effects and mechanism of rTMS in the treatment of Late-Life Depression. University of Saskatchewan
- 2017.9-2018.4 Jacob Cohen, Bachelor (honor project), Pharmacology/Psychiatry, Neuroscience, PTSD animal model and the effects of cannabis on PTSD. University of Saskatchewan
- 2017.5-8 Davin Truong, Bachelor, College of Medicine, LFMS as a treatment for post-stroke depression. University of Saskatchewan

Post-doctoral Fellow

- 2019.09-present Akanksha Baharani, Animal model of MS and the effects of cannabis on PTSD, University of Saskatchewan
- 2017.01-2018.06 Olubunmi.A Abebiyi, The effects of low-field magnetic stimulation on neuroprotection, microglia modulation and myelin repair, University of Saskatchewan

Postgraduate Student

- 2019.1-present Jacob Cohen, M.sc, Cannabidiols a potential treatment for PTSD, a preclinical study., Pharmacology Program, University of Saskatchewan
- 2018.9-present Zitong Wang, M.sc, The effects of Low-field Magnetic Stimulation on Remyelination and Oligodendrocytes development. Health Science Program, University of Saskatchewan
- 2017.5-2019.09 Ali Mooshekhian, M.sc, Effects of Low Field Magnetic Stimulation on Cognitive Impairment and Brain Pathologies in the Cuprizone Mouse Model of Demyelination, Health Science Program, University of Saskatchewan

Service on Thesis Committees

- 2019.08 James Benoit, PhD., external reviewer, Department of Psychiatry, Faculty of Medicine, University of Alberta.
- 2019.06 Anthony Pacholko, M.Sc., external reviewer, College of Medicine, University of Saskatchewan.
- 2019.01-present Evyn Peters M.Sc. College of Medicine, Melancholic depression and response to lamotrigine for the treatment of acute bipolar depression: a pooled analysis of five randomized controlled trials College of Medicine, University of Saskatchewan.
- 2017.05-2018.12 Jay Kim, M.Sc. Program. College of Medicine, University of Saskatchewan.
- 2017-2018 Hanan Mohanmmad, M.Sc. Program. College of Medicine, University of Saskatchewan.
- 2017-2018 Josh Allan, M.Sc. Program College of Medicine, University of Saskatchewan
- 2016-2017 Nikita Nogovitsy, M.Sc. program. The Site-Specific Effects of Kindling on Cognition and Adult Hippocampal Neurogenesis. College of Medicine, University of Saskatchewan.

Supervision of other Research and Academic Personnel

- 2019-2020 Yonglin Yang, Visiting scholar.
- 2018-2018 Fei Wang, Visiting Professor.
- 2016-2017 Zhen Zhang, Visiting Professor.

Other Education

- 2013-15 Psychiatry, Third Year Psychiatry, lectures, Shantou University, Shantou, China
- 2007-2010 Psychiatry Resident Neuroscience sessions, Department of Psychiatry, Faculty of Medicine, University of Manitoba

Memberships

- Canadian Medical Association (CMA)
- Canadian Psychiatric Association (CPA)
- American Psychiatric Association (APA)
- World Psychiatric Association (WPA)
- Saskatchewan Medical Association (SMA)
- Canadian Medical Protective Association (CMPA)
- Canadian College of Neuropsychopharmacology (CCNP)
- The International College of Neuropsychopharmacology (CINP)

Research Keywords

Depression, PTSD, Cannabidiol, antipsychotics, neuroprotection, neurodevelopment, neurodegeneration, magnetic stimulation (TMS)

Invited Lectures

- 2019.04 The biological mechanism behind LFMS. 11th International Congress on Psychopharmacology & 7th International Symposium on Child and Adolescent Psychopharmacology, 18-22, April, 2019, Antalya, Turkey
- 2019.04 LFMS as a novel treatment for psychiatric disorders, clinical insight. 11th International Congress on Psychopharmacology & 7th International Symposium on Child and Adolescent Psychopharmacology, 18-22, April, 2019, Antalya, Turkey
- 2018.11 The impact of cannabis on PTSD in military Veterans. The standing testimony before the Veteran Affairs Committee, The House of Commons, Ottawa, Canada
- 2017.11 The Effects of Deep-brain Magnetic Stimulation (DBS) on White Matter Deficits: New Mechanism in Multiple Sclerosis Treatment. Changhai Hospital, The Second Military Medical University, Shanghai, China
- 2017.11 The neurostimulation and its applications in adolscent. Xiamen Medical University, Xiamen, Fujian, China
- 2017.11 Antidepressant as a disease modifying treatment of Alzheimer's disease: findings from animal study. Xiamen Medical University, Xiamen, Fujian, China
- 2017.10 DSM-IV to DSM-5, what do we need to know. Ningxia Medical University, Yinchuan, Ningxia, China
- 2017.10 Brain Magnetic Stimulation and schizophrenia: a new direction for cognitive impariment. Guangzhou Medical University, Guangzhou, Guangdong, China
- 2017.10 Psychiatry training in Canada, patient-centered and competence-based approach. Guangzhou Medical University, Guangzhou, Guangdong, China
- 2016.9 Radio interview: the stigmas and challenges in mental health, Beijing People's Broadcasting Station, FM 103.9.
- 2016.9 Psychiatry training in neurology residency: Canadian system introduction. Beijing Municipal Commissions of Health and Family Planning, Beijing, China
- 2016.9 Psychiatry training in Canada, patient-centered and competence-based approach. The 13th Annual Meeting of Liaoning Psychiatry Association, 7-9 September 2016, Shenyang, Liaoning, China
- 2016.9 Law and Psychiatry practice in Canada. The 13th Annual Meeting of Liaoning Psychiatry Association, 7-9 September 2016, Shenyang, Liaoning, China
- 2016.9 The therapeutic effects on white matter deficits: the implications of new targets in psychiatric disorders. The 14th Chinese Society of Psychiatry Annual Conference, 31 August- 3 September, 2016. Changsha, Hunan, China.
2016. 9 The dark side of pot: Cannabis and mental health. The Institute of Mental Health, Peking University Health Science Center, Beijing, China
- 2015.1 Introduction of CanMEDs concept to Chinese residents, Peking University Health Science Center, Beijing, China
- 2014.12 Psychiatry service and resident training in Canada, Shantou University, Shantou, China

