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The NIDA Biorepositories Provide Biospecimen Processing, Multiomic Analyses and Genetic Data for the Addiction Research Community

Since 2001, NIDA has funded a series of biorepositories dedicated to the establishment of genetic resources for global addiction research. These centers provide comprehensive support for major studies in the etiology and progression of disease. Services range from the assembly and shipment of sample collection kits to sites around the world, to processing participant biosamples for blood fractionation and nucleic acid extraction, to multiomic analyses with data analysis, to distribution of samples and genetic and clinical data to investigators around the world.

SAMPLED, founded in 1998 as a nonprofit affiliated with Rutgers University becoming a company in 2020, established a number of biorepository resources for NIH, chief among them the NIDA Center for Genetic Studies (NGCS) and the biobank for the Adolescent Brain Cognitive Development (ABCD) and HEALthy Brain and Child Development (HBCD) Studies. While these centers were conceived as cell, DNA and clinical data resources designed to facilitate cost-effective sample sharing among researchers, their portfolios have evolved to include Whole Genome and Single Cell sequencing, ATAC-Sequencing and Proteomics.

We will focus on the materials and services available to researchers in the academic, government and commercial sectors engaged in addiction research, with a case study that exemplifies our approach in collaborating with investigators to develop innovative solutions while maximizing the precious biospecimens in the collection. This study involved the interrogation of the transcriptome and chromatin accessibility related to opioid dependence through RNA-sequencing and ATAC-sequencing, respectively, leveraging the PBMC biospecimens that have been collected as blood samples, along with critical clinical and phenotypic data, for more than 20 years by participating NIDA studies, followed by processing and cryopreserved of the PBMCs at Sampled. This case study highlights the critical role of biorepository, as guardian of precious genetic resources, in designing processing strategies that take present and future applications into account.

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