

University of California, San Francisco
CURRICULUM VITAE

Name: Arturo Alvarez-Buylla, PhD
Position: Professor, Step 8
Neurological Surgery
School of Medicine

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EDUCATION

1977 - 1983	UNAM, Mexico	Licenciad o	Biomedical Research
1983 - 1988	Rockefeller University	Ph.D.	
1988 - 1989	Rockefeller University	Postdocto ral fellow	Neurobiology
-	Trained in the following Laboratories		
1980 - 1981	UNAM. Development (Dr. Merchant-Larios)		
1981 - 1982	Rockefeller University. Biochemistry (Dr. Reich)		
1984 - 1984	Institut d' Embryologie, France. Development (Dr. Le Douarin)		
1983 - 1989	Rockefeller University. Neurobiology (Dr. Nottebohm)		

PRINCIPAL POSITIONS HELD

1989 - 1991	Rockefeller University	Assistant Professor
1991 - 1995	Rockefeller University	Assistant Professor-Head of Lab
1995 - 2000	Rockefeller University	Associate Professor-Head of

		Lab	
2000 -	University of California, San Francisco	Professor	Neurosurgery
2001 - 2003	University of California, San Francisco	Stephen Muss Endowed Chair	Department of Neurosurgery
2003 -	University of California, San Francisco	Heather and Melanie Muss Endowed Chair	Department of Neurosurgery

OTHER POSITIONS HELD CONCURRENTLY

2000 - 2008	University of California, San Francisco	Professor, Anatomy
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HONORS AND AWARDS

1981	Undergraduate International Fellowship- UNAM, MEXICO
1983	Medal Gabino Barreda- UNAM
1990	First Award, NIH-R29 NS28478. The origin of new neurons in the adult avian brain.
1992	Sinsheimer Award
2000	Jacob Javits Award
2002	Neuronal Plasticity Prize. Fondation IPSEN, France (Shared with Dr. R. McKay and Dr. S. Weiss)
2003	Catedra Miguel Aleman, Mexico, D.F.
2004	The Givaudan-Roure 2004 Lecture and Award (Association for Chemoreception Sciences)
2006	Catedra Santiago Grisolia, Spain. Lecture and Award.
2006	"Académico Correspondiente Extranjero". Real Academia de Ciencias Exactas, Físicas y Naturales. Spain.
2007	Catedra Ramón y Cajal, Sociedad Española de Neurología, Spain
2011	Principe de Asturias de Investigacion Cientifica y Tecnica, Spain (Shared with Dr. Joseph Altman and Dr. Giacomo Rizzolatti)
2012	NICH; NIH Merit award
2013	American Academy of Arts and Sciences
2013	Catedra de Excelencia Banco de Santander, Pompeu Fabra University, Barcelona, Spain June

- 17-July 17
- 2014 New York University, Honors Lecture, New York, NY, March 24
- 2014 Honorary Segerfalk Lecture Award/ Annual Neuroscience Day, Lund University, Sweden, May 7-9

KEYWORDS/AREAS OF INTEREST

Neurogenesis, assembly of the brain, brain tumors and repair, ontogeny and phylogeny of behavior, neuronal cell fate determination.

PROFESSIONAL ACTIVITIES

PROFESSIONAL ORGANIZATIONS

Memberships

- 1987 - 2000 International Brain Research Organization
- 1995 - 2000 Society for Biochemistry
- 2003 - 2005 American Society for Cell Biology
- 1985 - present Society for Neuroscience
- 2002 - present Academia de Ciencias de America Latina (ACAL)
- 2002 - present International Society for Stem Cell Research (ISSCR)
- 2013 - present American Academy of Arts and Sciences

Service to Professional Organizations

- | | | |
|----------------|--|---|
| 1990 - 1993 | Genentech Inc. | Consultant |
| 1997 - 1998 | Neurocal International | Scientific Advisory Board |
| 2002 - 2002 | Neuropharma | Scientific Advisory Board |
| 2002 - 2002 | Geron Cooperation | Scientific Advisor |
| 2005 - 2005 | International Society for Stem Cell Research (ISSCR) | Strategic Planning Committee |
| 2000 - present | Department of Neurological Surgery, | University of California, San Francisco |
| 2011 - present | Broad Center of Regeneration Medicine and Stem Cell Research | University of California, San Francisco |
| 2011 - present | International Society for Stem Cell Research (ISSCR) | Board of Directors Member |
| 2015 - present | Neurona Therapeutics | Founder and Advisory Board |

Member

SERVICE TO PROFESSIONAL PUBLICATIONS

- 1990 - 1990 Editor, Multi-author collection of reviews in the vertebrate brain, *Experientia*
- 1998 - 1998 Guest Editor Special Issue, *Journal of Neurobiology*
- 2002 - 2010 Editorial Board, *Journal of Neurobiology*
- 2006 - 2011 Board of Reviewing Editors, *Science*
- 2006 - 2006 Editorial Board, *Cell Stem Cell*
- Reviewer: *Neuron*, *Nature*, *Science*, *Cell*, *Journal of Neuroscience*, *Neuroscience*, *Journal of Comparative Neurology*, *Journal of Experimental Neurology*, *Journal Cell Biology*, *F1000*, *Development*, *Journal of Neurobiology*, *Developmental Biology*, *Molecular and Cellular Neuroscience*, *Brain Research*
- 2006 - present Editorial Board, *Neural Development*
- 2012 - present Editorial Board, *F1000 Research*
- 2013 - present Editorial Board, *Brain Pasticity*

INVITED PRESENTATIONS

INTERNATIONAL

- 1991 Departamento de Fisiología, CINVESTAV, Mexico
- 1992 Juan March Symposium, Madrid, Spain
- 1993 Instituto de Fisiología Celular, UNAM, México
- 1994 Department of Anatomy, University of Toronto, Canada
- 1994 International Ornithological Congress, Vienna, Austria
- 1995 Universidad Internacional de Andalucía, España
- 1995 Second Corsica International Workshop, Corsica, France
- 1995 Fondation IPSEN, Paris, France
- 1995 Hopital de la Salpetriere, Paris, France
- 1995 Departamento de Zoología, Universidad de Valencia, Spain
- 1995 Karolinska Institute, Stockholm, Sweden
- 1997 IFICE, UNAM, Mexico
- 1997 University of Calgary, Canada
- 1998 Nobel Conference, Stockholm, Sweden
- 1998 European Federation of Neuroscience
- 2000 University of Lund, Sweden
- 2000 Embryonic and Specialized Stem Cells, Foundation de Treilles, France

- 2000 Juan March Meeting [organizer], Forebrain Histogenesis, Madrid, Spain
- 2000 Stem Cell Meeting, Baden-Baden, Germany
- 2000 Embryonic and adult stem cells [plenary], Rio de Janeiro, Brazil, December 11-15
- 2001 Stem cells on neural transplantation [plenary], Valencia, Spain, March 5-7
- 2001 Int. Congress of Developmental Biology, Kyoto, Japan, July 8-12
- 2001 Universidad Catolica, Chile, August 25
- 2001 Int. Society for Neurochemistry, Buenos Aires, Argentina, August 26-31
- 2001 University of Oviedo, Spain, September 3-11
- 2002 Inst. Investigaciones Biomedicas, UNAM, Mexico, March 8, 2002
- 2002 Society of Neurological Surgeons, Toronto, Canada, May 12-13
- 2002 Neuropharma, Madrid, Spain, May 17
- 2002 Cortical Development Neurogenesis, Migration and Epilepsy, Delphi, Greece, May 23-26
- 2002 Salpetriere Hospital, Paris, France, September 16
- 2002 XXV Congreso SEBBM, Leon, Spain, September 18-20
- 2002 Neural Stem Cell Biology Meeting, Alicante, Spain, September 23-25
- 2002 El Colegio Nacional, Mexico City, Mexico, October 14-15
- 2003 Instituto Cajal, Madrid, Spain, January 17
- 2003 Fondation IPSEN, Paris, France, January 20
- 2003 Max Planck Inst. of Neurobiology, Martinsried, Germany, January 22
- 2003 IBRO World Congress of Neuroscience, Prague, Czech Republic, July 9-14
- 2003 Instituto de Fisiologia Celular, Mexico, October 20
- 2003 Universidad de Colima, Mexico, October 23-24
- 2003 Inst. Nacional de Neurologia y Neurocirugia, October 21
- 2004 Vertebrate Brain Development, Kobe, Japan, July 20-23
- 2004 Riken BSI Retreat, Japan, October 4-6
- 2005 Keystone Symposium, Banff, Canada, February 10-15

- 2005 Cortical Development Meeting, Santorini, Greece, May 12-15
- 2005 Swiss Federal Inst. of Technology, Lausanne, Switzerland, May 19
- 2005 Euroglia Meeting, Amsterdam, Netherlands, May 18-21
- 2006 Instituto de Neurobiología, Queretaro, Mexico, February 9-10
- 2006 Keystone Symposium on Stem Cells, British Columbia, Canada, March 27-31
- 2006 Fundación Ciudad de las Artes y las Ciencias, Valencia, Spain, May 2-4
- 2006 International Society for Stem Cell Research, Toronto, Canada, June 29-July 1
- 2006 Universidad Internacional Menendez Pelayo, Santander, Spain, July 24-28
- 2006 Stem Cell Priority Program and Leopoldina Conference, Dresden, Germany, Sept 24-29
- 2006 International Stem Cell Research Symposium, San Francisco, CA, November 29
- 2007 Genes & Development Research Group, University of Calgary, Canada, March 23
- 2007 Pan American Congress in Developmental Biology, Cancun, Mexico, June 16-20
- 2007 Instituto de Neurobiología, UNAM. Queretaro, Mexico, August 19-21
- 2007 Pasteur Institute, Paris, France, September 4
- 2007 INMED Conference, La Ciotat, France, September 5-8
- 2007 Molecular Cancer Biology Program, Biomedicum Helsinki, University of Helsinki, Finland, September 17
- 2007 UCSF-Karolinska Institute Meeting, Stockholm, Sweden, September 18
- 2007 Montreal Neurological Institute, Killam Speaker, McGill University, Canada, October 9
- 2007 International Conference on Glioma Research and Therapy, Boston, MA, October 10-13
- 2007 Conferencia Dr. Santiago Ramón y Cajal- LIX Reunion annual de la Sociedad Española de Neurología, Barcelona, Spain, November 21-22
- 2008 Center for Developmental Biology, RIKEN Kobe, Kobe,