Peer Reviewed Publications (*first author or corresponding author)

1. Du, B., Li, H., Zheng, H., Lian, Y., Fan, C., Liang, M., Wei, Z; **Zhang, Y*** and Bi, X* (2019). Minocycline ameliorates depressive-like behavior and demyelination induced by transient global cerebral ischemic via inhibition of microglia activation. *Front Pharmacol.* 22 October 2019 doi: 10.3389/fphar.2019.01247
2. Sekar, S., **Zhang, Y.**, Miranzadeh Mahabadi, H., Parvizi, A., Taghibiglou, C. (2019). Gamma Rhythm Low Field Magnetic Stimulation Restores Dopaminergic Neurons and Motor Function in an Acute Experimental Mouse Model of Parkinson's Disease. *Sci Rep.* (revision)
3. Kim, J., Zaki, M., Stockwell, J., **Zhang, Y*** and Cayabyab, F. (2019). Gamma Burst Oscillations

- (GBOs) Using Low Field Magnetic Stimulation (LFMS) Improves Post-Stroke Cognitive and Psychiatric Deficits in an Animal Stroke Model. *Translational Psychiatry*. (submitted)
4. Mooshekhian, A., Adebisi, O.A., Lavoie, C., Truong, D., Cohen, J., Kim, D., Wei, Z and **Zhang, Y***. (2019). The Effects of Low Field Magnetic Stimulation on Cognitive Impairment and Depressive-like Behaviours in a Cuprizone Mouse Model of Demyelination. (2019). *Front Psychiatry* (Submitted).
 5. Cohen, J., Wei, Z., Phang, J., Laprairie, R., **Zhang, Y***. (2019). Cannabinoids as an Emerging Therapy for Post-traumatic Stress Disorder and Substance Use Disorders. *Journal of Clinical Neurophysiology*. (accepted).
 6. Sekar, S., **Zhang, Y.**, Miranzadeh Mahabadi, H., Parvizi, A., Taghibiglou, C. (2019). Low Field Magnetic Stimulation Restores Cognitive and Motor Functions in the Mouse Model of Repeated Traumatic Brain Injury: Role of Cellular Prion Protein. *J Neurotrauma*. 2019 Apr 25. doi: 10.1089/neu.2018.5918.
 7. **Zhang, Y***, Bi, X.Y., Adebisi, O., Wang, J., Mooshekhian, A., Jacob, C., Wei, Z., Wang, F., Li, X-M. (2019). Venlafaxine Improves the Cognitive Impairment and Depression-Like Behaviors in a Cuprizone Mouse Model by Alleviating Demyelination and Neuroinflammation in the Brain. *Front Pharmacol*. 2019 Apr 5;10:332. doi: 10.3389/fphar.2019.00332. PMID: 31024304
 8. Li, H., Li, J., Yu, X., Zheng, H., Sun, X., Lu, Y., **Zhang, Y.**,* Li, C., Bi X. (2017). The incidence rate of cancer in patients with schizophrenia: A meta-analysis of cohort studies. *Schizophr Res*. 2017 Sep 21. pii: S0920-9964 (17) 30541-8. doi: 10.1016/j.schres.2017.08.065.
 9. Zhu, S., Wang, J., **Zhang, Y.**, He, J., Kong, J., Wang, J., Li, X.-M. (2017). The role of neuroinflammation and amyloid in cognitive impairment in an APP/PS1 transgenic mouse model of Alzheimer's disease. *CNS Neurosci Ther*. 2017 Apr; 23(4):310-320. doi: 10.1111/cns.12677. PMID: 28191738
 10. Li, J., Zhang, L., **Zhang, Y.**, Deng, B., Bi, X. (2016). Misdiagnosis of spinal subacute combined degeneration in a patient with elevated serum B12 concentration and sensory deficit level. *Neurol Sci*. 2016 Sep;37(9):1577-8. doi: 10.1007/s10072-016-2566-1. PMID: 27043950
 11. Qiao, J., Wang, J., Wang, H., **Zhang, Y.**, Zhu, S., Adilijiang, A., Guo, H., Zhang, R., Guo, W., Luo, G., Qiu, Y., Xu, H., Kong, J., Huang, Q., Li, X-M. (2016). Regulation of astrocyte pathology by fluoxetine prevents the deterioration of Alzheimer phenotypes in an APP/PS1 mouse model. *Glia*. 2015 Oct 8. doi: 10.1002/glia.22926. PMID: 26446044
 12. Zhu, S., Wang, J., **Zhang, Y.**, Li, V., Kong, J., He, J., Li, X-M. (2014). Unpredictable chronic mild stress induces anxiety and depression-like behaviors and inactivates AMP-activated protein kinase in mice. *Brain Research* doi: 10.1016/j.brainres.2014.06.002. PMID: 24971831
 13. Wang, J., Zhu, S., Wang, H., He, J., **Zhang, Y.**, Adilijiang, A., Zhang, H., Hartle, K., Guo, H., Kong, J., Huang, Q., Li, X-M. (2014). Astrocyte-dependent protective effect of quetiapine on GABAergic neuron is associated with the prevention of anxiety-like behaviors in aging mice after long-term treatment. *Journal of Neurochemistry* 2014 Sep;130(6):780-9. doi 10.1111/jnc.12771. PMID: 24862291.
 14. Wang, J., Qiao, J., **Zhang, Y.**, Wang, H., Zhu, S., Zhang, H., Hartle, K., Guo, H., Guo, W., He, J., Kong, J., Huang, Q., Li, X-M. (2014). Desvenlafaxine prevents white matter injury and improves the decreased phosphorylation of the rate-limiting enzyme of cholesterol synthesis in a chronic mouse model of depression. *Journal of Neurochemistry* doi: 10.1111/jnc.12792. PMID: 24934403.
 15. Wang, J., **Zhang, Y***, Xu, H., Zhu, S., Wang, H., He, J., Zhang, H., Guo, H., Kong, J., Huang, Q., **Zhang, Y.**, Li, X-M. (2014). Fluoxetine improves behavioral performance by suppressing the production of soluble β -amyloid in APP/PS1 mice. *Current Alzheimer Research* 11 (7), 672-680. PMID: 25115542.
 16. Zhang, H., **Zhang, Y***, Xu, H., Wang, L., Adilijiang, A., Wang, J., Zhang, Z., Zhang, D., Tan, Q., Kong, J., Huang, Q., Li X-M. (2014). Olanzapine ameliorates neuropathological changes and increases IGF-1 expression in frontal cortex of C57BL/6 mice exposed to cuprizone. *Psychiatry Research* 216(3):438-45. PMID: 24613202.
 17. Hayes, K., Buist, R., Vincent, T., Thiessen J., **Zhang, Y.**, Zhang, H., Wang, J., Summers, A., Kong, J.,

