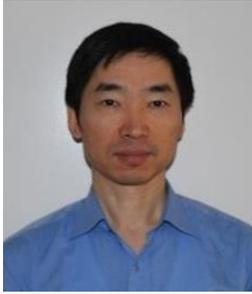




**Dr Tie Yuan Zhang, PhD**

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Dr Zhang is an **Assistant Professor** in the Department of Psychiatry at McGill University, **leads the Optoneuroepigenetics Lab** at the Douglas Mental Health University Institute, and is a **Primary Investigator** at the Ludmer Centre for Neuroinformatics & Mental Health.

In the prenatal, early-childhood and adolescent periods, epigenetic changes profoundly influence brain development and establish an individual's susceptibility to mental health problems across their lifetime. Whether these epigenetic changes are part of normal development or induced by exposure to adversity, our knowledge of the underlying mechanisms is still in the exploratory stages and a key focus of Dr Zhang's research.

Dr Zhang combines ten years of neuroepigenetics expertise with new technologies, specifically, optogenetics and next-generation sequencing techniques, to characterize critical brain circuits and transcriptional pathways. His research in animals focuses on elucidating gene expression and brain-circuit activity regulating maternal behavior and the resulting impact on an offspring's neurodevelopment.

In 2010, Dr Zhang contributed to novel research proving the existence of adversity-induced epigenetic changes, by demonstrating that variations in early-life maternal-childcare profoundly influences the expression of the GAD1 gene and phenotypic development in rat offspring. The Faculty of 1000 commended his research for demonstrating that the intensity of maternal care distinctly influences methylation patterns in the brain of the offspring, specifically in genes associated with neurodevelopmental diseases such as schizophrenia. Dr Zhang authored one of the first publications to review the growing number of studies that have found an association between brain development, epigenetic mechanisms in neurons—neuroepigenetics—and the risk for developing a mental illness.

Dr Zhang's current research continues to advance our understanding of these complex neurodevelopment processes. His recent work provides evidence for remarkable regional-specificity in the effects of enriched living condition on gene transcription and DNA modifications. In particular, he has identified thousands of sites in which DNA methylation is reduced in the dorsal (as compared with ventral) dentate gyrus, including many binding sites of transcriptional factors that play key roles in the regulation of adult neurogenesis.

Dr Zhang is also advancing research into genetic architecture to explain why some people are extremely sensitive to environmental adversities, while others are more resilient, able to thrive regardless. His aim is to identify genes that distinguish resilient and susceptible mice and determine whether these genes match those of a newly developed candidate polygenic risk score for susceptibility to adversity, a predictor of poor mental health outcomes in humans.

Dr Zhang completed his MD (1991) and MSc (1994) in Medical Sciences at Yanbian University, China and a PhD (2001) in Pharmacology at Yonsei University, Seoul, Republic of Korea. A postdoctoral fellow position in Neurobiology brought him to McGill University (2002-2007). Dr. Zhang won the highly competitive NARSAD young investigator award and joined Dr Michael Meaney's lab in 2007. He is now an Assistant Professor at McGill and a Primary Investigator at the Ludmer Centre.