- Japan, March 24-26
- 2008 33rd FEBS Congress & 11th IUBMB Conference, Athens, Greece, June 28-July 3
- 2008 2nd International Congress on Stem Cells and Tissue Formation, Center for Regenerative Therapies, Technische Universität Dresden, Dresden, Germany, July 6-9
- 2008 Genomic Sciences Undergraduate Program Study, Mexico City, Mexico, September 1
- 2009 Regenerative Medicine Course of the Gulbenkian Program for Medical Doctors, Institute of Molecular Medicine, Lisbon, Portugal, February 16-20
- 2009 2nd International Stem Cell Research Symposium: Frontiers of Neural Stem Cells, San Francisco, CA, October 1-2
- 2009 Understanding Cancer Stem Cells, Workshop II, La Coruna, Spain, October 2-3
- 2009 XV Congress Posters "Lino Diaz de Leon", UNAM, Mexico, October 16
- 2009 XVI Commemorative Lecture in Honor of Severo Ochoa, Severo Ochoa Molecular Biology Centre, Madrid, Spain, November 18
- 2010 Two Faces of Evil: Cancer & Neurodegeneration, Fontation IPSEN, Paris, France, April 26
- 2010 IGBMC Lecture Series, Strausbourg, France, April 27
- 2010 International Society for Stem Cell Research 8th Annual Meeting, San Francisco, California, USA, June 16-19
- 2010 7th Forum of European Neuroscience, Amsterdam, The Netherlands, July 3-7
- 2010 Oxford University Department of Anatomy, Oxford, United Kingdom, July 9-12
- 2010 Distinguished Lectureship Series, University of Toronto, Toronto, Ontario, Canada, September 20
- 2010 Trends in Biomedical Science, University of Andalusia, Baeza, Spain, Oct 13-15
- 2011 Therapeutic Approaches to Neurodegeneration - Age

Modifiers and Stem Cell

Conference, Nassau, Bahamas, February 14-17

2011 Cortical Development, Chania, Crete, Greece, May 19-22

2011 Samuel Lunenfeld Research Institute 13th Annual SLRI
International Symposium,

Toronto, Ontario, Canada, June 2

2011 Cambridge Neuroscience Symposium, Cambridge, United
Kingdom, September 5

2011 Seminar in Basel, Basel, Switzerland, September 7

2011 Seminar at the Caesar Institute, Bonn, Germany, October
31

2012 New Developments in Stem Cell Research and their
Possible Applications in Medicine, Pontifical Academy of
Sciences, Vatican City, Rome, Italy, April 16-16

2013 Keystone Meeting/ Stem Cell Regulation in Homeostasis
and Disease, Banff, Canada, Feb 24-28

2013 Stem Cells for Neural Repair, Siena, Italy, May 4-12

2013 International Society for Stem Cell Research, Annual
Meeting, Boston, MA, June 11-14

2013 Replacement Neurons, Barcelona Biomedical Research
Park, Barcelona, Spain, June 21

2013 Catedra de Excelencia Banco de Santander, Pompeu
Fabra University, Barcelona, Spain June 17-July 17

2013 12th International Symposium on Neural Transplantation
and Restoration, Cardiff, Wales UK, Sep 3-6

2013 Ciudad de Las Ideas, Puebla, Mexico, Nov 7-9

2014 Students-Organized Workshop, RIKEN Center for
Developmental Biology, Kobe, Japan, Feb 4-7

2014 Adult Neurogenesis: From Stem Cells to Therapies, Tata
Institute of Fundamental Research, Mumbai, India, Feb 6-
8

2014 Honorary Segerfalk Lecture Award/ Annual Neuroscience
Day, Lund University, Sweden, May 7-9

2014 Keystone Symposium on Adult Neurogenesis, Stockholm,
Sweden, May 12-17

2014 International Society for Stem Cell Research, Annual
Meeting, Vancouver, Canada, June 18-21

2014 Gordon Research Conference, Molecular & Cellular
Neurobiology, Hong Kong, June 29-July 4

2014 Institute of Brain Science, Fudan University, Shanghai,

China, July 3-8

- 2014 The Annual Meeting of the Chilean Society for Cell Biology, Plenary Lecture, Puerto Varas, Chile, Oct 26-30
- 2015 University of Toronto, Donnelly Centre for Cellular and Biomolecular Research, Toronto, Canada, Feb 12
- 2015 University of Toronto Mississauga, Biology Department Seminar Series, Mississauga, Canada Feb 13
- 2015 New York University, Abu Dhabi Institute, Genomics and Systems Biology Conference, Abu Dhabi, U.A.E. Feb 17-19

NATIONAL

- 1993 Keystone meeting on Stem Cells, Taos, New Mexico
- 1994 The brain fountain of youth: The subventricular zone as a reservoir of neuronal and glial precursors, WCBR
- 1998 Keystone Symposium, Colorado
- 1998 WCBR, Utah
- 1999 Plenary lecture, SDV meeting, Memphis
- 2000 AAAS, February
- 2000 New York Academy of Sciences
- 2000 Weith-Ayers stem cell meeting, Newport, RI
- 2001 Human Genome Odyssey [plenary], Akron Ohio, April 5-7
- 2001 Symposium on Stem Cells, San Diego, November 10
- 2001 Association for Research in Nervous and Mental Disease, New York, November 30
- 2002 Keystone Symposia, Keystone, CO, March 17-23
- 2002 Tumor Satellite Symposium, Chicago, IL, April 11-12
- 2002 Cincinnati Neurofest, University of Cincinnati, April 12-13
- 2003 AAA, Experimental Biology- San Diego, CA, April 12
- 2003 International Society for Stem Cell Research, Washington, D.C., June 8-11
- 2003 Developmental Biology Gordon Conference, Proctor Academy, NH, June 22-27
- 2003 Society for Neuro-Oncology, Keystone, November 14
- 2004 Ass. Chemoreception Sciences, Sarasota FL, April 21
- 2004 Mount Dessert Island Stem Cell Symposium, ME, August

13-14

- 2007 National Multiple Sclerosis Society, San Francisco, CA, January 16-19
- 2008 48th Annual American Society for Cell Biology, San Francisco, CA December 17
- 2009 Rui Pedro Capelo de Abreu Galvao, Aula Magna da Faculdade Medicina da Universidade de Lisboa, Lison, Portugal February 10-19
- 2009 AACR Genetics & Biology of Brain Cancers Conference, San Diego, CA, Dec 13-15
- 2009 American Association for Cancer Research, Genetics and Biology of Brain Cancers, San Diego, CA, December 13-15
- 2010 Keystone Symposia: Cilia, Signaling & Human Disease, Monterey, CA, February 21-26
- 2010 American Society for Neurochemistry 41st Annual Meeting, Santa Fe, NM, March 8
- 2010 Birdsong Conference at Rockefeller, Millbrook, NY, July 21-22
- 2010 University of Colorado Denver 25th Annual National MD/PhD Student Conference, Keystone, Colorado, July 23-25
- 2010 Society of Neuroscience 40th Annual Meeting, San Diego, CA November 13-17
- 2011 Keystone Symposium on Adult Neurogenesis, Taos, New Mexico, January 9-14
- 2011 Seminar Rockefeller University, New York, NY, October 20
- 2012 Pediatric Brain Tumor Foundation, Asheville, North Carolina, May 17-18
- 2012 Cell and Developmental Biology, Vanderbilt University, Nashville TN, Oct 28-30
- 2013 Oklahoma State University, Oklahoma City, OK, Feb 18-19
- 2013 Congressional Biomedical Research Caucus, Washington DC, Sep 11
- 2013 Rockefeller University, New York, NY, Oct 10
- 2013 American Academy of Arts and Sciences Induction Ceremony, Cambridge, MA, Oct 11-13
- 2013 University of Pennsylvania, Neuroscience Symposium,

- Philadelphia, PA, Dec 5
- 2014 New York University, Honors Lecture, New York, NY,
March 24
- 2014 University of Colorado, Denver, CO, March 26
- 2014 UCSF Biomedical Sciences Retreat, Lake Tahoe, CA Oct
10
- 2014 Maryland Stem Cell Research Symposium, Silver
Springs, MD, Dec 2
- 2015 University of California Irvine Winter Lecture Series,
Irvine CA, March 13

REGIONAL AND OTHER INVITED PRESENTATIONS

- 1990 Department of Neurobiology, Duke University, Durham,
NC
- 1990 Department of Neuroscience, Genentech Inc., San
Francisco, CA
- 1990 Department of Neurobiology, Columbia University, New
York, NY
- 1991 Central Institute for the Deaf, Washington University
Medical Center, St. Louis, MI
- 1993 Department of Neuroscience, Genentech Inc., San
Francisco, CA
- 1993 Neurobiology, Yale University, New Haven, CT
- 1993 Approaches to study of neurogenesis in the adult nervous
system, Winter Conference on
Brain Research, Snowbird, UT
- 1994 Department of Biology, University of Puerto Rico, San
Juan, Puerto Rico
- 1994 Department of Neurobiology and Physiology,
Northwestern University, Chicago, IL
- 1994 Beckman Institute, University of Illinois at Urbana-
Champaign, Champaign, IL
- 1996 Department of Neuroscience, University of Oregon,
Eugene, OR
- 1996 The Salk Institute for Biological Studies, La Jolla, CA
- 1996 Neurobiology Seminar Series, California Institute of
Technology, Pasadena, CA
- 1996 Neuroscience Graduate Program, University of Virginia,
Charlottesville, VA
- 1996 Brookdale Center, The Mount Sinai Medical Center, New

- York, NY
- 1996 Department of Cell Biology, Cornell University, Ithaca NY
 - 1996 Department of Neurobiology, Columbia University, New York, NY
 - 1997 University of California Los Angeles, Los Angeles, CA
 - 1997 University of California Irvine, Irvine, CA
 - 1997 University of Arizona, Tucson, AZ
 - 1997 Wesleyan University, Middletown, CT
 - 1997 University of Massachusetts, Amherst, MA
 - 1997 Yale University, New Haven, CT
 - 1998 Massachusetts General Hospital, Harvard University, Boston, MA
 - 1998 St. Jude Children's Research Hospital, Memphis, TN
 - 1998 Gordon Research Conference, Newport, RI
 - 1999 Neurobiology, Johns Hopkins University, Baltimore, MD
 - 1999 Department Neurobiology, University of California, Los Angeles, CA
 - 1999 Neuroscience Seminar, Case Western Reserve University, Cleveland, OH
 - 1999 Department of Neurobiology, Harvard University, Cambridge, MA
 - 2000 National Institutes of Health, Bethesda, MD
 - 2000 University of California, Irvine, Irvine, CA
 - 2000 Skirball Institute, New York University, NY
 - 2000 Robert Wood Johnson University Hospital, New Brunswick, NJ
 - 2000 Gordon Research Conference, Newport, RI
 - 2000 University of Massachusetts Medical School, Worcester, MA
 - 2000 Center for Neurobiology and Behavior, Columbia University, Ithaca, NY
 - 2001 Winter Conference on Brain Research, Steam Boat, CO, January 20-27
 - 2001 Agy Therapeutics Inc., San Francisco, CA, February 2
 - 2001 Yale University, Neurobiology, New Haven, CT, February 28
 - 2001 Dept. Cell Biology, Medical College of Wisconsin, April 4

