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Center for genetic studies of drug abuse in outbred rats

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The purpose of the Center for genetic studies of drug abuse in outbred rats is to study the genetic basis of a host of psychologically complex traits that are relevant to drug abuse. We have selected the N/NIH heterogeneous stock (**HS**) rats, which were created in 1984 by intercrossing eight inbred rat strains, and have been maintained as an outbred population for 85 generations. Because of the numerous accumulated recombinations, HS rats provide the best available mapping resolution, which is critical for our efforts to identify specific genes. In the initial funding period, we have examined Pavlovian Conditioned Approach, Nicotine Self-Administration and Behavioral Regulation (delay discounting, sustained attention, and several other traits). Since its inception, our center has produced 6,590 male and female HS rats, we have behaviorally phenotyped >4,300 HS rats, genotyped >4,400 HS rats, and performed RNASeq on 440 samples from 5 brain regions. Moreover, our center has helped numerous other collaborating grants, including 6 U01 grants studying cocaine, oxycodone and heroin iv self-administration, cocaine aversion and several other traits, which will collectively add more than 5,000 additional HS rats to this project. *This represents the largest rat genetic study ever undertaken.* All data are stored in a centralized database that represents a tremendous and enduring resource. We have used these data to perform estimate heritability, to perform GWAS for numerous traits, to examine genetic correlations and to map expression QTLs. Our data are also being made publically available on GeneNetowrk.