

Curriculum vitae prepared 1/23/2013

Asa Abeliovich, M.D., Ph.D.

Columbia University

College of Physicians and Surgeons

Departments of Pathology, Cell Biology, and Neurology

Taub Institute

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Personal Data:

Name: Asa Abeliovich

Birthdate: 05/17/1964

Birthplace: Afula, Israel

Citizenship: USA, Israel

Work Experience

07/2000-07/2007 Assistant Professor, Departments of Pathology and Neurology, Taub Institute
07/2007-present Associate Professor (with Tenure), Departments of Pathology and Neurology, Taub Institute

7/2001-present Attending Physician, Neurology, New York-Presbyterian Hospital
7/2001-6/2006 Attending Physician, Neurology, New York Psychiatric Institute

Training:

06/1994-05/1995 Postdoctoral Fellow, MIT, Department of Biology
 Advisor: Susumu Tonegawa

07/1996-06/2000 Postdoctoral Researcher, Genentech, Inc., Dept. of Neuroscience
 Advisor: Arnon Rosenthal

06/1996-06/1997 Intern Physician, Dept. of Medicine, University of California, San Francisco
06/1997-06/2000 Resident Physician, Dept. of Neurology, University of California, San Francisco

Education:

09/1986-05/1990 S.B, Massachusetts Institute of Technology, Life Sciences
09/1986-05/1990 S.B, Massachusetts Institute of Technology, Humanities
09/1988-05/1994 Ph.D., Massachusetts Institute of Technology, Biology; Thesis Title: "The role of protein kinase C γ in mammalian central nervous system function: a genetic approach"
 Sponsor: Susumu Tonegawa

09/1986-05/1996 M.D., Harvard Medical School

Gaps:

None

Licensure and Board Qualification:

10/2000-Present New York Medical License, Registration No. 219456-1 (Active)
05/2002-12/2012 Diplomate in Neurology No. 51209, American Board of Psychiatry and Neurology

Professional Organizations and Societies:

Society for Neuroscience
International Society for Stem Cell Research

Honors:

1987 Medical Scientist Training Program Predoctoral Fellowship, Harvard Medical School
2001 Culpeper Scholar, Rockefeller Brothers Foundation
2001 Mathissen Foundation Award, Columbia University
2001 Beeson Scholar, American Federation for Aging Research
2005 Lamport Award for Excellence in Basic Science Research, Columbia University

Fellowships and Grant Support**Grant Support, Present:**

Agency: **NIH** (R01 NS064433-01)
PI: Asa Abeliovich
Period: 1/1/2009 –12/31/13
Direct Costs: \$1,250,000
Title: Gene expression circuitry and microRNAs in midbrain dopamine neurons

Agency: **Helmsley Foundation**
PI: Asa Abeliovich
Period: 5/1/2011 –4/30/2013
Direct Costs: \$170,000
Title: Directed conversion of human fibroblasts to a neuronal phenotype

Agency: **NIH** (R01 AG042317)
PI: Asa Abeliovich
Period: 7/1/2012-6/30/2017
Direct Costs: \$2,124,608
Title: Human induced neuronal stem cell models of familial Alzheimer's disease

Agency: **Merck**
PI: Asa Abeliovich
Period: 7/1/2012 –6/3/14
Direct Costs: \$197,286
Title: Using human induced neurons for target validation

R01 OD011783-01

Agency: **NIH** (R01 OD011783-01)
PI: Asa Abeliovich
Period: 09/01/2012-08/30/2017
Direct Costs: \$2,046,489
Title: Generation and integration of new CNS neurons by in vivo directed conversion

Grant Support, Past:

Agency: **Mathissen Foundation**
PI: Asa Abeliovich
Period: 7/1/2000-6/30/2001
Direct Costs: \$50,000
Title: Familial Parkinson Disease Genes

Agency: **Rockefeller Brothers Foundation (Culpeper Fellowship)**
PI: Asa Abeliovich
Period: 7/1/2001-6/30/2004
Direct Costs: \$300,000
Title: Genetics of Parkinson's Disease

Agency: **American Federation for Aging Research (Beeson Fellowship)**

PI: Asa Abeliovich
Period: 7/1/2001-6/30/2004
Direct Costs: \$450,000
Title: Molecular Analysis of Familial Parkinson Disease Genes

