AMENDMENT FOR DISTRIBUTION 11.0— INDUCED PLURIPOTENT STEM CELLS (iPSC)
NIMH HUMAN GENETICS INITIATIVE DISTRIBUTION AGREEMENT

NOW, THEREFORE, it is mutually agreed that the National Institute of Mental Health (NIMH) Human Genetics Initiative Distribution Agreement signed by NIMH, the center for Genetic Studies, and _____ as the Receiving Institution is amended to include the following text in paragraph 14 under the section, Acknowledgement for Induced Pluripotent Stem Cells (iPSC) Sample Biomaterials and Clinical Data:

Biomaterials and phenotypic data were obtained from the following projects that participated in the NIMH iPSC Genetics Initiative:

Study 92- Data and biomaterials in Study 92 were collected as part of a longitudinal study of epigenetics of schizophrenia, supported by National Institutes of Mental Health (NIMH) grants RC2MH089859 and RC2MH089973 to Vishwajit L. Nimgaonkar, M.D., Ph.D., University of Pittsburgh and Raquel Gur, M.D., Ph.D., University of Pennsylvania, respectively. This project was part of a network of three NIMH-supported Consortia: The 8-site Consortium on the Genetics of Schizophrenia (COGS); the 3-site Multiplex-Multigenerational Investigation (MGI); and the 8-site Project among African-Americans to Explore Risks for Schizophrenia (PAATNERS). The consortium was complemented by investigators from Johns Hopkins University (PI: A. Feinberg, M.D., Ph.D.), Rutgers University (PI: D. Fugman, Ph.D.), and the Southwest Foundation for Biomedical Research (PI: L. Almasy, Ph.D.). The study coordinators were Sue Clifton (University of Pittsburgh) and Amy Cassidy (University of Pennsylvania). The data managers were Joel Wood (University of Pittsburgh) and Kosha Ruparel (University of Pennsylvania). The investigators are very grateful to the families who have participated in and contributed to this study.

Study 115- Data and biomaterials collection were supported by the National Institutes of Health. The Principal Investigator of NIH grant DP1MH099904 was Dr. Ricardo Dolmetsch and the Co-Investigator was Dr. Joachim Hallmayer. The Principal Investigators of NIH grant R33MH087898 were Dr. Joachim Hallmayer and Dr. Ricardo Dolmetsch. Additionally, Dr. Hallmayer received supplementary funding for NIH grant R33MH087898 to obtain biomaterials, diagnostic assessments and other data from subjects with Phelan McDermid Syndrome Foundation and their families. Dr. Hallmayer supervised the diagnostic data collection on all projects.

Study 116- The collection of data and biomaterials comes from two studies funded by the NIMH. The first project, Biological Correlates of Altered Brain Growth in Autism, was supported from 2009 to 2012 by the NIMH grant R01MH089176. Co-principal investigators were Flora Vaccarino, M.D., Sherman Weissman, M.D., Mark Gerstein, Ph.D., and Elena Grigorenko, Ph.D., of Yale University. The second study, Cellular and Genetic Correlates of Increased Head Size in Autism Spectrum Disorder, is funded since 2009 by the NIMH grant R21/R33 MH087879. Principal investigator is Flora Vaccarino, M.D., Co-investigators are Katarzyne Chawarska, Ph.D., and Anita Huttner, M.D.

Study 117- The collection of data and biomaterials for NIMH Study 117 was supported by the National Institutes of Health grant number R33MH087925 entitled “Autism iPSCs for Studying Function and Dysfunction in Human Neural Development” to Jeanne F. Loring, Ph.D. (The Scripps Research Institute). Biospecimen collection was coordinated by Philip Schwartz, Ph.D. (Children's Hospital of Orange County) and Randi Hagerman, M.D. (University of California – Davis). Subjects enrolled in the study were diagnosed using the Autism Diagnostic Interview-Revised (ADI-R) and the Autism Diagnostic Observation Schedule (ADOS). The induced pluripotent stem cells were generated in Jeanne Loring’s laboratory by Michael Boland, Ph.D. (TSRI).

