

## CURRICULUM VITAE

WALTER C. LOW, Ph.D.  
U.S.A.

### PROFESSIONAL ADDRESS

University of Minnesota  
Department of Neurosurgery  
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### IDENTIFYING INFORMATION

#### Education

| Degree              | Institution                                   | Date Degree Granted |
|---------------------|---|---------------------|
| B.S.                | University of California<br>Santa Barbara, CA | 1972                |
| M.S.                | University of Michigan<br>Ann Arbor, MI       | 1974                |
| Ph.D.               | University of Michigan<br>Ann Arbor, MI       | 1979                |
| Postdoctoral Fellow | University of Cambridge<br>Cambridge, U.K.    | 1979-1980           |

#### Academic Appointments

University of Minnesota Medical School, Twin Cities

|  |  |              |
|--|--|--------------|
| Department of Neurosurgery                       |  |              |
| Professor, with tenure                           |  | 1993-present |
| Associate Professor, with tenure                 |  | 1990-1993    |
| Department of Physiology                         |  |              |
| Professor  |  | 1993-2012    |
| Associate Professor                              |  | 1990-1993    |
| Department of Integrative Biology and Physiology |  |              |
| Professor  |  | 2012-present |

2020

Walter C. Low, Ph.D.

|  |              |
|--|--------------|
| Cancer Center<br>Professor   | 1995-present |
| Stem Cell Institute<br>Professor   | 2005-present |
| Institute for Engineering in Medicine<br>Professor                         | 2007-present |
| Biomedical Engineering Institute<br>Professor                              | 2002-2007    |
| NeuroEngineering Center<br>Professor                                       | 2007-present |
| Institutes for Health Informatics<br>Professor                             | 2017-present |
| Graduate Program in Neuroscience<br>Professor                              | 1993-present |
| Microbiology, Immunology, and Cancer Biology Graduate program<br>Professor | 1993-present |

#### Indiana University School of Medicine, Indianapolis

|  |           |
|--|-----------|
| Department of Physiology and Biophysics<br>Adjunct Associate Professor                                       | 1990-1993 |
| Department of Physiology and Biophysics; Program in Medical Neurobiology<br>Associate Professor, with tenure | 1989-1990 |
| Assistant Professor  | 1983-1989 |
| Neurobiology Graduate Program<br>Associate Professor, with tenure  | 1989-1990 |
| Assistant Professor  | 1983-1989 |

#### University of Vermont, Burlington

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|---|-----------|
| Department of Physiology and Biophysics<br>Research Associate | 1980-1983 |
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#### **Administrative Appointments**

|  |              |
|--|--------------|
| Director, Low Laboratory for Translational Neuroscience<br>University of Minnesota Medical School, Twin Cities | 1990-present |
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|---|-----------|
| Director, Neurosurgery Research Laboratories,<br>University of Minnesota Medical School, Twin Cities  | 1998-2017 |
| Associate Chair for Research, Department of Neurosurgery,<br>University of Minnesota Medical School, Twin Cities  | 2007-2017 |
| Fesler-Lampert Endowed Chair in Aging, University of Minnesota  | 2009-2010 |
| President, American Society for Neural Therapy and Repair   | 2005-2006 |
| Director, Laboratory for Neural Transplantation and Regeneration,<br>Department of Neurosurgery, University of Minnesota Medical School,<br>Twin Cities | 1990-1998 |
| Director, NIH/Minnesota Fetal Tissue Bank,<br>University of Minnesota Medical School, Twin Cities   | 1992-1994 |
| Director, Graduate Program, Department of Physiology and Biophysics,<br>Indiana University School of Medicine, Indianapolis, IN                         | 1985-1988 |

### **Consulting and Advisory Positions**

|  |              |
|--|--------------|
| Consultant, Superior Organoid Technologies, Twin Cities, MN                                      | 2018-present |
| Chief Scientific Officer, Regenevida Division of RCI, St. Paul, MN                               | 2013-2020    |
| Consultant, Genomix, Inc., Minneapolis, MN   | 2013-present |
| Board of Directors, Metselex, Connecticut  | 2011-present |
| Scientific Advisory Board, Insera Therapeutics, Sacramento, CA                                   | 2007-present |
| Stem Cell Consultant, Saneron CCL, Tampa, FL   | 2002-present |
| Consultant, Applied Informatic Solutions, St. Paul, MN   | 2011-2013    |
| Scientific Advisory Board, SMG Therapeutics, Inc., Connecticut                                   | 2006-2009    |
| Stem Cell Consultant, Twin Star Medical, Inc., Minneapolis, MN                                   | 2002-2005    |
| Scientific Advisory Board, Genovus, Inc., Minneapolis, MN  | 1995-1999    |
| Neuroscience Consultant, 3M Corporation, St. Paul, MN  | 1992-1999    |
| Summer Fellow, Howard Hughes Aircraft Company,<br>Space Communications Division, Los Angeles, CA | 1972         |
| Summer Fellow, Research Laboratories,<br>Pacific Gas and Electric Company, Berkeley, CA          | 1971         |

## Membership and Offices in Professional Organizations

American Association for the Advancement of Science, 1974-present  
 American Heart Association, 1989-present  
   Member, Stroke Council, 1992-1995  
 American Physiological Society, 1990-1996  
 Cell Transplantation Society, 1993-1997  
 European Neuroscience Association, 1990-1996  
 International Brain Research Organization, 1990-1996  
 International Society of Neuropathology, 1991-1993  
 Minnesota Academy of Science, 1992-1998  
 New York Academy of Sciences, 1979-1995  
 Sigma Xi Scientific Honor Society  
   Full Member, I. U. School of Medicine Chapter, 1985-1990  
   Associate Member, University of Michigan Chapter, 1978  
 Society for Neuroscience, 1977-present  
   National Chapter, 1977-present  
   Voyageurs (Minnesota) Chapter, 1990-1996  
   Indianapolis Chapter, 1983-1990  
     President, 1985-1987  
     Executive Committee Member, 1987-1990  
   Vermont Chapter, 1980-1983  
   Executive Committee Member, 1982-1983  
   Michigan Chapter, 1977-1979  
 American Society for Neural Transplantation and Repair, 1994-Present  
   Secretary-Elect, 1994-1995  
   Clinical Practice Committee, 1995-present  
   President-Elect, 2005-2006

## HONORS AND AWARDS FOR RESEARCH WORK, TEACHING, PUBLIC ENGAGEMENT, AND SERVICE

### External Sources

Thorne Stroke Award – Minnesota Medical Foundation, 2003  
 Congress of Neurological Surgeons, Preuss Award for Brain Tumor Research  
   (Resident: Walter Jean), 1997  
 American Association of Neurological Surgeons, Preuss Award for Brain Tumor Research  
   (Resident: Margaret A. Wallenfriedman), 1996  
 Established Investigator Award, American Heart Association, 1990-1995  
 Congress of Neurological Surgeons, Preuss Award for Brain Tumor Research  
   (Resident: Eric P. Flores), 1994  
 Rotary Club Honorary "Tree for Tomorrow", Hennepin Parks Foundation, 1993  
 Nominee, Moore Award for Teaching Excellence, Indiana University and Purdue University at  
   Indianapolis, 1988  
 Honorable Mention, Weil Award, American Association for Neuropathology, 1987  
 National Research Service Award, National Heart, Lung, and Blood Institute, 1981-1983  
 Agan Award, American Heart Association, Vermont Affiliate, 1980-1981  
 National Science Foundation NATO Fellow, 1979-1980.

National Research Service Award, National Institute of Neurological and Communicative Disorders, and Stroke, 1979  
 National Institutes of Health, NIGMS, Predoctoral Fellow, 1975-1978  
 Eta Kappa Nu Engineering Honor Society, 1972  
 Honors Graduate, University of California, 1972  
 California State Scholar Award, 1968-1972  
 University of California Alumni Scholar Award, 1968-1969  
 Rotarian Scholar Award, 1968-1969  
 Bank of America Laboratory Sciences Award, 1968  
 California Scholastic Federation Life Member, 1968  
 University of California Honors at Entrance, 1968

### **Biographical Citations**

Who's Who in America, 2002, 2005, 2007  
 Who's Who in Medical Science Education, 2005  
 Who's Who in Stem Cell Research, 2003  
 2000 Outstanding Intellectuals of the 21<sup>st</sup> Century, 2003  
 American Men and Women of Science, 1982, 2002  
 Who's Who Among America's Teachers, 2002  
 Who's Who in Medicine and Healthcare, 1997  
 Who's Who in American Education, 1992  
 Who's Who in the World, 1989  
 Who's Who in the Midwest, 1986  
 Who's Who in Frontier Science and Technology, 1984

### **RESEARCH AND SCHOLARSHIP**

#### **Current and Past Grants**

*The following 174 grants have received over \$66 million in funding.*

|           |  |
|-----------|--|
| 2020-2021 | National Institutes of Health<br>"Generating Exogenic Hippocampal Neural Cells via Blastocyst Complementation for Transplantation in Alzheimer's Disease"<br>R01 DK117286-03S1<br>\$385,000 (Principal Investigator) |
| 2020-2021 | National Institutes of Health<br>"Microbial Synthesis of Therapeutic Bile Acids"<br>R41 NS113732<br>\$422,378 (Co-Principal Investigator)  |
| 2020-2021 | Randy Shaver Cancer Research and Community Fund<br>"Zika Virus-Based Immunotherapy for Treating Malignant Brain Tumors: FDA Enabling Studies"<br>\$79,176 (Principal Investigator)                                   |

2020

Walter C. Low, Ph.D.

- 2020-2022 UMN AHC Faculty Research Development Program  
“Modeling and Reversing Alzheimer’s Pathology via Human Brain Organoids”  
\$200,000 (Co-Investigator)
- 2020-2022 State of Minnesota  
University of Minnesota–Mayo Clinic Biotechnology Program  
“Magnetic Nanodevice Arrays for the Treatment of Neurological Disorders  
\$913,049 (Co-Investigator)
- 2020-2023 National Institutes of Health  
“Training in PharmaconeuroImmune Substance Abuse Research”  
T32 DA007097  
\$180,000 (postdoctoral fellow mentor)
- 2019-2022 National Institutes of Health  
“Stem Cells for Treating Acute Stroke”  
R42 NS112070  
\$4,209,449 (Principal Investigator)
- 2019-2020 National Institutes of Health  
“Novel Highly Regenerative and Scalable Progenitor Cell Exosomes for  
Treating Stroke”  
R41 NS105263  
\$385,923 (Co-Investigator)
- 2019-2020 National Institutes of Health  
“High Density Multielectrode Arrays with Spatially Selective Unidirectional and  
Rotating Fields for Investigation of Neural Networks – in Alzheimer’s Disease”  
U01 NS103569-S1  
\$334,020 (Co-Principal Investigator)
- 2019-2021 State of Minnesota Spinal Cord Injury and Traumatic Brain Injury Research  
Program.  
“Spinal Cord Regeneration by Cell Reprogramming in Chronic Spinal Cord  
Injury”  
\$151,000 (Principal Investigator)
- 2019-2020 Institute for Engineering in Medicine, University of Minnesota  
“Orientation Selective Activation of Neural Circuits of the Limbic System  
Involved in Alzheimer’s Disease”.  
\$60,000 (Principal Investigator)
- 2019-2020 Randy Shaver Cancer Research and Community Fund  
“Enhancing Zika Virus-Based Therapies for Treating Malignant Brain Tumors”  
\$50,000 (Principal Investigator)
- 2019-2020 Biomedical Research Awards for Interdisciplinary New Science (BRAINS),  
University of Minnesota  
“Analysis of Stem Cell-derived Extracellular Vesicle Targeting to Sites of Tissue  
Damage and Cancer”.  
\$75,000 (Co-Investigator)

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| 2019-2022 | National Institutes of Health<br>“Training in PharmacImmune Substance Abuse Research”<br>T32 DA007097<br>\$180,000 (pre-doctoral fellow mentor)  |
| 2018-2019 | State of Minnesota Spinal Cord Injury and Traumatic Brain Injury Research Program.<br>“Training Transplanted Spinal Neuronal Progenitors Cells (SNPCS) to Function after Chronic Spinal Cord Injury”.<br>\$125,000 (Co-Principal Investigator)                               |
| 2018-2019 | State of Minnesota Spinal Cord Injury and Traumatic Brain Injury Research Program.<br>“Optogenetics for Corticospinal Tract Stimulation in Combination with Transplanted Spinal Neuronal Progenitor Cells After Spinal Cord Injury”<br>\$125,000 (Co-Principal Investigator) |
| 2018-2020 | Regenerative Medicine Minnesota<br>“Neuroprotection Using Human Extremely Low Gestational Age Neonate-Derived Umbilical Cord Blood Stem Cells in Neonatal Hemorrhagic Brain Injury”<br>\$247,593 (Co-Investigator)   |
| 2018-2019 | Randy Shaver Cancer Research & Community Fund<br>“Zika Virus-Based Therapy for Treating Malignant Brain Tumors – Mechanisms of Action”<br>\$30,000 (Principal Investigator)  |
| 2018-2019 | Institute for Engineering in Medicine, University of Minnesota<br>“Large Scale and High Resolution Magnetic Array for Brain Stimulation and Recording”<br>\$35,000 (Co-Investigator)   |
| 2018-2022 | National Institutes of Health<br>“A Novel Stem Cell-Based Approach for Generating Non-Human Primate Liver in Pigs”<br>R01 DK117286<br>\$2,021,184 (Principal Author)   |
| 2018-2019 | National Institutes of Health<br>MN-REACH: “Treatment of Malignant Brain Tumors with the Zika Virus as a Vaccine Adjuvant and Oncolytic Virus”<br>U01 HL127479<br>\$50,000 (Principal Investigator)  |
| 2018-2020 | National Institutes of Health<br>“Functional Proteomics of Aging”<br>T32 AG029796<br>\$120,000 (postdoctoral fellow mentor)  |

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| 2018-2019 | HRK Foundation<br>“Immunotherapy for NF1”<br>\$30,000 (principal investigator)  |
| 2017-2021 | National Institutes of Health<br>“High Density Multielectrode Arrays with Spatially Selective Unidirectional and Rotating Fields for Investigation of Neural Networks”<br>U01 NS103569<br>\$3,456,055 (Co-Investigator) |
| 2017-2019 | National Institutes of Health<br>MN-REACH Program: “Midbrain Organoid-Derived Product for Treatment of Parkinson’s Disease”<br>U01 HL127479<br>\$115,000 (Co-Investigator)  |
| 2017-2019 | Regenerative Medicine Minnesota<br>“Production of Dopamine Neurons – A Cellular Product for Treating Parkinson’s Disease”.<br>\$100,000 (Principal Investigator)  |
| 2017-2018 | Randy Shaver Cancer Research Foundation<br>“Harnessing the Zika Virus to Target Malignant Brain Tumors”<br>\$25,000 (Principal Investigator)  |
| 2016-2018 | Regenerative Medicine Minnesota<br>“Generating Human Neural Stem Cells and Progenitor Cells in a Porcine Model Through Blastocyst Complementation”<br>\$250,000 (Co-Investigator)                                       |
| 2016-2018 | Academic Health Center, University of Minnesota<br>“Generating Human Pancreas in Gene Edited Pigs”<br>\$200,000 (Co-Principal Investigator)   |
| 2016-2018 | Minnesota Partnership Infrastructure Fund, State of Minnesota<br>“3-Dimensional Nanoscale Resolution Microscope for Understanding Human Disease Processes”.<br>\$1,059,320 (Co-Investigator)                            |
| 2016-2018 | Grant-in-Aid program, University of Minnesota<br>“Modulating Macrophages to Enhance Neurogenesis in Alzheimer Disease”<br>\$30,000 (Co-Investigator)  |
| 2016-2017 | Institute for Engineering in Medicine, University of Minnesota<br>“Generating Exogenic Human Liver and Hepatocytes”<br>\$35,000 (Co-Investigator)   |
| 2015-2018 | Academic Health Center, University of Minnesota<br>“Development and Application of MRI Methods to Quantify Brain Energy Impairment and Drug Responses in Neurodegenerative Disorders”<br>\$200,000 (Co-investigator)    |



- 2015-2016 Stem Cell Institute, Adjacent Possible Research Grant Program, Univ. Minnesota  
“Interrogating Human Stem Cells for Engineering Human Organs/Cells  
via Blastocyst Complementation”  
\$73,467 (principal investigator)
- 2015-2016 Institute for Engineering in Medicine, University of Minnesota  
“Generating Human Hematopoietic Cells in the Pig as a Biological Incubator”  
\$24,573 (principal investigator)
- 2015-2016 Institute for Engineering in Medicine, University of Minnesota  
“Genesis Project for Organ, Tissue, and Cell Engineering”  
\$59,994 (principal investigator)
- 2015-2016 Wallin Neuroscience Discovery Fund, University of Minnesota  
“Creating Young Blood to Rejuvenate Old Brains”  
\$125,000 (principal investigator)
- 2015-2018 Department of Defense  
“Exogenic Human Heart in Gene-Edited Animals”  
\$2,340,480 (co-investigator)
- 2015-2018 National Institutes of Health  
“Minnesota Craniofacial Research Training Program”  
T90 DE022732  
\$180,000 (postdoctoral fellow mentor)
- 2014-2016 National Institutes of Health  
“Image-Guided Transcranial Focused Ultrasound Therapy for Neurological  
Disorders”  
R21-NS087887  
\$392,169 (co-principal investigator)
- 2014-2016 Stem Cell Institute, Adjacent Possible Res. Grant Program, Univ. of Minnesota  
“Creating Human Dopamine Neurons in Human-Pig Chimeras for Parkinson  
Disease”  
\$50,000 (principal investigator)
- 2014-2016 MnDRIVE Program, University of Minnesota  
“DNA Nanotechnology – Developing and Analyzing a New Tool for Sensing  
and Targeting Disease”  
\$500,000 (co-investigator)
- 2014-2015 Center for AIDS Research, University of Minnesota  
“Creating Humanized Mice from the Inside-Out to Test the Feasibility of using  
the CCR5-delta32 Mutation to Treat HIV Infection”  
\$12,000 (co-principal investigator)
- 2014-2015 Institute of Engineering in Medicine, University of Minnesota  
“Organ, Tissue, and Cell Engineering”  
\$20,000 (principal investigator)