Agency: **NIH (R21 NS43744)**
PI: Asa Abeliovich
Period: 7/1/2002-6/30/2005
Direct Costs: \$285,000
Title: Genetic Analysis of Familial Parkinson Disease Genes

Agency: **Michael J. Fox Foundation**
PI: Asa Abeliovich
Period: 1/1/2003-12/31/2004
Direct Costs: \$250,000
Title: Parkinson's Disease and the Regulation of Neuronal Survival

Agency: **Spitzer Family Fund**
PI: Asa Abeliovich
Period: 2/1/2004-2/01/2009
Direct Costs: \$1,250,000
Title: Regulation of the midbrain dopamine neuron phenotype in ES cultures

Agency: **Michael J. Fox Foundation**
PI: Asa Abeliovich
Period: 7/1/2007-6/30/2009
Direct Costs: \$250,000
Title: Targeting the PTEN pathway in Parkinson's disease

Agency: **Michael J. Fox Foundation**
PI: Asa Abeliovich
Period: 3/1/2008-2/30/2009
Direct Costs: \$75,000
Title: miRNA regulation of aSynuclein

Agency: **NIH (R01 NS049070-01)**
PI: Asa Abeliovich
Period: 7/1/2005-6/30/2010
Direct Costs: \$1,250,000
Title: Molecular and Cellular Analyses of DJ-1 Function

Agency: **NYSTEM (N08T-002)**
PI: Asa Abeliovich
Period: 1/1/2009 –12/31/12
Direct Costs: \$900,000
Title: Intracellular signaling cascades in iPS reprogramming

Agency: **NYSTEM (N08T-001)**
PI: Asa Abeliovich
Period: 1/1/2009 –12/31/12
Direct Costs: \$900,000
Title: Human iPS cell-based models for neurodegeneration

Agency: **Anonymous Private Foundation**
PI: Asa Abeliovich

Period: 1/1/2009 –12/31/2011
 Direct Costs: \$500,000
 Title: Induced pluripotent stem cell approaches to Alzheimer's disease modeling

Agency: NIH (R01 NS060876)
 PI: Asa Abeliovich
 Period: 7/1/2009 –6/30/12
 Direct Costs: \$750,000
 Title: Autophagy and Protein Degradation in Parkinson's Disease Models

Departmental and University Committees:

2004 Columbia University Stem Cell Policy Advisory Committee
 2004-2006 Executive Committee of the Faculty Council, Columbia University College of Physicians and Surgeons
 2004-2006 Faculty Council, Columbia University College of Physicians and Surgeons
 2006-present Advisory Committee, MD-PhD Program, Columbia University

Teaching Activities:

Courses

2004-2005 Co-director, Reading Seminar in Pathobiology
 2004-2010 Co-director, "Molecular and Cellular Mechanics in Human Disease"

Trainees

a) Postgraduate Training:

2000-2002 Caroline Macdermott, Ph.D. (Glasgow, UK)
 current position: Postdoctoral fellow, University of London
 2000-2002 Daya Gupta, Ph.D. (SUNY Downstate)
 current position: postdoctoral fellow, NIH
 2002-2005 Cecile Martinat, Ph.D. (Institute Pasteur)
 Researcher, INSERM Genethon, Evry, France
 2002-2005 Jean-Jacques Bacci, Ph.D. (U Mediterranee, Marseille, France)
 Current position, Finance
 2002-2005 Alan Jonason, Ph.D. (Yale)
 current position: Scientist, Vaccinex, Inc., Rochester, NY
 2003-2004 Honggang Wang (Shinshu University, Japan)
 current position: Research Scientist, Duke University
 2003- 2007 Rachel Hammond, Ph.D. (Univ. London, UK)
 current position: consultant, McKinsey Associates
 2005- present Keichi Inoue, Ph.D. (Univ. Tokyo, Japan; won New York Stem Cell
 Foundation Fellowship)
 2007-2010 Jane Cummings (Univ. Auckland, New Zealand)
 current position: postdoctoral scientist, Columbia University
 2008-present Herve Rhinn (Pierre and Marie Curie University)
 2008-2010 Natsumi Watanabe (Tokyo University)
 current position: scientist, Tokyo University
 2009-present Claudia Doege (Humboldt University)
 2009-present Ryousuke Fujita (Tokyo University)
 2010-2012 Toru Yamashita (Tokyo University)
 2011-2012 David Rhee (NIH)
 2011-present Tomoki Kuwahara (Tokyo University)
 2011-present David McLeod (Columbia University)

b) Graduate Students:

2000-2004 John Staropoli, MD/PhD program, graduated with honors (now resident at MGH Pathology)

2001-2004	Shoshana Shendelman, Integrated Program (now applying for postdoctoral positions after maternity leave)
2004-2008	Jongpil Kim, Pathology and Cell Biology program (won Bruni Prize for stem cell research; now postdoc with Rudolf Jaenisch at MIT)
2005-2011	David MacLeod, Pathology and Cell Biology program
2007-2012	Lily Chau, MD/PhD program

c) Fellowships awarded to Trainees

John Staropoli: NIH NRSA predoctoral fellowship
 Cecile Martinat: National Parkinson Foundation Postdoctoral Fellowship
 Rachel Hammond: National Parkinson Foundation Postdoctoral Fellowship
 Keiichi Inoue: New York Stem Cell Foundation Fellowship
 Toru Yamashita: Japan Society for the Promotion of Science
 Tomoki Kuwahara: Japan Society for the Promotion of Science

Peer review Activities:

Editorial Activities:

a) **Paper manuscripts:** *Nature, Cell, Science, Proc.Natl.Acad.Sci.USA, Nature Neuroscience, Nature Medicine, J.Neurosci., Neuron, Public Library of Science, Journal of Neurobiology, Journal of Neurochemistry, Journal of Cell Science, Human Molecular Genetics*

c) **Grant reviews:** NIH Clinical Neuroplasticity and Neurotransmitters Study Section Member, 2010-2014; Ad hoc reviewer for: Neurogenesis and Cell Fate, Cell Death in Neurodegeneration, and Udall Center for Excellence Study Sections; Medical Research Council, UK; Michael J. Fox Foundation; National Parkinson Foundation; Parkinson Disease Foundation; Starr Foundation for Stem Cell Research, NYSCF, Singapore expert panel for biomedical engineering and life sciences, 2009-2013.

Publications:

Original, Peer Reviewed Articles (Asterisk [*] indicates candidate is the senior author)

1. Tuan, D., **Abeliovich, A.**, Lee-Oldham, M. & Lee, D. Identification of regulatory elements of human beta-like globin genes. **Prog Clin Biol Res** (1987) 251, 211-220.
2. **Abeliovich, A.**, Gerber, D., Tanaka, O., Katsuki, M., Graybiel, A.M. & Tonegawa, S. On somatic recombination in the central nervous system of transgenic mice. **Science** (1992) 257, 404-410.
3. **Abeliovich, A.**, Chen, C., Goda, Y., Silva, A.J., Stevens, C.F. & Tonegawa, S. Modified hippocampal long-term potentiation in PKC gamma-mutant mice. **Cell** (1993) 75, 1253-1262.
4. **Abeliovich, A.**, Paylor, R., Chen, C., Kim, J.J., Wehner, J.M. & Tonegawa, S. PKC gamma mutant mice exhibit mild deficits in spatial and contextual learning. **Cell** (1993) 75, 1263-1271.
5. Ishikawa, H., Li, Y., **Abeliovich, A.**, Yamamoto, S., Kaufmann, S.H. & Tonegawa, S. Cytotoxic and interferon gamma-producing activities of gamma delta T cells in the mouse intestinal epithelium are strain dependent. **Proc Natl Acad Sci U S A** (1993) 90, 8204-8208.
6. Butler, L.S., Silva, A.J., **Abeliovich, A.**, Watanabe, Y., Tonegawa, S. & McNamara, J.O. Limbic epilepsy in transgenic mice carrying a Ca²⁺/calmodulin-dependent kinase II alpha-subunit mutation. **Proc Natl Acad Sci U S A** (1995) 92, 6852-6855.
7. Kano, M., Hashimoto, K., Chen, C., **Abeliovich, A.**, Aiba, A., Kurihara, H., Watanabe, M., Inoue, Y. & Tonegawa, S. Impaired synapse elimination during cerebellar development in PKC gamma mutant mice. **Cell** (1995) 83, 1223-1231.
8. Hsia, A.Y., Salin, P.A., Castillo, P.E., Aiba, A., **Abeliovich, A.**, Tonegawa, S. & Nicoll, R.A. Evidence against a role for metabotropic glutamate receptors in mossy fiber LTP: the use of mutant mice and pharmacological antagonists. **Neuropharmacology** (1995) 34, 1567-1572.
9. Harris, R.A., McQuilkin, S.J., Paylor, R., **Abeliovich, A.**, Tonegawa, S. & Wehner, J.M. Mutant mice lacking the gamma isoform of protein kinase C show decreased behavioral actions of