- 2001 Cold Spring Harbor, Cold Spring Harbor, NY, April 9
- 2001 Neuroplasticity, University of California, San Diego, CA, May 17
- 2001 Neurobiology, Stanford, CA, May 21
- 2001 The Buck Institute, Novato, CA, May 30
- 2001 National Neurotrauma Society, San Diego, CA, November 9-10
- 2001 Northwestern University and Children's Memorial Institute, Chicago, IL, November 29
- 2002 Koshland Lecture, University of California, Berkeley, CA May 7
- 2002 McGovern Inst. for Brain Research, MIT, Cambridge, MA, May 13-14
- 2002 Rockefeller University, New York, NY, October 30
- 2002 Society for Neuroscience, Orlando, FL, November 2-4
- 2003 Wake Forest University, Winston-Salem, NC, April 1
- 2003 Purdue University, West Lafayette, IN, April 2
- 2003 University Pennsylvania, Philadelphia, PA, October 29
- 2003 University of Michigan, Ann Arbor, MI, October 30
- 2004 Department of Pathology, University of California, San Francisco, CA, January 16
- 2004 Gladstone Institute of Neurological Disease, University of California, San Francisco, CA, January 21
- 2004 Stanford Brain Research Institute, Stanford, CA January 22
- 2004 Dept. Neurobiology, Harvard Medical School, Boston MA, March 30
- 2004 Oregon Health & Sciences University, Neurology Sciences Institute, Portland, OR, June 1
- 2004 U. of Texas Southwestern Med. Center, Dallas, TX, October 27
- 2005 Scripps Research Institute, La Jolla, CA, January 24-25
- 2005 Center for Brain Health, University of Texas at Dallas, TX, April 7
- 2005 Rockefeller University, New York, NY, May 9
- 2005 Miami Project to Cure Paralysis, Miami, FL, November 30
- 2006 University of California, Riverside, CA April 18

- 2006 University of California, San Francisco, CA
- 2006 Mount Desert Island Stem Cell Symposium, Salisbury Cove, ME, August 11-12
- 2007 Burnham Institute, La Jolla, CA, January 11
- 2007 Neuroscience Program, Yale University, New Haven, CT, February 13
- 2007 Cold Spring Harbor Laboratory, New York, February 15
- 2007 University of Calgary, Calgary, Alberta, Canada, March 23
- 2007 University of Washington, Seattle, WA, April 1-3
- 2007 Stanford University, Stanford, CA, May 1
- 2007 University of Oregon, Eugene, OR, June 22
- 2007 Glioma Research and Therapy, Boston, MA, October 10-13
- 2007 University of Connecticut, Department of Physiology & Neurobiology, Storrs, CT, October 15
- 2007 Jan Coffin Childs Memorial Fund Symposium 2007, Lakeville, CT, October 13-14
- 2007 Pennsylvania State University, Owen Memorial Lecture, University Park, PA, Nov 28
- 2008 Cornell University, New York, NY, January 10-11
- 2008 University of California, San Diego, CA, February 26
- 2008 California Institute of Technology, Department of Biology, Pasadena, CA, February 29
- 2008 University of California, Santa Cruz, CA, March 10
- 2008 Pediatric Brain Tumor Foundation, San Diego, CA April 11
- 2008 Duke University Medical Center, Durham, NC, April 16
- 2008 Georgia State University, Atlanta, GA, April 17
- 2008 Memorial Sloan-Kettering Cancer Center, New York, NY, April 23
- 2008 Fred Hutchinson Cancer Center, Seattle, WA May 20
- 2008 Cold Spring Harbor, Control and Regulation of Stem Cells, Cold Spring Harbor, NY May 28-June 2
- 2008 Columbia University College of Physicians and Surgeons, New York, NY, June 25

- 2008 Cincinnati Children's Hospital Research Foundation, Cincinnati, OH, September 17
- 2008 Merck Regenerative Medicine, CNS Regeneration and Repair Symposium, Boston, MA
September 18
- 2008 University of North Carolina Neuroscience Center, Chapel Hill, NC, October 16
- 2008 Stanford University, Stanford, CA, November 13
- 2008 Japan/Bay Area Joint Meeting on Vertebrate Organogenesis, San Francisco, CA
November 24-25
- 2008 Rockefeller University, New York, NY, December 3
- 2009 Tetrad Program, University of California, San Francisco, February 19
- 2009 5th Annual Stem Cell Symposium 2009, University of California, Los Angeles, Feb 27
- 2009 Joint Seminars in Neuroscience, University of California, Los Angeles, May 5
- 2009 BTRC EAB Retreat, University of California, San Francisco, CA May 21-22
- 2009 Cold Spring Harbor, Meeting on Stem Cell Biology, Cold Spring Harbor, NY, Sept 22-26
- 2009 NYSCF 4th Annual Translational Stem Cell Conference, New York, NY, October 13-14
- 2009 Developmental Biology Symposium, Oregon Health & Science University, October 23
- 2009 Children's Hospital Boston, Harvard Medical School, Boston, MA
- 2010 Keystone Symposia, Monterey, CA February 21-26
- 2010 Neuroscience Day, University of New Mexico, Albuquerque, MN, March 5
- 2010 Albert Einstein College of Medicine, April 21
- 2010 Stony Brook State University of New York, October 7
- 2010 Cajal Club / Allen Institute for Brain Research, Seattle, WA, October 27
- 2010 Joint Seminars in Neuroscience, University of California, Los Angeles, May 11
- 2011 Cortical Development Meeting, Chania, Greece, May 19-22

- 2011 National Institutes of Health, Washington DC, February 28-March 2
- 2011 International Symposium on Neurobiology, Toronto, June 1-2
- 2011 13th Annual SLRI International Symposium, Toronto, June 2
- 2011 Skirball Institute of Biomolecular Medicine Seminar Series, New York, June 15
- 2011 National Institutes of Health, Bethesda, MD June 27
- 2011 California Institute for Regenerative Medicine, Basel, September 7, 2011
- 2011 International Symposium 2011 Collaborative Research Center 665, University of Freiburg, Berlin, October 29, 2011
- 2012 University of Iowa, Neuroscience Graduate Program, April 9-11

CONTINUING EDUCATION COURSES ATTENDED

- 2005 San Francisco Neurological Society, Quail Lodge, CA

GOVERNMENT AND OTHER PROFESSIONAL SERVICE

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|----------------|--|----------------------|
| 2000 - 2002 | NIH | Grant Reviews |
| 2004 - 2004 | UC MEXUS-CONACYT | Grant Reviews |
| 2005 - 2005 | National Institute of Health | Study Section Member |
| 2006 - 2009 | NIH-Neurogenesis and Cell Fate | Study Section Member |
| 2007 - 2007 | NIH Blueprint Neuroscience Information Framework, Terminology Worksheet, Cornell University | |
| 2012 - present | Abstract Review Committee for The International Society for Stem Cell Research 10th Annual Meeting | |

UNIVERSITY AND PUBLIC SERVICE

UNIVERSITY SERVICE

UCSF CAMPUS-WIDE

- 2005 - 2005 Campus Advisory Committee on the Ethics of Oocyte, Embryo and Stem Cell Research
- 2005 - 2011 Human Gamete, Embryo, and Stem Cell Research Committee

SCHOOL OF MEDICINE

2002 - 2004	Developmental and Stem Cell Biology Steering Committee	
2002 - 2004	Chair Developmental and Stem Cell Program Committee	
2002 - 2002	Developmental and Stem Cell Biology Faculty Search Committee	
2002 - 2002	Obstetrics, Gynecology and Reproductive Sciences Faculty Search Committee	
2004 - 2004	Stem Cell Research Programming Committee	
2006 - 2006	Neuroscience Graduate Program (Elizabeth T. Buchen)	Chair Thesis Committee
2007 - 2007	IRM Seminar Series Committee	
2008 - 2008	Co-Director BMS course 225: Organ and Tissue Development	
2008 - 2009	Neuroscience Thesis Committee: Abraham Langseth	
2010 - 2010	Search Committee for the Chair of Psychiatry	
2010 - 2010	Biopharmaceutical Sciences Thesis Committee: Michael Berberoglu	
2011 - 2012	Ophthalmology, Search Committee	
2012 - present	Biomedical Sciences Program Thesis Committee: Vien Nguyen	
2010 - 2014	Neuroscience Graduate Program Thesis Committee: John Silbereis	
2010 - 2014	Medical Scientist Training Program Thesis Committee: Bridget Lamonica	
2010 - 2014	Neuroscience Graduate Program Thesis Committee: Xinwei Lui	
2014 - 2014	Biomedical Graduate Program: Rotation Student Advisor: Yvanka Desoysa	
2014 - 2014	Biomedical Graduate Program Journal Club Coach: Mario Zubia	
2010 - 2014	Medical Scientist Training Program Thesis Committee: Caroline Tang	
2008 - 2014	Neuroscience Graduate Program Thesis Committee: Caitlyn Gertz	
2010 - 2014	Neuroscience Graduate Program Thesis Committee: Cheuk Ka Tong	
2010 - 2014	Neuroscience Graduate Program Chair Thesis Committee: Leslie Tong	

2010 - 2015 Neuroscience Graduate Program Thesis
Committee: Robert Lindquist

DEPARTMENTAL SERVICE

2001 - 2002 Department of Neurosurgery, Preuss Molecular
Neuro-Oncology Search Committee

2004 - 2004 Department of Neurosurgery, Committee to recommend one faculty member for the Neill and Linda Brownstein Endowed Chair in Brain Tumor Research, and one faculty member for the Karen Osney Brownstein Endowed Chair in Molecular Neuro-Oncology

2007 - 2007 Neurosurgery Search Committee

2007 - 2007 William K. Bowes, Jr., Endowed Chair in
Neurosciences Search Committee

SUMMARY OF SERVICE ACTIVITIES

My major service activities these past three years at UCSF have been as part of the GESCR committee, 3 search committees, and actively participate in the recruitment and planning of our growing stem cell program. Outside UCSF, my major efforts are with NIH, as a regular member reviewing grants for the Neurogenesis and Cell Fate Study section. More recently, I was appointed to the Board of Directors of the International Society of Stem Cell Research (ISSCR). We are in charge of developing major national and international policies for stem cell research, the planning of the international meeting from the society, and promoting ethical basic and translational research using stem cells.