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| 2014-2015 | ReGenex<br>“AAV Mediated Gene Transfer to the CNS for MPS II”<br>\$367,416 (co-investigator)  |
| 2014-2015 | Sangamo<br>Targeted IDUA and IDS expression for MPS I and MPS II<br>\$277,270 (co-investigator)   |
| 2013-2014 | Office of the VP for Research, University of Minnesota<br>Research Infrastructure Investment Program, “Single-Cell Genomics”<br>\$228,763 (co-principal investigator)                 |
| 2013-2014 | Institute of Engineering in Medicine, University of Minnesota<br>“Nanotechnology Development and Applications for Clinical Neuroscience”<br>\$75,000 (co-principal investigator)      |
| 2012-2014 | National Institutes of Health<br>“AAV-mediated Gene Transfer to the CNS for MPS I”<br>R41 DK094539, \$211,009<br>(Co-Investigator)  |
| 2012-2013 | Masonic Cancer Center, University of Minnesota<br>“Validation of Novel Prognostic Biomarkers for Serous Ovarian Cancer”<br>\$25,000 (co-investigator)                                 |
| 2011-2012 | AOSpine, “Transplantation of Human Induced Pluripotent Stem Cells for Spinal<br>Cord Injury in the Adult Rat”, \$30,000 (co-investigator)   |
| 2011-2012 | International Organization of Glutaric Aciduria<br>“Cord Blood Stem Cells for the Treatment of<br>Glutaric Aciduria”, \$10,000 (principal investigator)                               |
| 2011-2016 | National Institutes of Health<br>“Gene Therapy for Metabolic Disorders”<br>PO1 HD32652,<br>\$7.2 million<br>(Director, Core B; co-investigator, Project II)                           |
| 2011-2012 | National Institutes of Health<br>“SampleJet Dual Mode Automated Sample Changer with a Liquid Handler 215<br>and Temperature Control”,<br>S10 RR031545, \$138,850<br>(co-investigator) |
| 2010-2014 | National Institutes of Health<br>“Fate of Neural Stem Cells During Viral Encephalitis”,<br>R01 NS065817<br>\$1,510,000 (co-investigator)  |
| 2010-2012 | National Institutes of Health   |

- “Lenti Gene Therapy for Mucopolysaccharidosis”  
R41 DK085944, \$364,704 (co-investigator)
- 2010-2013 Cancer Experimental Therapeutics Initiative (CETI), University of Minnesota TASC #90033, “Dendritic Cell Vaccine for Treating Brain Tumors – Phase I Clinical Trial”, \$293,282 (FDA IND sponsor, and co-principal investigator)
- 2009-2011 Innovation Grant, University of Minnesota “Biomarker Analysis System”  
\$158,700 (principal investigator)
- 2009-2010 Fesler-Lampert Award, “Aging of Inducible Pluripotent Stem Cells”  
\$40,000 (principal investigator)
- 2008-2013 National Institutes of Health  
“Functional Proteomics of Aging”  
T32 AG02976, \$875,000 (steering committee member)
- 2008-2010 National Institutes of Health  
“Transgenic Mice for the Visualization of Dopamine Neurons in vivo”  
R03-NS060059, \$150,000 (principal investigator)
- 2008-2010 National Institutes of Health  
“Transplantation of Umbilical Cord Blood Stem Cells in Ischemic Brain Injury”  
R41-NS056626, \$96,315 (principal investigator)
- 2008-2010 National Institutes of Health,  
“Assessment of Brain Iron and Neuronal Integrity using Novel T1r and T2r MRI”  
R21-NS05913, \$344,579 (co-investigator)
- 2008-2010 Academic Health Center, University of Minnesota, Translational Research Grant,  
“Immunotherapy for Brain Tumor Stem Cells”  
TRG #08-02, \$167,500 (principal investigator)
- 2008-2010 Gateway Foundation, “Immunotherapeutic Targeting of Brain Tumor Stem Cells  
– A Phase I/IIB Clinical Trial”  
\$300,000 (Co-Principal Investigator)
- 2008-2009 HRK Foundation, “Inducible Pluripotent Stem Cells for Neurofibromatosis”  
\$80,000 (co-investigator)
- 2007-2008 Institute for Engineering in Medicine, Center for Medical Devices, University of Minnesota,  
“Microfluidics for Brain Tumor Stem Cells”, \$50,000 (principal investigator)
- 2007-2009 Childrens’ Cancer Research Fund, “Dendritic Cell Vaccine for Treating Brain Tumors – A Phase I Clinical Trial”, \$150,000 (co-principal investigator)
- 2007-2009 Academic Health Center, University of Minnesota, “Neural Stem Cell Response to Viral Encephalitis”, \$200,000 (co-investigator)
- 2007-2008 Minnesota Medical Foundation, University of Minnesota, “Correction of Hurler

- Syndrome with Multipotent Stem Cells”, \$25,000 (co-investigator)
- 2007-2008 Institute for Engineering in Medicine, University of Minnesota,  
“Neural Tissue Engineering Interest Group”, \$5,000 (principal investigator)
- 2007-2012 National Institutes of Health  
“Minnesota Craniofacial Research Training Program”  
T32 DE007288, \$5,605,000 (preceptor)
- 2007-2010 National Institutes of Health  
“Stroke and Stem Cells”  
K12 BIRCWH, (sponsoring mentor) – Award declined,
- 2007-2009 National Institutes of Health  
“Concurrent Immune Stimulation and Inhibition of Angiogenesis for Glioma  
Therapy”,  
1R21 NS055738-01, \$150,000 (co-investigator)
- 2006-2012 National Institutes of Health  
“Translational Research in Neurobiology of Disease”  
T32 DA022616, \$1.4 million (Director and principal investigator)
- 2006-2011 National Institutes of Health  
“Skeletal Muscle Plasticity Post Stroke”  
K08 HD049459, \$541,188 (sponsoring mentor)
- 2006-2007 National Institutes of Health, “American Society for Neural Transplantation and  
Repair Conference”, R13-NS055615, \$20,000 (co-principal investigator)
- 2006-2008 Biomedical Engineering Institute, University of Minnesota, “Neural Tissue  
Engineering and Devices Interest Group”, \$44,000 (principal investigator)
- 2006-2007 Graduate School Grant-in-Aid, University of Minnesota, “Development of Cord  
Blood Stem Cells for the Treatment of Ischemic Heart Injury”; \$24,000  
(principal investigator)
- 2006-2007 Chemical Biology Initiative, University of Minnesota, “Supercomputing  
Workstation for High Throughput Analyses of Chemical Libraries”, \$10,000 (co-  
investigator)
- 2005-2006 Bob Allison Ataxia Research Center, University of Minnesota, “Differentiation  
of Neural Stem Cells into Cerebellar Cells in Experimental Ataxia”, \$74,560  
(principal investigator)
- 2005-2006 Biomedical Engineering Institute, University of Minnesota, “Neural Tissue  
Engineering and Devices”, \$50,570 (principal investigator)
- 2005-2006 Academic Health Center, Faculty Seed Grant, University of Minnesota,  
“Differentiation of Bone Marrow Derived Stem Cells into Auditory Progenitor  
Cells”; \$25,000 (co-investigator)

- 2005-2007 National Institutes of Health  
“Hemorrhagic Brain Injury Repair with Human Cord Blood”  
R43-NS050889, \$158,569 (principal investigator)
- 2004-2007 National Institutes of Health  
“Correction of Hurlers Syndrome by Multipotent Stem Cells”  
RO1-NS48606, \$1,257,700 (co-investigator)
- 2004-2005 National Institutes of Health  
Brainstorm Award, “Sleeping Beauty Transposons for Cancer Gene Therapy”,  
5P30CA077598, \$50,000, (co- principal investigator)
- 2004-2009 National Institutes of Health  
“Gene Therapy for Metabolic Disorders”  
PO1-HD-32652-09, \$5.5 million (co-investigator, Project II; director, Core G)
- 2004-2005 Michael Charles Winery Foundation, “Stem Cells and Glutaric Aciduria”,  
\$10,000, (principal investigator)
- 2003-2008 National Institute of Health  
“Predoctoral Training of Neuroscientists”  
T32-GM08471, (preceptor)
- 2002-2005 National Institutes of Health  
“Umbilical Cord Stem Cells Supplement ”  
R01-NS40831-02S2, \$50,000 (principal investigator).
- 2002-2005 National Institutes of Health  
“Human Embryonic Stem Cells Supplement ”  
R01-NS40831-02S1, \$50,000 (principal investigator).
- 2002-2005 National Institutes of Health  
“Minority Supplement for Stem Cells and Ischemic Brain Injury”  
R01-NS40831-02S1, \$120,130 (principal investigator)
- 2002-2007 National Institute of Health  
“Minnesota Craniofacial Research Training Program”  
T32-DE007288 (preceptor)
- 2002-2005 National Institutes of Health,  
“In vivo Delivery of Nucleic Acids by Anionic Liposomes”  
R21-NS-43191, \$290,000 (co-investigator)
- 2002-2003 Bobby Allison Ataxia Research Center, “Transplantation of Adult Stem Cells in  
Experimental Ataxia”, \$64,275 (principal investigator)
- 2001-2004 American Heart Association, National Chapter  
“Repair Ischemic Brain Injury with Bone Marrow Derived Stem Cells”  
\$214,500; (principal investigator).
- 2001-2005 National Institutes of Health

- “Neuroectoderm Differentiation from Mesenchymal Stem Cells”  
R01-HL-69137, \$1,160,000 (co-principal investigator)
- 2001-2005 National Institutes of Health  
“Neural Transplantation of Mesenchymal Stem Cells for Cellular Repair and Gene Therapy”  
F31-NS43121, \$140,000; (fellowship sponsor).
- 2001-2006 National Institutes of Health  
“Stem Cells and Ischemic Brain Injury”  
R01- NS40831, \$975,000; (principal investigator)
- 2001-2003 National Institutes of Health  
“Correction of Neural Abnormalities in Hurler Syndrome by Multipotent Bone Marrow Derived Stem Cells”  
\$126,000 (consultant)
- 2001-2003 Academic Health Center, University of Minnesota, “Stem Cells and the Nervous System”; FRD-01-10; \$198,015; (principal investigator)
- 2001-2002 Parkinson’s Disease Foundation, "Conversion of Human Adult Bone Marrow Stem Cells into Dopamine Neurons"; \$34,700; (principal investigator)
- 2001-2002 University of Minnesota, Biomedical Genomics Center Grant, “Gene Expression in Nerve Growth and Repair”, \$9,750, (principal investigator).
- 2000-2001 Medtronic, “Test of the Feasibility of Delivering DNA/RNA Chimeraplasts to the Central Nervous System: Potential New Indications for the Medtronic Neurological Drug Delivery Business”; \$29,780 (co-investigator).
- 2000-2001 Minnesota Medical Foundation, “Cryostat for Histological Analyses of Transplanted Stem Cells”; \$13,000; (principal investigator)
- 2000-2001 Academic Health Center, Faculty Seed Grant, “Converting Bone Marrow Stem Cells into Cholinergic Neurons”; \$25,000; (principal investigator)
- 2000-2004 National Institutes of Health  
"Gene Therapy for Metabolic Disorders";  
P01-HD-32652-05, \$4,412,238; (co-investigator)
- 2000-2002 American Heart Association  
“Repair of Hemorrhagic Brain Injury with Bone Marrow-Derived Stem Cells”  
\$97,320; (principal investigator).
- 1999-2002 National Institutes of Health  
"The Cholinergic System in Transgenic Alzheimer Mice"  
\$37,500, (fellowship sponsor)
- 1999-2000 National Institutes of Health  
Brainstorm Award, "Tracking of Brain Tumor Antigen-Specific CD4+ T Cells Following the Administration of Cancer Vaccines"

- 5P30CA077598, \$25,000 (principal investigator).
- 1999-2001 Minnesota Medical Foundation, "Laser Doppler System for Measurement of Cerebral Blood Flow in Ischemic Brain Injury", \$13,000 (co-investigator).
- 1999-2000 Academic Health Center, University of Minnesota  
"Porcine Cytomegalovirus: A Risk for Xenotransplantation";  
\$169,022 (co-investigator)
- 1998-2001 Academic Health Center, University of Minnesota,  
Funding for a Center for Molecular and Cell Therapy;  
\$1.5 million (co-investigator)
- 1998-2000 Cancer Center, University of Minnesota, Advanced Therapies Initiative,  
"Designing Peptides that Inhibit Tumor Growth in the Brain",  
\$260,000 (co-principal investigator).
- 1998-2000 Graduate School, University of Minnesota, Interdisciplinary Programs,  
"Establishment of a Center for Molecular and Cell Therapy";  
\$100,000 (co-investigator)
- 1998-2000 University of Minnesota, Academic Health Center Strategic Initiative Program,  
"Parkinson's Disease and Movement Disorders"; \$40,000 (principal investigator).
- 1998-1999 Medtronic, Inc., "DBS Systems for Subthalamic Thalamic Stimulation for the  
Treatment of Parkinson's Disease"; \$100,000 (principal investigator).
- 1998-1999 Minnesota Medical Foundation, "Development of Dendritic Cell-Based Vaccines  
for the  
Treatment of Brain Tumors"; \$8,000; (principal investigator)
- 1998-2001 National Institutes of Health, NIMH  
"Transplantation of Human Striatal Progenitor Cells in Experimental  
Huntington's Disease"  
F30-MH12157; \$37,500; (fellowship sponsor)
- 1997-2000 National Institutes of Health, NIMH  
"Cerebellar Transplants into SCA1 Transgenic Mice"  
F31-MH-11640; \$39,024; (fellowship sponsor).
- 1996-1998 Immunex, Inc., "Localized Peripheral GM-CSF Infusions for  
the Treatment of Primary Brain Tumors", \$25,000; (principal investigator).
- 1996-1997 Graduate School, University of Minnesota, "Development of GM-CSF Based  
Vaccines for the Treatment of Brain Tumors", \$21,359; (principal investigator).
- 1996-1997 Medtronic, Inc., "Pallidal Stimulation for Parkinson's Disease Using the  
Medtronic Model 3382 DBS™ Lead"; \$110,000 (principal investigator).
- 1996-1997 SenMed Ventures, "Effect of Synthetic Peptide Administration on Experimental  
Animal Models of Stroke"; \$22,772 (principal investigator)

- 1996-1997 Bob Allison Ataxia Research Center, "Development of an Antisense Oligonucleotide Based Gene Therapy for Treating Ataxia", \$10,000; (principal investigator).
- 1996-1997 Northstar Research Innovation Fund, "Effects of *c-myb* Antisense Oligonucleotides on the Inhibition of C-MYB Protein Synthesis and Glioblastoma Cell Proliferation"; \$9,990; (principal investigator).
- 1996-1997 Medtronic, Inc., Educational Grant "Symposium on Deep Brain Stimulation for Treating Parkinson's Disease", \$20,000; (principal organizer).
- 1996-1997 American Heart Association  
"Neuronal Protection from Cerebral Ischemia by Synthetic Fibronectin Peptides to Leukocyte Adhesion Molecules",  
\$22,456; (principal investigator).
- 1995-1996 Minnesota Medical Foundation, "Development of Cancer Vaccines using IGF-1R Antisense for Treating Brain Tumors"; \$5,000; (principal investigator)
- 1995-1996 University of Minnesota Grant-in Aid of Research, "Development of Antisense-based Brain Tumor Therapy"; \$13,992; (co-principal investigator)
- 1994-1999 National Institutes of Health  
"Transplantation of Cholinergic Nerve Cells"  
R01-NS-24464; \$595,906; (principal investigator).
- 1994-1996 National Institutes of Health, NINDS  
"MR Spectroscopy Characterization of Focal Cerebral Ischemia";  
K08-NS-01745; \$383,711; (CIDA mentor)
- 1994-1995 American Cancer Society  
"Inhibition of Malignant Tumor Cell Proliferation with Antisense Oligonucleotides to *c-myb* Oncogene";  
\$10,000; (co-principal investigator).
- 1994-1995 Neuropsychiatric Research Institute, Fargo, ND, "Effects of Transplanted Human Fetal Striatal Tissue on Dopamine Receptors in a Huntington Disease Animal Model"; \$5,155; (co-investigator)
- 1994-1995 Bob Allison Ataxia Research Center Grant, "Repair and Reconstruction of Nerve Cell Connections in Experimental Cerebellar Ataxia"; \$14,423; (principal investigator)
- 1994-1995 University of Minnesota Medical School, Dept. of Radiology, "Radiotracer-Assisted Noninvasive Monitoring of Neural Tissue Graft Viability in Parkinson's Disease"; \$5,958; (co-principal investigator)
- 1993-1994 American Parkinson's Disease Association  
"Effects of Growth Factors on the Proliferation of Dopamine Precursor Cells in Fetal Rats"



- \$24,575; (principal investigator)
- 1993-1996 National Institutes of Mental Health, "Neonatal Hypoxic-Ischemia Brain Injury"; \$32,250; (fellowship sponsor)
- 1993-1998 National Institute of Health, "Predoctoral Training of Neuroscientists", T32-GM-08471; \$838,582 (preceptor).
- 1993-1998 National Institute of Health "Medical Scientist Training Program", T32-GM-08244; \$1,304,940 (preceptor)
- 1993 China Center, University of Minnesota, Travel Grant; \$600; (principal investigator)
- 1992-1997 National Institutes of Health "Research Training for Clinical Neuroscientists" T32-NS-07361; \$644,655; (preceptor).
- 1992-1994 National Institutes of Health "The Minnesota Fetal Tissue Bank"; R24-HD30511; \$1,107,632; (principal investigator)
- 1992-1994 United Cerebral Palsy Association "Reconstructive Neurosurgery in Experimental Cerebral Palsy" R-425-92; \$97,452; (principal investigator)
- 1992-1993 American Heart Association, "Cerebral Ischemia: Kinetics of Excitotoxic Neurotransmitter Release" \$24,000; (fellowship sponsor)
- 1992-1993 American Heart Association, Medical Student Research Fellowship "Functional Restoration of the Neostriatum with Neural Grafts in Conditions of Ischemic Injury" \$12,000; (fellowship sponsor)
- 1992-1993 University of Minnesota Graduate School, "Functional Incorporation of Transplanted Cholinergic Neurons"; \$15,000; (principal investigator)
- 1991-1993 National Institutes of Health "Evaluation of Hyperbaric Oxygen in Head Injury" P20-NS-30322; \$750,000 (co-investigator)
- 1991-1992 University of Minnesota Graduate School, "Effects of Sm-C/IGF-I on Cholinergic Nerve Cell Function in Aged Rats"; \$15,000; (principal investigator)
- 1990-1992 Research Investment Fund, Indiana University, "New Computational Approaches to Neural Information Processing"; \$228,965; (co-investigator)
- 1990-1995 American Heart Association