- Li, X-M., Martin, M. (2014). Comparison of manual and semi-automated segmentation methods to evaluate hippocampus volume in APP and PS1 transgenic mice obtained via in vivo magnetic resonance imaging. *Journal of Neuroscience Methods* 15;221:103-11. PMID: 24092239.
18. Thiessen, J., **Zhang, Y.**, Zhang, H., Wang, L., Buist, R., Del Bigio, M., Kong, J., Li, X-M., Martin, M. (2013). Quantitative MRI and ultrastructural examination of the cuprizone mouse model of demyelination. *NMR in Biomedicine* 26(11):1562-81. PMID: 23943390.
 19. Zhang, H., **Zhang, Y***, Xu, H., Wang, L., Zhao, J., Wang, J., Zhang, Z., Tan, Q., Kong, J., Huang, Q., Li, X-M. (2013). Locomotor activity and anxiety status, but not spatial working memory, are affected in mice after brief exposure to cuprizone. *Neuroscience Bulletin* 29(5):633-41. PMID: 23990221.
 20. Fang, F., Zhang, H., **Zhang, Y.**, Xu, H., Huang, Q., Adilijiang, A., Wang, J., Zhang, Z., Zhang, D., Tan, Q., He, J., Kong, J., Liu, Y., Li, X-M. (2013). Antipsychotics promote the differentiation of oligodendrocyte progenitor cells by regulating oligodendrocyte lineage transcription factors 1 and 2. *Life Sciences* 93(12-14):429-34. PMID: 23973956.
 21. Bi, X., **Zhang, Y***, Yan, B., Fang, S., He, J., Tan, Q., Zhang, D., Kong, J., and Li, X-M. (2012). Quetiapine prevents oligodendrocyte and myelin losses and promotes maturation of oligodendrocyte progenitors in the hippocampus of global cerebral ischemia mice. *Journal of Neurochemistry* 123:14-20. PMID 22817262.
 22. **Zhang, Y.**, Zhang, H., Wang, L., Jiang, W., Xu, H., Xiao, L., Bi, X., Wang, J., Zhu, S., Zhang, R., He, J., Tan, Q., Zhang, D., Kong, J., and Li, X-M. (2012). Quetiapine enhances oligodendrocyte regeneration and myelin repair after cuprizone-induced demyelination. *Schizophrenia Research* 138(1):8-17. PMID 22555017.
 23. Tian, L., Meng, C., Yan, H., Zhao, Q., Liu, Q., Yan, J., Han, Y., Y, H., Wang, L., Yue W., **Zhang, Y.**, Li, X-M., Zhu, C., He, Y., and Zhang, D. (2011). Convergent evidence from multimodal imaging reveals amygdale abnormalities in schizophrenic patients and their first-degree relatives. *PLoS One*, 6(12): e28794. PMID 22174900.
 24. Wang, Y., **Zhang, Y.**, He, J., Zhang, H., Lan, X., Nazarali, A., Zhang, Z., Zhang, D., Tan, Q., Kong, J., and Li, X-M. (2011). Hyperforin promotes mitochondrial function and development of oligodendrocytes. *Journal of Neurochemistry* 119(3):555-568. PMID 21848657.
 25. Fang, S., Yan, B., Wang, D., Bi, X., **Zhang, Y.**, He, J., Yang, Y., Xu, H., Kong, J., Wu, J., and Li, X-M. (2010). Chronic effects of venlafaxine on synaptophysin and neuronal cell adhesion molecule in the hippocampus of cerebral ischemic mice. *Biochemistry and Cell Biology* 88(4):655-663. PMID 20651837.
 26. Xu, H., Yang, H-J., **Zhang, Y.**, Clough, R.W., Browning, R. A., and Li, X-M. (2009). Behavioral and neurobiological changes in C57BL/6 mice chronically exposed to cuprizone. *Behavioral Neuroscience* 123(2):418-429. PMID 19331464.
 27. Yu, Y., He, J., **Zhang, Y.**, Luo, H., Zhu, S., Yang, Y., Zhao, T., Wu, J., Huang, Y., Kong, J., Tan, Q., and Li, X-M. (2009). Increased hippocampal neurogenesis in the progressive stage of Alzheimer's disease phenotype in an APP/PS1 double transgenic mouse model. *Hippocampus* 19(12):1247-53. PMID 19309037.
 28. Xu, H., Yang, H-J., Wang, H., **Zhang, Y.**, Xiao, L., Clough, R.W., Browning, R., and Li, X-M. (2009). Region-specific susceptibilities to cuprizone-induced lesions in the mouse forebrain: implications for the pathophysiology of schizophrenia. *Brain Research* 123:418-429. PMID 19306847.
 29. He, J., Luo, H., Yan, B., Yu, Y., Wang, H., Wei, Z., **Zhang, Y.**, Xu, H., Tempier, A., Li, X., and Li, X-M. (2009). Beneficial effects of quetiapine in a transgenic mouse model of Alzheimer's disease. *Neurobiology of Aging*, 30(8):1205-1216. PMID 18079026.
 30. **Zhang, Y.**, Xu, H., Jiang, W., Xiao, L., Yan, B., He, J., Wang, Y., Bi, X., Li, X., Kong, J., and Li, X-M. (2008). Quetiapine alleviates the cuprizone-induced white matter pathology in the brain of C57BL/6 mouse. *Schizophrenia Research* 106(2-3):182-91. PMID 18938062.
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Conference Papers (Oral presentation)

