

ALLEN Human Brain Atlas

ACKNOWLEDGMENT OF COLLABORATORS

The Allen Institute for Brain Science gratefully acknowledges the following collaborators and contributors for their generosity and support of the Allen Human Brain Atlas.

MICROARRAY SURVEY

Human Brain Anatomy

Patrick R. Hof, M.D., Mount Sinai School of Medicine, for consultation on all aspects of this project including neuroanatomy, cytoarchitecture, cortical anatomy, parcellation and ontology.

Edward G. “Ted” Jones, M.D., Ph.D., Center for Neuroscience, University of California, Davis, for guidance on thalamic anatomy and ontology

Jose Leonardo V. Mejino Jr., M.D., FMA Ontology, Structural Informatics Group, Department of Biological Structure, University of Washington School of Medicine.

Clifford B. Saper, M.D., Ph.D., Department of Neurology, Program in Neuroscience, and Division of Sleep Medicine, Harvard Medical School and Beth Israel Deaconess Medical Center, for guidance on hypothalamic anatomy and ontology.

Jeremy D. Schmamann, M.D., Ataxia Unit, Cognitive/Behavioral Unit, Department of Neurology, Massachusetts General Hospital and Harvard Medical School, for providing assistance with cerebellum anatomy and ontology.

Gulgun Sengul, M.D., Professor of Anatomy, Ege University School of Medicine, for [review of brainstem annotations and sample delineations](#).

John W. Sundsten, Ph.D., Emeritus Associate Professor, Department of Biological Structure, University of Washington, for human brainstem anatomy training and annotation.

Larry Swanson, Ph.D., Department of Biological Sciences, University of Southern California, for guidance on anatomy and ontology of the thalamus.

Magnetic Resonance Imaging

Karen F. Berman, M.D. Section on Integrative Neuroimaging, Clinical Brain Disorders Branch, Genes Cognition and Psychosis Program, Intramural Research Program, National Institute of Mental Health, National Institutes of Health, for early advice and investigation into ex cranio postmortem MR imaging

Jacqueline Chen, Ph.D., and Bruce Trapp, Ph.D., Department of Neurosciences, **Elizabeth Fisher, Ph.D.**, Department of Biomedical Engineering, Cleveland Clinic Lerner Research Institute, for advice and guidance on postmortem MR image acquisition.

Barry Daly, M.D., FRCR, Rao Gullapalli, Ph.D., Alan McMillan, Ph.D., Robert Morales, M.D., Department of Diagnostic Radiology and Nuclear Medicine, University of Maryland School of Medicine and University of Maryland Medical Center, for postmortem magnetic resonance imaging and radiology interpretation of MR data.

Alexander Hammer, M.D., Ph.D., and Rolf A. Heckemann, M.D., Ph.D., Imperial College London and Neurodis Foundation, France, for collaboration on segmentation of early postmortem imaging data.

Dharmendra (D) Patel, Patrick Bird, MRI – Radiology, UCI Medical Center, University of California, Irvine, for postmortem magnetic resonance imaging.

Bruce Pike, Ph.D., McConnell Brain Imaging Centre, Montreal Neurological Institute, for advice and guidance on postmortem MR image acquisition.

Molecular Biology and Microarrays

Agilent Technologies, for early access to high density (8x60K) gene expression platform.

Beckman Coulter Genomics, for processing RNA samples through labeling and hybridization.

Covance Genomics Laboratory, for processing RNA samples through labeling and hybridization.

Expression Analysis Inc., for RNA-Seq data generation.

Yudong He, Ph.D., for review and analysis of pilot data and advice and guidance on statistical analysis of array data.

Patrick Hurban, Ph.D., and **Ken Phillips**, Beckman Coulter Genomics, for assistance in designing new gene content for high density gene expression arrays.

Anne Bergstrom Lucas, Genomics R&D, Agilent Technologies, for assistance in experimental design for and final selection of ERCC transcripts and probes for molecular barcodes.

Paul T Manser, M.S., Department of Biostatistics, Virginia Commonwealth University, for expertise on array data normalization.

Mark A Reimers, Ph.D., Department of Biostatistics, Virginia Commonwealth University, for review and analysis of pilot microarray data, and guidance and expertise on array data normalization and statistical analysis.

The External RNA Controls Consortium (ERCC), the US National Institute of Standards (NIST) and Technology, and Marc Salit, Ph.D., Chair, ERCC and Group Lead, NIST, for access to ERCC transcripts during Phase V testing.

Tissue Acquisition, Processing and Screening

Preston Cartagena, PsyD, CRCC, Associate Director, Brain Donor Program, Psychiatry and Human Behavior, University of California, Irvine; **Joe Davis, CTSS**, Medical Examiner Chaplain, Office of the Medical Examiner, County of San Diego; **David Walsh, PsyD**, Psychologist, College of Medicine, Psychiatry and Human Behavior, University of California, Irvine, for donor coordination, tissue acquisition and psychological autopsy.

OCTOBER 2013 v.3

Acknowledgement of Collaborators

page 2 of 4

alleninstitute.org
brain-map.org

Thomas M. Hyde, M.D., Ph.D., Acting Chief Operating Officer, Lieber Institute for Brain Development, Baltimore, M.D.; and Special Volunteer, Clinical Brain Disorders Branch, Section on Neuropathology, GCAP, Intramural Research Program, National Institute of Mental Health, National Institutes of Health for providing tissue.

Joel E. Kleinman, M.D., Ph.D., Section on Neuropathology, Clinical Brain Disorders Branch, Genes Cognition and Psychosis Program, Intramural Research Program, National Institute of Mental Health, National Institutes of Health, for providing tissue used in methods development for this work.

