

Opioid Withdrawal Shifts Amygdalar Transcriptome and is Correlated with Gut Dysbiosis

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Opioid withdrawal involves a spectrum of physiological activity that largely manifests in dysphoria, nausea, anxiety and fear. The negative-reinforcement model of addiction postulates that avoidance of these negative physical and emotional symptoms drives drug-seeking. The amygdala plays a central role in opioid withdrawal because it is a limbic structure responsible for fear and anxiety that also processes autonomic inputs, generates autonomic outputs, and has consistently demonstrated involvement in addiction and motivated behaviors. Here, we assayed the transcriptome of single neurons, microglia, and astrocytes in the amygdala of morphine-dependent and morphine-withdrawn rats using high-throughput microfluidic RT-qPCR. We found global transcriptional shifts along with cell type-specific gene alterations that may provide insight into the underlying addiction pathophysiology. Inflammatory and antioxidant genes showed the most dysregulation. Additionally, we describe gut microflora dysbiosis in morphine dependence and withdrawal for the first time as a possible contributor to the visceral malaise opioid withdrawal induces.