Study 125- Data and biomaterials generated in Study 125/site 393 were funded by an NIMH grant to Dr. Herb Lachman (MH087840: Analysis of Glutamatergic Neurons Derived from Patient-Specific iPS Cells). The co-investigators on this grant included Dr. Deyou Zheng, a co-investigator and Dr. Reed Carroll, both from the Albert Einstein College of Medicine. Patients and controls were recruited at the Albert Einstein College of Medicine and at the Child Psychiatry Branch, NIMH, directed by Dr. Judith L. Rapoport. We want to thank participating families and Dr. Robert J. Shprintzen, Ph.D. President and Chairman of the board of The Virtual Center for Velo-cardio-Facial-Syndrome, Inc., for patient referrals at the Einstein site.

Study 127- Data and biomaterials generated in NIMH Study 127/Site 717 were funded by a grant to Dr. Chang-Gyu Hahn (Target Identification and Validation for Negative Symptoms and Social Cognition in Schizophrenia: A Translational Study: funded by Pfizer via University of Pennsylvania – Pfizer collaborative alliance). The co-investigators and collaborators on this grant included Edward Brodkin, M.D. (Co-PI), Karin Borgmann-Winter, M.D. (Collaborator), Bruce Turetsky, M.D. (Collaborator) and Paul Moberg, Ph.D. (Collaborator), all from the University of Pennsylvania. Patients and controls were recruited at the University of Pennsylvania directed by Dr. Raquel Gur. We want to thank participating families and all clinical research staff contributing to this study.

Study 130- Data and biomaterials were collected as part of an in vivo and in vitro study of simvastatin as a modulator of Wnt/GSK3 signaling, supported by National Institutes of Health grant R21MH093958. This study is based at Massachusetts General Hospital. The Principal Investigators were Roy H. Perlis, M.D., MSc and Stephen J. Haggarty, Ph.D.

Study 131- Investigators using these cells should cite “Yoshimizu T, Pan JQ, Mungenast AE, Madison JM, Su S, Ketterman J, Ongur D, McPhie D, Cohen B, Perlis R, Tsai LH. Functional implications of a psychiatric risk variant within CACNA1C in induced human neurons. Mol Psychiatry 2015 Feb; 20(2):162-169. PMID: 25403839; PMCID: PMC4394050” and acknowledge NIMH R01MH091115 and P50MH106933. The principal investigators were Dr. Li-Huei Tsai, Dr. Bruce Cohen, and Dr. Roy Perlis.

Study 132- NIMH studies 03-M-0035 and 84-M-0050: data and biomaterials were collected as part of an NIMH Intramural Research Program (IRP) project on the diagnosis, treatment and neurobiology of childhood onset schizophrenia. From 1990 to the present the Principal Investigator has been Judith Rapoport M.D., Child Psychiatry Branch, NIMH. All skin biopsies were obtained, and fibroblasts were also grown at the NIMH, Bethesda MD.

Study 136- The data and collection of biomaterials and derivation of induced pluripotent stem cells have been supported by the National Institutes of Health Grant RO1. The principal investigators and co-investigators of this study were: Stanford University: Joachim Hallmayer, MD; Ruth O'Hara PhD; Jonathan A Bernstein, MD; PhD, Wendy Froehlich, MD; Sergiu Pasca MD; Alexander Urban, PhD; University of California Los Angeles: Carrie Bearden, PhD; Katrina Dipple, MD; Daniel Geschwind, MD, PhD; University of California San Diego: Wesley Thompson, PhD. We would especially like to thank the participating families for their generous contribution of time and effort in support of this study. We would also like to thank the study managers, clinical interviewers, and postdoctoral students for their efforts.

Study 143- This work was supported by grants from the California Institute for Regenerative Medicine (CIRM) TR4-06747, the National Institutes of Health through the NIH Director's New Innovator Award Program (1-DP2-OD006495-01), an R21 MH093954 from NIMH; and a NARSAD Independent Investigator award. The principal investigators are Drs. Alysson R. Muotri and Vias Duvvuri at UCSD.

Study 144- This work was supported by grants from the California Institute for Regenerative Medicine (CIRM) TR2-01814 and TR4-06747, the National Institutes of Health through the NIH Director's New Innovator Award Program (1-DP2-OD006495-01), an R01 MH100175-01 from NIMH and from the International Rett Syndrome Foundation (IRSF grant # 2915); a NARSAD Independent Investigator Grant, an NIMH Autism Center of Excellence Program Project; the work was supported by the Helmsley Trust, the JPB Foundation, the Engmann Foundation, a grant from the CDMRP Autism Research Program; a KL2 CTRI (KL2TR00099) and a Postdoctoral Translational Fellowship from Autism Speaks. The principal investigators are Drs. Alysson R. Muotri (UCSD); Eric Courchesne (UCSD); Alan Percy (University of Birmingham); Fred H. Gage (Salk); Daniel Geschwind (UCLA) and Anthony Wynshaw-Boris (Case Western Reserve University).