- ethanol and altered function of gamma-aminobutyrate type A receptors. **Proc Natl Acad Sci U S A** (1995) 92, 3658-3662.
10. Chen, C., Kano, M., **Abeliovich, A.**, Chen, L., Bao, S., Kim, J.J., Hashimoto, K., Thompson, R.F. & Tonegawa, S. Impaired motor coordination correlates with persistent multiple climbing fiber innervation in PKC gamma mutant mice. **Cell** (1995) 83, 1233-1242.
 11. Bowers, B.J., Owen, E.H., Collins, A.C., **Abeliovich, A.**, Tonegawa, S. & Wehner, J.M. Decreased ethanol sensitivity and tolerance development in gamma-protein kinase C null mutant mice is dependent on genetic background. **Alcohol Clin Exp Res** (1999) 23, 387-397.
 12. **Abeliovich, A.**, Schmitz, Y., Farinas, I., Choi-Lundberg, D., Ho, W.H., Castillo, P.E., Shinsky, N., Verdugo, J.M., Armanini, M., Ryan, A., Hynes, M., Phillips, H., Sulzer, D. & Rosenthal, A. Mice lacking alpha-synuclein display functional deficits in the nigrostriatal dopamine system. **Neuron** (2000) 25, 239-252.
 - *13. Staropoli, J.F., McDermott, C., Martinat, C., Schulman, B., Demireva, E. & **Abeliovich, A.** Parkin is a component of an SCF-like ubiquitin ligase complex and protects postmitotic neurons from kainate excitotoxicity. **Neuron** (2003) 37, 735-749.
 - *14. Martinat, C., Shendelman, S., Jonason, A., Leete, T., Beal, M.F., Yang, L., Floss, T. & **Abeliovich, A.** Sensitivity to oxidative stress in DJ-1-deficient dopamine neurons: an ES-derived cell model of primary Parkinsonism. **PLoS Biol** (2004) 2, e327.
 - *15. Shendelman, S., Jonason, A., Martinat, C., Leete, T. & **Abeliovich, A.** DJ-1 is a redox-dependent molecular chaperone that inhibits alpha-synuclein aggregate formation. **PLoS Biol** (2004) 2, e362.
 - *16. Staropoli, J.F. & **Abeliovich, A.** The ubiquitin-proteasome pathway is necessary for maintenance of the postmitotic status of neurons. **J Mol Neurosci** (2005) 27, 175-183.
 17. Klivenyi, P., Siwek, D., Gardian, G., Yang, L., Starkov, A., Cleren, C., Ferrante, R.J., Kowall, N.W., **Abeliovich, A.** & Beal, M.F. Mice lacking alpha-synuclein are resistant to mitochondrial toxins. **Neurobiol Dis** (2006) 21, 541-548.
 - *18. Martinat, C., Bacci, J.J., Leete, T., Kim, J., Vanti, W.B., Newman, A.H., Cha, J.H., Gether, U., Wang, H. & **Abeliovich, A.** Cooperative transcription activation by Nurr1 and Pitx3 induces embryonic stem cell maturation to the midbrain dopamine neuron phenotype. **Proc Natl Acad Sci U S A** (2006) 103, 2874-2879.
 - *19. MacLeod, D., Dowman, J., Hammond, R., Leete, T., Inoue, K., and **Abeliovich, A.** The familial Parkinsonism gene LRRK2 regulates neurite process morphology. **Neuron** (2006) 52, 587-593.
 - *21. Kim, J.P., Murchison, E., Hannon, G., and **Abeliovich, A.** miRNAs regulation of midbrain dopamine neurons: Mir133b functions in a feedback circuit with the homeodomain transcription factor Pitx3. **Science** (2007) 317, 1220-1224.
 - *20. Hammond, R., Blaess, S., Joyner, A., and **Abeliovich, A.** Sonic Hedgehog chemoattractant gradient specifies the structural diversity of midbrain dopamine neuron axonal projections. **PloS One** (2009) 4, e7007-7012.
 - *21. Qiang, L., Fujita, R., Yamashita, T., Angulo, S., Rhinn, H., Rhee, D., Doege, C., Chau, L., Aubry, L., Vanti, W., Moreno, H., and **Abeliovich, A.** Directed Conversion of Alzheimer's Disease Patient Skin Fibroblasts into Functional Neurons. **Cell** (2011) 146, 359-371.
 - *22. Inoue, K., Rispoli, J., Kaphzan, H., Klann, E., Chen, E.I., Kim, J., Komatsu, M., and **Abeliovich, A.** (2012). Macroautophagy deficiency mediates age-dependent neurodegeneration through a phospho-tau pathway. **Mol Neurodegeneration** 7, 48.
 - *23. Rhinn, H., Qiang, L., Yamashita, T., Rhee, D., Zolin, A., Vanti, W.B., and **Abeliovich, A.** Alternative α -synuclein transcript usage as a convergent mechanism in Parkinson's disease pathology. **Nature Communications** (2012) 3, 1084-1095.
 - *24. Doege, C.A., Inoue, K., Yamashita, T., Rhee, D.B., Travis, S., Fujita, R., Guarnieri, P., Bhagat, G., Nik S., Chen E. I., Vanti, W. B., and **Abeliovich, A.** Early-stage epigenetic modification during somatic cell reprogramming by Parp1 and Tet2. **Nature** (2012) 488, 652-655.
 - *25. MacLeod, D., Rhinn, H., Kuwahara, T., Zolin, A., Di Paulo, G., McCabe, B.D., Marder, K.M., Honig, L.S., Clark, L.S., Small, S.A., **Abeliovich, A.** RAB7L1 interacts with LRRK2 to modify intraneuronal protein sorting and Parkinson's disease risk. **Neuron** (2013) 77, 425.