1. **Zhang, Y.**, Li, X-M., Adebiyi, O.A., Truong, D., Moosheiken, A., Zelan W., Lavoie, C., Bowen, R., Wang, Fei. (2019) Effects of Low Field Magnetic Stimulation (LFMS) on Proliferation and Differentiation of Oligodendrocyte Progenitor Cells. The 19th WPA World Congress of Psychiatry (WCP), 21-24 August 2019, Lisbon, Portugal.
2. Adebiyi, O.A., Truong, D., Moosheiken, A., Wei, Z., Lavoie, C., Bowen, R., Wang, F., Li, X.-M and **Zhang, Y.** (2018) Gamma low-field magnetic stimulation (LFMS) accelerates remyelination and improves cognitive and depressive symptoms in a cuprizone. The 18th WPA World Congress of Psychiatry, 27-30 September 2018, Mexico City, Mexico.
3. Sekar, S., **Zhang, Y.**, Taghibiglou, C. (2018). Effect of Low Field Magnetic Stimulation on cognitive and motor functions in a traumatic brain injury mouse model. The 12th Annual Canadian Neuroscience Meeting; 13-16 May 2018. Vancouver, British Columbia, Canada.
4. Li, X-M and **Zhang Y.** (2017). The Effects of Deep-brain Magnetic Stimulation (DMS) on White Matter Deficits: New Mechanism in Major Depressive Disorder (MDD) Treatment. The 25th European Congress of Psychiatry (EPA 2017), 1-4 April 2017, Florence, Italy
5. **Zhang Y** and Li, X-M.(2016). Antidepressant as a disease modifying treatment of alzheimer's disease: findings from animal study. The World Psychiatry Association International Congress, 18-22 Nov, 2016, Cape Town, South Africa.

6. **Zhang Y**, Wang J, Guo H, Zhu S, Li, X-M. (2015). Fluoxetine Improves behavioural and memory performance of amyloid precursor protein-presenilin 1 transgenic mice by decreasing the soluble beta-amyloid in the brain. The 64th Canadian Psychiatric Association Annual Conference; CPA Junior Investigator Research Colloquium. 1-3 October, 2015, Vancouver, British Columbia, Canada.
7. **Zhang Y**, Wang J, Zhu S, Li, X-M. (2015). Fluoxetine alleviates behavioral impairments and soluble beta-amyloid production in app/ps1 mice. The 12th World Congress of Biological Psychiatry, 14 - 18 June, 2015. Athens, Greece.
8. **Zhang Y**, Zhang H, Kong J, Li, X-M (2014). Antipsychotics promote the differentiation of oligodendrocyte progenitor cells by regulating oligodendrocyte lineage transcription factors 1 and 2. The 22nd European Congress of Psychiatry; 1-4 March, 2014. Munich, Germany.
9. **Zhang Y**, Bi X, Zhang H, Kong J, Li, X-M (2013). Quetiapine prevents hippocampal white matter damage in the brain of global cerebral ischemia mouse: A model of vascular depression. The American Psychiatry Association Annual Meeting; 18-22 May, 2013. San Francisco, California, USA.