TEACHING AND MENTORING

TEACHING

FORMAL SCHEDULED CLASSES FOR UCSF STUDENTS

Qtr	Academic Yr	Course Number and Title	Teaching Contribution	Units	Class Size
F	2001 - 2002	Developmental Neurobiology Course	Lecturer (1 x 2hrs) Discussion Group (1 x 2hrs)		
	2002 - 2003	MSTP Program	Lecturer (1 x 2hrs)		
W	2002 - 2003	NS201B Neural Development	Lecturer (9 x 2hrs) Conference Leader (3 x 2hrs)	4	
S	2002 - 2003	NS201C Neural Development	Lecturer (2 x 1.5hrs)	3	
F	2004 - 2005	NS223 Developmental Biology	Lecturer (2 x 2hrs)	3	

Qtr	Academic Yr	Course Number and Title	Teaching Contribution	Units	Class Size
F	2004 - 2005	N201C Neuroscience	2 hour lecture	3	
F	2004 - 2005	BMS225A Biomedical Sciences	2 hour lecture		
W	2005 - 2006	BMS225A Developmental and Stem Cell Biology	2 hour lecture, 5 hours prep		
S	2006 - 2007	BMS225A	1 hour lecture, 5 hours prep		
W	2007 - 2008	BMS225A Tissue and Organ Biology	1 hour lecture, 5 hours prep		
S	2008 - 2009	BMS220 Stem Cells course on Neuronal Stem Cells: Adult			
S	2008 - 2009	BMS225A Tissue and Organ Biology			
F	2009 - 2009	NS201A Basic Concepts in Cellular and Molecular Neuroscience	2 hour lecture, 6 hours prep		
F	2010 - 2010	NS201A Basic Concepts in Cellular and Molecular Neuroscience	2 hour lecture, 6 hours prep, 4 hours exam preparation, one-on-one student supervision		
S	2010 - 2011	BMS225A Tissue and Organ Biology	2 hour lecture, 6 hours prep, 4 hours exam preparation		
W	2011 - 2011	BMS225A Tissue and Organ Biology	2 hour lecture, 6 hours prep, 4 hours exam preparation, one-on-one student supervision		
S	2011 - 2011	BMS270 Neuro-Oncology	2 hour lecture, 6 hours prep, 4 hours exam preparation		
W	2012 - 2012	BMS225B Developmental and Stem Cell Biology	2 hour lecture, 6 hours prep, 4 hours exam preparation		
W	2014 - 2014	BMS225b Tissue and Organ Biology	2 hour lecture, 6 hours prep, 4 hours exam preparation		
F	2013 - 2013	DSCB 257 Developmental and Stem Cell Biology	2 hours lecture, 6 hours prep, 4 hours exam preparation		
T	2015 - 2015	BMS 225 Neuronal Stem Cells	2 hours lecture, 6 hours prep, 4 hours exam preparation		

POSTGRADUATE AND OTHER COURSES

1982 - 1983	Developmental Biology Course, Universidad Nacional Autonoma de Mexico
1988 - 1988	Learning and plasticity, Rockefeller University
1990 - 1990	Neurobiology, Rockefeller University.
1991 - 1991	Molecular and Cellular Neurobiology, Rockefeller University
1996 - 1996	Plasticity and Learning, Rockefeller University
1998 - 1998	Developmental Neuroscience, Rockefeller University
2000 - 2000	Neural Plasticity and learning, Rockefeller University
2001 - 2001	Neuroscience Course for residents (Neurosurgery): Lecture (1 x 2 hours) UCSF
2002 - 2002	Neuroscience Course for residents (Neurosurgery): Lecture (2 x 1 hour) UCSF
2003 - 2003	S RTP Basic Science Seminar Series (1 x 1 hour) UCSF
2003 - 2003	AGEP Colloquium as the Faculty Keynote Speaker
2005 - 2005	Lecture for Neurosurgery residents (1 hour lecture, 3 hours prepare)
2005 - 2005	Course on neurogenesis and stem cells. Universidad Internacional Menendez Pelayo, Valencia, Spain.
2005 - 2005	Developmental Biology Course. Smith College, MA (video conference 12/12)
2013 - 2013	Neuroscience School of Advanced Studies, "Neural Stem Cells for Development and Repair", Cortona, Italy

TEACHING NARRATIVE

Along with additional teaching and mentoring activities, I have continued to contribute every year to three main courses within the BMS, Developmental Biology, Stem Cell, and Neuroscience programs. For the Neuroscience course, I cover the mechanism of neuronal migration and basic principles of circuit assembly. I teach a BMS class on adult

neural stem cells, and recently a course in the new Developmental Biology and Stem Cell program on basic principles of neural development. Additionally, I have contributed to a class on ontogenesis in the brain wherein I teach the connection between brain tumors and stem cells. In all my classes, I try to provide a historical perspective, to highlight general concepts and discuss some that are inaccurate or incorrect. I try to stimulate critical thinking and curiosity. For the sake of the latter, I try to highlight the many things that are unknown or controversial. In the class on neuronal migration, I cover basic forms of neuronal migration, mechanisms of locomotion, and guidance – this includes all recent advances in the field. For the BMS course, I provide an updated view on the identity, regulation, origin of adult neural stem cells, and discuss their link to disease and cancer. In the basic Development course, I cover core neurodevelopment concepts which includes segmentation of the early brain, nomenclature, anatomy, and basic processes of neurogenesis and gliogenesis. In addition to these courses, I speak every year with 10-15 students that need direct guidance or have questions about areas of expertise in my laboratory. I continue to directly supervise 3 graduate students and 7 postdocs in my laboratory. I have also mentored 3 neurosurgery residents during their research years. Every summer we host one to two undergraduate or high school students and have had one of them complete a 3-year research project. As part of a yearly thesis committee, I have actively guided graduate students in the Neuroscience and BMS programs.

MENTORING

PREDOCTORAL STUDENTS SUPERVISED OR MENTORED

Dates	Name	Program or School	Role	Current Position
1992 - 1996	Carlos Lois	Rockefeller University	PhD Advisor	Associate Professor, University of Massachusetts
1993 - 1998	S. Rasika	Rockefeller University	PhD Advisor	INSERM, France
1993 - 1998	Fiona Doetsch	Rockefeller University	PhD Advisor	Associate Professor, Columbia University
1996 - 2001	Daniel Lim	Rockefeller University	PhD Advisor	Assistant Professor Neurosurgery, UCSF
1995 - 2000	Hynek Wichterle	Rockefeller University	PhD Advisor	Associate Professor, Columbia University
1997 - 2003	Leopoldo Petreanu	Rockefeller University	PhD Advisor	Principal Investigator, Champalimaud Foundation, Portugal
1997 - 2003	Bettina Seri	Rockefeller University	PhD Advisor	Senior Medical Writer, Ogilvy Healthworld Medical Education, London, UK
2001 - 2003	Nader Sanai	School of Medicine, University of California, San Francisco (UCSF)	Research Advisor	Director of Barrow Brain Tumor Research Center, Barrow Neurosurgical Institute
2001 - 2006	Minoree	Neuroscience	PhD Advisor	Postdoctoral Fellow.

Dates	Name	Program or School	Role	Current Position
	Kohwi	Program, UCSF		University of Oregon
2001 - 2004	Rui Galvao	University of Lisbon, Portugal	PhD Advisor	Postdoctoral Fellow. University of Oregon
2003 - 2007	Florian Merkle	Neuroscience Program, UCSF	PhD Advisor	Postdoctoral fellow, Harvard University
2003 - 2008	Zaman Mirzadeh	Medical Scientist Training Program (MSTP), Biomedical Sciences Program (BMS), UCSF	PhD Advisor	Neurosurgery Resident, St. Joseph's, Phoenix, AZ
2004 - 2010	Derek Southwell	MSTP-Neuroscience, UCSF	PhD Advisor	Neurosurgery, Resident, Stanford University
2006 - 2011	Melissa Lezameta	Universidad de Valencia	PhD Advisor	Postdoc Scientist, Geron
2010 -	Cheuk Ka Tong	Neuroscience Program, UCSF	PhD Advisor	Graduate Student
2010 -	Robert Lindquist	MSTP, Neuroscience Program, UCSF	PhD Advisor	Graduate Student
2010 -	Yunshuo Tang	MSTP, Biomedical Sciences Program, UCSF	PhD Advisor	Graduate Student
2011 -	Jugal Shah	MD Student, UCSF	Research Advisor	Medical Student

POSTDOCTORAL FELLOWS AND RESIDENTS DIRECTLY SUPERVISED OR MENTORED

Dates	Name	Fellow	Faculty Role	Current Position
-	MENTORED:			
-	Name	Fellow	Faculty Role	Current Position
1993 - 1996	Christine Nyet, Ph.D.	Post-Doc Researcher	Research Supervision	
1995 - 1998	B. Kirschenbaum Ph.D.	Post-Doc Researcher	Research Supervision	School Teacher, NY
1995 - 1999	Daniel Herrera, Ph.D.	Post-Doc Researcher	Research Supervision	Assistant Professor, Cornell Univ.
1996 - 1999	Isabelle Caille, Ph.D.	Post-Doc Researcher	Research Supervision	Research Associate, Ecole Normale Supérieure, France
1995 - 2000	Joanne Conover, Ph.D.	Post-Doc Researcher	Research Supervision	Associate Professor, Univ. Connecticut
2000 - 2003	Anthony Tramontin, Ph.D.	Post-Doc Researcher	Research Supervision	Principal, McKinsey & Company's, NY
2001 - 2003	Kazunobu Sawamoto, Ph.D.	Post-Doc Researcher	Research Supervision	Assistant Professor, Nagoya City University Graduate School of Medical Sciences
2001 - 2002	Nathalie	Post-Doc Researcher	Research	Assist. Professor