F. Warren Lovell, M.D., for expert consultation on gross neuropathology.

Firoza Mamdani, Ph.D., Maureen Martin, Ph.D., Emily Moon, Ling Morgan, Brandi Rollins, Adolfo P. Sequeira, Ph.D., Marquis P. Vawter, PsyD, Ph.D., Functional Genomics Laboratory, Department of Psychiatry and Human Behavior, School of Medicine, University of California, Irvine, for tissue processing.

NICHD Brain and Tissue Bank for Developmental Disorders, H. Ronald Zielke, Ph.D., Director; Peter Baab, John Cottrell, Melissa Davis, Robert Johnson, Ling Li, Kim Moraniec, Robert Vigorito, Anthony Weldon, Yang Zhang, University of Maryland School of Medicine, for tissue acquisition and processing. Supported by NICHD Contracts N01-HD-4-3368 and N01-HD-4-3383

Yeva Snitkovsky and Mary M Hermann, M.D., Section on Neuropathology, Clinical Brain Disorders Branch, Genes Cognition and Psychosis Program, Intramural Research Program, National Institute of Mental Health, National Institutes of Health, for providing sectioned paraffin-embedded tissue for histological staining methods and controls.

Joshua A Sonnen, M.D., Department of Pathology, Neuropathology Division, University of Washington for expert consultation on tissue microneuropathology.

Richard Woortman, Cavex Holland BV, for contribution of alginate during methods development phases of processing fresh whole brain tissue.

***IN SITU* HYBRIDIZATION STUDIES**

(1,000 Gene Survey in Cortex (Cortex Study), Autism Study, Neurotransmitter Study, Schizophrenia Study, Subcortex Study)

The Allen Institute for Brain Science gratefully acknowledges the following contributors for their generosity and support of ISH studies in human brain.

Alzheimer Disease Research Center Tissue Bank and Aimee Schantz, University of Washington, for providing tissue used in ISH methods development work, ISH studies and plaque-positive tissue for plaque assessment. Supported by grant P50-AG05136.

Jacopo Annese, Ph.D., The Brain Observatory, University of California, San Diego, for creation of cortical region reference images for the Allen Institute.

Autism Tissue Program, Princeton, NJ., for providing tissue for the Autism Study.

Brain and Tissue Bank for Developmental Disorders, Miami, FL., for providing tissue for the Autism Study.

Eric Courchesne, Ph.D., Department of Neuroscience, NIH–UCSD Autism Center of Excellence, School of Medicine, University of California San Diego, La Jolla, CA, for Autism Study collaboration.

Amy Deep-Soboslay, MEd, Mary M. Herman, M.D., Thomas M. Hyde, M.D., Ph.D., Vesna Imamovic, Barbara K. Lipska, Ph.D., Yeva Snitkovsky and Joel E. Kleinman, M.D., Ph.D., Section on

OCTOBER 2013 v.3

Acknowledgement of Collaborators

page 3 of 4

alleninstitute.org
brain-map.org

Neuropathology, Clinical Brain Disorders Branch, Genes Cognition and Psychosis Program, Intramural Research Program, NIMH, NIH, for providing well characterized, dissected brain specimens with regard to clinical diagnosis, demographics, neuroanatomy and neuropathology for the Cortex Study and Schizophrenia Study, and for expertise and guidance on gene expression studies on postmortem human brain.

Evan Eichler, Ph.D., HHMI, University of Washington, for providing *morpheus* riboprobe template for the Cortex Study.

Richard Gibbs, Ph.D., Baylor College of Medicine, for contributing unpublished data on genes under positive selection to support Cortex Study gene selection.

Harvard Brain Tissue Resource Center, Belmont, MA for providing tissue for the Autism Study.

Patrick R. Hof, M.D., Mount Sinai School of Medicine, for consultation on neuroanatomy, cytoarchitecture, tissue and RNA quality, tissue sources and procurement, gene selection, gene expression and data presentation for all ISH datasets.

Human Brain and Spinal Fluid Resource Center, VA West Los Angeles Healthcare Center, for providing tissue specimens used in ISH methods development work. Sponsored by NINDS/NIMH, National Multiple Sclerosis Society and the Department of Veterans Affairs.

Charles Jennings, Ph.D., for consultation on tissue sources and procurement.

Jeffrey A. Loeb, M.D., Ph.D., Wayne State University, for providing tissue samples used in methods development efforts.

Thomas Montine, M.D., Ph.D., University of Washington, for expertise and guidance in neuroanatomy and neuropathology and for general support of these ISH studies.

NICHD Brain and Tissue Bank for Developmental Disorders, University of Maryland, for providing neuroanatomy expertise and tissue for the Autism Study, Neurotransmitter Study, and Subcortex Study. Supported by NICHD Contracts N01-HD-4-3368 and N01-HD-4-3383.

Adam Siepel, Ph.D., Cornell University, for contributing unpublished data on genes under positive selection to support Cortex Study gene selection.

James Sikela, Ph.D., University of Colorado Health Sciences Center, for supplying data on genes under positive selection to support Cortex Study gene selection.

John Q. Trojanowski, M.D., Ph.D., University of Pennsylvania, for providing tissue used in ISH methods development work. Supported by ADCC NIH/NIA P30-AG010124.

Dr. Deborah Mash and the University of Miami Brain Endowment Bank, Miami, FL for providing human cortical brain samples used in the Cortex Study. The University of Miami Brain Endowment Bank is funded, in part, by the National Parkinson Foundation.

Jean Paul Vonsattel and Katerina Mancevska, New York Brain Bank, The Taub Institute, Columbia University for providing tissue used in ISH methods development work and for guidance on human tissue quality parameters and neuroanatomy. Supported by the NIH and NIA: P01-AG07232, R37-AG15473, and P50-AG08702.