Conference Papers (Poster presentation)

10. Moosheiken, A., Li, X.-M and **Zhang, Y. (2019)**. The protective effects of Low Field Magnetic Stimulation (LFMS) against cognitive deficits and depression-like symptoms in a cuprizone mouse model of demyelination. The 14th World Congress of Biological Psychiatry, 2 - 6 June 2019, Vancouver, BC, Canada.
11. Moosheiken, A., Wei, Z., Li, X.-M and **Zhang, Y. (2019)**. Low Field Magnetic Stimulation (LFMS) as a promising treatment for MS: preclinical studies. Podium presentation, Health Science Research Day 3, May 2019, Saskatoon, SK, Canada.
12. Kim, D., Fyfe, J., Truong, D., Cohen, J., and **Zhang, Y. (2019)**. Low Field Magnetic Stimulation Promotes Oligodendrocyte Maturation and Remyelination of Cuprizone-induced Mouse Model of Multiple Sclerosis. University of Saskatchewan Students' Union Undergraduate Project Symposium 2019, 31 Jan 2019, Saskatoon, SK, Canada.
13. Hua Q, Wei Z, Gui L, Zhang Z, Mueller R, **Zhang, Y. (2018)**. Low Field Magnetic Stimulation (LFMS) and Venlafaxine on Proliferation and Differentiation of Oligodendrocyte Progenitor Cells. Dean's Summer and Biomedical Research Day 2018, 23 November, 2018, Saskatoon, SK, Canada.
14. Simko, A., Cohen, J., Wei, Z., Hua, Q., **Zhang, Y. (2018)**. Comparing male and female behaviour in a rat and mouse model of PTSD. Dean's Summer and Biomedical Research Day 2018, 23 November, 2018, Saskatoon, SK, Canada.
15. Moosheiken, A., Li, X.-M and **Zhang, Y. (2018)**. Low-Field Magnetic Stimulation (LFMS) decreases cuprizone-induced cognitive impairment and brain pathology in mice. The 4th Neuroscience Cluster Symposium of the University of Saskatchewan, 3 October 2018, Saskatoon, SK, Canada.
16. Adebiyi, O.A., Truong, D., Moosheiken, A., Wei, Z., Lavoie, C., Bowen, R., Wang, Fei., Li, X.-M and **Zhang, Y. (2018)** Low-Field Magnetic Stimulation (LFMS) decreases cuprizone-induced cognitive impairment and brain pathology in mice. The 31st ECNP Congress of Applied and Translational Neuroscience, 6-9 October 2018, Barcelona, Spain.
17. Bi, X., Adebiyi, O.A., Moosheiken, A., Li, X.-M and **Zhang, Y. (2018)**. Venlafaxine, but not fluoxetine reduces cuprizone-induced demyelination and neuroinflammation. The International College of Neuropsychopharmacology (CINP) World Congress, 16-19 June 2018. Vienna, Austria.
18. Adebiyi, O.A., Bi, X., Moosheiken, A., Truong, D., Wei, Z., Li, X.-M and **Zhang, Y. (2018)**. Venlafaxine ameliorates cognitive impairments and brain myelin deficits in a cuprizone induced demyelination animal. The 41st Canadian College of Neuropsychopharmacology Annual Meeting, 28-30 June, 2018. Vancouver, British Columbia, Canada.