Dates	Name	Fellow	Faculty Role	Current Position
	Spassky, Ph.D.		Supervision	INSERM, France
2000 - 2003	Manuel Alvarez-Dolado, Ph.D.	Post-Doc Researcher	Research Supervision	Andalusian Center for Molecular Biology and Regenerative Medicine, Seville, Spain
2000 - 2003	Benedicte Menn, Ph.D.	Post-Doc Researcher	Research Supervision	Neurokin, S.A.R.L., France
2003 - 2006	Erica Jackson, Ph.D.	Post-Doc Researcher	Research Supervision	Scientist, Genentech
2003 - 2003	Young-Goo Han, Ph.D.	Post-Doc Researcher	Research Supervision	Assistant Member of Development Neurobiology St. Jude's Children Research Hospital
2003 - 2004	Alfredo Quinones-Hinojosa, M.D.	Neurosurgery Resident	Research Supervision	Associate Professor of Neurosurgery and Oncology, Johns Hopkins University Professor, Johns Hopkins University
2004 - 2006	Oscar Gonzalez-Perez, M.D., Ph.D.	Post-Doc Researcher	Research Supervision	Universidad de Colima, Mexico
2004 - 2006	Hirohide Takebayashi, M.D., Ph.D.	Post-Doc Researcher	Research Supervision	Asst Professor, National Inst. Physiological Sciences Japan
2004 - 2007	Silvia Espejel-Carbajal, Ph.D.	Post-Doc Researcher	Research Supervision	Assistant Research Scientist, Willenbring Lab, UCSF
2006 - 2006	Rebecca Ihrie, Ph.D.	Post-Doc Researcher	Research Supervision	Assistant Professor, Vanderbilt University
2005 - 2007	Yin-Cheng Huang, M.D.	Neurosurgery Fellow	Research Supervision	Department of Neurology, Chang Gung University, Taiwan
2006 - 2007	Daniel Lim, Ph.D., M.D.	Neurosurgery Resident	Research Supervision	Assistant Professor of Neurosurgery, UCSF
2007 - 2008	Nader Sanai, M.D.	Neurosurgery Resident	Research Supervision	Director of Barrow Brain Tumor Research Center, Barrow Neurosurgical Institute
2007 - 2008	Timothy Sanders, M.D., Ph.D.	Post-Doc Researcher	Research Supervision	Adjunct Instructor, Division of Perinatal-Neonatal Medicine, UCSF
2007 - 2010	David Hansen, Ph.D.	Post-Doc Researcher	Research Supervision	Scientist Genentech
2009 - 2011	Giovanna Ponti, Ph.D.	Post-Doc Researcher	Research Supervision	Marie Curie IOF

Dates	Name	Fellow	Faculty Role	Current Position
2009 -	Luis Fuentealba Ph.D.	Post-Doc Researcher	Research Supervision	Hellen Hay Whitney Foundation Fellowship
2010 - 2011	Matthew Tate, MD, Ph.D.	Neurosurgery Resident	Research Supervision	Neurosurgery Chief Resident, UCSF
2010 -	Mercedes Paredes, MD, Ph.D.	Neurology Fellow	Research Supervision	NIH R35
2010 -	Shinya Ohata Ph.D	Post-Doc Researcher	Research Supervision	TOYOBO Foundation
2011 -	Kirsten Obernier, Ph.D.	Post-Doc Researcher	Research Supervision	Fellowship from the German Research Foundation(Deutsche Forschungsgemeinschaft DGF)
2011 -	Tim Stowe, Ph.D.	Post-Doc Researcher	Research Supervision	CIRM
2011 -	Shawn Sorrells, Ph.D.	Post-Doc Researcher	Research Supervision	NIH R01
2013 -	Julien Spatazza, PhD	Post-Doc Researcher	Research Supervision	CIRM

OTHER VISITING FACULTY SUPERVISED

2001 - 2001	Jose Manuel Garcia-Verdugo, Ph.D.	University of Valencia, Spain
2003 - 2003	Jose Manuel Garcia-Verdugo, Ph.D.	University of Valencia, Spain
2004 - 2004	Jose Manuel Garcia-Verdugo, Ph.D.	University of Valencia, Spain
2006 - 2006	Jose Manuel Garcia-Verdugo, Ph.D.	University of Valencia, Spain

OTHER

2012 Bridget Lamonica Graduate Thesis Committee

2012 Vien Nguyen Graduate Thesis Committee

SUMMARY OF TEACHING AND MENTORING HOURS

2004 - 2005 440 total hours of teaching (including preparation)
 Formal class or course teaching hours: 10 hours

Informal class or course teaching hours: 200 hours
Mentoring hours: 0 hours
Other hours:

2005 - 2006

440 total hours of teaching (including preparation)
Formal class or course teaching hours: 10 hours
Informal class or course teaching hours: 200 hours
Mentoring hours: 230 hours
Other hours:

2006 - 2007

440 total hours of teaching (including preparation)
Formal class or course teaching hours: 10 hours
Informal class or course teaching hours: 200 hours
Mentoring hours: 230 hours
Other hours:

2007 - 2008

440 total hours of teaching (including preparation)
Formal class or course teaching hours: 10 hours
Informal class or course teaching hours: 200 hours
Mentoring hours: 230 hours
Other hours:

2008 - 2009

440 total hours of teaching (including preparation)
Formal class or course teaching hours: 10 hours
Informal class or course teaching hours: 200 hours
Mentoring hours: 230 hours
Other hours:

2009 - 2010

440 total hours of teaching (including preparation)
Formal class or course teaching hours: 10 hours
Informal class or course teaching hours: 200 hours
Mentoring hours: 230 hours
Other hours:

2010 - 2011

440 total hours of teaching (including preparation)
Formal class or course teaching hours: 10 hours
Informal class or course teaching hours: 200 hours
Mentoring hours: 230 hours
Other hours:

2011 - 2012	440 total hours of teaching (including preparation) Formal class or course teaching hours: 10 hours Informal class or course teaching hours: 200 hours Mentoring hours: 230 hours Other hours:
2012 - 2013	440 total hours of teaching (including preparation) Formal class or course teaching hours: 10 hours Informal class or course teaching hours: 200 hours Mentoring hours: 230 hours Other hours:
2013 - 2014	480 total hours of teaching (including preparation) Formal class or course teaching hours: 20 hours Informal class or course teaching hours: 230 hours Mentoring hours: 230 hours Other hours:
2015 - 2016	Total anticipated hours of teaching: 480 hours

RESEARCH AND CREATIVE ACTIVITIES

RESEARCH AWARDS

CURRENT

R01 NS28478 (PI)	07/01/2010 - 06/30/2019
NIH	\$366,364 direct/yr1
Characterization of Neural Stem Cells in the Adult Brain	
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1 R01 NS071785 (Baraban)	06/01/2010 - 05/31/2015
NIH	\$264,773 direct/yr1 direct/yr1
MGE Progenitor Cell Grafts and Epilepsy	\$1,058,960 direct/yr1-4 total
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2 R37 HD032116-14 REVISED (PI)	06/01/2009 - 05/31/2018
NIH	\$288,834/yr direct/yr1
Heterogeneity of Adult Neural Stem Cells	
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PO1 NS083513 (PI)	07/01/2014 - 06/30/2019
NIH	\$165,002/yr direct/yr1

REGULATION OF CELLULAR PATHWAYS IN HUMAN
BRAIN DEVELOPMENT

1 P01 NS 41997-06A1 (Carlson)	09/15/2007 - 06/30/2014
NIH	\$385,995 direct/yr1
Replication of Human, Ungulate and Synthetic Prions in Neurospheres.	
UCSF FDN Bowes Stem Cell Grant (Berger)	08/23/2003 - 01/01/2020
RC1-00346-1 (Kriegstein)	
UCSF FDN Bowes Stem Cell Grant (PI)	\$496,091 total
Farber Development (PI)	07/01/2000 - 12/31/2020
	\$215,839 total
Siebrandt Glioblastoma (PI)	07/01/2000 - 12/31/2020
	\$783,468 total

PENDING

R01 EY025174-01 (Alvarez-Buylla, CO-PI)	-
NIH	
Interneuron Precursors and the induction of cortical plasticity	

This project aims to identify which type(s) of interneurons are responsible for the induction of cortical plasticity in mice and determine if these cells can induce similar plasticity and functional recovery when grafted into fully mature adult brains. We will also determine if the types of interneurons that induce plasticity in mice are present in the visual cortex of the developing young human brain correlated with known periods of plasticity in children.

PAST

Seth Feldman Chair of Research ()	09/01/2001 - 08/01/2003
Brain Tumor Research Grant (PI)	\$90,909 direct/yr1
R37 NS28478-12 (PI)	\$247,313 total
R01 HD032116-10 (PI)	09/01/1994 - 05/31/2008
NIH	

Origins of new neurons and glia in the postnatal brain.

Brain Tumor Research Grant (PI) The Goldhirsh Foundation Do brain tumors originate from adult neural stem cells	07/01/2004 - 06/30/2005
R37 NS28478-12 (PI) NIH Characterization of Neural Stem Cells in the Adult Brain	08/01/2001 - 07/31/2005
UCSF Research Award (PI) Sandler Program in Basic Science: Opportunity Award Cell fusion between blood and brain: role in tumor recurrence	12/01/2005 - 11/30/2008
Pre-Institute Grant (Berger) Pediatric Brain Tumor Foundation Molecular and Cellular Biology of Pediatric Tumors	01/01/2006 - 12/31/2008
Brain Tumor Research Grant (PI) The Goldhirsh Foundation Are PDGFR + stem cells a source of brain tumors	07/01/2005 - 06/30/2009
RC1-00346-1 (Kriegstein) CIRM Derivation of Inhibitory Nerve Cells from Human Embryonic Stem Cells	04/01/2007 - 03/31/2011
RB2-01602 ((Co-Investigator)) NIH MGE Enhancers to Select for Interneuron Precursors Produced from Human ES Cells	06/01/2008 - 05/31/2013
1 P01 NS 41997-06A1 (Carlson) NIH Replication of Human, Ungulate and Synthetic Prions in Neurospheres.	09/15/2007 - 06/30/2012 \$385,995 direct/yr1
1 P01 NS 41997-06A1 (Carlson) NIH Replication of Human, Ungulate and Synthetic Prions in Neurospheres.	09/15/2007 - 06/30/2012 \$385,995 direct/yr1
1 P01 NS 41997-06A1 (Carlson)	09/15/2007 - 06/30/2012

NIH

\$385,995 direct/yr1

Replication of Human, Ungulate and Synthetic Prions in Neurospheres.