- Established Investigator Award  
Cerebral Ischemia and Mechanisms of CNS Repair"  
AHA 90-230; \$175,000; (principal investigator)
- 1990-1995 National Institutes of Health  
"Dopamine Neuron Grafts in Genetic Extrapyramidal Disease"  
\$512,610; (consultant)
- 1990-1993 American Heart Association  
"Cerebral Ischemia and Mechanisms of Functional Recovery"  
AHA 90-1135; \$105,119; (principal investigator)
- 1990-1991 Minnesota Medical Foundation, "Innervation of Transplanted Hippocampal  
Neurons by Host Serotonergic Fibers in a Rodent Model of Cerebral Ischemia";  
\$10,000; (principal investigator)
- 1990-1991 Biomedical Research Support Grant, NIH, "Dopamine Neuron Grafting in a  
Genetic Model of Extrapyramidal Disorder", \$20,000; (consultant)
- 1989-1991 American Heart Association  
"Repair of Damaged Neural Circuitry: Innervation of Transplanted Cholinergic  
Neurons by the Host Brain"  
\$20,000; (fellowship sponsor)
- 1989-1990 American Heart Association  
"Reconstruction of Neuronal Connections in the Ischemic Brain"  
\$10,000; (fellowship sponsor)
- 1988-1989 Alzheimer's Disease and Related Disorders Association  
"Trophic effects of insulin-like growth factor II (IGF-II) on cholinergic neurons  
of the central nervous system"  
\$20,000; (principal investigator)
- 1988-1991 National Institutes of Health  
"Significance of TRH in Epilepsy";  
R01-NS-25661; \$281,867; (co-investigator)
- 1988-1989 American Heart Association  
"Reconstruction of Neuronal Connections in Ischemic Brain"  
\$8000; (fellowship sponsor)
- 1988 National Institutes of Health  
"Molecular Biology, the Aging Process, and Neurodegenerative Disorders  
Conference"  
R13-AG-7993; \$9,800; (co-investigator)
- 1988-1989 Diabetes Research and Training Center, Indiana University School of Medicine,  
"Effects of insulin and IGF-II on the CNS"; \$23,071; (principal investigator)
- 1987-1992 National Institutes of Health  
"Transplantation of Cholinergic Nerve Cells"

- R01-NS-24464; \$234,313; (principal investigator)
- 1987-1992 National Institutes of Health  
"Selective Neuronal Loss and Its Sequelae: A Model"  
R01-NS-14426; \$780,269; (co-investigator)
- 1987-1990 American Heart Association  
"Cerebral Ischemia and Factors Affecting Functional Recovery"  
87-051; \$90,000; (principal investigator)
- 1987-1990 Veterans Administration  
"Role of Thyrotropin-releasing Hormone (TRH) in Antidepressant Treatment"  
\$257,600; (consultant)
- 1987-1988 American Heart Association  
"Reinnervation of Ischemic Striatum by Cultured Fetal Neurons"  
\$6,500; (pre-doctoral fellowship sponsor)
- 1986-1987 American Heart Association  
"Cerebral Ischemia, Neural Transplants, and Recovery of Function"  
\$13,978; (principal investigator)
- 1986-1987 Huntington's Disease Foundation  
"Effects of Nerve Growth Factor on the Function of Transplanted Striatal Neurons in Rats with Kainic Acid Lesions of the Striatum"  
\$15,000 - award declined; (postdoctoral fellowship sponsor)
- 1986-1988 Eli Lilly & Co. Grant, "Effects of IGF-II on Neural Implant Survival and Innervation"; \$10,124; (principal investigator)
- 1985-1987 National Institutes of Health  
"Transplants of Cholinergic Neurons Derived from Adult Rat Brain"  
\$13,427; (principal investigator)
- 1985-1990 National Institutes of Health  
"Vascular Biology in Health and Disease";  
HL-7595; \$371,335; (preceptor)
- 1985-1986 Eli Lilly & Co. Grant, "Effects of Nerve Growth Factor the Survival of Transplanted Cerebellar Nerve Cells in Mutant Mice with Neurodegenerative Disorders"; \$8,563; (co-principal investigator)
- 1984 International Programs Travel Grant, Indiana University, Symposium on Neural Transplantation, Lund, Sweden; \$300; (principal investigator)
- 1984-1985 National Institutes of Health  
"Neural Transplantation and Neuro-Trophic Factors"  
RR-5371; \$13,792; (principal investigator)
- 1983-1986 National Institute of Health  
"Neurobiological Aspects of Mental Disorder"

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|           | MH-17107; \$188,707; (preceptor)  |
| 1981-1983 | National Institutes of Health<br>Individual National Research Service Award<br>"Catecholamines in the Development of Hypertension"<br>HL-6339; \$33,044; (principal investigator)   |
| 1981      | American Heart Association<br>"Catecholamines in Genetic Neurogenic Hypertension"<br>\$15,500 – award declined; (principal investigator)  |
| 1980-1981 | American Heart Association<br>AGAN Fellowship,<br>"The Locus Coeruleus in Genetic Neurogenic Hypertension"<br>\$15,500; (principal investigator)                                    |
| 1979-1980 | National Science Foundation<br>"Electron Probe Analysis of Nervous Tissue"<br>\$12,500; (principal investigator)  |
| 1979-1981 | National Institutes of Health<br>Individual National Research Service Award<br>"Analytical Electron Microscopy of Neural Tissue"<br>F32-NS-6121; \$10,000; (principal investigator) |
| 1978-1979 | Institutional Faculty Grant, University of Michigan; \$5,000; (co-investigator)   |
| 1976-1978 | Rackham Dissertation Grant, University of Michigan; \$3,000; (principal investigator)   |
| 1975-1978 | National Institute of Health<br>NIGMS, Predoctoral Fellowship<br>\$16,500; (predoctoral fellow)   |

### Peer-Reviewed Publications

*The following publications have received over 15,965 citations in the scientific literature. Seventeen articles have received over 100 citations. The h-index for the scientific impact of these publications is ranked among the top 5% of faculty in academic neurosurgery departments in the United States.*

1. Walsh P, Troung V, Saldia Montivero M, Nayak S, Low WC, Parr AM, Dutton J, Accelerated differentiation of human pluripotent stem cells into neural lineages via an early intermediate ectoderm population, *Stem Cells* (in press, 2020).
2. Lehto LJ, Canna A, Wu L, Sierra A, Pearce C, Shiao M, Johnson MD, Low WC, Grohn O, Tanila H, Mangia S, and Michaeli S, Orientation selective deep brain stimulation of the subthalamic nucleus in rats, *Neuroimaging*, (in press, 2020).

3. Chrostek MR, Fellows EG, Crane AT, Grande AW, and Low WC, Efficacy of Stem Cell-Based Therapies for Stroke, *Brain Research*. doi: 10.1016/j.brainres.2019.146362. (2020).
4. Sathe AG, Tuite P, Chen C, Ma YW, Chen W, Cloyd J, Low WC, Steer CJ, Lee BY, Zhu XH, and Coles LD, Pharmacokinetics, safety and tolerability of orally administered ursodeoxycholic acid in patients with Parkinson's disease – A pilot study, *Journal of Clinical Pharmacology*, (in press, 2020).
5. Crane AT, Aravalli RN, Asakura A, Grande AW, Krishnan VD, Carlson DF, Cheeran MCJ, Danczyk G, Durrón JR, Hackett PB, Hu WS, Li L, Lu WC, Miller ZD, O'Brien T, Panoskaltis-Mortari A, Parr AM, Pearce C, Ruiz M, Shiao M, Sipe C, Toman NG, Voth J, Xie H, Steer, CJ, and Low WC, Interspecies organogenesis for human transplantation, *Cell Transplantation*. doi: 10.1177/0963689719845351. (2019).
6. Crane AT, Voth JP, Shen FX, and Low WC, Human-animal neurological chimeras: humanized animals or human cells in an animal, *Stem Cells*. doi: 10.1002/stem.2971. (2019)
7. Chrostek MR, Fellows EG, Guo WL, Swanson WJ, Crane AT, Cheeran MC, Low WC, and Grande, AW, Efficacy of cell-based therapies for traumatic brain injuries, *Brain Sciences* (in press, 2019).
8. Shiao ML, Yuan C, Crane AT, Voth JP, Juliano M, Hocum-Stone LL, Nan Z, Zhang Y, Kuzman-Nichols N, Sanberg PR, Grande AW, and Low WC, Immunomodulation with human umbilical cord blood stem cells ameliorates ischemic brain injury – A brain transcriptome profiling analysis, *Cell Transplantation*. doi: 10.1177/0963689719836763. (2019).
9. Toman, N, Grande AW, and Low WC, Neural repair in stroke, *Cell Transplantation* doi: 10.1177/0963689719863784. (2019).
10. Lehto LJ, Filip P, Laakso H, Sierra A, Slopsema J, Johnson MD, Eberly LE, Utecht L, Low WC, Grohn O, Tanila H, Mangia S, and Michaeli S, Tuning neuromodulation effects by orientation selective deep brain stimulation in the rat medial frontal cortex. *Frontiers in Neuroscience*, doi: 10.3389/fnins.00899. (2019).
11. Do TH, Miller C, Low WC, Haines SJ, The Radicchi Index (hf) for Comparing Academic Productivity of Medical Specialties, *Neurosurgery*, doi: 10.1093/neuros/nyz207.(in press, 2019).
12. Steevens AR, Glatzer JC, Kellogg CC, Low WC, Santi P, and Kiernam AE, SOX2 is required for inner ear growth and nonsensory formation prior to sensory development, *Development*. doi: 10.1242/dev.170522. (2019).
13. Arantes S, Low WC, Juhn S, Pauna HF, Auditory dysfunction in aging: Prospect for stem cell therapy, *Advances in Bioscience and Technology*, (in press, 2019).
14. Pearce CM, Chrostek MR, Fellows EG, Toman NG, Tran S, Crane AT, and Low WC, Immunotherapy and checkpoint inhibitors for gliomas, *Neuroimmunology and Neuroinflammation*, 5:47, doi 1.20517/2347-8659.2018.46 (2018)

15. Snow L, Low WC, and Thompson L, Distinct patterns of fiber type adaptation in rat hindlimb muscles 4 weeks after hemorrhagic stroke, *American Journal of Physical Medicine and Rehabilitation*, doi: 10.1097/PHM.0000000000001062. [Epub ahead of print] (2018).
16. Rockswold SB, Burton PC, Chang OD, McNally N, Grant A, Rockswold GL, Low WC, Eberly L, Yacoub E, and Linglet C, Functional Magnetic Resonance Imaging and Oculomotor Dysfunction in Mild Traumatic Brain Injury, *J Neurotrauma*, doi: 10.1089/neu.2018.5796. (2018)
17. Walsh P, Trung V, Hill C, Stoflet ND, Baden J, Low WC, Keirstead SA, Dutton JR, and Parr AM, Defined culture conditions accelerate small-molecule-assisted neural induction for the production of neural progenitors from human-induced pluripotent stem cells, *Cell Transplantation*, 26:1890-1902 (2017).
18. Laoharawee K, Podetz-Pedersen K, Nguyen T, Fairbanks C, Low WC, Kozarsky K, and McIvor RS, Prevention of neurocognitive deficiency in mucopolysaccharidosis type II mice by CNS-directed AAV9-mediated sulfatase gene transfer, *Human Gene Therapy*, 28(7):626-638 (2017)
19. Belur LR, Temme A, Podetz-Pedersen KM, Riedl M, Vulchanova L, Robinson N, Hanson LR, Kozarsky K, Frey WH, Low WC, and McIvor RS, Intranasal AAV mediated gene delivery and expression of human iduronidase in the CNS: A non-invasive and effective approach for prevention of neurologic disease in mucopolysaccharidosis type I. *Human Gene Therapy*, 28(7):576-587 (2017)
20. Gardeck AM, Sheehan J, and Low WC, Immune and viral therapies for brain cancer. *Expert Opinion on Biological Therapies* 17(4):457-474 (2017)
21. Lehto LJ, Slopsema JP, Johnson MD, Shatillo A, Teplitzky B, Utecht L, Adriany G, Mangia S, Sierra A, Low WC, Grohn O, and Machaeli S, Orientation selective deep brain stimulation, *Journal of Neural Engineering*, 14(1):016016 ePub ahead of print (2017)
22. Parry GJ, Rodrigues CMP, Low WC, Hilbert SJ, and Steer CJ, ursodeoxycholic acid may slow progression of amyotrophic later sclerosis. *Annals of Neurodegenerative Disorders* ePub ahead of print (2016).
23. Stone LLH, Xiao F, Rotshafer J, Juliano M, Sanberg CD, Sanberg PR, Kuzmin-Nichol N, Grande A, Cheeran MC, and Low WC. Amelioration of ischemic brain injury in rats with human umbilical cord blood stem cells: Mechanisms of action, *Cell Transplantation*, 25:1473-1488 (2016).
24. Terzic D, Maxon JR, Krevitt L, DiBartolomeo, Goyal T, Dutton JR, Low WC, and Parr AM, Directed differentiation of oligodendrocyte progenitor cells from mouse induced pluripotent stem cells, *Cell Transplantation*, 25:411-424 (2016).
25. Satzer, D, Miller, C, Maxon J, Dibartolomeo C, Dutton JR, Low WC, and Parr AM, T cell deficiency in spinal cord injury – altered locomotor recovery and whole-genome transcriptional analysis, *BMC Neuroscience* 16:74 doi: 10.1186/s12868-015-0212-0 (2015).

26. Divani AA, Murphy AJ, Meints J, Sadeghi-Bzargani H, Nordberg J, Monga M, Low WC, Bhatia PM, Beilman GJ, and SantaCruz KS, A novel preclinical model of moderate primary blast-induced traumatic brain injury, *Journal of Neurotrauma*, 32:1109-1116 (2015).
27. Satzer D, DiBartolomeo C, Ritchie MM, Storino C, Idiyatullin D, Mangia S, Michaeli S, Parr AM, and Low WC, Assessment of dysmyelination with RAFF MRI – application to murine MPS I, *PLoS ONE* 10:e0116788 (2015).
28. Wolf DA, Banerjee S, Hackett PB, Whitley CB, McIvor RS, and Low WC, Gene therapy for nervous system manifestations of mucopolysaccharidoses, *Expert Opinion on Drug Delivery*, 12:283-296 (2014).
29. Neuss ND, Peirson MJ, Montaniel KRC, McPherson SW, Lehmann U, Hussong SA, Ferrington DA, Low WC, and Gregerson DA, Retinal dendritic cell recruitment is inhibited in MyD88 and TRIF deficient mice, *Journal of Neuroinflammation*, ePub ahead of print, doi:10.1186/s12974-014-0143-1 (2014).
30. Vang S, Longley K, Steer CJ, and Low WC, The unexpected uses of urso- and tauroursodeoxycholic acid in the treatment of non-liver diseases, *Global Advances in Health and Medicine*, 3:62-73 (2014).
31. Olin M, Low WC, McKenna DH, Haines SJ, Tambra D, Nacene D, Gustafson MP, Dietz AB, Clark HB, Chen W, Blazar B, Ohlfest JR, and Moertel C, Vaccination with dendritic cells loaded with allogeneic brain tumor stem cells for recurrent and progressive malignant brain tumors induces a CD4+IL17+ response, *Journal for Immunotherapy of Cancer*, ePub ahead of print doi: 10.1186/2051-1426-2-4 (2014).
32. Janson C, Romanova L, Leone P, Nan ZH, Belur L, McIvor RS, and Low W, Comparison of endovascular and intraventricular gene therapy with AAV5-IDUA for Hurler’s disease. *Neurosurgery* ePub ahead of print doi: 10.1227NEU.000000157 (2014).
33. Chen Y, Ye L, Zhong J, Yan C, Chandler MP, Calvin S, Xiao F, Negia M, Low WC, Zhang J, and Yu X., The structural basis of functional improvement in response to human umbilical cord blood stem cell transplantation in hearts with post-infarct LV remodeling. *Cell Transplantation* ePub ahead of print (2013).
34. Rotschafer JH, Hu S, Little M, Erickson M, Low WC, and Cheeran MCJ, Modulation of neural stem/progenitor cell proliferation during experimental Herpes Simplex encephalitis is mediated by differential FGF-2 expression in the adult brain, *Neurobiology of Disease* 58:144-155 (2013).
35. Stone, LL, Grande A, and Low WC, Neural repair and neuroprotection with stem cells in ischemic stroke. *Basic Sciences* 3:599-614 (2013).
36. Lo Nigro A, Geraerts M, Notelaers T, Roobrouck VD, Muijtjens M, Eggermont K, Subramanian K, Ulloa-Montoya F, Park Y, Owens J, Burns TC, Low W, Sharma S, Sohni A, Crabbe A, Pauwelyn K, Roelandt P, Agirre X, Prosper F, O'Brien TD, Zwijsen A, Hu WS, Binias B, Verfaillie CM. MAPC culture conditions support the derivation of cells with nascent hypoblast features from bone marrow and blastocysts. *J Mol Cell Biol.* 4(6):423-6 (2012).

