

# Dongsheng Cai, M.D., Ph.D.

## **Positions:**

Professor, Department of Molecular Pharmacology  
Young Men's Division Chair in Physiology  
Director, Einstein Institute for Neuroimmunology and Inflammation  
Member, Einstein Diabetes Research Center  
Member, Institute for Aging Research  
Member, Einstein Stem Cell Institute  
Member, Einstein Cancer Center

## **Research interests:**

My lab has been interested in studying the neural basis of health problems that are significantly related to metabolic syndrome and aging. One important aspect in our research is to study the features of hypothalamic neural stem cells (htNSC) that my lab initially identified, including neurogenesis and neuroendocrinology (such as releasing peptides and miRNA/piRNA exosomes) of these cells as well as the significance of these properties in normal physiology or disease. Therapeutically, we aim to generate htNSC-based cellular and exosome technologies for combating health problems which range from aging to metabolic diseases and to their co-morbidities such as immune disorders and cancers.

## **Current grant funding:**

NIH R01 HL147477 (PI: Cai)	03/2019 to 01/2023 Hypothalamic astrocyte-neuron relationship links overnutrition to hypertension
NIH R01 DK121435 (PI: Cai)	06/2019 to 03/2023 Hypothalamic NF-kB and astrocytic programs in obesity
NIH R01 AG069433 (Cai: co-investigator)	08/2020 to 04/2025 Promoting brain resilience to Alzheimer's Neuropathology
Milky way research award (PI: Cai)	09/2021 to 08/2024 Hypothalamic stem cell and epigenetic control of aging

## **Recent publications (selected):**

1. Li J, Tang Y, Cai D. IKKbeta/NF-kappaB disrupts adult hypothalamic neural stem cells to mediate a neurodegenerative mechanism of dietary obesity and pre-diabetes. *Nature Cell Biology*. 2012;14(10):999-1012.
2. Zhang Y, Kim M, Jia B, Yan J, Hertz J, Han C, Cai D. Hypothalamic stem cells control ageing speed partly through exosomal miRNAs. *Nature*, 2017; 548(7665):52-57.
3. Xiao YZ, Yang M, Xiao Y, Guo Q, Huang Y, Li CJ, Cai D, Luo XH. Reducing hypothalamic stem cell senescence protects against aging-associated physiological decline. *Cell Metabolism*. 31(3):534-548, 2020.
4. Tang Y, Zuniga-Hertz JP, Han C, Yu B, Cai D. Multifaceted secretion of htNSC-derived hypothalamic islets induces survival and antidiabetic effect via peripheral implantation in mice. *Elife*. 9:e52580, 2020.
5. Yu B, Ikhlās S, Ruan C, Zhong X, Cai D. Innate and Adaptive Immunity of Murine Neural Stem Cell-Derived piRNA Exosomes/Microvesicles against Pseudotyped SARS-CoV-2 and HIV-Based Lentivirus. *iScience*. 2020;23(12):101806.
6. Ikhlās S, Usman A, Kim D, Cai D. Exosomes/microvesicles target SARS-CoV-2 via innate and RNA-induced immunity with PIWI-piRNA system. *Life Sci Alliance*. 2021; 5(3):e202101240.