PEER REVIEWED PUBLICATIONS

1. Merchant-Larios H and **Alvarez-Buylla A.** (1981) The role of dense core granules of mammalian primordial germ cells: an in vivo and in vitro study. Excerpta Medica 559:119-121.
2. **Alvarez-Buylla A** and Valinsky JA. (1985) Production of plasminogen activator in cultures of superior cervical ganglia and isolated Schwann cells. Proc Natl Acad Sci USA 82:3519-3523.
3. Merchant-Larios H, Mendlovic F, **Alvarez-Buylla A.** Characterization of alkaline phosphatase from primordial germ cells and ontogenesis of this enzyme in the mouse. Differentiation. 1985; 29(2):145-51. PMID: 4043584
4. **Alvarez-Buylla A** and Merchant-Larios H. (1986) Mouse primordial germ cells use fibronectin as a substrate for migration. Exp. Cell Res. 165:362-368.
5. **Alvarez-Buylla A**, Buskirk DR, Nottebohm F. Monoclonal antibody reveals radial glia in adult avian brain. J Comp Neurol. 1987 Oct 8; 264(2):159-70. PMID: 2445794
6. Sudol M, **Alvarez-Buylla A**, Hanafusa H. Differential developmental expression of cellular yes and cellular src proteins in cerebellum. Oncogene Res. 1988 May; 2(4):345-55. PMID: 3041345
7. **Alvarez-Buylla A**, Theelen M, Nottebohm F. Mapping of radial glia and of a new cell type in adult canary brain. J Neurosci. 1988 Aug; 8(8):2707-12. PMID: 3411349
8. **Alvarez-Buylla A**, Vicario DS. Simple microcomputer system for mapping tissue sections with the light microscope. J Neurosci Methods. 1988 Sep; 25(2):165-73. PMID: 3172826
9. **Alvarez-Buylla A**, Nottebohm F. Migration of young neurons in adult avian brain. Nature. 1988 Sep 22; 335(6188):353-4. PMID: 3419503
10. **Alvarez-Buylla A**, Theelen M, Nottebohm F. Birth of projection neurons in the higher vocal center of the canary forebrain before, during, and after song learning. Proc Natl Acad Sci U S A. 1988 Nov; 85(22):8722-6. PMID: 3186755
11. Clayton DF, **Alvarez-Buylla A.** In situ hybridization using PEG-embedded tissue and riboprobes: increased cellular detail coupled with high sensitivity. J Histochem Cytochem. 1989 Mar; 37(3):389-93. PMID: 2918223

12. Sudol M, Kuo CF, Shigemitsu L, **Alvarez-Buylla A**. Expression of the yes proto-oncogene in cerebellar Purkinje cells. *Mol Cell Biol*. 1989 Oct; 9(10):4545-9. PMID: 2685556
13. Nottebohm F, **Alvarez-Buylla A**, Cynx J, Kirn J, Ling CY, Nottebohm M, Suter R, Tolles A and Williams H. (1990) Song learning in birds: the relation between perception and production. *Phil. Trans. R. Soc. Lond. B.* 329:115-124
14. **Alvarez-Buylla A**, Theelen M, Nottebohm F. Proliferation "hot spots" in adult avian ventricular zone reveal radial cell division. *Neuron* 1990 Jul; 5(1): 101-9. PMID: 2369518
15. **Alvarez-Buylla A**, Ling CY, Kirn JR. Cresyl violet: a red fluorescent Nissl stain. *J Neurosci Methods*. 1990 Aug; 33(2-3):129-33. PMID: 2232864
16. **Alvarez-Buylla A**. Commitment and migration of young neurons in the vertebrate brain. *Experientia*. 1990 Sep 15; 46(9):879-82. PMID: 2209795
17. **Alvarez-Buylla A**. Mechanism of neurogenesis in adult avian brain. *Experientia*. 1990 Sep 15; 46(9):948-55. PMID: 2209804
18. **Alvarez-Buylla A**, Theelen M and Nottebohm F. (1990) Proliferation "hot spots" in adult avian ventricular zone reveal radial cell division. *Neuron* 5:101-109.
19. **Alvarez-Buylla A**, Kirn JR, Nottebohm F. Birth of projection neurons in adult avian brain may be related to perceptual or motor learning. *Science*. 1990 Sep 21; 249(4975):1444-6. PMID: 1698312
20. Clark SJ, Cynx J, **Alvarez-Buylla A**, O'Loughlin B, Nottebohm F. On variables that affect estimates of the true sizes and densities of radioactively labeled cell nuclei. *J Comp Neurol*. 1990 Nov 1; 301(1):114-22. PMID: 1706354
21. Kirn JR, **Alvarez-Buylla A**, Nottebohm F. Production and survival of projection neurons in a forebrain vocal center of adult male canaries. *J Neurosci*. 1991 Jun; 11(6):1756-62. PMID: 2045885
22. **Alvarez-Buylla A**. Neurogenesis and plasticity in the CNS of adult birds. *Exp Neurol*. 1992 Jan; 115(1):110-4. PMID: 1728556
23. **Alvarez-Buylla A**, Ling CY, Nottebohm F. High vocal center growth and its relation to neurogenesis, neuronal replacement and song acquisition in juvenile canaries. *J Neurobiol*. 1992 Jun; 23(4):396-406. PMID: 1634887
24. Lois C, **Alvarez-Buylla A**. Proliferating subventricular zone cells in the adult mammalian forebrain can differentiate into neurons and glia. *Proc Natl Acad Sci U S A*. 1993 Mar 1; 90(5):2074-7. PMID: 8446631
25. Lois C, **Alvarez-Buylla A**. Long-distance neuronal migration in the adult mammalian brain. *Science*. 1994 May 20; 264(5162):1145-8. PMID: 8178174

26. Nottebohm F, O'Loughlin B, Gould K, Yohay K, **Alvarez-Buylla A**. The life span of new neurons in a song control nucleus of the adult canary brain depends on time of year when these cells are born. *Proc Natl Acad Sci U S A*. 1994 Aug 16; 91(17):7849-53. PMID: 8058722
27. Rasika S, Nottebohm F, **Alvarez-Buylla A**. Testosterone increases the recruitment and/or survival of new high vocal center neurons in adult female canaries. *Proc Natl Acad Sci U S A*. 1994 Aug 16; 91(17):7854-8. PMID: 8058723
28. **Alvarez-Buylla A**, Ling CY, Yu WS. Contribution of neurons born during embryonic, juvenile, and adult life to the brain of adult canaries: regional specificity and delayed birth of neurons in the song-control nuclei. *J Comp Neurol*. 1994 Sep 8; 347(2):233-48. PMID: 7814666
29. Rousselot P, Lois C, **Alvarez-Buylla A**. Embryonic (PSA) N-CAM reveals chains of migrating neuroblasts between the lateral ventricle and the olfactory bulb of adult mice. *J Comp Neurol*. 1995 Jan 2; 351(1):51-61. PMID: 7896939
30. **Alvarez-Buylla A**, Lois C. Neuronal stem cells in the brain of adult vertebrates. *Stem Cells*. 1995 May; 13(3):263-72. PMID: 7613493
31. Lois C, García-Verdugo JM, **Alvarez-Buylla A**. Chain migration of neuronal precursors. *Science*. 1996 Feb 16; 271(5251):978-81. PMID: 8584933
32. Yoon SO, Lois C, Alvarez M, **Alvarez-Buylla A**, Falck-Pedersen E, Chao MV. Adenovirus-mediated gene delivery into neuronal precursors of the adult mouse brain. *Proc Natl Acad Sci U S A*. 1996 Oct 15; 93(21):11974-9. PMID: 8876247
33. Doetsch F, **Alvarez-Buylla A**. Network of tangential pathways for neuronal migration in adult mammalian brain. *Proc Natl Acad Sci U S A*. 1996 Dec 10; 93(25):14895-900. PMID: 8962152
34. Alvarez-Buylla R, Alvarez-Buylla E, Mendoza H, Montero SA, **Alvarez-Buylla A**. Pituitary and adrenals are required for hyperglycemic reflex initiated by stimulation of CBR with cyanide. *Am J Physiol*. 1997 Jan; 272(1 Pt 2):R392-9. PMID: 9039034
35. Ling C, Zuo M, **Alvarez-Buylla A**, Cheng MF. Neurogenesis in juvenile and adult ring doves. *J Comp Neurol*. 1997 Mar 10; 379(2):300-12. PMID: 9050792
36. **Alvarez-Buylla A**. Mechanism of migration of olfactory bulb interneurons. *Semin Cell Dev Biol*. 1997 Apr; 8(2):207-13. PMID: 15001097
- 37.
- Wichterle H, Garcia-Verdugo JM, **Alvarez-Buylla A**. Direct evidence for homotypic, glia-independent neuronal migration. *Neuron*. 1997 May; 18(5):779-91. PMID: 9182802

38. Doetsch F, García-Verdugo JM, **Alvarez-Buylla A**. Cellular composition and three-dimensional organization of the subventricular germinal zone in the adult mammalian brain. *J Neurosci*. 1997 Jul 1; 17(13):5046-61. PMID: 9185542
39. **Alvarez-Buylla A**, Kirn JR. Birth, migration, incorporation, and death of vocal control neurons in adult songbirds. *J Neurobiol*. 1997 Nov; 33(5):585-601. PMID: 9369461
40. Lim DA, Fishell GJ, **Alvarez-Buylla A**. Postnatal mouse subventricular zone neuronal precursors can migrate and differentiate within multiple levels of the developing neuraxis. *Proc Natl Acad Sci U S A*. 1997 Dec 23; 94(26):14832-6. PMID: 9405699
41. **Alvarez-Buylla A**, García-Verdugo JM, Mateo AS, Merchant-Larios H. Primary neural precursors and intermitotic nuclear migration in the ventricular zone of adult canaries. *J Neurosci*. 1998 Feb 1; 18(3):1020-37. PMID: 9437023
42. **Alvarez-Buylla A**, Temple S. Stem cells in the developing and adult nervous system. *J Neurobiol*. 1998 Aug; 36(2):105-10. PMID: 9712298
43. García-Verdugo JM, Doetsch F, Wichterle H, Lim DA, **Alvarez-Buylla A**. Architecture and cell types of the adult subventricular zone: in search of the stem cells. *J Neurobiol*. 1998 Aug; 36(2):234-48. PMID: 9712307
44. Rasika S, **Alvarez-Buylla A**, Nottebohm F. BDNF mediates the effects of testosterone on the survival of new neurons in an adult brain. *Neuron*. 1999 Jan; 22(1):53-62. PMID: 10027289
45. Kirn JR, Fishman Y, Sasportas K, **Alvarez-Buylla A**, Nottebohm F. Fate of new neurons in adult canary high vocal center during the first 30 days after their formation. *J Comp Neurol*. 1999 Aug 30; 411(3):487-94. PMID: 10413781
46. Temple S, **Alvarez-Buylla A**. Stem cells in the adult mammalian central nervous system. *Curr Opin Neurobiol*. 1999 Feb; 9(1):135-41. PMID: 10072370
47. Kirschenbaum B, Doetsch F, Lois C, **Alvarez-Buylla A**. Adult subventricular zone neuronal precursors continue to proliferate and migrate in the absence of the olfactory bulb. *J Neurosci*. 1999 Mar 15; 19(6):2171-80. PMID: 10066270
48. Wichterle H, Garcia-Verdugo JM, Herrera DG, **Alvarez-Buylla A**. Young neurons from medial ganglionic eminence disperse in adult and embryonic brain. *Nat Neurosci*. 1999 May; 2(5):461-6. PMID: 10321251
49. Doetsch F, Caillé I, Lim DA, García-Verdugo JM, **Alvarez-Buylla A**. Subventricular zone astrocytes are neural stem cells in the adult mammalian brain. *Cell*. 1999 Jun 11; 97(6):703-16. PMID: 10380923
50. Lim DA, **Alvarez-Buylla A**. Interaction between astrocytes and adult subventricular zone precursors stimulates neurogenesis. *Proc Natl Acad Sci U S A*. 1999 Jun 22; 96(13):7526-31. PMID: 10377448