37. Wolf DA, Leander AW, Nan ZH, Braunlin E, Podetz-Pdersen KM, Whitley CB, Gupta P, Low WC, and McIvor RS, Increased longevity and metabolic correction following syngeneic bone marrow transplantation in a murine model of mucopolysaccharidosis Type I, *Bone Marrow Transplantation* 47:1235-1240 (2012).
38. Misra V, Ritchie MM, Stone LL, Low WC, and Janardhan V, Stem cell therapy in ischemic stroke: Role of intravenous and intra-arterial therapy, *Neurology* 79:S207-S212 (2012).
39. Snow LM, Low WC, and Thompson LV., Skeletal muscle plasticity after hemorrhagic stroke: influence of spontaneous physical activity, *American Journal of Physical Medicine and Rehabilitation* 91:965-976 (2012).
40. Wolf DA, Hanson LR, Nan ZH, Low WC, Frey WH II, and McIvor RS, Lysosomal enzyme an bypass the blood-brain barrier and reach the CNS following intranasal administration, *Molecular Genetics and Metabolism* 106:131-134 (2012).
41. Nikas JB, Low WC, and Burgio PA, Prognosis of treatment response (pathological complete response) in breast cancer. *Biomarker Insights*. 7:59-70 (2012).
42. Chun HS and Low WC, Ursodeoxycholic acid suppresses mitochondria-dependent programmed cell death induced by sodium nitroprusside in SH-SY5Y cells, *Toxicology* 292:105-112 (2012).
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44. Nikas JB and Low WC, Linear discriminant functions in connection with the microRNA diagnosis of colon cancer, *Cancer Informatics* 11:1-14 (2012).
45. Nikas JB, Boylan KL, Skubitz AP, and Low WC, Mathematical prognostic models for treatment response and survival in epithelial ovarian cancer, *Cancer Informatics* 10:233-247 (2011).
46. Dodd K., Burns TC, Wiesner SM, Kudishevich E, Schomberg DT, Jung BW, Kim JE, Ohlfest JR, Low WC, Transgenic mice expressing luciferase under a 4.5 kb tyrosine hydroxylase promoter, *PeerEMed* (2011).
47. Wolf DA, Lenander A, Nan Z, Belur L, Whitley CB, Gupta P, Low WC, and McIvor RS, Neonatal administration of AAV8 vector directly to the CNS prevents emergence of neurologic disease in a murine model of mucopolysaccharidosis type I, *Neurobiology of Disease* 43:123-133 (2011).
48. Nikas J, and Low WC, Application of clustering analyses to the diagnosis of Huntington disease in mice and other diseases with well-defined group boundaries, *Computer Methods and Programs in Biomedicine*, 104:e133-147 (2011).
49. Nikas J and Low WC, ROC-Supervised Principal Component Analysis in Connection with the Diagnosis of Diseases, *American Journal of Translational Research* 3:180-196 (2011).



50. Azan G, Low WC, Wendelschafer-Crabb G, Ikramuddin S, and Kennedy WR, Evidence for neural progenitor cells in the human adult enteric nervous system, *Cell and Tissue Research* 344:217-225 (2011).
51. Zu T, Gibbens B, Moncada N, Gomes-Pereira M, Huguet A, Stone MD, Margolis J, Peterson M, Markowski TW, Ingram MAC, Nan Z, Forster C, Low WC, Schoser B, Somia NV, Clark HB, Schmechel S, Bitterman BP, Gourdon G, Swanson MS, Moseley M, Ranum LPW, Non-ATG Initiated Translation Directed by Microsatellite Expansions, *Proceedings of the National Academy of Sciences* 108:260-265 (2011).
52. Ramalho RM, Viana RJS, Nunes AF, Low WC, Steer CJ, and Rodrigues CMP, Modulation of apoptosis in experimental Alzheimer's disease: Therapeutic opportunities for an ancient bile acid, In: *Neurochemistry – Molecular Aspects, Cellular Aspects, and Clinical Applications*, Pacos A, Nogueira S (eds.) Nova Science Publishers, Inc. pp. 103-131 (2010).
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54. Nikas, JB, Keene CD, and Low WC, Comparison of analytical mathematical approaches for identifying key nuclear magnetic resonance spectroscopy biomarkers in the diagnosis and assessment of clinical change of diseases, *Journal of Comparative Neurology* 518:4091-4112 (2010).
55. Wu A, Ericson K, Chao W, and Low WC, NFAT and AP1 are essential for the expression of a glioblastoma multiforme related IL-13Ra2 transcript, *Cellular Oncology* 32:313-329 (2010).
56. Armien AG, Hu S, Little MR, Robinson N, Lokensgard JR, Low WC, and Cheeran MCJ, Chronic cortical pathology ensuing experimental herpes encephalitis, *Brain Pathology* 20:738-750 (2010).
57. Parry GJ, Rodrigues, CMP, Aranha MM, Hilbert S, Davey C, Keller P, Low WC, and Steer CJ, Safety, tolerability, and cerebrospinal fluid penetration of ursodeoxycholic acid in patients with ALS, *Clinical Neuropharmacology* 33:17-21 (2010).
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## Presentations

### Invited Oral Presentations at International Professional Symposia and Conferences

1. 2019 East Asia Neurosurgery Summit, “Harnessing the Zika Virus for Brain Tumor Immunotherapy”, Shenyang, China, 2019
2. 13<sup>th</sup> International Conference on Alzheimer’s and Parkinson’s, “Towards the Generation of Nigral Dopamine Neurons in Gene Edited Animals via Stem Cell Complementation for Treating Parkinson’s Disease”, Vienna, Austria, 2017
3. 13<sup>th</sup> International Neural Transplantation and Repair Symposium, “Characterization of Chimeric Human-Porcine Blastocysts and PITX3 Knockout Swine for Generating Authentic Human Cells in the Pig”, Beijing, China, 2015
4. Frontiers in Biomedical Research Symposium, “Stem Cells for Neural Repair”, Karolinska Institute, Stockholm, Sweden, 2010
5. International Meeting of the Society for NeuroImmune Pharmacology, “State of the Art in Neural Stem Cell Biology”, Keynote Speaker, Wuhan, China, 2009
6. International Symposium on Stem Cells and Transplantation, “Pluripotency and Neural Induction of Mesenchymal Stem Cells Derived from Adult Bone Marrow”, Nantes, France, 2003
7. Capital Institute of Medicine, (Formerly Beijing Medical College), Beijing, China, "Neural Transplantation and Pallidotomy for Parkinson's Disease", 1993
8. Third International Symposium on Neural Transplantation, Cambridge, U.K., "Evidence for innervation of grafted cholinergic neurons by GABAergic afferents", 1989
9. Fernstrom International Symposium, Neural Grafting in the Mammalian Central Nervous System, Lund, Sweden, "Cross Species Transplants of Cholinergic Neurons and the Recovery of Function", 1984
10. International Symposium on Brain Tissue Transplantation, European Winter Brain Conference, Les Arc, France, "Cross species Transplantation of Cholinergic Neurons", 1983

### Invited Oral Presentations at National Professional Symposia and Conferences

1. Genome Writers’ Guild-2020, “Generating Human-Animal Chimeras in Gene Edited Animals: Science, Policy, and Public Attitudes”, Rochester, MN, 2020
2. Association for Research in Otolaryngology, “Generating Exogenic Cells for Transplantation in Gene Edited Animals via Blastocyst Complementation”, San Jose, CA, 2020
3. American Society for Neural Therapy and Repair, “Human-Animal Chimeras Generated via Blastocyst Complementation”, Clearwater, FL, 2019

4. Cambridge HealthTech Institute, "Gene Editing for Generating Exogenic Organs and Cells", Boston, MA 2016
5. American Society for Neural Therapy and Repair, Workshop on Techniques for NeuroRepair, "Generating Authentic Neural Cells for Cellular Replacement and Repair", Clearwater, FL 2016
6. National Institutes of Health, Workshop on Animals Containing Human Cells, "Characterization of Human-Porcine Blastocysts and Fetuses", Bethesda, MD, 2015
7. Iowa State University, "Neural Induction of Bone Marrow-Derived Stem Cells", Ames, Iowa, 2003
8. University of South Florida, "Neural Induction of Multipotent Adult Progenitor Cells (MAPCs) from Bone Marrow", Tampa, Florida, 2003
9. University of Louisville, "Characterization and Neural Induction of Bone Marrow Derived Stem Cells", Louisville, Kentucky, 2003
10. Medical College of Georgia, "Neural Induction of Bone Marrow-Derived Adult Stem Cells", Augusta, GA, 2002
11. Central Michigan University, "Neural Transplantation of Marrow-Derived Stem Cells", Mt. Pleasant, Michigan, 2001
12. Ataxia-Telangiectasia Children's Project, Washington, D.C., "Transplantation of Cerebellar Purkinje Cells in Experimental Ataxia", 1998
13. National Institutes of Health Workshop on Neuroprosthetics, Washington, D.C., "Deep Brain Stimulation for the Treatment of Parkinson's Disease", 1997
14. Annual Meeting, American Association of Tissue Banks, Boston, MA, "A Retrospective Study of Human Fetal Tissue from Spontaneous Abortions: Potential Application for Cell Transplantation Therapies", 1993
15. United Cerebral Palsy Teleconference, Washington, DC, "Reconstructive Neurosurgery in Experimental Cerebral Palsy", 1993
16. Department of Physiology, Syracuse University, Syracuse, NY, "Transplantation of Dopaminergic and Cholinergic Neurons and the Restoration of Function", 1988
17. Schmitt Neurological Sciences Symposium on Transplantation into the Mammalian CNS, Rochester, NY, "Functional Reinnervation of Transplanted Dopamine Neurons in Mutant Mice with Inherited Nigrostriatal Dopamine Deficiency", 1987
18. Eli Lilly and Co., Indianapolis, IN, "Effects of Insulin like Growth Factor II (IGF II) on Neurite Extension of Hippocampal Neurons in Tissue Culture", 1987

19. New York Academy of Science Conference on Brain Tissue Transplantation in the Adult Brain, New York, NY, "Cerebellar Transplants into Mutant Mice with Purkinje Cell Degeneration", 1986
20. IBM College and University Executive Conference, Palm Springs, CA, "Microcomputer Simulations in Physiology", 1986
21. Department of Anatomy, University of Illinois, Chicago, Illinois, "Transplants of Cholinergic Nerve Cells", 1983
22. Surgical Neurology Branch, National Institute of Neurological and Communicative Disorders and Stroke, Bethesda, Washington, D.C., "Methods of Neural Transplantation", 1983
23. Department of Physiology, Texas Tech University, Lubbock, Texas, "Transplantation of Cholinergic Nerve Cells and the Recovery of Function", 1983
24. Department of Biology, Rutgers University, Camden, New Jersey, "The Development of Transplanted Nerve Cells and the Recovery of Function", 1983
25. Department of Anatomy, Medical College of Pennsylvania, Philadelphia, Pennsylvania, "Neural Transplantation", 1982
26. Department of Neurosurgery, Tufts University School of Medicine, Boston, Massachusetts, "Methods of Transplanting Cholinergic Neurons and the Recovery of Function", 1982

#### **Invited Oral Presentations at Local and Regional Professional Meetings, Conferences**

1. Institute for Molecular Virology, University of Minnesota, Symposium on Minnesota's Response to COVID-19, "Mesenchymal Stem Cell Therapy to Control Inflammation in COVID-19", Minneapolis, MN 2020
2. Departments of Surgery and Research Day, University of Minnesota, "Generating Exogenic Organs for Transplantation, Minneapolis, MN 2019
3. Department of Medicine Research Conference, University of Minnesota. "The Genesis Project – Generating Organs and Cells for Transplantation". Minneapolis, MN 2016
4. 4<sup>th</sup> Engineering and Stem Cell Institute Symposium, University of Minnesota, "The Genesis Project: Generating Exogenic Organs and Cells for Regenerative Medicine", Minneapolis, MN 2016
5. Stem Cell Institute, University of Minnesota, "Creating Human Organs/Cells via Gene Editing and Blastocyst Complementation", Minneapolis, MN 2015
6. Lilliehei Heart Institute, University of Minnesota "Stem Cells for Ischemic Brain Injury" Minneapolis, MN 2015
7. St. Thomas University, "Translational Neuroscience in Neurodegenerative Diseases", St. Paul, MN, 2013

8. Institute for Engineering in Medicine Symposium on The Heart-Brain Connection, “Stem Cells for the Protection of the Brain and Heart”, Minneapolis, MN, 2011
9. Minnesota Mini Medical School, “Cancer Vaccines for Treating Brain Tumors”, University of Minnesota Medical School, Minneapolis, MN, 2011
10. University of Minnesota Duluth, “Stem Cells for the Treatment of Ischemic Brain Injury”, Duluth, MN, 2006
11. University of Minnesota Medical School Alumni Association, New Horizons in Minnesota Medicine Symposium, “Stem Cells and Neuroscience”, Minneapolis, MN 2006
12. Minnesota Science Teachers Association, 12th Annual Meeting of Life Science and Biology Teachers, “Stem Cells and the Brain”, St. Paul, Minnesota, 2005
13. Minnesota Biotechnology Symposium on “The Future of Stem Cells and Regenerative Medicine”, Bloomington, Minnesota, 2004
14. Veterans Administration Hospital, “Stem Cells and the Brain”, Minneapolis, MN 2002
15. Minnesota Medical Foundation, “The Promise of Stem Cells for Parkinson’s Disease”, Minneapolis, MN, 2002
16. Fairview-University Medical Center, Brain Tumor Symposium, “Development of Cancer Vaccines for the Treatment of Brain Tumors”, Bloomington, MN, 2000
17. Brain Awareness Week Symposium, “Parkinson’s Disease: Current Clinical Trials and Future Therapies”, Minneapolis, MN, 2000
18. Xenotransplantation Workshop, Minneapolis, MN, 1999
19. 25th Lehman Swine Conference, Symposium on Swine in Biomedical Research, Minneapolis, MN, “Neural Xenotransplantation”, 1998
20. Minnesota Medical Foundation - New Horizons in Minnesota Medicine Symposium, Minneapolis, MN, “Neurosurgical Advances for Treating Parkinson’s Disease”, 1997
21. Hennepin County Medical Center, Department of Surgery, Minneapolis, MN, “GM-CSF Based Vaccines for the Treatment of Brain Tumors”, 1997
22. Huntington’s Disease Society of America Annual Meeting, Symposium on Recent Advances in Huntington’s Research, Minneapolis, MN, “Recovery of Motor Function Following Transplantation of Human Fetal Striatum in Rodents with Experimental Huntington’s Disease”, 1996
23. Microbiology, Immunology, and Molecular Pathology Program, University of Minnesota, Minneapolis, MN, “Cell Transplantation Therapies for Experimental Neurodegenerative Diseases”, 1996
24. Clinical Neuroscience Conference, University of Minnesota, Minneapolis, MN, “Development of Antisense Oligonucleotides for the Treatment of Brain Tumors”, 1995

25. Rotary Club, Minneapolis, MN "Decade of the Brain", 1993
26. Learning Center, University of Minnesota, Minneapolis, MN "Restoration of Spatial Memory Function with Transplanted Cholinergic Neurons", 1993
27. Research Animal Resources, University of Minnesota Medical School, Minneapolis, MN, "Behavioral Tests for Learning and Memory, and Locomotor Function in Rodents", 1992
28. M.D./Ph.D. Program, University of Minnesota Medical School, Minneapolis, MN, "Neuronal Transplantation in Experimental Models of Neurodegenerative Disorders", 1992
29. Department of Psychiatry, University of Minnesota Medical School, Minneapolis, MN, "Nerve Cell Transplantation in a Rodent Model of Alzheimer's Disease: Improvement in Spatial Memory Function", 1991
30. Department of Physiology, University of Minnesota Medical School, Minneapolis, MN, "The Hippocampal Formation: Remembrance of Places Past, Present and Future", 1991
31. Department of Surgery, University of Minnesota Medical School, "Repair of Neural Connections with Nerve Cell Transplants: Restoration of Neurologic Function", 1991
32. Neuroscience Seminar Series, University of Minnesota Medical School, "Neural Grafting in Experimental Models of Neurodegenerative Disorders", 1991
33. Clinical Neuroscience Conference, University of Minnesota Medical School, "Brain Cell Transplants: Repair of Dopaminergic and Cholinergic Pathways and Restoration of Neurologic Function", 1991
34. Department of Neurosurgery, University of Minnesota Medical School, Minneapolis, MN, "Neural Grafting and the Restoration of Function", 1990
35. Department of Biology, Indiana University Purdue University, Indianapolis, IN, "Nerve Cell Transplantation and the Restoration of Function", 1988
36. Medical Science Program, Indiana University, Bloomington, "Neural grafting and functional restoration in animal models of neuronal degeneration", 1989
37. International Symposium on Molecular Neurobiology, the Aging Process and Neurodegenerative Disease, Indianapolis, IN, "Transplantation of Cholinergic Neurons and Functional Restoration in the Mammalian Central Nervous System: An Overview", 1988
38. Department of Pharmacology and Toxicology, Indiana University School of Medicine, Indianapolis, IN, "Restoration of Function with Intrahippocampal Grafts of Cholinergic Neurons from the Medial Septal Nucleus", 1988
39. 7th Annual Meeting, Society for Neuroscience, Indianapolis Chapter, Indianapolis, IN, Symposium on Neural Networks, "Adaptive Neural Networks in the Hippocampal Formation", 1990



40. Medical Science Program, Indiana University, Bloomington, Indiana, "Growth and Development of Neural Transplants", 1986
41. Vascular Biology Training Program, Indiana University School of Medicine, Indianapolis, Indiana, "Methods of Neural Transplantation", 1985
42. Evansville Center for Medical Education, Indiana University School of Medicine, Evansville, Indiana, "Transplantation of Cholinergic Neurons and the Recovery of Function", 1984
43. Department of Psychiatry, Indiana University School of Medicine, Indianapolis, Indiana, "Neural Transplantation of Cholinergic Neurons and the Recovery of Function", 1984
44. Department of Physiology and Biophysics Retreat, Indiana University School of Medicine, Brown County, Indiana, "Transplantation of Cholinergic Neurons", 1983
45. Department of Physiology and Biophysics, University of Vermont, Burlington, Vermont, "Neural Transplantation of Cholinergic Neurons", 1981
46. Society for Neuroscience, Vermont Chapter, University of Vermont, Burlington, Vermont, "Neural Transplantation and the Recovery of Function", 1980
47. Symposium on State of the Art Techniques in Neuroscience, Society for Neuroscience, 9th Annual Meeting of the Michigan Chapter, East Lansing, Michigan, "Electrophysiological Recordings from in vitro Hippocampal Slices", 1979
48. Department of Physiology, Downstate Medical Center, State University of New York, Brooklyn, New York, "Synaptic Potentiation of CA1 Pyramidal Cells in Hippocampal Slices", 1978
49. Neuroscience Program, University of Michigan, Ann Arbor, Michigan, "Heterosynaptic Potentiation of Pyramidal Cells in Hippocampal Slices", 1977

#### **Poster Abstract Presentations at Professional Meetings, Conferences, etc.**

1. Shen F, Brown JL, Ruiz M, Voth J, Sawai, T, Hatta T, Fujita M, Crane A, and Low WC, Public attitudes in the United States towards human-animal chimeric research using human induced pluripotent stem cells to generate human organs for transplantation, International Society for Stem Cell Research, Los Angeles, CA 2019
2. Sathe AG, Chen C, Chen W, Cloyd J, Coles L, Low WC, Sanders L, Steer CJ, Tuite P, Zhu, XH, A comprehensive evaluation of UDCA pharmacokinetics, biological target engagement, and mechanism(s) of action in people with Parkinson's disease, AP/PD2019 Symposium, Lisbon, Portugal, 2019.
3. Chrostek M, Crane A, Vegoe A, Lindborg B, O'Brien T, and Low WC, Cerebral organoids as a novel source of dopaminergic neuron progenitors for cell based treatment of Parkinson's disease, American Society for Neural Therapy and Repair, Clearwater, FL, 2018.