19. Huynh, D., Ojah, R., Trecker, M., Holt, A., Drew, M., Orb, J., Hedley, P., Hanoski, R., **Zhang, Y.** (2018). Are mental health services able to keep up with the recent increase in student mental health awareness and education? A university-wide student survey study. The 19th Canadian Collaborative Mental Health Care Conference, June 1 & 2, 2018. Toronto, ON, Canada.
20. Ojah, R., Huynh, D., Holt, A., Drew, M., Orb, J., Hedley, P., Hanoski, R., Szelest, I., and **Zhang, Y.** (2018). Be Well' – A Proposal to Evaluate the University of Saskatchewan Mental Health Strategy: Early Response Prevention Domain. The 19th Canadian Collaborative Mental Health Care Conference, June 1 & 2, 2018. Toronto, ON, Canada.
21. Sekar, S., **Zhang, Y.**, Taghibiglou, C. (2018). Effect of Low Field Magnetic Stimulation on restoring neuronal and glial functions against 1-Methyl-4-Phenyl-1,2,3,6-Tetrahydropyridine induced Parkinson's disease mouse model. The 12th Annual Canadian Neuroscience Meeting; 13-16 May 2018. Vancouver, British Columbia, Canada.
22. Mooshekhian, A., Adebisi, O.A., Lavoie, C., Truong, D., Cohen, J., Wei, Z and **Zhang, Y.** (2018). The Effects of Low Field Magnetic Stimulation on Cognitive Impairment and Depressive-like Behaviours in a Cuprizone Mouse Model of Demyelination. Life and Health Sciences Research Exposition. 3 May 2018. Saskatoon, SK, Canada.
23. Kim, J., Zaki, M., Stockwell, J., **Zhang, Y** and Cayabyab, F. (2018). Gamma Burst Oscillations (GBOs) Using Low Field Magnetic Stimulation (LFMS) Improves Post-Stroke Cognitive and Psychiatric Deficits in an Animal Stroke Model. Life and Health Sciences Research Exposition. 3 May 2018. Saskatoon, SK, Canada.
24. Cohen, J., Wei, Z., Moosheiken, A., Adebisi, O.A. and **Zhang, Y.** (2018). Face Validity of Rodent PTSD model. Life and Health Sciences Research Exposition. 3 May 2018. Saskatoon, SK, Canada.
25. Kim, H., **Zhang, Y.**, Cayabyab, F. (2018). Non-invasive Treatment of Post-Stroke Depression with Low Field Magnetic Stimulation (LFMS) in a Small Vessel Animal Stroke Model. The University of Saskatchewan Surgery Faculty Research Day. April 12, 2018. Saskatoon, SK, Canada.
26. Cohen, J., Wei, Z., Moosheiken, A., Adebisi, O.A. and **Zhang, Y.** (2018). Face Validity of Rodent PTSD model. Physiology and Pharmacology honours poster presentation. 20 March 2018. Saskatoon, SK, Canada.
27. Adebisi, O.A., Moosheiken, A., Lavoie, C., Truong, D., Cohen, J., Wei, Z and **Zhang, Y.** (2017). Effects of low field magnetic stimulation on cognitive and emotional deficits in a multiple sclerosis model. The University of Saskatchewan 2017 Neuroscience Research Symposium. November 3, 2017. Saskatoon, SK, Canada.
28. Kim, H., **Zhang, Y.**, Cayabyab, F. (2017). Characterizing the therapeutic potential of transcranial magnetic stimulation for the immediate treatment of post-stroke psychiatric symptoms. The University of Saskatchewan 2017 Neuroscience Research Symposium. November 3, 2017. Saskatoon, SK, Canada.
29. **Zhang Y**, Feng S, Wang H., Abulimiti A, Hartle K, Wang J, Tan Q, Li X-M (2015). HF-RTMS treatment ameliorates acute cuprizone- induced demyelination and behavioral deficits (2015). 25th Meeting of The International Society For Neurochemistry. 23-27, August, 2015. Cairns, Australia.
30. Feng S, Wang H, Abulimiti A, Hartle K, **Zhang Y**, Wang J, Tan Q, Li X-M (2015). HF-rTMS Treatment Ameliorates Acute Cuprizoneinduced Demyelination and Behavioral Deficits. 1st International Brain Stimulation Conference 2–4 March 2015. Singapore, Singapore.
31. **Zhang Y**, Wang J, Guo H, Zhu, S, Li X-M. (2015). Fluoxetine Improves behavioural and memory performance of amyloid precursor protein-presenilin 1 transgenic mice by decreasing the soluble beta-amyloid in the brain. The 64th Canadian Psychiatric Association Annual Conference; 1-3 October, 2015, Vancouver, British Columbia, Canada.
32. **Zhang Y**, Bi X, Zhang H, Kong J, Li X-M (2014). Quetiapine enhances oligodendrocyte and myelin repair in a mouse model of vascular depression. The 64th Canadian Psychiatric Association Annual Conference; 11-13 September, 2014. Toronto, Ontario.

33. **Zhang Y**, Zhang H, Kong J, Li X-M (2014). Antipsychotics promote the differentiation of oligodendrocyte progenitor cells by regulating oligodendrocyte lineage transcription factors 1 and 2. The 29th CINP World Congress of Neuropsychopharmacology; 22-26 June, 2014. Vancouver, British Columbia
34. **Zhang Y**, Zhang H, Kong J, Li X-M (2014). Targeting oligodendrocyte repair and development: A new feature of atypical antipsychotic drugs and beyond? The Canadian College of Neuropsychopharmacology 37th Annual meeting; 18-21 June, 2014. Banff, Alberta, Canada.
35. **Zhang Y**, Zhang H, Kong J, Li X-M (2012). Antipsychotic drugs promote the development of oligodendrocyte through transcription factors olig1 and olig2 in vitro. CSCI Young Investigators Forum; 19-21 September, 2012, Ottawa. Ontario, Canada.
36. Wang J, Zhang R, **Zhang Y**, Zhang H, Zhang C, Wang H, Hou Z, He J, Kong J and Li X-M (2011). Astrocyte- dependent protective effects of quetiapine on GABAergic neuron in primary cultures. The 7th Annual Child Health Research Day; 6 August, 2011. Winnipeg, Manitoba, Canada.
37. Zhu S, Wang J, He J, Zhang R, **Zhang Y**, Kong J, Li X-M (2011). Modifying Alzheimer's disease progression by targeting β -amyloid production. The 34th Annual Canadian College of Neuropsychopharmacology (CCNP) Meeting; 20-23 May, 2011. Montreal, Quebec, Canada.
38. He J, Zhu S, **Zhang Y**, Kong J, Li X-M (2011). Increased serum β -amyloid peptide levels in the early stage of Alzheimer's disease phenotype in an APP/PS1 double transgenic mouse model. 26th International Conference of Alzheimer's Disease; 26-29 September, 2011, Toronto, Ontario, Canada.
39. **Zhang Y**, Zhang H, Xu H, Kong J, Li X-M. (2011) Antipsychotic drugs promote oligodendrocyte development by regulating transcription factors olig1 and olig2 in vitro. The 61st Canadian Psychiatric Association's Annual Conference; 13-15 October, 2011. Vancouver, British Columbia, Canada,
40. **Zhang Y.**, Zhang, H., Wang, L., Zhang, R., Wang, J., Zhu, S., He, J., Kong, J., and Li, X-M. (2010) Quetiapine promotes remyelination and oligodendrocyte maturation in cuprizone-induced demyelination model. The 60th Canadian Psychiatric Association's Annual Conference; 23-26 September, 2010. Toronto, Ontario, Canada.
41. **Zhang Y.**, Xu, H., Jiang, W., Xiao. L., Yan, B., He, J., Wang, Y., Bi, X., Li, X., Kong, J., and Li, X-M. (2009) Quetiapine alleviates the cuprizone-induced white matter pathology in the brain. The 59th Canadian Psychiatric Association's Annual Conference; 27-29 August, 2009. St. John's, Newfoundland, Canada.
42. **Zhang Y.**, Xu, H., Jiang, W., He, J., Bi, X., Li, X., Kong, J., and Li, X-M. (2009) Quetiapine prevents mice from cuprizone induced behavioural changes and demyelination. The 22nd ISN-APSN Joint Meeting; 23- 28 August, 2009. Busan, South Korea.
43. **Zhang Y.**, Xu, H., Jiang, W., Xiao. L., Yan, B., He, J., Wang, Y., Bi, X., Li, X., Kong, J., and Li, X-M. (2009) Quetiapine alleviates the cuprizone-induced demyelination and promotes the remyelination following withdrawal of cuprizone. 9th World Congress of the World Federation of Biological Psychiatry; 28 June-2 July, 2009. Paris, France.
44. **Zhang Y.**, Xiao. L., Xu, H., Wei, Z., He, J., Jiang, W., Li, X., Dyck, L., Devon, R., Kong, J., and Li, X-M. (2008) New features of atypical antipsychotic drug quetiapine: Regulating oligodendrocyte development and regeneration, preventing demyelination induced by cuprizone. 1st Schizophrenia International Research Society Conference; 21-25 June 2008. Venice, Italy.
45. **Zhang Y.**, Xu, H., Wei, Z., He, J., Jiang, W., Li, X., Dyck, L., Devon, R., Kong, J., and Li, X-M. Quetiapine exerts protective effects on oligodendrocytes in cuprizone induced demyelination model and promotes oligodendrocyte maturation in remyelination process. New Clinical Drug Evaluation Unit (NCDEU) of NIMH; 27-30 May, 2008, Phoenix, Arizona, USA.
46. **Zhang Y.**, Xiao L., Xu H., Wei Z., Dyck, L., Devon, R.M., He, J., Jiang, W., and Li, X-M. (2007). Quetiapine facilitates oligodendrocyte development and prevents mice from cortical demyelination and behavioral changes. The 57th Canadian Psychiatry Association Annual Conference; 16-20 November, 2007 Montreal, Québec, Canada.