Reviews/Commentaries/Opinions

- *1. **Abeliovich, A.** & Beal, M.F. Parkinsonism genes: culprits and clues. **J Neurochem** (2006) 99, 1062-1072.
- *2. **Abeliovich, A** & Hammond, R. Midbrain dopamine neuron differentiation: factors and fates. **Dev Biol** (2007) 304, 447-454.
- *3. **Abeliovich, A. & Doege, C.A.** Reprogramming therapeutics: iPS cell prospects for neurodegenerative disease. **Neuron** (2009) 61, 337-339.
- *4. **Abeliovich, A.** Parkinson's disease: mitochondrial damage control. **Nature** (2010) 463, 744-745.

Patent Applications (through Columbia University)

1. Parkin-associated complex for protecting post-mitotic neurons from excitotoxicity and uses thereof (Patent application publication number 2004/0247586, Filed 2/20/2004).
2. Vector-mediated gene regulation in midbrain dopamine neurons (Patent application publication number 2006/0153807, Filed 07/13/2006).
3. Protecting cell therapy for neurological disorders including Parkinson's disease (Patent application publication number 2006/0171935, Filed 8/3/2006).
4. Cellular models of neuron-associated disorders and uses thereof (Patent application publication number 2006/0183104, Filed 08/17/2006).
5. Modified human embryonic stem cells and methods of use to treat neuron-associated disorders (Patent application publication number 2006/0275744, Filed 12/7/2006).
6. Methods for the treatment of neurodegenerative diseases using nmda receptor glycine site antagonists (Patent application publication number 2009/0004112, Filed 1/1/2009).
7. Methods to treat neurodegenerative conditions or diseases by targeting components of a pten signaling pathway (Patent application publication number 2011/0189308, Filed 8/4/2011).