4. Toman N, Shiao ML, Voth J, Danczyk G, and Low WC, Assessing the ability of the Zika virus to infect human GBM6 and U87 gliomas, Peyton Society 80<sup>th</sup> Anniversary Meeting, Minneapolis, MN 2017
5. Pearce CM, Shiao ML, and Low WC, Zika virus targeting of human DAOY medulloblastoma, Peyton Society 80<sup>th</sup> Anniversary Meeting, Minneapolis, MN 2017
6. Sipe CJ, Shiao ML, and Low WC, Characterization of the Zika virus as an oncolytic virus in murine GL261 gliomas, Peyton Society 80<sup>th</sup> Anniversary Meeting, Minneapolis, MN 2017
7. Voth J, Miller ZD, Danczyk G, Low WC, and Parr AM, Porcine to porcine blastocyst complementation to generate oligodendrocytes, Peyton Society 80<sup>th</sup> Anniversary Meeting, Minneapolis, MN 2017
8. Crane A, Swaminathan P, Hewitt H, Xiao F, Savanur V, Voth J, Schultz Z, Carlson D, Fahrenkrug S, Dutton J, and Low WC, Use of blastocyst complementation in identifying novel source of tissue for craniofacial and neural regenerative therapies, Federation of European Neuroscience Society Annual Meeting, Copenhagen, Denmark, 2016.
9. Savanur VH, Schultz Z, Hewitt H, Swaminathan P, Crane A, Voth J, Carlson D, Fahrenkrug S, Dutton, J, and Low WC, Interrogation of PITX# for blastocyst complementation in generating lens, Institute for Engineering in Medicine Annual Meeting, Minneapolis, MN, 2015
10. Fernando, N, Hewitt H, and Low WC, Optimization of an immunohistochemical fluorescent antibody staining protocol for use on chimeric tissues, Proceedings of the Summer Undergraduate Research Symposium, University of Minnesota, page 12, 2014.
11. Xiao F, Juliano M, Stone LL, Mihalko H, Vinodkumar D, Suresh M, Nan C, Kuzmin-Nichols N, Sanberg CD, Sanberg PR, Grande A, and Low WC, Amelioration of ischemic brain injury with non-hematopoietic umbilical cord blood stem cells (nh-UCBSCs): Mechanisms of action, Cell Transplantation 23(6):789, 2014.
12. Nan Z, Podetz-Pederson KM, Muenzer J, Low WC, and McIvor RS, Spatial navigation and working memory tests demonstrate neurological deficits in a murine model of mucopolysaccharidosis Tye II (Hunter syndrome). Proceedings for the WORLD Conference, 2012.
13. Divani AA, Bhatia P, Hartly EW, Low WC, Monga M, Beilman G. A New Novel Model of Blast Traumatic Brain Injury. The 1<sup>st</sup> International Congress of Interventional Neurology, Minneapolis, MN. Oct 6-8, 2011.
14. Nan Z, Belur L, Wolf D, Gunther R, Whitley C, McIvor RS, and Low WC, Central nervous system biodistribution of AAV5-GFP following intraventricular administration in neonatal and adult mice, Proceedings of the American Society for Neural Therapy and Repair, 2010.
15. Chen Y, Zhong J, Chandler M, Low WC, Zhang J, and Yu X, Long-term effects of human umbilical cord stem cells on myocardial function in post-infarct rat heart, Proceedings of the American Heart Association Annual Meeting, 2009.
16. Nikas J, and Low WC, Mathematical analyses of *in vivo* Proton Nuclear Magnetic Resonance Spectroscopy (<sup>1</sup>H NMRs) in the diagnosis, assessment of clinical change, and metabolomics

investigation of the underlying causes of the neuropathology of Huntington's disease in R6/2 transgenic mice, Proceedings of the American Society for Neural Therapy and Repair, 2008.

17. Gao Y, Zu T, Low WC, Orr HT and McIvor RS, Antisense RNA Sequences Modulating the Ataxin-1 Message: Molecular Model of Gene Therapy for Spinocerebellar Ataxia Type 1, a Dominant-Acting Unstable Trinucleotide Repeat Disease, Proceedings of the American Society for Neural Therapy and Repair, 2007.
18. Xin J, Noetzel M, Demorest ZL, Carlson G, Ashe KH, and Low WC, Decreased proliferation of endogenous neural stem cells in transgenic tau Alzheimer's mice, American Society for Neural Therapy and Repair Abstracts, Experimental Neurology 198:595, 2006.
19. Naylor MC, Negia M, Noetzel M, Demorest ZL, and Low WC, Heparan sulfate mediates neuroprotection from degeneration in experimental glutaric aciduria, American Society for Neural Therapy and Repair Abstracts, Experimental Neurology 198:582-583, 2006.
20. Demorest ZL, Ohlfest JR, Low WC, and Freese A., Non-viral gene transfer using Sleeping Beauty transposition for long-term gene expression in the CNS of neonatal mice, American Society for Neural Therapy and Repair Abstracts, Experimental Neurology 198:565-566, 2006.
21. Burns, TC, Ortiz-Gonzales XO, Keen CD, Demorest Z, Nakagawa Y, Verfaillie, CM, and Low WC, BrdU is not a reliable label for transplanted cells in the embryonic and neonatal host brain, Society for Neuroscience Abstracts, Program Number 257.3 (2005).
22. Low WC, Xiao J, Nan ZH, and Motooka, Y, Characterization and transplantation of a novel population of umbilical cord blood stem cells in experimental ischemic brain injury, Iowa State University Stem Cell Meeting Abstracts, Ames, IA (2004).
23. Oh, S, WM Journey, XR Ortiz-Gonzalez, CD Keene, WC Low, CM Verfaillie, SK Juhn, and JH Andersen, Survival and distribution of adult-derived stem cells transplanted into the adult mouse inner ear, Society for Neuroscience Abstracts, Program Number 150.15 (2003).
24. Motooka, Y, XR Ortiz-Gonzalez, CM Verfaillie, and WC Low, Neurogenesis and axonal fiber sprouting following human multipotent adult progenitor cells (MAPC) transplantation in acutely ischemic rats, Society for Neuroscience Abstracts, Program Number 42.2 (2003).
25. Ortiz-Gonzalez, XR, CD Keene, M Reyes, ZH Nan, WM Duan, CM Verfaillie, and WC Low, Human and rat derived multipotent adult progenitor cells (MAPC) survive and express neural markers when transplanted into neonatal rats, Society for Neuroscience Abstracts, Program Number 237.19 (2002).
26. Keene, CD, CMP Rodrigues, T Eich, MS Chhabra, CJ Steer, and WC Low, TUDCA, a common bile acid, ameliorates neuropathology and associated behavioral deficits in a transgenic mouse model of Huntington's disease, Society for Neuroscience Abstracts, Program Number 195.13 (2002).
27. Keene, CD, CM Rodrigues, T Eich, C Linehan-Stieers, A Abt, BT Kren, CJ Steer and WC Low, Neuroprotective effects of TUDCA, a hydrophilic bile acid, in experimental Huntington's disease, Society for Neuroscience Abstracts, Program Number 968.10 (2001).

28. Kaemmerer, WF, RS McIvor, and WC Low, Evidence that transduction of cerebellar purkinje cells by adeno-associated virus type 2 is mediated by bFGF receptor type 1, Society for Neuroscience Abstracts, Program Number 294.6 (2001).
29. Zhao, LR, WM Duan, M Reyes, CD Keene, ES Nussbaum, CM Verfaillie, and WC Low, Human bone marrow stem cells exhibit neural phenotypes after transplantation and ameliorate neurologic deficits with ischemic brain injury, Society for Neuroscience Abstracts, abstract 860.1 (2000).
30. Reyes M, CD Keene, WC Low, and CM Verfaillie, Ex vivo differentiation of mesenchymal stem cells into oligodendrocytes, astrocytes, and/or dopaminergic, gamma amino butyric acid-ergic, or serotonergic neurons, Society for Neuroscience Abstracts, abstract 415.15 (2000).
31. Duan WM, LR Zhao, CMP Rodrigues, CJ Steer, and WC Low, Tauro-ursodeoxycholic acid improves the survival and function of nigral transplants in a rat model of Parkinson's disease, Society for Neuroscience Abstracts, abstract 328.6 (2000).
32. Keene, CD, M Reyes, LR Zhao, W Wang, SR Spellman CM Verfaillie, and WC Low, Transplantation of bone marrow derived multipotent adult stem cells into the rat CNS: Phenotypic expression, Society for Neuroscience Abstracts, abstract 327.6 (2000).
33. Kaemmerer, WF, CMP Rodrigues, C Steer, HT Orr, and WC Low, Creatine supplemented diet extends Purkinje cell survival in SCA-1 transgenic mice, but does not prevent the ataxic phenotype, Society for Neuroscience Abstracts, abstract 203.12 (2000).
34. Rodrigues CMP, CD Keene, C Linehan-Stieers, X Ma, WC Low, CJ Steer. Tauroursodeoxycholic acid prevents apoptosis induced by the neurotoxin 3-nitropropionic acid in rat neuronal cells: evidence for a mitochondrial-dependent pathway that does not involve the permeability transition. European Association for the Study of Liver Diseases (1999)
35. Ni, H-T, SR Spellman, WC Jean, WA Hall, WC Low, Dendritic cells pulsed with tumor extract is a potent treatment for C57Bl/6 mice bearing intracranial GL261 gliomas. 5<sup>th</sup> International Symposium on Dendritic Cells in Fundamental and Clinical Immunology (1998).
36. Ni, H-T, JC David, SR Spellman, JL Mortenson, WC Jean, WA Hall, WC Low, Immunotherapy with B16 melanoma cells transfected with the B7-1 co-stimulatory molecule increases the survival of mice with melanoma. Congress of Neurological Surgeons (1998).
37. Jean, WC, ES Nussbaum, SR Spellman, WC Low, Reperfusion injury after focal cerebral ischemia: the role of inflammation and treatment strategies. Congress of Neurological Surgeons (1998).
38. Ni, H-T, WC Jean, SR Spellman, WA Hall, WC Low, Immunization with dendritic cells pulsed with tumor extract increases survival of C57BL/6 mice bearing intracranial GL261 glioma. Congress of Neurological Surgeons (1998).
39. Duan, W-M, M Westerman, T Flores, WC Low, Intrastratial grafting of ventral mesencephalic tissue from MHC knockout mice to adult rats. Society for Neuroscience, (1998).
40. Keene, C.D., I Tkac, J Pfeuffer, R Gruetter, WC Low, Proton magnetic resonance spectroscopic identification of alterations in the neurochemical profile of the rat striatum following quinolinic acid lesions. Society for Neuroscience, (1998).

41. Ni, H-T., SR Spellman, WC Jean, MA Wallenfriedman, WA Hall, WC Low, Dendritic cells pulsed with tumor extract is a potent treatment for C57BL/6 mice bearing intracranial GL261 gliomas. Society for Neuroscience, (1998).
42. Duan, W-M, M. Westerman, T Flores, WC Low, Xenotransplantation of fetal dopamine neurons from MHC I and MHC II knockout mice to adult rats: enhancement of cell survival. Annual Meeting of the American Society for Neural Transplantation. (1998).
43. Jean, W.C., SR Spellman, FT Merkle, CT Flores, L DelaBarre, M Garwood, WA Hall, WC Low, Effects of combined GM-CSF and IL-2 in the treatment of rat 9L glioma. Annual Meeting of the American Association of Neurological Surgeons (1998).
44. Wallenfriedman, MA, JA Conrad, L Chiang, L DelaBarre, WC Jean, M Garwood, DYK Wen, WA Hall, and WC Low, Antisense oligonucleotide vaccine for intracerebral metastatic breast cancer, Annual Meeting of the Congress of Neurological Surgeons (1997).
45. Jean, WC, SR Spellman, WA Wallenfriedman, WA Hall, and WC Low, IL-12 based tumor cell vaccine for the treatment of gliomas, Annual Meeting of the Congress of Neurological Surgeons (1997).
46. Jean, WC, SR Spellman, L Chiang, WA Hall, and WC Low, Antisense oligonucleotides to the mdm-2 gene yield paradoxical effects in the treatment of brain tumors, Annual Meeting of the Congress of Neurological Surgeons (1997).
47. Jean, WC, G Lee, SR Spellman, MA Wallenfriedman, WA Hall, and WC Low, IL-2 treatment of 9L glioma provides additional long-term immunity to alternate glioma cell line, Annual Meeting of the American Association of Neurological Surgeons (1997).
48. Jean, WC, SR Spellman, FT Merkle, CT Flores, L DelaBarre, M Garwood, WA Hall, and WC Low, Effects of combined GM-CSF and IL-2 in the treatment of rat 9L glioma, Annual Meeting of the American Association of Neurological Surgeons (1997).
49. Spellman, SR, WC Jean, FT Merkle, WA Hall, and WC Low, Cytokine dependent lymphocyte infiltration of 9L gliosarcoma peripheral tumors in Fischer 344 rats, Annual Meeting of the American Association of Neurological Surgeons, (1997).
50. Lakkaraju, A., W.C. Jean, W.C. Low, and Y.E. Rahman, Liposomes as vectors for the delivery of antisense oligonucleotides targeting the mRNA of the p53 tumor-suppressor gene, Proceedings of the American Association of Pharmaceutical Scientists Annual Meeting, submitted (1997).
51. Wallenfriedman, M.A., W.E. Galicich, W.C. Jean, S.R. Spellman, A. Sanan, W.A. Hall, and W.C. Low, Spontaneous regression of C6 glioma tumors in BD-IX rats. Society for Neuroscience, 23:2449, (1997).
52. Pundt, L.L., N. Narang, and W.C. Low, Localization of striatal markers in human ganglionic eminence transplants in quinolinic acid-lesioned rats. Society for Neuroscience, 23:84, (1997).
53. Lee, G., S.R. Spellman, W.A. Hall, D.S. Gregerson, M.A. Wallenfriedman, and W.C. Low, Brain tumor regression in Fischer 344 rats vaccinated with F98 glioma cells treated with antisense oligonucleotides for the IGF1 receptor. Society for Neuroscience, 23:2448, (1997).

54. Keene, C.D., E.M. Jansen, and W.C. Low, Effects of intraventricular injection of antisense oligodeoxynucleotides on NR1 protein production in neonatal rat brain. Society for Neuroscience, 23:2434, (1997).
55. Kaemmerer, W.F., and W.C. Low, Wildtype cerebellar grafts into spinocerebellar ataxia Type-1 transgenic mice survive and improve motor behavior. Society for Neuroscience, 23:347, (1997).
56. Jean, W. C., S.R. Spellman, L. Chiang, P.J. Camarata, W.A. Hall, and W.C. Low, Paradoxical effects of antisense oligonucleotides in the treatment of brain tumors: an illustration using the *mdm-2* gene. Society for Neuroscience, 23:2447, (1997).
57. Jansen, E.M., C.D. Keene, and W.C. Low, Pretreatment with antisense oligonucleotides against mRNA to the NMDA receptor is neuroprotective in a rat model of neonatal ischemic-hypoxia: TTC staining. Society for Neuroscience, 23:2434, (1997).
58. Pundt, L.L., E.A. Jorn, J.A. Conrad, and W.C. Low, Organotypic organization of human fetal cerebellar tissue following transplantation into the cerebellum of nude mice, Proceedings of the 6th International Neural Transplantation Meeting, pg. 50, (1997).
59. Khan, M.H., L.L. Pundt, W.B. Rathbun, and W.C. Low, Increased survival of fetal ventral mesencephalon cells following treatment with an L-cysteine prodrug: in vitro studies, Proceedings of the 6th International Neural Transplantation Meeting, pg. 34 (1997).
60. Galicich, W.E., W.C. Low, J.A. Conrad, E.P. Flores, and W.A. Hall, c-myb antisense oligonucleotide uptake and diffusion in the brain, Proceedings of the Congress of Neurological Surgeons Poster Program, pg. 293 (1997).
61. Wallenfriedman, M.A., K.K. Stiffler, F.T. Merkle, J.A. Conrad, L. Chiang, W.C. Jean, D.Y.K. Wen, W.A. Hall, and W.C. Low, Peripheral vaccines for the treatment and prevention of 9L glioblastoma also provide long-term immunity to an alternate glioma cell line of syngeneic origin, Proceedings of the Congress of Neurological Surgeons. Poster Program, pg. 278 (1997).
62. Tuite, P.J., W.C. Low, Tj.J. Ebner, S.K. Eriksen, F. Zwiebel, and R.E. Maxwell, GPi stimulator efficacy in PD patient with prior contralateral pallidotomy, Proceedings of the American Neurological Association Symposium on the Etiology, Pathogenesis, and Treatment of Parkinson's Disease & Hyperkinetic Movement Disorders, (in press, 1997).
63. Low W.C., J.H. Anderson, T.J. Ebner, S.K. Eriksen, D.R. Kaiser, T.H. Rockwood, D.D. Roman, P.M. Silverstein, N.P. Solomon, C.L. Truwit, P.J. Tuite, F. Zwiebel, and R.E. Maxwell, Pallidal stimulation for the treatment of Parkinson's disease, Society for Neuroscience Abstracts, (1997).
64. Kahn, M.H., L.L. Pundt, W.B. Rathbun, and W.C. Low, Increased survival of fetal ventral mesencephalon cells following treatment with an L-cysteine prodrug: in vitro studies, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P29, (1997).
65. E.A. Jorn, L.L. Pundt, and W.C. Low, Organization and phenotypic expression of human fetal cerebellar cells following transplantation into normal cerebellum of nude mice, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P28, (1997).