Most Significant Scientific Contributions

- a) ***Genetic studies to identify schizophrenia candidate genes.*** My previous studies focused on locating candidate genes of schizophrenia and autism using single nucleotide polymorphism (NSP) association. I found that the FZD3 and FGF20 gene polymorphisms are associated with schizophrenia (Am J Med Gen, 2004).
- b) ***The neuroprotective capacity of atypical antipsychotic drugs (APDs).*** My study found that quetiapine is neuroprotective and alleviates the oxidative stress and brain pathology induced by the typical antipsychotic drug haloperidol (Neurosci Lett, 2007). We published the first in vitro study indicating the neuroprotective effects of APDs on white matters. In this study, quetiapine, in conjunction with the addition of growth factors, increased the proliferation of neural progenitors from the cerebral cortex of embryonic rat culture (Molecular Psychiatry, 2008). Quetiapine could protect animals against cuprizone-induced brain demyelination and cognitive impairment (Schizophrenia Research, 2008 and 2012, Psychiatry Research 2014). In the APP/PS1 double transgenic mouse model of Alzheimer's disease, quetiapine prevents memory impairment. It reduces the number of β -amyloid ($A\beta$) plaques in the cortex and hippocampus (Neurobiol of Aging, 2009, Current Alzheimer Res, 2012), which may be due to its anti-oxidative effects (FEBS J, 2008).
- c) ***The psychiatric symptoms in the demyelination animal model.*** We have extensively studied the emotional and cognitive deficits in the cuprizone-induced demyelination model. The mouse with brain demyelination demonstrates anxiety and depression-like behaviours, working memory deficits (Behavioral Neuroscience, 2009); Brain Research; 2009; Neuroscience Bulletin, 2013).
- d) ***The mechanism of protective effects of APDs and antidepressants on white matter and glial cells.*** Studies found quetiapine attenuated depressive-like behaviour and white matter damage in global ischemic mice (J Neurochem, 2012) through GABA neuron modulation (J Neurochem, 2014). In the APP/PS1 double transgenic mouse model of Alzheimer's disease, quetiapine prevents memory impairment. It reduces the number of β -amyloid ($A\beta$) plaques in the cortex and hippocampus (Neurobiol of Aging, 2009, Current Alzheimer Res, 2012), which is likely due to its anti-oxidative effects (FEBS J, 2008). We found that the antidepressants desvenlafaxine reverse stress-induced changes in synaptophysin and microtubule-associated protein 1 in the hippocampus (J Neurochem, 2014). We also found that fluoxetine improves cognitive performance by suppressing the production of soluble β -amyloid in APP/PS1 mice (Current Alzheimer Research, 2014) and by regulating astrocyte pathology (Glia, 2015). Our recent study reported that VEN exerts durable protection and anti-inflammatory effects and protects against CPZ induced demyelination in the mouse brain (Frontiers in Pharmacology, 2019).
- e) ***Magnetic and ultrasound for neuropsychiatric disorders.*** We studied the role of low-field magnetic stimulation (LFMS) on PrPc, proteins related to the circadian rhythm, and behavioural alterations in a repeated TBI mouse model. The results showed that LFMS treated TBI mice significantly improved cognitive and motor function. The results obtained from the study demonstrated the neuroprotective effect of LFMS, which may be through regulating PrPc proteins related to the circadian rhythm. Thus, the present study suggests that LFMS may improve the subject's neurological condition following TBI (Journal of Neurotrauma, 2019).
- f) ***Anti-inflammatory treatment for depression.*** Studies have indicated that increased levels of inflammatory cytokines released from activated microglia induce depression-like behaviours by affecting neurotransmitter pathways, but the mechanisms remain elusive. We explored the potential mechanisms that link microglia activation with ischemia-induced depression and cognitive dysfunction by studying the effects of minocycline on white matter damage, cytokine levels, and the monoaminergic neurotransmitters. Our study found that minocycline, an inhibitor of microglial activation, shortened the immobile duration in tail suspension test and forced swimming test and decreased the plasma levels of IL-1 β , IL-6, TNF- α , HMGB1, and netrin-1. Collectively, our data demonstrated that minocycline exerts an antidepressant effect by inhibiting microglia activation, promoting oligodendrocyte maturation and remyelination. (Frontiers in Pharmacology, 2019).

