

Name: Christie Fowler, Ph.D.

Email: cdfowler@uci.edu

Transcriptional plasticity of ventral tegmental area dopamine neurons induced by cocaine abstinence

Chronic cocaine triggers changes in brain function that can persist long after drug taking has ceased. Relapse to substance use during abstinence is often provoked by exposure to drug-related cues. This implicates the drug-free period after chronic cocaine as a time when relapse probability is modulated by brain plasticity mechanisms. Here we studied the regulation and function of molecular plasticity mechanisms activated in a time-dependent manner in dopamine (DA) neurons of the mouse ventral tegmental area (VTA) over a drug-free period after chronic cocaine. We used in vivo dCas9/CRISPR inhibition to demonstrate a causal role for Brain-Derived Neurotrophic Factor transcription in the incubation of cocaine seeking during abstinence, and we used single-nucleus sequencing to identify a program of *Erg1* associated gene regulation induced in DA neurons selectively by the prolonged absence of cocaine. These data advance understanding of plasticity mechanisms that modulate reward functions of VTA DA neurons.

Authors:

Submitter: Christie Fowler, Professor, University of California Irvine, Irvine
Kendyl Laumann, B.S., University of California Irvine
Arthy Narayanan, Ph.D., Duke University
Anne West, M.D./Ph.D., Duke University