51. Doetsch F, García-Verdugo JM, **Alvarez-Buylla A**. Regeneration of a germinal layer in the adult mammalian brain. *Proc Natl Acad Sci U S A*. 1999 Sep 28; 96(20):11619-24. PMID: 10500226
52. Herrera DG, Garcia-Verdugo JM, **Alvarez-Buylla A**. Adult-derived neural precursors transplanted into multiple regions in the adult brain. *Ann Neurol*. 1999 Dec; 46(6):867-77. PMID: 10589539
53. **Alvarez-Buylla A**, Herrera DG, Wichterle H. The subventricular zone: source of neuronal precursors for brain repair. *Prog Brain Res*. 2000; 127:1-11. PMID: 11142024
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1. Merchant-Larios, H. and **Alvarez-Buylla, A.** (1986) The role of extracellular matrix and tissue topographic arrangement in mouse primordial germ cell migration. *Development and Function of Reproductive Organs.* Peters, H. and Tsafirri, A., Eds.
2. **Alvarez-Buylla, A.** (1988) Radial glia and the migration of young neurons in the adult avian brain. PhD. Thesis. The Rockefeller University.
3. **Alvarez-Buylla A.** (1991) Neurogenesis en el cerebro adulto: Mecanismos de una forma extrema de plasticidad. *Neurobiología del desarrollo. Aspectos comparativos y mecanismos de regulación de la ontogenia neural.* Ed. Salas, M. Sociedad Mexicana de Ciencias Fisiológicas-UNAM. México. pp. 59-72
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10. **Alvarez-Buylla, A.** and Yaschine, C. 2003. Origen de las células madre del sistema nervioso central. In: Plasticidad y Aprendizaje en el Sistema Nervioso Central. El Colegio Nacional. Mexico. Pp. 7-23
11. **Alvarez-Buylla, A.**, Doetsch, F., Seri, B. and Garcia-Verdugo, J.M. (2004). Astrocytic nature of adult neural stem cells in vivo. In: Stem Cells in the nervous System: Functional and Clinical Implications. Gage, F.H., Bjorklund, A., Prochiantz, A. and Christen, Y. (Eds.) Fondation IPSEN. Springer-Verlag 43-56.
12. **Alvarez-Buylla A.** and Jackson, E. (2005) Stem Cells in the Adult Brain: Their Identification and Role in Neurogenesis. In: the Encyclopedia of Molecular Cell Biology and Molecular Medicine (2. edition). Myers, R. (Ed.)
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14. Lim, D.A. and **Alvarez-Buylla, A.** (2005) Neural Stem Cells in the Adult Brain. Implications of Their Glial Characteristics. In: Neural Development and Stem Cells. Rao, M.S. (ed). Humana Press pp. 29-47
15. Lim, D.A., Huang, Y.C. and **Alvarez-Buylla, A.** (2007) Adult subventricular zone and olfactory bulb neurogenesis. In: Adult Neurogenesis. Gage, F.H., Kempermann, G. and Song, H. (Eds.) Cold Spring Harbor Laboratory Press pp. 175-206
16. Galvao, R.P., **Alvarez-Buylla, A.** and Garcia- Verdugo, J.M. (2008) Adult Neural Stem Cells; Prospects for Brain Repair In: Cell Therapy. Damian Garcia-Olmo, Jose Manuel Garcia- Verdugo, Jorge Alemany, Jose A. Gutierrez-Fuentes (Eds.) McGraw-Hill
17. **Alvarez-Buylla, A.** Neurogenesis in the Adult Brain preface. Tatsunori Seki, Kazunobu Sawamoto, Jack Parent, Arturo Alvarez-Buylla (Eds.) Springer
18. Mirzadeh, Z., Han, Y., Garcia-Verdugo, J. and **Alvarez-Buylla, A.** (2011) Neurogenesis In the Adult Brain; Chapter 12; Epithelial Organization of Adult Neurogenic Germinal Niches. Tatsunori Seki, Kazunobu Sawamoto, Jack Parent, Arturo Alvarez-Buylla (Eds.) Springer

19. **Alvarez-Buylla A.** Yoshiki Sasai Obituary (1962-2014). Nature. 2014 Sep 4; 513(7516):34. PMID: 25186892. PMCID: PMC22119

OTHER CREATIVE ACTIVITIES

1. Device for mounting tissue sections on histological slides.
2. Digital stereotaxic apparatus for mice and song birds.
3. Computer based mapping system for tissue sections.
4. Nissl fluorescent staining.

RESEARCH PROGRAM

Our laboratory studies the mechanisms of adult neurogenesis and neuronal replacement. Contrary to the dogma held for over a century, some populations of neurons continue to be produced in juvenile and adult brains. Basic mechanisms of neural development can be studied in a fully assembled brain, providing key insights into the nature of neural stem cells, mechanisms of neuronal migration, and neural maturation. Our goal is to understand how young neurons are generated, how they migrate long distances, how they differentiate and contribute to brain function, and whether similar processes can be used for brain repair.

We have identified the neural stem cells (NSCs), intermediate progenitors cells, and lineages for adult neurogenesis in the adult mammalian ventricular-subventricular zone (V-SVZ). This is the most extensive germinal niche in the adult mammalian brain. These NSCs integrate information throughout the niche and also receive axonal input from local and distant sources. NSCs in the V-SVZ generate large numbers of new neurons that migrate long distances through the complex matrix of the postnatal brain and then differentiate into local-circuits neurons that become incorporated into the olfactory bulb. We are studying the properties of adult NSCs, their embryonic origins, and their mode of division.

We also studying the V-SVZ in the human brain. We found that in infants the V-SVZ

contains many migrating young neurons. Interestingly, in addition to the migration to the olfactory bulb in young children, new neurons derived from the V-SVZ migrate towards cortex. We are investigating: 1) The regions of cortex where these new young neurons migrate to; 2) During which period of human postnatal development they contribute new neurons to cortical circuits; and 3) What types of neurons they generate.

Replacement of local circuit neurons (interneurons) is a promising new approach for brain repair; however, we have found that V-SVZ neurogenesis is highly tailored for the production of olfactory bulb neurons. We are investigating the potential of young neurons derived from the embryonic medial ganglionic eminence (MGE) for brain repair. The MGE is a major source of inhibitory local circuit neurons for the cerebral cortex. Unlike, neurons derived from the adult V-SVZ, young MGE neurons can migrate and functional integrate into the adult brain outside of the olfactory bulb. In collaboration with other laboratories at UCSF, we have found that these cells can induce a new period of plasticity in the visual cortex, can ameliorate seizures in epileptic mice, and can reduce pain thresholds in spinal cord circuits. We are studying how these cells integrate into adult cortex and which populations of interneurons are responsible for the above therapeutic effects.

The laboratory uses mostly in vivo approaches. We take advantage of the collaborative environment at UCSF to use multiple levels of analysis to understand the mechanism of adult neuronal replacement at the molecular, cellular, circuit, and behavior levels.

SIGNIFICANT PUBLICATIONS

1. **Alvarez-Buylla A**, Nottebohm F. Migration of young neurons in adult avian brain. *Nature*. 1988 Sep 22; 335(6188):353-4. PMID: 3419503

First demonstrations of long-range neuronal migration in an adult vertebrate brain

2. **Alvarez-Buylla A**, Theelen M and Nottebohm F. (1990) Proliferation "hot spots" in adult avian ventricular zone reveal radial cell division. *Neuron* 5:101-109.

First evidence that Radial Glia are precursors of neurons

3. **Alvarez-Buylla A**, Kirn JR, Nottebohm F. Birth of projection neurons in adult avian brain may be related to perceptual or motor learning. *Science*. 1990 Sep 21; 249(4975):1444-6. PMID: 1698312.

First demonstration of the birth of long-projection neurons in the adult brain

4. Lois C, **Alvarez-Buylla A**. Proliferating subventricular zone cells in the adult mammalian forebrain can differentiate into neurons and glia. *Proc Natl Acad Sci U S A*. 1993 Mar 1; 90(5):2074-7. PMID: 8446631.

Direct evidence that proliferating cells in the adult mammalian subventricular zone in vivo can give rise to new neurons

5. **Lois C**, Alvarez-Buylla A. Long-distance neuronal migration in the adult mammalian brain. *Science*. 1994 May 20; 264(5162):1145-8. PMID: 8178174

First demonstrations of long-range neuronal migration in an adult mammalian brain

6. Rasika S, Nottebohm F, **Alvarez-Buylla A**. Testosterone increases the recruitment and/or survival of new high vocal center neurons in adult female canaries. *Proc Natl Acad Sci U S A*. 1994 Aug 16; 91(17):7854-8. PMID: 8058723

First evidence that vacancies created by the death of old neurons is essential for the long-term replacement of neurons in the adult avian brain

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Discovery of a new form of neuronal migration: chain migration

8. Doetsch F, **Alvarez-Buylla A**. Network of tangential pathways for neuronal migration in adult mammalian brain. *Proc Natl Acad Sci U S A*. 1996 Dec 10; 93(25):14895-900. PMID: 8962152

First demonstration of an extensive tangential network of pathways for neuronal migration in the walls of the lateral ventricles of adult rodents

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Cellular mechanism of chain migration

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- Wichterle H, Garcia-Verdugo JM, Herrera DG, **Alvarez-Buylla A**. Young neurons from medial ganglionic eminence disperse in adult and embryonic brain. *Nat Neurosci*. 1999 May; 2(5):461-6. PMID: 10321251

First evidence showing that interneurons precursors can migrate and integrate when transplanted into the adult brain

12. Doetsch F, Caillé I, Lim DA, García-Verdugo JM, **Alvarez-Buylla A**. Subventricular zone astrocytes are neural stem cells in the adult mammalian brain. *Cell*. 1999 Jun 11; 97(6):703-16. PMID: 10380923