Current research Interests

As a clinician scientist in the field of biological psychiatry and neuropharmacology, I use cell and animal models to study the both neurodevelopmental and neurodevelopmental aspects of mental health disorders, demyelinating disorders, and the neuroprotective effects of pharmacological and non-pharmacological agents.

1. The neuroprotective effects of Low-Field Magnetic Stimulation (LFMS) on major depressive disorder (MDD), posttraumatic stress disorder (PTSD) and multiple sclerosis (MS).

Preclinical studies: This research is to examine the effects and the biological mechanism of LFMS, a non-invasive and non-convulsive neurostimulation treatment on animal models of a variety of neuropsychiatric disorders. This project elucidates the effects of LFMS on oligodendrocytes/myelin and corresponding behaviours in our established animal models (Schizophrenia Research 2008; Molecular Psychiatry, 2008; Schizophrenia Research 2012; Journal of Neurochemistry, 2012). We are using the chemical cuprizone to induce myelin damage and produce cognitive impairment in mice. We are determining if LFMS treatment alleviates the behavioural symptoms and protects white matter from demyelination and promotes myelin repair using pathological staining and Canadian Light Source (CLS) synchrotron-based imaging. Complementary methods include immunochemistry and cell biology methodology to understand the impacts of LFMS on cell survival, growth and gene expression regulation. To our knowledge, this is the first study to focus on the effects and mechanism of LFMS on white matter. Accomplishment of this project will enhance our understanding of serious psychiatric disorders and improve patient care by guiding the use of LFMS and the development of new therapeutic methods.

Clinical studies: we have proposed a randomized double-blind clinical trial using LFMS as an add-on treatment for patients with treatment resistant depression (TRD). Currently, the proposal is pending for Health Canada approval. I have received the Rx&D Health Research Foundation (HRF) Young Minds Clinical Research Fellowship (2013-2015), Indiana Small Professorship of Psychiatry, University Start-up fund and SHRF Establishment grant.

2. The effects of **cannabidiol (CBD) and LFMS** in the treatment of posttraumatic stress disorder (PTSD).

This study focuses on revealing the treatment effects of CBD and/or LFMS in reducing PTSD symptoms and the underlying neurobiological underpinnings.

PTSD is a severe mental disorder that reflects cognitive, emotional and physiological changes after exposure to traumatic events, including sexual assault, warfare, traffic collisions, or other threats on a person's life. Violent and sexual assault yield the highest prevalence of PTSD in men and women, respectively. Patients with PTSD have a higher risk of self-harm and suicide. Current treatment with antidepressants and therapy only provide partial effects, leaving a substantial portion of patients continuing suffering PTSD. Cannabis has long been reported as a coping tool for individuals who suffer PTSD symptoms and self-medicate with it. Recreational use of cannabis will be legal in Canada in 2018, but this area of research is in its infancy and needs to be explored. The primary psychoactive cannabinoid is delta-9-tetrahydrocannabinol (THC), which is thought to be responsible for addiction and “high” seen in cannabis use disorder. CBD is the major non-psychotomimetic component present in *Cannabis Sativa*. Unlike THC, CBD use does not produce the “high” that recreational marijuana smokers seek. CBD can produce several potential therapeutic effects, including anti-inflammatory, immunomodulatory, anticonvulsive, neuroprotective, antipsychotic and anxiolytic. However, the effects of CBD on PTSD and the exact mechanisms of CBD pharmacological effects remain to be fully elucidated. We chose a widely used model predator exposure/scent that generates an persist anxiogenic effect to represent the symptoms in PTSD patients. Our study investigates the potential of CBD in attenuating the long-lasting behavioural consequences resulted from a traumatic event. In addition, we also study the therapeutic potential of LFMS in treating PTSD using the same animal model. This project will examine the therapeutic potential of different concentrations of THC and CBD as a modifying agent for the treatment of PTSD and focus on the behavioural, cellular, and neurodegenerative aspects of the disease. The results of the project will provide valuable information for future clinical trials and to improve the understanding of neurobiology and optimal treatments for cannabis oils.