66. Kaemmerer, W.F. and W.C. Low, Cerebellar transplants into spinocerebellar ataxia type-1 (SCA1) transgenic mice improve motor behavior, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P27, (1997).
67. Westerman, M.A., L.L. Pundt, S.B. Love, K.K. Hsiao, and W.C. Low, Characterization of the cholinergic system in transgenic mice overexpressing human APP695 containing a double mutation, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P16, (1997).
68. Pundt, L.L., N. Narang, and W.C. Low, Localization of dopamine receptors and associated mRNA in human fetal striatal transplants in an animal model of Huntington's disease, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P14, (1997).
69. Lee, G., S.R. Spellman, W.A. Hall, M.A. Wallenfriedman, and W.C. Low, Effects of antisense oligonucleotides to the IGF-1 receptor on the growth of F98 gliomas in Fischer 344 rats, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P13, (1997).
70. Wallenfriedman, M.A., P. Graupman, G. Lee, J.A. Conrad, L. Chiang, D.Y.K. Wen, W.A. Hall, and W.C. Low, Development of granulocyte-macrophage colony stimulating factor (GM-CSF) vaccines for the treatment of brain tumors in syngeneic Fischer 344 rats, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P7, (1997).
71. Jansen E.A., C.D. Keene, and W.C. Low, Neuroprotection with antisense to the NR1 subunit of the NMDA receptor in a rodent model of neonatal ischemic-hypoxia, Proceedings of the 19th Annual Meeting of Midwest Neurobiologists, P6, (1997).
72. Jansen, E.M., S. Underhill, W.C. Low, Histochemistry of neocortical grafts in rats following neonatal ischemic-hypoxia. Experimental Neurology, 143:329 (1997).
73. Low, W.C., Pundt, L.L., Blount, J.P., Conrad, J.A., and Kondoh, T., Suitability and availability of human fetal neural tissue from spontaneous abortions for transplantation in Parkinson's disease. Experimental Neurology, 143:332 (1997).
74. Wallenfriedman, M.A., Conrad, J.A., Chiang, L., Lee, G., Flores, E.P., Wen, D.K.Y., Hall, W.A., Low, W.C. Effects of IGF-1R antisense and nonsense oligonucleotide administration on 9L glioblastoma and MAT B3 breast tumor growth in Fischer 344 rats. Proceedings of the American Association for Cancer Research. (1996).
75. Wallenfriedman, M.A., P. Graupman, G. Lee, J.A. Conrad, D.Y.-K. Wen, W.A. Hall, and W.C. Low. Development of granulocyte / macrophage-colony stimulating factor (gm-csf)-based peripheral vaccines for the treatment and prevention of 9L glioblastoma in syngeneic Fischer 344 rats, Proceedings of the Congress of Neurological Surgeons, (1996).
76. Wallenfriedman, M.A., Lee, G., Graupman, P., Conrad, J.A., Chiang, L., Wen, D.K.Y., Hall, W.A., Low, W.C. IGF-1R antisense and nonsense oligonucleotide therapy for 9L glioblastoma results in immune response against an unrelated syngeneic tumor in Fischer 344 rats, Society for Neuroscience Abstracts 22:948, (1996).
77. Pundt, L.L., Jörn, E.A., Conrad, J.A., and Low, W.C., Phenotypic expression of human fetal cerebellar cells following transplantation into nude mouse cerebellum, Society for Neuroscience Abstracts 22:579, (1996).

78. Westerman, M.A., Pundt, L.L., Love, S.B., Hsiao, K.K., and Low, W.C., Assessment of cholinergic neurons in transgenic mice overexpressing Alzheimer amyloid precursor proteins, Society for Neuroscience Abstracts 22:206, (1996).
79. Jansen, E.M., Keene, C.D. and Low, W.C., Pretreatment with antisense oligonucleotides against mRNA to the NMDA glutamate receptor is neuroprotective in rodent model of neonatal ischemic-hypoxia: behavioral and morphometric analyses, Society for Neuroscience Abstracts, 22:937, (1996).
80. Wallenfriedman, M.A., J.A. Conrad, L. Chiang, E.P. Flores, D.Y.-K. Wen, W.A. Hall, W.C. Low, Antisense oligonucleotides to insulin-like growth factor 1 receptor (IGF-1R) mediate a systemic defense against C6 rat glioma tumors. Proceedings of the American Association for Neurological Surgeons, (1996).
81. Blount, J.P., T. Kondoh, T.J. Ebner, W.C. Low, and R.E. Maxwell, Pallidotomy for the treatment of dystonia. Proceedings of the American Association of Neurological Surgeons, (1996).
82. Pundt, L.L., T. Kondoh, and W.C. Low, Incorporation of human glial cells into host rodent striatum following transplantation of fetal striatum, thalamus and ventral mesencephalon. Experimental Neurology 135:168 (1995).
83. Jansen, E.M., L. Solberg, S. Wilson, and W.C. Low, Transplantation of fetal neocortical tissue in a rodent model of neonatal ischemic-hypoxia: behavioral analysis. Experimental Neurology 135:166 (1995).
84. Low, W.C., C. You, E.P. Flores, L. Chiang, J.A. Conrad, X.Q. Liu, D.Y.K. Wen, and W.A. Hall, Suppression of human U87 glioblastoma tumor growth in the flank of nude mice with antisense oligonucleotides to the *c-myb* oncogene. Society for Neuroscience Abstracts 21:2136, (1995).
85. Kondoh, T., A. L. Rivard, X.Q. Liu, and W.C. Low, Secondary changes in substantia nigra after intracerebral hemorrhage in rat striatum, Society for Neuroscience Abstracts 21:497, (1995).
86. Jansen, E.M., and W.C. Low, Isoflurane is neuroprotective in a rodent model of neonatal ischemic hypoxia: behavioral and morphological analyses. Society for Neuroscience Abstracts 21:227, (1995).
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232. Low, W.C. and S.L. BeMent, Evidence for long-term potentiation in the *in vitro* hippocampal preparation: Fimbrial-CA1 synaptic activation. Proceedings of the Society for Neuroscience, 7th Annual Meeting of the Michigan Chapter, Abstract 21 (1977).

### Other Key Activities and Accomplishments

FDA Investigational Device Exemption (IDE) and Investigation New Drug (IND) Protocols:

1. "Pallidal Stimulation for Parkinson's Disease using the Medtronic Model 3382 DBS™ Lead and ITREL® II System", FDA IDE #G950133, 1995 (principal investigator/sponsor)
2. "Unilateral Pallidal Stimulation for Parkinsonian Patients with Prior Pallidotomies", FDA IDE #G950133, Supplement 1, 1996 (principal investigator)
3. "Subthalamic Nucleus Stimulation for the Treatment of Parkinson's Disease", FDA IDE #G950133, Supplement 2, 1998 (principal investigator/sponsor)
4. "Dendritic Cell – Brain Tumor Stem Cell Vaccine for Treating Brain Tumors", FDA IND #13887, 2010 (principal investigator/sponsor)

### TEACHING AND CURRICULUM DEVELOPMENT

**University of Minnesota (repeat for other university or academic positions)**

*Use reverse chronological order – present to past – in each section.*

#### Course/Lecture List

|          |  |
|----------|--|
| NSu 8324 | Course Director - Fundamentals of Neuroscience for Neurosurgery, 2013 – present, University of Minnesota |
| SCB 8181 | Stem Cell Biology, 2012-present, University of Minnesota Medical School                                  |
| NSc 5667 | Course Director, Neurobiology of Disease, 2007- 2013, University of Minnesota Medical School             |

|                        |   |
|------------------------|---|
| PT 6282                | Scientific Foundations II: Neuromotor Control, 2007, University of Minnesota Medical School                     |
| NSc 5561               | Systems Neuroscience, 1999-2004, University of Minnesota Medical School   |
| NSc 8320               | Survival Skills, 1998- present, University of Minnesota Medical School  |
| NSu 8320               | Neurosurgical Teaching Conference, 1990-present, University of Minnesota Medical School                         |
| NSu 8324               | Course Director, Readings in Neurobiology, 1990-2013, University of Minnesota Medical School                    |
| NSu 8316               | Neurosurgical Research, 1990-present, University of Minnesota Medical School                                    |
| NSu 5520               | Neurosurgical Investigations, 1990-present, University of Minnesota Medical School                              |
| AdPy 5927              | Biological Psychiatry, 1992-2000, University of Minnesota Medical School  |
| Nsc 5660               | Behavioral Neuroscience, 1995, University of Minnesota Medical School   |
| Phsl 3091              | Undergraduate Physiology Research, 1994, University of Minnesota Medical School                                 |
| CBN 5110/<br>Phsl 5101 | Neuroscience for dental students, 1993-1995, University of Minnesota Medical School                             |
| Phsl 5112              | Human Neuroscience for medical students, 1991, University of Minnesota Medical School                           |
| Nsc 8550               | Itasca Neurobiology Course, 1991-2004, University of Minnesota Medical School                                   |
| PSLB301                | Human Physiology for medical students, Summer Course, 1983-1994, University of Vermont College of Medicine      |
| F513                   | Human Physiology for medical students, 1984-1990, Indiana University School of Medicine                         |
| F613                   | Mammalian Physiology for graduate students, 1984-1990, Indiana University School of Medicine                    |
| F724                   | Physiology of the Nervous System for graduate students, 1986, 1988, 1990, Indiana University School of Medicine |
| 93HA790                | Elective in Neurophysiology for Senior Medical Students, 1990, Indiana University School of Medicine            |
| N8XX                   | Neurophysiology for Neurology Residents and Fellows, 1990, Indiana University School of Medicine                |

2020

Walter C. Low, Ph.D.

- D876 Neurotransmitter and Neuroendocrine Cytology, 1988, Indiana University School of Medicine
- F499 Directed Research in Medical Physiology and Biophysics for undergraduates, 1985-86, Indiana University School of Medicine
- F509 Physiology for dental students, 1984-1986, Indiana University School of Medicine
- ANNB302 Neuroscience for medical students, 1983, University of Vermont
- PSLB102 Physiology for physical therapists, 1982, University of Vermont
- PSLB304 Cell Physiology and Biophysics for graduate students, 1982, University of Vermont
- ANNB305 Techniques in Neurobiology for graduate students, 1982, University of Vermont
- PSLB323 Biomedical Instrumentation for graduate students, 1981, University of Vermont
- PSLB10 Human Physiology for undergraduates, 1980, University of Vermont
- ZOOL325 Comparative Physiology for undergraduates, 1975, University of Michigan
- PSIO101 Human Physiology for undergraduates, 1974, University of Michigan

### **Curriculum Development**

- NSu 8324 Fundamentals of Neuroscience for Neurosurgery - Online, 2013, University of Minnesota

### **ADVISING AND MENTORING**

#### **High School Student Mentees in the Twin Cities**

|                   |           |                            |
|-------------------|-----------|----------------------------|
| Olivia Chen       | 2020-     |                            |
| Kelly Zeng        | 2019-2020 |                            |
| Gauri Binoy       | 2016-2017 | (Cornell University)       |
| Malu Suresh       | 2012-2013 | (Carleton College)         |
| Jeff Zhang        | 2010-2011 | (Yale University)          |
| Brandon Law       | 2007-2008 | (Harvard University)       |
| Tara Mokhtari     | 2006-2007 | (MIT)                      |
| Jonathan Kleinman | 2002-2003 | (Johns Hopkins University) |
| Kejia Sun         | 1999-2000 | (Stanford University)      |
| Manik Chhbhra     | 1998-2000 | (Stanford University)      |
| Florian Merkle    | 1996-1997 | (Cal Tech)                 |

#### **Undergraduate Students**

|                  |              |                         |
|------------------|--------------|-------------------------|
| Jake Borgida     | 2020         | Trinity College         |
| Kashif Qureshi   | 2019-present | University of Minnesota |
| Samantha Johnson | 2019-present | University of Minnesota |
| Kennedy Person   | 2019         | University of Maryland  |

|                    |              |                           |
|--------------------|--------------|---------------------------|
| Chris Carchi       | 2018-present | University of Minnesota   |
| Derek Chen         | 2018-present | University of Minnesota   |
| Winston Guo        | 2018-present | University of Minnesota   |
| Sarah Tran         | 2017-2018    | University of Minnesota   |
| Salma Issa         | 2017-2018    | University of Minnesota   |
| Max Sandler        | 2017         | Tulane University         |
| Clairice Pearce    | 2016-present | University of Minnesota   |
| Nicolas Toman      | 2016-2019    | University of Minnesota   |
| Nancy Abdelrahman  | 2016-2017    | University of Minnesota   |
| Matthew Chrostek   | 2016-present | University of Minnesota   |
| Arielle Hay        | 2016         | Carthage College          |
| Antony Crane       | 2015-2016    | University of Minnesota   |
| Zach Coffel        | 2014-2015    | University of Minnesota   |
| Nimasha Fernando   | 2014         | University of Maryland    |
| Brenna Holms       | 2014-2015    | University of Minnesota   |
| Breanna Hardy      | 2014-2015    | University of Minnesota   |
| Sunita Krishnan    | 2014-2015    | University of Minnesota   |
| Quincy Rudman      | 2014-2015    | University of Minnesota   |
| Zach Schultz       | 2014-2015    | University of Minnesota   |
| Jordan Sheehan     | 2014-2015    | University of Minnesota   |
| Joseph Voth        | 2014-2016    | University of Minnesota   |
| Kendra Wright      | 2014-2015    | University of Minnesota   |
| Madeleine Howard   | 2013-2015    | University of Minnesota   |
| Andrew Gardeck     | 2013-2014    | University of Minnesota   |
| Katie Longley      | 2013-2014    | University of Minnesota   |
| Shiela Vang        | 2013-2014    | University of Minnesota   |
| Hanna Mihalko      | 2012-2014    | University of Minnesota   |
| Garima Singh       | 2012-2014    | University of Minnesota   |
| Mona Sonbol        | 2012-2013    | University of Minnesota   |
| Sabrina Hermsen    | 2012         | University of Minnesota   |
| Grant Larson       | 2011-2012    | University of Minnesota   |
| Ronda Fahim        | 2011-2012    | University of Minnesota   |
| Jasmine Abraham    | 2011-2012    | Hamline University        |
| Marissa Donatelle  | 2011-2012    | University of Minnesota   |
| Blake Siljander    | 2011-2012    | University of Minnesota   |
| June K. Yan Huang  | 2011         | University of Puerto Rico |
| Michael Kalinowski | 2010-2012    | University of Minnesota   |
| Gretta Joseph      | 2010-2012    | University of Minnesota   |
| Carrie Evavold     | 2009-2010    | University of Minnesota   |
| Katherine Holten   | 2009-2010    | University of Minnesota   |
| Brittney Lemke     | 2009-2010    | University of Minnesota   |
| Sheena Potretzke   | 2009-2010    | University of Minnesota   |
| Justin Snesrud     | 2009-2010    | University of Minnesota   |
| Jill Crosby        | 2008-2009    | University of Minnesota   |
| Julie Neborak      | 2008-2009    | University of Minnesota   |
| Jackie Jensen      | 2008-2009    | University of Minnesota   |
| Emily Nuechterlein | 2008-2009    | Macalester College        |
| Katya Erickson     | 2007-2008    | University of Minnesota   |
| Julianne Eggum     | 2007-2008    | University of Minnesota   |
| Yuliya Perepelitsa | 2007-2008    | University of Minnesota   |
| Erin Bromberg      | 2007-2009    | University of Minnesota   |

|                   |           |                            |
|-------------------|-----------|----------------------------|
| Sarah Parker      | 2007-2009 | University of Minnesota    |
| Jeff Ames         | 2007-2008 | University of Minnesota    |
| Nathan Mesfin     | 2007-2008 | University of Minnesota    |
| Patrick Hosrt     | 2007-2008 | University of Minnesota    |
| Elina Kudishevich | 2007-2008 | University of Minnesota    |
| Aleta Reese       | 2006-2007 | University of Minnesota    |
| Kelly Sorvell     | 2006-2007 | University of Minnesota    |
| Rita Weiss        | 2006-2007 | University of Minnesota    |
| Elina Lipovski    | 2006-2007 | University of Minnesota    |
| Alex Hartman      | 2006-2007 | University of Minnesota    |
| Jessica Curtis    | 2005      | St. Catherine's University |
| Blake Daley       | 2005-2006 | University of Minnesota    |
| Dominic Schomberg | 2005-2006 | University of Minnesota    |
| Jenny Xin         | 2004-2005 | University of Minnesota    |
| Mitch Mudra       | 2004-2005 | University of Minnesota    |
| Japs Lee          | 2002-2003 | University of Minnesota    |
| Tina Flores       | 1999-2000 | University of Minnesota    |
| Anna Abt          | 1998-1999 | University of Minnesota    |
| Leah Solberg      | 1995-1996 | University of Minnesota    |
| Suzanne Underhill | 1994-1995 | University of Minnesota    |

### Medical Students

|                  |           |                                       |
|------------------|-----------|---------------------------------------|
| Emily Fellows    | 2019-     | University of Minnesota               |
| Cleresa Roberts  | 2019-     | University of Minnesota               |
| Tony Larson      | 2017-2019 | University of Minnesota               |
| Zach Miller      | 2016-2018 | University of Minnesota               |
| Elizabeth Straub | 2016      | University of Minnesota               |
| Kelly Setterholm | 2015      | University of Minnesota               |
| Amber Retzlaff,  | 2014-2016 | University of Minnesota               |
| Huy Nguyen,      | 2014-2015 | University of Minnesota               |
| Amanda Louiselle | 2013-2014 | University of Minnesota               |
| Zi Gong          | 2012      | University of Minnesota               |
| Tom Zhou         | 2011-2012 | University of Minnesota               |
| Ken Dodd         | 2009-2011 | University of Minnesota               |
| Michelle Naylor  | 2008-2009 | University of Minnesota               |
| Oleg Ryabinin    | 2009-2011 | University of Minnesota               |
| Andy Rivard      | 2004-2005 | University of Minnesota               |
| Caitlin Anderson | 2003-2005 | University of Minnesota               |
| Andrew Grande    | 1999-2000 | University of Minnesota               |
| Jason Chesney    | 1993-1994 | University of Minnesota               |
| Frank Tomecek    | 1985-1986 | Indiana University School of Medicine |

