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The Addiction Biobanks: Three Repositories Of Biological Samples From Genetically Characterized Outbred Rats That Exhibit Compulsive-Like Escalation of Cocaine, Oxycodone, and Alcohol Self-Administration

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Identification of the mechanisms that underlie addiction-like behaviors in animal models is a major goal for understanding the risk factors for addiction and facilitating the identification of novel druggable targets. A key issue for the field is the lack of a repository that contains biological samples from behaviorally and genetically characterized rats. We describe the Cocaine Biobank (www.cocainebiobank.org), the Oxycodone Biobank (www.oxycodonebiobank.org), and the Alcohol Biobank (www.alcoholbiobank.org), three repositories of biological samples from a unique, genetically diverse strain of outbred heterogeneous stock (HS) rats that have been behaviorally and genetically characterized using next-generation sequencing, state-of-the-art behavioral screening, and a variety of preservation techniques. Male and female rats are trained to self-administer cocaine (0.5 mg/kg/inf) in daily 6 h sessions, oxycodone (0.15 mg/kg/inf) in daily 12 h sessions, or alcohol (10% w/v) in daily 30-minute session and tested using progressive-ratio responding, responding despite adverse consequences (contingent footshocks), and measures of analgesia, hyperalgesia and irritability-like behaviors. Results show high individual variability with vulnerable and resistant rats that is likely to facilitate the detection of gene variants and the molecular and cellular mechanisms of addiction. Preservation techniques include perfusion, snap-freezing, and cryopreservation to maximize the compatibility of these tissue banks with cellular, molecular, and anatomical methods. The Biobanks provides free access to over 20 organs. The Biobanks have the potential to facilitate the identification of novel druggable targets and provide a unique data/tissue repository that will facilitate follow-up and replication studies.