Bulk RNA-seq in Cocaine Memory Circuits

Cocaine-associated memories are extremely strong and persistent, as cocaine enhances synaptic plasticity within a network of brain regions involved in motivation and contextual learning. Modulating these processes may offer important insights into addiction and point toward new therapeutic strategies.

In this project, we analyze a newly generated bulk RNA-seq dataset from four brain regions (prelimbic cortex, nucleus accumbens core, basolateral amygdala, and ventral hippocampus) of male and female rats (1) controle rats, (2) rats exposed to cocaine, (3) rats exposed to cocaine while treated with minocycline, an antibiotic known to influence LTP associated pathways as well as microglial activity. The student will investigate how cocaine and minocycline shape the molecular signatures of these memory and motivation circuits, and how these effects differ across regions and sexes.

This internship offers a unique opportunity to work with a complete RNA-seq dataset (72 samples) and state-of-the-art transcriptomics analysis, combined with a clear neurobiological question on memory, stress, and addiction.

keywords:
RNA-seq, neurobiology, addiction, transcriptomics, bioinformatics, gene expression, synaptic plasticity, GSEA

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