Study 146- Data and biomaterials for NIMH Study 146 were collected as part of Induced neuronal cells: A novel approach to study neuropsychiatric disorders, supported by NIMH grant R01MH092931. The principal investigators are Marius Wernig and Tom Südhof, Stanford University.

Study 158- Data and biomaterials were collected as part of a proof-of-concept study that schizophrenia could be modeled in vitro using human induced pluripotent stem cells. This study was based at the Salk Institute for Biological Studies and later at Icahn School of Medicine at Mount Sinai. The Principal Investigators were Fred H. Gage, PhD and Kristen J. Brennand, Ph.D. Co-investigators included Anthony Simone, Jessica Jou, Chelsea Gelboin-Burkhart, Ngoc Tran N, Sarah Sangar, Yan Li, Yangling Mu, Gong Chen and Diana Yu (Salk Institute for Biological Studies). Study collaborators included Shane McCarthy and Jonathan Sebat. The early characterization of these hiPSCs occurred in the Gage Laboratory, and was partially funded by CIRM Grant RL1-00649-1, The Lookout and Mathers Foundation, the Helmsley Foundation as well as Sanofi-Aventis. Subsequent studies occurred in the Brennand Laboratory, and were supported by the Brain and Behavior Research Foundation and the New York Stem Cell Foundation. The investigators are very grateful to the patients who participated in this study.

Study 159- Data and biomaterials for NIMH Study 159 were collected as part of “A chimeric brain model to study human neurological diseases”, supported by NIMH grant # R21MH10777 and The International Foundation for CDKL5 Research (IFCR). The principal investigator is Alysson R Muotri/University of California San Diego.
Study 160- Data and biomaterials for NIMH Study 03-M-0035 were collected as part of Screening for Childhood-Onset Psychotic Disorders. The principal investigator was Judith Rapoport, M.D./Child Psychiatry Branch/NIMH. The ClinicalTrials.gov identifier is NCT00049738 (Terminated).

Study 163- Study participants were consented and enrolled, data and biomaterials were collected, and cell lines were generated at Massachusetts General Hospital as part of an NIMH/NHGRI Center of Excellence in Genomic Science grant (P50MH106933). The Neurobank PI is Roy Perlis, M.D., MSc; key MGH co-investigators included Hannah Brown, M.D., J. Niels Rosenquist, M.D., Ph.D., Steven Sheridan, Ph.D., and Jennifer Wang, Ph.D. The CEGS co-PIs are Isaac Kohane, M.D., Ph.D. and Roy H. Perlis, M.D., MSc.

Study 165- Acknowledgement for use by those using the cells: The DISC1 family was originally ascertained by LE DeLisi. Identification of the mutation, reexamination of the family, and skin biopsies were performed by N Sachs, A Sawa, SE Holmes, N Yoritomo, CA Ross, and RL Margolis. Stem cell generation and characterization was performed by C-H Chiang, Y Su, Z Wen, H Song, and G-I Ming.

Study 166- Data and biomaterials for NIMH Study 166 were collected as part of Juvenile Onset Schizophrenia iPSCs, supported by NIMH grant R21/R33MH087877. The principal investigators are Paul Tesar, Ph.D., Robert H. Miller, Ph.d, and Robert L. Findling, M.D.

Study 200- Data and biomaterials for NIMH Study #200 were collected as part of Mechanisms of Circuit Failure and Treatments in Patient-Derived Neurons in Autism, supported by NIMH grant 5R01MH105442-06. The principal investigator is Eric M. Morrow, MD, PhD, Brown University.

DATED SIGNATURES

Principal Investigator, **PLEASE PRINT**

Signature and **Date**, Principal Investigator

Signature and **Date**, Receiving Institution's Authorized Representative

Signature and **Date**, NIMH Repository & Genomics Resource's Authorized Representative, Rutgers University

Signature and **Date**, NIMH's Authorized Representative