### Graduate Students

|                       |           |  |
|-----------------------|-----------|--|
| Anala Shetty          | 2019-     | Univ. of Minnesota (Stem Cell Biology)   |
| Nicole Emmitt         | 2018-     | Univ. of Minnesota (Veterinary Medicine) |
| Swathi Radha          | 2018-     | Univ. of Minnesota (Stem Cell Biology)   |
| Azhar Abdukadir, M.S. | 2018-2019 | Univ. of Minnesota (Stem Cell Biology)   |
| Angelo Ce Yuan, Ph.D  | 2017-2019 | Univ. of Minnesota (Bioinformatics and   |



|                               |            |  |
|-------------------------------|------------|--|
|                               |            | Computational Biology)                     |
| Emily Segler, M.S.            | 2017-2018  | Univ. of Minnesota (Stem Cell Biology)     |
| Chris Sipe, M.S.              | 2016-2017  | Univ. of Minnesota (Stem Cell Biology)     |
| Shivanshi Vaid, M.S.          | 2016-2017  | Univ. of Minnesota (Stem Cell Biology)     |
| Jennifer Winters, M.S.        | 2015-2016  | Univ. of Minnesota (Stem Cell Biology)     |
| Josh Hamborg, M.D., M.S.      | 2014-2015  | Univ. of Minnesota (Stem Cell Biology)     |
| Vibha Savanur, M.S.           | 2014-2015  | Univ. of Minnesota (Stem Cell Biology)     |
| Preethi Swaminathan, M.S.     | 2013-2015  | Univ. of Minnesota (Stem Cell Biology)     |
| Deepti Vinodkumar, M.S.       | 2012-2013  | Univ. of Minnesota (Stem Cell Biology)     |
| Brian Andersen, M.D., Ph.D.   | 2012-2013  | Univ. of Minnesota (Neuroscience)          |
| Michael Ritchie, M.S.         | 2010-2012  | Univ. of Minnesota (Stem Cell Biology)     |
| Mayra Quito, M.S.             | 2010-2012  | Univ. of Minnesota (Biological Sciences)   |
| Mesfin Negia, M.S.            | 2008-2010  | Univ. of Minnesota (Biological Sciences)   |
| Laura Stone, Ph.D.            | 2007-2014  | Univ. of Minnesota (Neuroscience)          |
| Terry Burns, M.D., Ph.D.      | 2003-2007  | Univ. of Minnesota (Neuroscience)          |
| Andy Rivard, M.D., M.S.       | 2003-2005  | Univ. of Minnesota (Physiology)            |
| Murray Blackmore, Ph.D.       | 2000-2005  | Univ. of Minnesota (Neuroscience)          |
| Xilma Ortiz, M.D., Ph.D.      | 1999-2004  | Univ. of Minnesota (Neuroscience)          |
| Stephen Spellman, M.S.        | 1999-2000  | Univ. of Minnesota (Biomedical Sciences)   |
| Dirk Keene, M.D., Ph.D.       | 1997- 2003 | Univ. of Minnesota (Neuroscience)          |
| Marcus Westerman, M.D., Ph.D. | 1996- 2001 | Univ. of Minnesota (Neuroscience)          |
| William Kaemmer, Ph.D.        | 1995-2001  | Univ. of Minnesota (Lab Med and Pathology) |
| Elizabeth M. Jansen, Ph.D.    | 1991-1997  | Univ. of Minnesota (Neuroscience)          |
| Ying-Jie Li, M.D., Ph.D.      | 1990-1994  | Indiana University (Physiol.& Biophys.)    |
| Thomas Cavanaugh, M.S.        | 1990       | Indiana University (Medical Neurobiol.)    |
| Ming-Lei Cui, M.S.            | 1989-1990  | Indiana University (Physiol.& Biophys.)    |
| Bonnie J. Tarricone, Ph.D.    | 1988-1991  | Indiana University (Medical Neurobiol.)    |
| Lee Phebus, Ph.D.             | 1987-1990  | Indiana University (Medical Neurobiol.)    |
| Sandra L. Gage, M.D., Ph.D.   | 1987-1991  | Indiana University (Medical Neurobiol.)    |
| Stephen M. Onifer, Ph.D.      | 1986-1990  | Indiana University (Physiol.& Biophys.)    |
| Scott H. Murphy, M.D., M.S.   | 1985-1987  | Indiana University (Physiol.& Biophys.)    |

#### Member on Doctoral Committees

|                          |              |  |
|--------------------------|--------------|--|
| Daniel Schilling         | 2020-present | Univ. of Minnesota (Biochm Mol Biol Biophys)               |
| Garrett Draper           | 2019-present | Univ. of Minnesota (Comparative Mol. Biosci.)              |
| Yinglong Feng            | 2019-2020    | Univ. of Minnesota (Elec. Computer Engr.)                  |
| Wei Zhu                  | 2017-present | Univ. of Minnesota (Medical Biophysics)                    |
| Michael Pryzbilla        | 2017-2018    | Univ. of Minnesota (Mol Cell Dev Biol & Gen)               |
| Dong-Seong Cho           | 2016-2017    | Univ. of Minnesota (Chem Engr & Material Sci)              |
| Dustin Chernick          | 2015-2018    | Univ. of Minnesota (Pharmacology)                          |
| Ravali Raju              | 2014-2015    | Univ. of Minnesota (Chem Engr & Material Sci)              |
| Leo Oh                   | 2012-2015    | Univ. of Minnesota (Mol Cell Dev Biol & Gen)               |
| Juan Felipe Diaz Quiroz  | 2012-2015    | Univ. of Minnesota (Mol Cell Dev Biol & Gen)               |
| Liang Tu, Ph.D.          | 2011-2012    | Univ. of Minnesota (Electrical Engineering)                |
| Anja Srienc              | 2010-2014    | Univ. of Minnesota (Neuroscience)                          |
| Xiao Wang                | 2009-2013    | Univ. of Minnesota (Biophysical Sci. and Med.<br>Physics.) |
| Chris Chamberlain, Ph.D. | 2008-2012    | Univ. of Minnesota (Mol Cell Cev Biol &Gen)                |
| Timothy Kline            | 2008-2010    | Univ. of Minnesota (Biomedical Engineering)                |

|                                     |           |  |
|-------------------------------------|-----------|--|
|                                     |           | Walter C. Low, Ph.D.                                     |
| Maureen Handoko, Ph.D.              | 2008-2012 | Univ. of Minnesota (Neuroscience)                        |
| Brian Gibbens, Ph.D.                | 2008-2010 | Univ. of Minnesota (Mol Cell Dev Biol & Gen)             |
| Cornelius Lam, Ph.D.                | 2008-2011 | Univ. of Minnesota (Biomedical Engineering)              |
| Daniel Wolf Ph.D.                   | 2007-2010 | Univ. of Minnesota (Mol Cell Dev Biol & Gen)             |
| LeeAnn Bera, M.S.                   | 2007-2008 | Univ. of Minnesota (Mol Cell Dev Biol & Gen)             |
| Daniel Franc, Ph.D.                 | 2007-2008 | Univ. of Minnesota (Neuroscience)                        |
| Paul Score, Ph.D.                   | 2007-2008 | Univ. of Minnesota (Mol Cell Dev Bio & Gen)              |
| Marc Parent, Ph.D.                  | 2006-2010 | Univ. of Minnesota (Neuroscience)                        |
| Jon Larson, Ph.D.                   | 2006-2011 | Univ. of Minnesota (MICaB)                               |
| Steven Highfill, Ph.D.              | 2006-2010 | Univ. of Minnesota (MICaB)                               |
| Amada Brosnahan, Ph.D.              | 2006-2008 | Univ. of Minnesota (MiCaB)                               |
| Sandra Alcala, Ph.D.                | 2005-2009 | Univ. of Minnesota (Neuroscience)                        |
| Ge "Christie" Zhang, Ph.D.          | 2004-2006 | Univ. of Minnesota (Biomedical Engineering)              |
| Nathan Jorgensen, Ph.D.             | 2003-2007 | Univ. of Minnesota (Neuroscience)                        |
| Edward Rustamzadeh,<br>M.D., Ph.D.  | 2003-2005 | Univ. of Minnesota (Biophysical Sci. and Med<br>Physics) |
| Kerri Petro, M.S.                   | 2002-2003 | Univ. of Minneosta (Physical Therapy)                    |
| Ann Mosemiller                      | 2002-2008 | Univ. of Minnesota (Neuroscience)                        |
| John Ohlfest, Ph.D.                 | 2002-2004 | Univ. of Minnestoa (MICaB)                               |
| Corey Carlson, Ph.D.                | 2002-2004 | Univ. of Minnesota (MICaB)                               |
| Aparna Lakkaraju, Ph.D.             | 1997-2001 | Univ. of Minnesota (Pharmaceutics)                       |
| Xueqing Chen, Ph.D.                 | 1997-1999 | Univ. of Minnesota (Pharmaceutics)                       |
| Angela Brienzo, Ph.D.               | 1997-1998 | Univ. of Minnesota (Dev. Biology)                        |
| Katherine Larson, M.S.              | 1997-1998 | Univ. of Minnesota (Comm. Disorders)                     |
| Peter L. Malen, Ph.D.               | 1994-1997 | Univ. of Minnesota (Neuroscience)                        |
| Scott A. Oakman, Ph.D.              | 1992-1998 | Univ. of Minnesota (Neuroscience)                        |
| Lisa Bellavance, Ph.D.              | 1992-1997 | Univ. of Minnesota (Neuroscience)                        |
| Jeffrey Andersen, Ph.D.             | 1987-1990 | Indiana University (Pharmacology)                        |
| Eric Engleman, M.S.                 | 1989-1990 | Indiana University (Medical Neurobiol.)                  |
| Jo-wen Liu, M.S.                    | 1988-1990 | Indiana University (Physiol.& Biophys.)                  |
| Robert Soltis, M.S.                 | 1988-1990 | Indiana University (Pharmacology)                        |
| Elizabeth Stotz, M.S.               | 1988-1990 | Indiana University (Medical Neurobiol.)                  |
| Rebecca Porter, M.S.                | 1986-1990 | Indiana University (Medical Neurobiol.)                  |
| Paul Garris, Ph.D.                  | 1985-1990 | Indiana University (Physiol.& Biophys.)                  |
| Willie T. Anderson, M.S.            | 1986-1989 | Indiana University (Medical Neurobiol.)                  |
| Thomas Herbst, M.S.                 | 1988-1989 | Indiana University (Medical Neurobiol.)                  |
| Keith Brandt, M.S.                  | 1987-1988 | Indiana University (Physiol.& Biophys.)                  |
| Lydia Arbogast, Ph.D.               | 1985-1988 | Indiana University (Physiol.& Biophys.)                  |
| Angela Ying, M.S.                   | 1986-1987 | Indiana University (Physiol.& Biophys.)                  |
| Lazaros C. Triarhou,<br>M.D., Ph.D. | 1985-1987 | Indiana University (Medical Neurobiol.)                  |
| Timothy Breen, M.S.                 | 1985-1986 | Indiana University (Physiol.& Biophys.)                  |
| James H. Wible, Jr., Ph.D.          | 1985-1986 | Indiana University (Pharmacology)                        |
| Joanne Daniloff, Ph.D.              | 1982-1983 | Univ. of Vermont (Anat. & Neurobiol.)                    |
| Janette Johnson, Ph.D.              | 1982-1983 | Univ. of Vermont (Psychology)                            |
| James T. Garsik, Ph.D.              | 1980-1982 | Univ. of Vermont (Physiol.& Biophys.)                    |

**Post-doctoral Fellows**

|                                   |              |   |
|-----------------------------------|--------------|---|
| Susanne Var, Ph.D.                | 2020-present | Central Michigan University, MI               |
| Aleta Steevens, Ph.D.             | 2018-present | University of Rochester, NY                   |
| Andrew Crane, Ph.D.               | 2015-present | Central Michigan University, MI               |
| Sharbani Banerjee, Ph.D.          | 2010-2014    | University of Minnesota, Minneapolis, MN      |
| Jason Nikas, DPT                  | 2008-2011    | University of Minnesota, Minneapolis, MN      |
| An-Hua Wu, M.D., Ph.D.            | 2005-2006    | China Medical University, Shenyang, China     |
| Seung-Uk Oh, Ph.D.                | 2003-2005    | Yonsei University, South Korea                |
| Yasuhiko Mootooka,<br>M.D., Ph.D. | 2002-2004    | Kobe University Medical School, Japan         |
| Feng Xiao, M.D.                   | 2006-present | Beijing Medical College, China                |
| An-Hua Wu, M.D., Ph.D.            | 2001-2002    | China Medical University, Shenyang, China     |
| Jing Xiao, M.D.                   | 2001-2006    | Chongqing Medical College, China              |
| Zhen-Hong Nan, M.D., Ph.D.        | 2000-2013    | Shanghai Medical University, China            |
| Wei-Jun Wang, M.D.                | 1998-2000    | Shandong Tumor Institute, China               |
| Li-Ru Zhao, M.D.                  | 1997-2002    | University of Lund, Sweden                    |
| Hsiao-Tzu Ni, Ph.D.               | 1997- 2000   | University of Minnesota                       |
| Wei-Ming Duan, M.D., Ph.D.        | 1997-2001    | University of Lund, Sweden                    |
| Erwin Concepcion, Ph.D.           | 1992-1993    | Wayne State University                        |
| Takeshi Kondoh, M.D.              | 1990-1995    | Kobe University School of Medicine, Japan     |
| Ying-Jie Li, M.D.                 | 1988-1990    | Capitol Institute of Medicine, Beijing, China |
| Yumiko Kaseda, M.D.               | 1986-1988    | Kyushu University School of Medicine, Japan   |
| Shereen Farber, Ph.D.             | 1985-1988    | Indiana Univ. School of Medicine, Indpls, IN  |

**Residents**

|   |           |                                     |
|---|-----------|-------------------------------------|
| Hart Garner, M.D.                       | 2006-2007 | University of Minnesota             |
| Ray Chu, M.D.                           | 2002-2003 | University of California, San Diego |
| Lars Anker, M.D.                        | 2001-2002 | Hamburg University, Germany         |
| Patrick Graupman, M.D.                  | 2000-2001 | University of Minnesota             |
| Darren Lovick, M.D.                     | 1998-2000 | University of Iowa                  |
| Walter Jean, M.D.                       | 1996-1998 | Cornell University                  |
| Margaret Wallenfriedman,<br>M.D., Ph.D. | 1995-1996 | Yale University                     |
| Edison McDaniels, M.D.                  | 1994-1995 | Stanford University                 |
| Eric Flores, M.D.                       | 1993-1994 | University of the Philippines       |
| Jeff Blount, M.D.                       | 1993-1994 | University of Rochester             |

**Visiting Scholars**

|                           |           |  |
|---------------------------|-----------|--|
| Wei-Cheng Lu, M.D.        | 2017-2019 | China Medical University, Shenyang, China  |
| Hui Xie, M.D., Ph.D.      | 2017-2019 | Shenyang Medical College, Shengyang, China |
| Hong-Sung Chun, Ph.D.     | 2010-2011 | Chosun University, South Korea             |
| Ji-Eun Kim, M.D.          | 2006-2008 | Catholic University of Daegu, South Korea  |
| Bo-Woo Jung, M.D.         | 2006-2007 | Kumi Medical Center, South Korea           |
| Joonho Song, M.D.         | 2003-2005 | Hallym University, South Korea             |
| Indrani Maitra, Ph.D.     | 2003-2005 | St. Catherine College, St. Paul, MN        |
| Yu Sawada, M.D.           | 2002-2003 | Akita University School of Medicine, Japan |
| Laurent Lescaudron, Ph.D. | 2000-2001 | University of Nantes, France               |

Kyoyuki Yanaka, M.D. 1995-1997 Tsuba University, Japan

### Junior Faculty

|                         |           |   |
|-------------------------|-----------|---|
| Andrew Grande, M.D.     | 2016-2019 | University of Minnesota, Minneapolis, MN<br>(NIH K12 Award – Neurosurgery)      |
| Ann Parr, M.D., Ph.D.   | 2014-2017 | University of Minnesota, Minneapolis, MN<br>(NIH K12 Award – Neurosurgery)      |
| LeAnn Snow, M.D., Ph.D. | 2007-2011 | University of Minnesota, Minneapolis, MN<br>(NIH K08 Award – Physical Medicine) |
| Vallabh Janardhan, M.D. | 2006-2009 | University of Minnesota, Minneapolis, MN<br>(NIH K12 Award – Neurology)         |

## PROFESSIONAL SERVICE AND PUBLIC OUTREACH

### Editorships/Journal Reviewer Experience

Editorial Board, *American Journal of Translational Research* (2008)  
 Associate Editor, *Stem Cells and Development* (2006)  
 Guest Editor, *Cell Transplantation, Special Issue on Guidelines and Regulations for Cell Transplantation Therapies, 1995*

Ad Hoc Reviewer:

*American Journal of Physiology*  
*Behavioral and Brain Sciences*  
*Behavioral Brain Research*  
*Brain Research*  
*Brain Research Bulletin*  
*Canadian Journal of Zoology*  
*Cancer Immunology and Immunotherapy*  
*Cell Transplantation*  
*Clinical Transplantation*  
*Experimental Neurology*  
*Experimental Hematology*  
*FEBS Letters*  
*Future Neurology*  
*International Journal of Neuroscience*  
*Journal of Cell Science*  
*Journal of Cellular and Molecular Medicine*  
*Journal of Immunology*  
*Journal of Neurochemistry*  
*Journal of Neuroimmunology*  
*Journal of Neuro-Oncology*  
*Journal of Neurophysiology*  
*Journal of Neuroscience*  
*Journal of Neuroscience Research*  
*Journal of the Autonomic Nervous System*

*Medicinal Research Reviews*  
*Molecular and Cellular Neurosciences*  
*Nature Medicine*  
*Neuro-Oncology*  
*Neuroscience*  
*Neuroscience Letters*  
*Physiology and Behavior*  
*PLOS One*  
*Restorative Neurology and Neuroscience*  
*Science*  
*Stem Cells*  
*Stem Cells and Development*  
*Stroke*  
*Surgical Neurology*  
*Trends in Neuroscience*

**Review panels for external funding agencies, foundations, etc.**

Member, NIH Center for Scientific Review, ZNS1 SRB-L Study Section, Special Emphasis Panel, 2018

Member, State of Minnesota Spinal Cord Injury and Traumatic Brain Injury Scientific Review Committee, 2017-2019.

