Submitter Name: Vivek M. Philip
PI Name: Elissa J. Chesler

Submitted Email: vivek.philip@jax.org
PI Email: elissa.chesler@jax.org

Systems genetics and genomics data resources from the Center for Systems Neurogenetics of Addiction

Vivek M. Philip[1], Center for Systems Neurogenetics of Addiction, Jason Bubier[1], Laura Reinholdt[1], Leona Gagnon[1], Lisa Tarantino[2], J. David Jentsch[3], Elissa J. Chesler[1]

[1] The Jackson Laboratory for Mammalian Genetics, Center for Addiction Biology, Bar Habor, ME
[2] Department of Genetics, School of Medicine, University of North Carolina, 120 Mason Farm Road, CB7361, Chapel Hill, NC
[3] Department of Psychology, Binghamton University, Binghamton, NY, USA.

The Integrative Genetics and Genomics Core (IGGC) plays a critical role in the integration, analysis and dissemination of synergistic biobehavioral studies of addiction susceptibility data from the Center for Systems Neurogenetics of Addiction (CSNA). Its centralized capabilities provide a state-of-the art suite of systems genetics methods and genomic data resources from within and outside the CSNA. Its overarching goal is to support the CSNA projects to uncover biological relations among biological basis of relations among sensitization, impulsivity and patterns of drug self-administration. The IGGC leverages the advantages of mouse genetic reference populations towards data integration across multiple addiction relevant behaviors, genomics and genetics datasets. Datasets generated by the CSNA and analyzed by the IGGC include behavioral, brain transcriptomic (bulk and single cell), epigenetic and long-read sequencing. The IGGC employs univariate and multivariate analytical approaches that enable the integration of these muti-modal datasets. For example, the IGGC has applied canonical correlations methods published by IGGCs called reference trait analysis towards studying shared or distinct genetic drivers across multivariate behavioral paradigms such as exploration and sensation seeking with cocaine self-administration. The IGGC data integration methods are not limited to just the mouse but ensures the interpretation of neurobehavioral mechanisms of addition in the context of human addiction. Here, we report on the data resources that have been generated by the CSNA, how they can be accessed and select vignettes of how they can be used collectively towards identifying genes, pathways and neurobiological mechanisms that have shared or distinct contributions.