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Education:

- Postdoc. Fellow, Icahn School of Medicine at Mount Sinai
- Ph.D., Mount Sinai School of Medicine of New York University
- B.A., Barnard College, Columbia University

Research Interest:

Cellular Neurophysiology and Behavior

Our research explores the neural circuits and neuroadaptations that mediate social behaviors. Affective disorders are typified by social dysfunction and currently there is a limited mechanistic understanding of the neural adaptations that are responsible for aberrant social behaviors. Therefore, we focus on how diverse coping strategies, sex hormones and/or social support can induce changes in the underlying neural circuits guiding social behaviors with the goal of identifying beneficial/pathological neural adaptations. To study these circuits we utilize cutting-edge cell-type/circuit specific *in vitro* electrophysiological recordings, viral-mediated gene transfer and optogenetic manipulations; all in combination with animal models of mood and anxiety disorders. We examine the neural adaptations that occur from the level of the ion channel and relate these changes back to behavior. The goal of this research is to expand our neurophysiological understanding of mood and anxiety disorders in order to find targets for mechanistically driven therapeutics.

Selected Publications:

- Friedman AK, Juarez B, Ku S, Zhang H, Calizo R, Walsh JJ, Chaudhury D, Zhang S, Hawkins A, Dietz DM, Murrough JW, Ribadeneira M, Wong E, Neve RL and Han MH. (2016) KCNQ channel openers reverse depressive symptoms via an active resilience mechanism. *Nature Communications,*
2016 May 24. doi:10.1038/ncomms11671.

- Koo, JW, Labonte B, Engmann O, Calipari E, Juarez B, Lorsch Z, Walsh JJ, Friedman AK, Han MH, Nestler J. (2015) Essential role of mesolimbic brain-derived neurotrophic factor in

chronic social-stress induced depressive behaviors. *Biological Psychiatry* 2015 Dec doi: 10.1016/j.biopsych.2015.12.009.

- Christoffel D, Golden S ,Walsh JJ , Heshmati M, Friedman AK, Dey A , Smith M, Pfau M, Rebusi N, Ables J, Hodes G , Deisseroth K , Tallon-Ibanez I , Malenka R, Han MH and Russo SJ. (2015) Opposing Effects of Cortical and Thalamic Inputs to Ventral Striatum on Social Stress-Induced Adaptations. *Nature Neuroscience* 2015 Jul;18(7):962-4. doi: 10.1038/nn.4034.
- Friedman AK, Weiss KR and Cropper EC. Specificity of repetition priming: The role of chemical coding. (2015) *Journal of Neuroscience* 2015 Apr 22;35(16):6326-34.
- Friedman AK. (2014) Jump-starting natural resilience reverses stress susceptibility. *Science* . Oct 31;346(6209):555.

- Li B, Jie W, Huang L, Wei P, Shuji Li, Luo Z, Friedman AK, Meredith A, Han MH and Gao T. (2014) Nuclear BK channels regulate gene expression via the control of nuclear calcium signaling. *Nature Neuroscience,* 22 June 2014. doi: 10.1038/nn.3744.
- Koo JW, Lobo MK, Chaudhury D, Lebonte B, Friedman AK, Heller E, Pena C, Han MH, and Nestler EJ. (2014) Loss of BDNF signaling in D1R expressing NAc neurons enhances morphine reward by reduction of GABA inhibition. *Neuropsychopharmacology*, 23 May 2014. doi: 10.1038/npp.2014.118.

- Friedman AK, Walsh JJ, Juarez B, Ku SM, Chaudhury D, Neve RL, Wang J, Xianting L, Dietz DM, Pan N, Vialou VF, Neve RL, Yue Z and Han MH. (2014) Enhancing Depression Mechanisms in Midbrain Dopamine Neurons Achieves Homeostatic Resilience. Science, 18 April 2014: 313-319.

Whalley K. Depression: Becoming resilient. Nature Reviews Neuroscience Highlight 15: 353-353, 2014.

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- Walsh JJ, Friedman AK, Sun H, Heller EA, Ku SM, Juarez B, Burnham VL, Mazei-Robison M, Ferguson D, Golden SA, Koo JW, Chaudhury D, Christoffel DJ, Pomeranz L, Friedman JM, Russo SJ, Nestler EJ, and Han MH. (2014) Stress and CRF gate neural activation of BDNF in the mesolimbic reward pathway. *Nature Neuroscience*, 17(1):27-9, 2014.
- Chaudhury D*, Walsh JJ*, Friedman AK, Juarez B, Ku SM, Koo JW, Ferguson D, Tsai HC, Pomeranz L, Christoffel DJ, Nectow AR, Ekstrand M, Domingos A, Mazei-Robison M, Mouzon E, Lobo MK, Neve RL, Russo SJ, Deisseroth K, Nestler EJ, and Han MH. (2013) Phasic firing of ventral tegmental area dopamine neurons promotes rapid induction of depression behaviors in response to social defeat stress. *Nature*. 493. 532-536.