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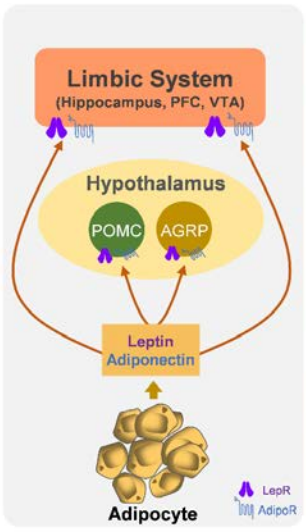
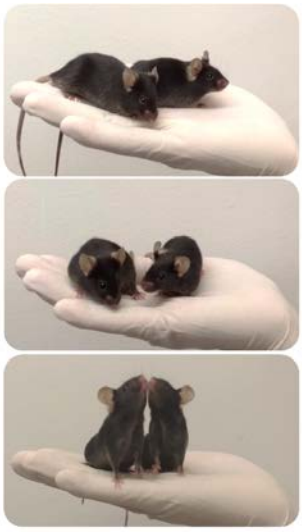
Adipokines, neural plasticity, emotion and motivation, mood disorders, PTSD, metabolic disorders

The goal of our research is to understand the molecular and cellular basis of mental disorders, especially for those with comorbid metabolic disturbances. Adipose tissue is now recognized as a highly active metabolic and endocrine organ, secreting adipokines that function as hormones. We are interested in how adipokines affect the structural and function of neurons and the plasticity of neural circuits involved in orchestrating behavioral responses to emotionally, motivationally and metabolically relevant stimuli. We utilize neuron-specific transgenic mouse models, various types of stress and behavioral paradigms, electrophysiology and in vivo neurochemical monitoring to understand the role of adipokines in the pathogenesis of major depression, anxiety and post-traumatic stress disorder and further explore their therapeutic potential for the treatment of these psychiatric disorders.





Selected Publications

1. Guo M, Li C, Lei Y, Xu S, Zhao D, Lu XY (2017). Role of the adipose PPARγ/adiponectin axis in susceptibility to stress and emotion-related behaviors. *Mol Psychiatry*, 22(7):1056-1068.
2. Zhang D, Wang X, Wang B, Garza JC, Fang X, Wang J, Scherer, PE, Brenner R, Lu XY (2017). Adiponectin regulates contextual fear extinction and intrinsic excitability of dentate gyrus neurons through AdipoR2 receptors. *Mol Psychiatry*, 22(7):1044-1055 (Cover).
3. Zhang D, Wang X, Lu XY (2016). Adiponectin exerts neurotrophic effects on dendritic arborization, spinogenesis and neurogenesis of the dentate gyrus of male mice. *Endocrinology*, 157(7):2853-2869.
4. Wang X, Zhang D, Lu XY (2015). Dentate gyrus-CA3 glutamate release/NMDA transmission mediates behavioral despair and antidepressant-like responses to leptin. *Mol Psychiatry*, 20(4):509-19 (Cover).
5. Guo M, Lu XY (2014) Leptin receptor deficiency confers resistance to behavioral effects of fluoxetine and desipramine via separable substrates. *Transl Psychiatry*, 2014 Dec 2;4:e486. doi: 10.1038/tp.2014.126. *Highlighted in N Engl J Med - Journal Watch Psychiatry (31 Dec 2014).*
6. Liu J, Guo M, Zhang D, Cheng SY, Liu M, Ding J, Scherer P, Liu F, Lu XY (2012). Adiponectin is critical in determining susceptibility to depressive behaviors and has antidepressant-like activity. *Proc Natl Acad Sci USA*, 109(30):12248-53. *Highlighted in Nature 487:274 (19 Jul 2012); PNAS press (10 Jul 2012); Faculty of 1000, 24 Jul 2012*
7. Guo M, Lu Y, Garza JC, Li Y, Chua SC, Zhang W, Lu B, Lu XY (2012). Forebrain glutamatergic neurons mediate leptin action on depression-like behaviors and synaptic depression. *Transl Psychiatry*, 2: e83; doi:10.1038/tp.2012.9. *Highlighted in N Engl J Med Journal Watch Psychiatry (2 Apr 2012).*
8. Garza JC, Guo M, Zhang W, Lu XY (2012). Leptin restores adult hippocampal neurogenesis in a chronic unpredictable stress model of depression and reverses glucocorticoid-induced inhibition of GSK-3β/β-catenin signaling. *Mol Psychiatry*, 17(8):790-808 (Cover). Highlighted by *Faculty of 1000, 31 Jan 2012*
9. Liu J, Perez S, Zhang W, Lodge D, Lu XY (2011). Selective deletion of the leptin receptor in dopamine neurons produces anxiogenic-like behavior and increases amygdaloid dopaminergic activity. *Mol Psychiatry*, 16:1024-1038 (Cover).
10. Zhang D, Guo M, Zhang W, Lu XY (2011). Adiponectin stimulates proliferation of adult hippocampal neural stem/progenitor cells through activation of p38MAPK/GSK-3β/β-catenin signaling cascade. *J Biol Chem*, 286(52):44913-20.