



Probing and Rescuing Dysfunctional Brain Circuits in Depression



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SPEAKER DISCLOSURE: Dr. Liston has served as a consultant or scientific advisor to Compass Pathways PLC, Delix Therapeutics and Brainfy AI. All views expressed are his own and do not necessarily reflect the opinions of Compass Pathways PLC, Delix Therapeutics and Brainfy AI.

DATE



Tuesday November 7th, 2023 | 7pm-8pm

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Abstract

Biomarkers have transformed modern medicine but remain largely elusive in psychiatry, partly because there is a weak correspondence between diagnostic labels and their neurobiological substrates. Like other neuropsychiatric disorders, depression is not a unitary disease, but rather a heterogeneous syndrome that encompasses varied, co-occurring symptoms and divergent responses to treatment. Genome-wide association studies have identified dozens of genetic risk variants, but it remains unclear precisely how these genes contribute to depression pathophysiology and whether they operate differently in men and women. I will present the results of two related projects aimed at understanding how dysfunction in prefrontal brain networks gives rise to specific depressive symptoms and behaviors and how they mediate transitions between mood states over time.

Biography

Conor Liston, MD, PhD is a Professor of Neuroscience and Psychiatry at Weill Cornell Medicine. The long-term goals of his research program are to define basic mechanisms by which prefrontal cortical brain circuits support learning, memory, and motivation, and to understand how these functions are disrupted in depression, OCD, and other neuropsychiatric disorders. His team is also developing neuroimaging technologies for informing psychiatric diagnosis in human populations and predicting treatment response to transcranial magnetic stimulation and other forms of therapeutic neuromodulation. He graduated summa cum laude from Harvard College in 2002, and received his PhD and MD from The Rockefeller University and Weill Cornell Medicine in 2007 and 2008, respectively. He subsequently completed his residency in psychiatry at NewYork-Presbyterian Hospital and postdoctoral training at Stanford University. He returned to Weill Cornell as an Assistant Professor in 2014. His research has been recognized with awards from the Klingenstein-Simons Foundation Fund, the Rita Allen Foundation, the Dana Foundation, the One Mind Institute, the Pritzker Neuropsychiatric Disorders Consortium, the Hope for Depression Research Foundation, the Wellcome Leap Foundation, and the Jeanne and Herbert Siegel Award for Outstanding Medical Research. He is also a clinically active psychiatrist specializing in the management of treatment-resistant mood disorders. Health and dedicates significant time to mentoring faculty colleagues.

Learning Objectives

1. Describe two changes in prefrontal cortex structure and function in chronic stress states.
2. Identify a role for prefrontal synaptogenesis in rescuing stress-induced behavioral changes.
3. Explain how abnormal functional connectivity contributes to diagnostic heterogeneity in depression.

Suggested Reading

1. Lynch, C. J., Elbau, I., Ng, T. H. B., Ayaz, A., Zhu, S., Manfredi, N., Johnson, M., Wolk, D., Power, J. D., Gordon, E. M., Kay, K., Aloysi, A., Moia, S., Caballero-Gaudes, C., Victoria, L. W., Solomonov, N., Goldwaser, E. L., Zebley, B., Grosenick, L., ... Liston, C. (2023). Expansion of a frontostriatal salience network in individuals with depression. *bioRxiv* (Cold Spring Harbor Laboratory). <https://doi.org/10.1101/2023.08.09.551651>
2. Moda-Sava, R. N., Murdock, M. H., Parekh, P. K., Fetcho, R. N., Huang, B., Huynh, T. N., Witzum, J., Shaver, D., Rosenthal, D., Alway, E., Lopez, K., Meng, Y., Nellissen, L., Grosenick, L., Milner, T. A., Deisseroth, K., Bitto, H., Kasai, H., & Liston, C. (2019). Sustained rescue of prefrontal circuit dysfunction by antidepressant-induced spine formation. *Science*, 364(6436). <https://doi.org/10.1126/science.aat8078>
3. Drysdale, A. T., Grosenick, L., Downar, J., Dunlop, K., Mansouri, F., Meng, Y., Fetcho, R. N., Zebley, B., Oathes, D. J., Etkin, A., Schatzberg, A. F., Sudheimer, K., Keller, J., Mayberg, H. S., Gunning, F. M., Alexopoulos, G. S., Fox, M. D., Pascual-Leone, A., Voss, H. U., Casey, B. J., ... Liston, C. (2017). Resting-state connectivity biomarkers define neurophysiological subtypes of depression. *Nature Medicine*, 23(1), 28–38. <https://doi.org/10.1038/nm.4246>