Identification of the adult neural stem cells and of the transit amplifying intermediate precursors

13. **Alvarez-Buylla A**, García-Verdugo JM, Tramontin AD. A unified hypothesis on the lineage of neural stem cells. *Nat Rev Neurosci*. 2001 Apr; 2(4):287-93. PMID: 11283751

Neural stem cells from development to adulthood are contained within cells previously considered committed glia

14. Seri B, García-Verdugo JM, McEwen BS, **Alvarez-Buylla A**. Astrocytes give rise to new neurons in the adult mammalian hippocampus. *J Neurosci*. 2001 Sep 15; 21(18):7153-60. PMID: 11549726

First identification of radial astrocytes (radial glia-like, Type 1 progenitors) as the primary precursors of new neurons in the adult hippocampus

15. Wichterle H, Turnbull DH, Nery S, Fishell G, **Alvarez-Buylla A**. In utero fate mapping reveals distinct migratory pathways and fates of neurons born in the mammalian basal forebrain. *Development*. 2001 Oct; 128(19):3759-71. PMID: 11585802

First in vivo demonstration of the migration of interneurons from ventral telencephalon into cortex--

16. Doetsch F, Petreanu L, Caille I, Garcia-Verdugo JM, **Alvarez-Buylla A**. EGF converts transit-amplifying neurogenic precursors in the adult brain into multipotent stem cells. *Neuron*. 2002 Dec 19; 36(6):1021-34. PMID: 12495619

Neurospheres are not derived from neural stem cells, but from intermediate progenitors

17. Alvarez-Dolado M, Pardal R, Garcia-Verdugo JM, Fike JR, Lee HO, Pfeffer K, Lois C, Morrison SJ, **Alvarez-Buylla A**. Fusion of bone-marrow-derived cells with Purkinje neurons, cardiomyocytes and hepatocytes. *Nature*. 2003 Oct 30; 425(6961):968-73. PMID: 14555960.

First direct demonstration that blood-derived cells can fuse with neurons to form binucleated heterokaryons; This finding helped resolve a long-standing dispute about transdifferentiation from blood to brain

18. Sanai N, Tramontin AD, Quiñones-Hinojosa A, Barbaro NM, Gupta N, Kunwar S, Lawton MT, McDermott MW, Parsa AT, Manuel-García Verdugo J, Berger MS, **Alvarez-Buylla A**. Unique astrocyte ribbon in adult human brain contains neural stem cells but lacks chain migration. *Nature*. 2004 Feb 19; 427(6976):740-4. PMID: 14973487

First indication of the presence of cells with neural stem cell competence in the adult human brain, but with very few migrating young neurons between this putative germinal zone and the olfactory bulb as seen in rodents

19. Merkle FT, Tramontin AD, García-Verdugo JM, **Alvarez-Buylla A**. Radial glia give rise to adult neural stem cells in the subventricular zone. *Proc Natl Acad Sci U S A*. 2004 Dec 14; 101(50):17528-32. PMID: 15574494

First demonstration that adult neural stem cells are derived from radial glia

20. Sawamoto K, Wichterle H, Gonzalez-Perez O, Cholfin JA, Yamada M, Spassky N, Murcia NS, Garcia-Verdugo JM, Marin O, Rubenstein JL, Tessier-Lavigne M, Okano H, **Alvarez-Buylla A**. New neurons follow the flow of cerebrospinal fluid in the adult brain. *Science*. 2006 Feb 3; 311(5761):629-32. PMID: 16410488.

First evidence that tangential neuronal migration is guided indirectly by the planar cell polarity of the ventricular epithelium in the adult brain

21. Merkle FT, Mirzadeh Z, **Alvarez-Buylla A**. Mosaic organization of neural stem cells in the adult brain. *Science*. 2007 Jul 20; 317(5836):381-4. PMID: 17615304

First demonstration that adult neural stem cells are regionally specified; different types of neurons in the adult brain are derived from unique locations

22. Han YG, Spassky N, Romaguera-Ros M, Garcia-Verdugo JM, Aguilar A, Schneider-Maunoury S, **Alvarez-Buylla A**. Hedgehog signaling and primary cilia are required for the formation of adult neural stem cells. *Nat Neurosci*. 2008 Mar; 11(3):277-84. PMID: 18297065.

First evidence that primary cilia is essential for the formation of adult neural stem cells

23. Mirzadeh Z, Merkle FT, Soriano-Navarro M, Garcia-Verdugo JM, **Alvarez-Buylla A**. Neural stem cells confer unique pinwheel architecture to the ventricular surface in neurogenic regions of the adult brain. *Cell Stem Cell*. 2008 Sep 11; 3(3):265-78. PMID: 18786414

Reveals for the first time the pinwheel architecture and the apical domain of adult neural stem cells in the subventricular zone

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First identification of epigenetic trithorax factor that control adult neurogenesis in the subventricular zone

25. Han YG, Kim HJ, Dlugosz AA, Ellison DW, Gilbertson RJ, **Alvarez-Buylla A**. Dual and opposing roles of primary cilia in medulloblastoma development. *Nat Med*. 2009 Sep; 15(9):1062-5. PMID: 19701203

This study revealed for the first time the dual role that primary cilia play in cancer growth in the brain

26. Baraban SC, Southwell DG, Estrada RC, Jones DL, Sebe JY, Alfaro-Cervello C, García-Verdugo JM, Rubenstein JL, **Alvarez-Buylla A**. Reduction of seizures by transplantation of cortical GABAergic interneuron precursors into Kv1.1 mutant mice. *Proc Natl Acad Sci U S A*. 2009 Sep 8; 106(36):15472-7. PMID: 19706400.

First indication that transplantation of interneurons precursors can suppress epileptic seizures

27. Southwell DG, Froemke RC, **Alvarez-Buylla A**, Stryker MP, Gandhi SP. Cortical plasticity induced by inhibitory neuron transplantation. *Science*. 2010 Feb 26; 327(5969):1145-8. PMID: 20185728

First evidence that tangential neuronal migration is guided indirectly by the planar cell polarity of the ventricular epithelium in the adult brain

28. Ihrie RA, Shah JK, Harwell CC, Levine JH, Guinto CD, Lezameta M, Kriegstein AR, **Alvarez-Buylla A**. Persistent sonic hedgehog signaling in adult brain determines neural stem cell positional identity. *Neuron*. 2011 Jul 28; 71(2):250-62. PMID: 21791285

First identification of a factor that controls the regional specification of neural stem cells in the adult brain-

29. Sanai N, Nguyen T, Ihrie RA, Mirzadeh Z, Tsai HH, Wong M, Gupta N, Berger MS, Huang E, Garcia-Verdugo JM, Rowitch DH, **Alvarez-Buylla A**. Corridors of migrating neurons in the human brain and their decline during infancy. *Nature*. 2011 Oct 20; 478(7369):382-6. PMID: 21964341

Discovery of a novel migratory stream in the human brain during infancy

30. Tsai HH, Li H, Fuentealba LC, Molofsky AV, Taveira-Marques R, Zhuang H, Tenney A, Murnen AT, Fancy SP, Merkle F, Kessaris N, **Alvarez-Buylla A**, Richardson WD, Rowitch DH. Regional astrocyte allocation regulates CNS synaptogenesis and repair. *Science*. 2012 Jul 20; 337(6092):358-62. PMID: 22745251

Reveals for the first time how astrocytes are strictly regionally allocated as they differentiate from radial glia

31. Southwell DG, Paredes MF, Galvao RP, Jones DL, Froemke RC, Sebe JY, Alfaro-Cervello C, Tang Y, Garcia-Verdugo JM, Rubenstein JL, Baraban SC, **Alvarez-Buylla A**. Intrinsically determined cell death of developing cortical interneurons. *Nature*. 2012 Nov 1; 491(7422):109-13. PMID: 23041929

Demonstrates how transplantation of interneuron precursors can be scaled, suggesting for the first time how programmed cell death in interneurons does not scale to the target by is autonomous to the interneurons

32. Ponti G, Obernier K, **Alvarez-Buylla A**. Lineage progression from stem cells to new neurons in the adult brain ventricular-subventricular zone. *Cell Cycle*. 2013 Jun 1; 12(11):1649-50. PMID: 23673324.

First identification of a factor that controls the regional specification of neural stem cells in the adult brain-

33. Tong CK, Chen J, Cebrián-Silla A, Mirzadeh Z, Obernier K, Guinto CD, Tecott LH, García-Verdugo JM, Kriegstein A, **Alvarez-Buylla A**. Axonal control of the adult neural stem cell niche. *Cell Stem Cell*. 2014 Apr 3; 14(4):500-11. PMID: 24561083. PMCID: PMC18083.

Reveals an extensive plexus of serotonergic axons inside the ventricles contacting ependymal cells and neural stem cells

34. Ohata S, Nakatani J, Herranz-Pérez V, Cheng J, Belinson H, Inubushi T, Snider WD, García-Verdugo JM, Wynshaw-Boris A, **Alvarez-Buylla A**. Loss of dishevelleds disrupts planar polarity in ependymal motile cilia and results in hydrocephalus. *Neuron*. 2014 Aug 6; 83(3):558-71. PMID: 25043421. PMCID: PMC141064.

Shows how Dishevelleds are essential for planar cell polarity in the ependymal layer to prevent hydrocephalus

35. Tong CK, Han YG, Shah JK, Obernier K, Guinto CD, **Alvarez-Buylla A**. Primary cilia are required in a unique subpopulation of neural progenitors. *Proc Natl Acad Sci U S A*. 2014 Aug 26; 111(34):12438-43. PMID: 25114218. PMCID: PMC18083

Surprisingly the brain develops normally without primary cilia, but this ablation results in defects in a specific regionally specified subpopulation of postnatal neural stem cells

36. Merkle F, Fuentealba L, Sanders T, Magno L, Kessar N, **Alvarez-Buylla A**. Adult Neural Stem Cells in Distinct Microdomains Generate Previously Unknown Interneuron Types. *Nature Neuroscience* 2014 Feb; 17(2):207-14 PMID: 24362763

Shows four new subtypes of interneurons born in a minute and restricted regions of the adult subventricular zone

37. Southwell DG, Nicholas CR, Basbaum AI, Stryker MP, Kriegstein AR, Rubenstein JL, **Alvarez-Buylla A**. Interneurons from embryonic development to cell-based therapy. *Science*. 2014 Apr 11; 344(6180):1240622. PMID: 24723614

Review summarizing multiple UCSF collaborations on the potential of interneuron precursor transplantation for the treatment of neurological disorders