

Stanford



Sean J. O'Sullivan

Postdoctoral Scholar, Psychiatry

Bio

BIO

Dr. Sean J. O'Sullivan is an MD/PhD postdoctoral scholar from Philadelphia. His PhD in neuroscience from Thomas Jefferson University focused on the molecular mechanisms of alcohol and opioid withdrawal.

Specifically, he took a systems neuroscience approach to understand the role of the gut microbiome in influencing the negative physical and emotional states that characterize alcohol and opioid withdrawal syndromes.

This work led to the generation of a novel hypothesis—interoceptive neuroinflammatory signaling involving gut dysbiosis and peripheral network decompensation secondary to abstinence in the context of allostasis drives neuroinflammation in the nucleus tractus solitarius (NTS) and amygdala during alcohol and opioid withdrawal which increases the severity of the withdrawal symptoms. He further conjectures that this interoceptive signaling constitutes an antiward pathway that motivates substance dependence via negative reinforcement.

He also investigated neuronal subphenotypes in the suprachiasmatic nucleus which is the principle circadian brain region. He further investigated how circadian rhythms affect gene expression in the NTS and amygdala.

In the Stanford Brain Stimulation Lab, Dr. O'Sullivan is part of the inpatient treatment team that is applying an accelerated transcranial magnetic stimulation (TMS) protocol (Stanford Accelerated Intelligent Neuromodulation Therapy [SAINT]) to hospitalized psychiatric patients. TMS is not currently available to psychiatric inpatients, and this work aims to make this innovative treatment available to those most in need. He is also leading a study researching the effects of TMS on a peripheral biomarker of depression known as L-acetyl-carnitine. He is in the process of applying for psychiatry residency and plans to integrate brain stimulation into his future clinical practice.

STANFORD ADVISORS

- Nolan Williams, Postdoctoral Faculty Sponsor

Research & Scholarship

LAB AFFILIATIONS

- Nolan Williams, Brain Stimulation Lab (6/1/2021)

Publications

PUBLICATIONS

- **Similarities in alcohol and opioid withdrawal syndromes suggest common negative reinforcement mechanisms involving the interoceptive antireward pathway.** *Neuroscience and biobehavioral reviews*
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- **Single-cell systems neuroscience: A growing frontier in mental illness** *BIOCELL*
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- **Single Cell Scale Neuronal and Glial Gene Expression and Putative Cell Phenotypes and Networks in the Nucleus Tractus Solitarius in an Alcohol Withdrawal Time Series** *Frontiers in Systems Neuroscience*
O'Sullivan, S. J., McIntosh-Clarke, D., Park, J., Vadigepalli, R., Schwaber, J. S.
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- **The Interoceptive Antireward Pathway and Gut Dysbiosis in Addiction** *Journal of Psychiatry Depression & Anxiety*
O'Sullivan, S. J.
2021
- **Understanding the Regulation of Transcription in Mental Illness** *OMB Genetics*
O'Sullivan, S. J.
2021; 5 (4): 7
- **Diurnal Patterns of Gene Expression in the Dorsal Vagal Complex and the Central Nucleus of the Amygdala - Non-rhythm-generating Brain Regions** *FRONTIERS IN NEUROSCIENCE*
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- **Combining Laser Capture Microdissection and Microfluidic qPCR to Analyze Transcriptional Profiles of Single Cells: A Systems Biology Approach to Opioid Dependence** *JOVE-JOURNAL OF VISUALIZED EXPERIMENTS*
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- **Single-Cell Glia and Neuron Gene Expression in the Central Amygdala in Opioid Withdrawal Suggests Inflammation With Correlated Gut Dysbiosis** *FRONTIERS IN NEUROSCIENCE*
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2019; 13: 665
- **Single-Cell Transcriptional Analysis Reveals Novel Neuronal Phenotypes and Interaction Networks Involved in the Central Circadian Clock** *FRONTIERS IN NEUROSCIENCE*
Park, J., Zhu, H., O'Sullivan, S., Ogunnaike, B. A., Weaver, D. P., Schwaber, J. S., Vadigepalli, R.
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