Member, NIH Center for Scientific Review, ZRG1 Study Section, Animal Models and Stem Cell-based therapies for Regenerative Medicine, 2016

Chair, Advisory Committee for Scientific Review, State of Minnesota Traumatic Brain Injury and Spinal Cord Injury Program, 2015-2017

Member, American Cancer Society, Grant Review Study Section, 2009

Member, NIH Center for Scientific Review, Biological Chemistry and Macromolecular Biophysics Study Section, 2009

Member, NIH Center for Scientific Review, Neurogenesis and Cell Fate Study Section, Washington, DC, 2006-2008

Ad-Hoc Grant Reviewer, Alberta Heritage Foundation for Medical Research, Edmonton, AB, Canada, 2006

Ad-Hoc Member, National Aeronautics and Space Administration Research Program Grant Review Committee, 2005

Ad hoc Reviewer on Stem Cells, Veterans Administration, 2003

Ad hoc Reviewer, Internal Grants Program, Rush University Medical Center, Chicago, 2003

Ad hoc Reviewer on Stem Cells, Veterans Administration, 2002

Ad hoc Reviewer for the Telethon Research Program of Italy, 2002

Ad hoc Reviewer on Stem Cells, National Institute of Drug Abuse, 2001

External Grant Reviewer, U.S. Army Medical Research Study Section on Parkinson's Disease and Neurotoxins, 1997

External Grant Reviewer, Veterans Administration Medical Research Service, 1997-98.

Ad Hoc Member, National Institute of Health, NIGMS, Special Review Committee for Predoctoral Institutional Training Grants, 1994.

Ad Hoc Member, National Institutes of Health, NINDS Program Project Review Committee, 1992.

Ad Hoc Reviewer, United States-Israel Bi-national Science Foundation, 1988.

Ad Hoc Reviewer, National Science Foundation, Developmental Neuroscience Study Section, 1985, 1988.

### **Organization of conferences, workshops, panels, symposia**

Scientific Program Committee, WORLD Meeting on Lysosomal Storage Disorders, Orlando, FL, 2019

Scientific Program Committee, WORLD Meeting on Lysosomal Storage Disorders, San Diego, CA, 2017

Chair, Scientific Session on Basic Sciences, WORLD Meeting on Lysosomal Storage Disorders, Orlando, FL, 2016

Organizing Scientific Program Committee Member, WORLD Meeting on Lysosomal Storage Disorders, Orlando, FL, 2015-2016

Member, Scientific Committee, 13<sup>th</sup> International Symposium on Neural Transplantation and Repair, Beijing, China, 2014-2015.

Chair, Scientific Session on Basic Sciences, WORLD Meeting on Lysosomal Storage Disorders, Orlando, FL, 2013

Organizing Committee Member, WORLD Meeting on Lysosomal Storage Disorders, Orlando, FL, 2012-2013

Chair, Scientific Session on Gene Therapy and Novel Approaches, American Society for Neural Therapy and Repair, Clearwater, FL, 2012

Member, International Organizing Committee, 9th International Conference on Neural Transplantation and Repair, Taipei, Taiwan, 2004-2005.

Chair, Scientific Session I, International Meeting for Stem Cells and Transplantation, Nantes, France, 2003

Co-Chair, Scientific Session on “Stem Cells and Progenitors”, American Society for Neural Transplantation and Repair, Annual Meeting, Clearwater, Florida, 2001

Member, Scientific Program Committee, American Society for Neural Transplantation and Repair, Annual Meeting, Clearwater, Florida, 2001

Chairperson, Scientific Session on “Neural Stem Cells”, American Society for Neural Transplantation and Repair, Annual Meeting, Clearwater, Florida, 2000

Chairperson, Scientific Session on Xenotransplantation, Lehman Conference, Minneapolis, Minnesota, 2000

Organizer, American Association of Neurological Surgeons Satellite Symposium on “Deep Brain Stimulation for the Treatment of Parkinson’s Disease”, 1996.

Local Organizing Committee, 2nd International Congress of the Cell Transplantation Society, 1993-1994.

Chairperson, Scientific Session on Molecular Mechanisms of Cell Death and Restoration of Function, 5th International Symposium on Neuronal Control of Bodily function - Molecular Neurobiology, the Aging Process and Neurodegenerative Disorders, Indianapolis, IN 1988.

Organizing and Scientific Program Committee, 5th International Symposium on Neuronal Control of Bodily Function - Molecular Neurobiology, the Aging Process, and Neurodegenerative Disease, 1987.

### **Committee memberships**

Member, Ethics Committee, Genome Writers’ Guild, 2019

External Chair, Thesis Defense, University of South Florida, Tampa, FL, 2008

Member, NIH Study Section, ZHL1 CSR-H, National Heart Lung and Blood Institute Special Emphasis Panel, 2005

President-elect, American Society for Neural Transplantation and Repair, 2004

External Member, Doctoral Thesis Committee, Stem Cells and Cerebral Ischemia, University of South Florida, 2004.

Member, Education Committee, American Society for Neural Transplantation and Repair, 1999-present.

Clinical Practice Committee, American Society for Neural Transplantation, 1995-present.

Scientific Program Committee, American Society for Neural Transplantation, First Annual Meeting, 1994.

Secretary Elect, American Society for Neural Transplantation, 1994-1995.

Member, Workshop on Scientific Literacy in Neuroscience, Society for Neuroscience, 1992.

Technical Committee, Colloquium on Computational Neuroscience, Satellite Conference of the IEEE International Symposium on Systems, Man and Cybernetics, Indianapolis, IN, 1992.

Member, Stroke Council, American Heart Association National Center, 1991-present.

Advisory Panel, National Research Council, Washington, D.C., 1988-1990.

National Chapters Delegate, Society for Neuroscience, 1985.

### **Public Advocacy**

Minnesota Legislative Initiative for Spinal Cord and Traumatic Head Injury Research Fund, 2016, \$6 million biennial state appropriation.

Minnesota Legislative Initiative for Spinal Cord and Traumatic Head Injury Research Fund, 2012-2015, \$1 million biennial state appropriation.

### **Service to the University/Medical School/Department**

#### **University-wide service**

Member, MNCreST Training Grant Executive Committee, 2015-2018

Member, Review Committee for UMN Research Infrastructure Investment Grants, 2015

Member, Scientific Advisory Board, Powell Center for Women's Health, University of Minnesota, 2013.

Member, Grant Review Committee, College of Pharmacy, University of Minnesota, 2011

Member, Graduate School, Grant-in-Aid review committee, University of Minnesota, 2009-2012.

Member Elect, University Senate, University of Minnesota, 2009-present

Member Elect, Dean's Advisory Committee, University of Minnesota Medical School, 2009-present

Member, American Cancer Society Grant Review Committee, University of Minnesota Medical School, 2009-2012.



- Member, Masonic Cancer Center Brainstorm Award Review Committee, University of Minnesota Medical School, 2009
- Member, Research Council, University of Minnesota Medical School, 2006-2009
- Member, Faculty Mentor Liaison Committee, University of Minnesota Medical School, 2008
- Chair, Search Committee for Faculty in Neuromodulation, University of Minnesota Medical School, 2007
- Chair, Search Committee for Faculty in Translational Neuroscience, University of Minnesota Medical School, 2005
- Member, Graduate School, Grant-in-Aid Review Committee, 2005
- Faculty Member, Mini-Med School, University of Minnesota Medical School, 2004, 2006
- Member, Promotion and Tenure Committee, University of Minnesota Medical School, 2004-2007
- Member, Diversity Task Force, University of Minnesota, 2004-2006
- Member, Technology Transfer Liaison Search Committee, Office of Patents and Technology Transfer, University of Minnesota, 2004
- Senator Elect, University Senate, University of Minnesota, 2003-2006.
- Chair, Search Committee for Faculty in Neural Stem Cell Biology, University of Minnesota Medical School, 2003
- Member, Dean's Task Force on Allied Health, University of Minnesota Medical School, 2003
- Chair, Nominations Subcommittee, Faculty Advisory Committee to the Dean, University of Minnesota Medical School, 2002
- Chair, Diversity Subcommittee, Faculty Advisory Committee to the Dean, University of Minnesota Medical School, 2002
- Member, Nominations Committee, University of Minnesota Medical School, 2001
- Member, Neuroscience Strategic Planning Committee, University of Minnesota Medical School, 2001
- Member, Search Committee, Stem Cell Institute, University of Minnesota, 2000, 2002
- Member, Steering Committee, Center for Molecular and Cell Therapy, University of Minnesota Medical School, 2000-2001
- Member, Medical School Faculty Advisory Committee, University of Minnesota, 2000-2003.

Senator Elect, University Senate, University of Minnesota, 2000-2003.

Member, Steering Committee, Graduate Program in Neuroscience,  
University of Minnesota Medical School, 1999-2002

Reviewer, Undergraduate Research Opportunity Program (UROP) Grants, University of  
Minnesota  
Medical School, 1998-present.

Member, Search Committee for Head of the Department of Psychiatry, University of Minnesota  
Medical School, 1998-1999.

Member, Medical School Space Allocation Committee, University of Minnesota, 1997- 2000.

Member, Center for Molecular and Cell Therapy Task Force, Academic Health Center,  
University of Minnesota, 1997-99.

Member, Animal Advisory Committee, University of Minnesota Medical School, 1997-2000.

Interviewer, Medical Admissions Committee, University of Minnesota Medical School,  
1990-95.

M.D./Ph.D. Combined Degree Program, University of Minnesota Medical School,  
1991-present.

Full Member, Graduate Faculty, University of Minnesota Graduate School, 1990-present.

Executive Faculty, University of Minnesota Medical School, 1990-present.

Biomedical Research Grant Review Committee, Indiana University School of Medicine,  
1989-90.

M.D./Ph.D. Combined Degree Committee, Indiana University School of Medicine,  
1989-90.

Laboratory Animal Use Review Committee, Indiana University School of Medicine,  
Indianapolis, IN, 1989-90.

Animal Care Committee, Indiana University - Purdue University Indianapolis,  
IN, 1989-1990.

Full Member, Graduate School, Indiana University, Bloomington, IN, 1987-90.

Faculty Member, Indiana University-Purdue University at Indianapolis (IUPUI),  
1983-90.

Education and Curriculum Topics Committee on the Central Nervous System, Indiana  
University School of Medicine, Indianapolis, IN 1989-1990.

Organizing Committee, Indiana University School of Medicine, First Annual Scientific  
Session, Indianapolis, IN, 1989.

Moderator, Indiana University School of Medicine, First Annual Scientific Session, Indianapolis, IN, 1989.

Member, Graduate Fellowship Committee, Indiana University School of Medicine, Indianapolis, IN, 1986-1988.

Faculty Member, Freshmen Medical Student Support Program, Indiana University School of Medicine, Indianapolis, IN, 1984-88.

Medical Cell Science Review Committee, Indiana University, Bloomington, IN, 1988

Member, Search and Screen Committee, Dept. of Pathology, Indiana University School of Medicine, Indianapolis, IN, 1988.

Faculty Member, Honors Council, Indiana University-Purdue University at Indianapolis, 1987-1988.

Associate Member, Graduate School, Indiana University, Bloomington, IN, 1985-1987.

### **Department/Unit Service**

Organizer, Joint Surgery and Neurosurgery Research Day, University of Minnesota, 2019

Member, Research Discovery Committee, Dept. Neurosurgery, University of Minnesota, 2014-18

Neurosurgery Residency Program Coordination, University of Minnesota, 2009

Member, Faculty Status Committee, Graduate Program in Neuroscience, University of Minnesota Medical School, 2005-2008.

Member, Curriculum Committee, Department of Neurosurgery, University of Minnesota Medical School, 2003-present.

Chairman, Neuroscience Graduate Program Seminar Committee, University of Minnesota Medical School, 1999-2003.

Member, Faculty Status Committee, Department of Physiology, University of Minnesota Medical School, 1994-1999.

Chair, Minority Recruitment Committee, Program in Neuroscience, University of Minnesota Medical School, 1994-1996.

Member, Steering Committee, Program in Neuroscience, University of Minnesota Medical School, 1994-1996; 1998-2003.

Admissions Committee, Program in Neuroscience, University of Minnesota Medical School, 1993-1996.

Member, Minority Recruitment Committee, Program in Neuroscience, University of Minnesota Medical School, 1992-1994.

Member, Development Officer Search Committee, Department of Neurosurgery, University of Minnesota Medical School, 1992.

Director, Basic Science Teaching Conference, Department of Neurosurgery, University of Minnesota Medical School, 1996-present.

Co-Director, Basic Science Teaching Conference, Department of Neurosurgery, University of Minnesota Medical School, 1990-1996.

Resident Examination and Evaluation, Department of Neurosurgery, University of Minnesota Medical School, 1990-present.

Resident Admissions, Department of Neurosurgery, University of Minnesota Medical School, 1990-present.

Department Development Committee, Dept. of Physiology and Biophysics, Indiana University School of Medicine, 1989-90.

Coordinator, Public Relations, Dept. of Physiology and Biophysics, Indiana University School of Medicine, 1989-90.

Director, Graduate Program in Physiology and Biophysics, Indiana University School of Medicine, 1985-1988.

Faculty Member, Promotion and Tenure Committee, Department of Physiology and Biophysics, Indiana University School of Medicine, 1985-1988.

Steering Committee Member, Committee on Microcomputers in Physiology, Department of Physiology and Biophysics, Indiana University School of Medicine, 1984-1987.

Coordinator, Department of Physiology and Biophysics Seminar Series, Indiana University School of Medicine, Fall 1986.

Course Organizer, Physiology and Biophysics F499, Directed Research in Medical Physiology and Biophysics for Undergraduates, Indiana University, 1985.

### **Community Outreach Activities**

Chair, State of Minnesota Spinal Cord and Traumatic Head Injury Research Fund Advisory Committee, 2013-2019

Member, Minnesota Brain Bee Organizing Committee, Minneapolis, MN 2008

Member, Outreach Committee, Graduate Program in Neuroscience, University of Minnesota, 2007

Scientist of the Week, Minnesota Science Museum, Minneapolis, MN, 2002

Brain Awareness Week Outreach, Twin Cities Metro Area, 1998-present.

Ad Hoc Member, Hennepin County Medical Center Grant Review Committee, Minneapolis, 1997-1998.

Science Fair Judge, Minnetonka High School, Minnetonka, MN, 1996

Search Committee Member, Department of Surgery, Division of Neurosurgery, Hennepin County Medical Center, Minneapolis, 1995.

Science Fair Judge, Clear Springs Elementary School, Minnetonka, MN, 1995.

Chairman, Grass Foundation Lecturer Search Committee, Society for Neuroscience, Voyageurs (Minnesota) Chapter, 1992-1993.

Ad Hoc Member, Hennepin County Medical Center Grant Review Committee, Minneapolis, 1992.

Scientific Advisor, Board of Directors, Supporters United for Parkinson's Education and Research (SUPER), Minneapolis, MN, 1992-present.

Member, American Parkinson's Disease Association, Minnesota Chapter, 1991-94.

Grassroots Network Representative, Society for Neuroscience, Indianapolis Chapter, 1989-90.

Member, Executive Committee, Indianapolis Chapter, Society for Neuroscience, 1987-1990.

Local Organizing Committee, Grass Foundation Traveling Scientist Program, Society for Neuroscience, Indianapolis Chapter, 1988, 1990.

President, Society for Neuroscience, Indianapolis Chapter, Indianapolis, Indiana, 1985-1987.

Editor, Neuroscience News, Society for Neuroscience, Indianapolis Chapter, 1985-1987.

Organizer, 4th Regional Meeting, Indianapolis Chapter, Society for Neuroscience, Lilly Corporate Center, Indianapolis, IN, 1987.

Organizer, 3rd Regional Meeting, Indianapolis Chapter, Society for Neuroscience, Lilly Corporate Center, Indianapolis, IN, 1986.

Chairman, Local Organizing Committee, Grass Foundation Traveling Scientist Program, Society for Neuroscience, Indianapolis Chapter, 1985.

Executive Committee Member, Society for Neuroscience, Vermont Chapter, Burlington, Vermont, 1981-1983.

**CITATION ANALYSIS  
TOP 10 UNIVERSITIES: BIOLOGICAL SCIENCES\*  
(1987 - 1990)**

| RANK | INSTITUTION            | NUMBER<br>OF PAPERS | TOTAL<br>CITATIONS | CITATIONS<br>PER PAPER |
|------|------------------------|---------------------|--------------------|------------------------|
| 1    | Rockefeller            | 1,646               | 13,094             | 7.96                   |
| 2    | Caltech                | 837                 | 6,450              | 7.71                   |
| 3    | MIT                    | 2,025               | 14,246             | 7.04                   |
| 4    | Stanford               | 3,962               | 24,539             | 6.19                   |
| 5    | Princeton              | 612                 | 3,713              | 6.07                   |
| 6    | UC Berkeley            | 2,353               | 14,025             | 5.96                   |
| 7    | Harvard                | 10,610              | 59,557             | 5.61                   |
| 8    | UC San Francisco       | 5,908               | 29,838             | 5.05                   |
| 9    | UC San Diego           | 3,824               | 17,566             | 4.59                   |
| 10   | U. Oregon              | 378                 | 1,731              | 4.58                   |
| --   | <b>Walter C. Low**</b> | <b>207***</b>       | <b>15,967</b>      | <b>77.14</b>           |

\*Source: *The Scientist*, March 8, 1993

\*\*Peer reviewed publications and citations from 1980 – 2017

\*\*\*The ***h-index*** of 54 for the scientific impact of these publications is ranked above the 95<sup>th</sup> percentile among faculty in academic neurosurgery departments in the United States.