

**ALEXANDER GEORGE RABCHEVSKY, Ph.D.****DEPARTMENT OF PHYSIOLOGY  
SPINAL CORD & BRAIN INJURY RESEARCH CENTER  
The University of Kentucky College of Medicine**

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**EDUCATION AND PROFESSIONAL TRAINING**

- 1988:** B.S. (Biology) • Hampden-Sydney College, Hampden-Sydney, VA
- 1995:** Ph.D. (Neuroscience) • University of Florida, Department of Neuroscience, Gainesville, FL  
**Thesis Title:** Intraspinal transplantation of microglia: Studies of host cellular responses and effects on neuritic growth Mentor: Paul J. Reier, Ph.D.

**PROFESSIONAL EXPERIENCE**

- 1988-1990:** **Biological Laboratory Technician**, Department of Pharmacology, Uniformed Services University of the Health Sciences (USUHS), Bethesda, MD

**ACADEMIC APPOINTMENTS**

- 1990-1995:** **Graduate Research Assistant**, University of Florida College of Medicine, Gainesville, FL
- 1992-1995:** **Graduate Teaching Assistant**, Medical & Veterinary Neuroscience, University of Florida College of Medicine, Gainesville, FL
- 1995-1997:** **Foreign Postdoctoral Fellow**, INSERM Unité 421, University of Paris XII, Creteil, France
- 1997-1999:** **Postdoctoral Scholar**, Sanders-Brown Center on Aging, University of Kentucky, Lexington, KY
- 1999-2001:** **Research Associate**, Department of Anatomy & Neurobiology, University of Kentucky College of Medicine, Lexington, KY
- 2002-2007:** **Assistant Professor**, tenure track, Department of Physiology, Spinal Cord & Brain Injury Research Center (SCoBIRC), University of Kentucky College of Medicine, Lexington, KY
- 2004-:** **SCoBIRC Endowed Chair #1**, University of Kentucky College of Medicine, Lexington, KY
- 2007-13:** **Associate Professor** with tenure, Department of Physiology, SCoBIRC, University of Kentucky College of Medicine, Lexington, KY
- 2013-:** **Professor** with tenure, Department of Physiology, SCoBIRC, University of Kentucky College of Medicine, Lexington, KY

**AWARDS/HONORS**

- 1987:** Presidential Award for Leadership and Character, Hampden-Sydney College, VA
- 1987:** Biological Fellowship (Molecular Genetics; Department of Biology), Emory University, Atlanta, GA
- 1988:** Presidential Award for Courageousness, Hampden-Sydney College, VA
- 1988:** Graduated with B.S. one semester behind my class (1987) despite missing an entire academic year following an accident rendering me paraplegic in 1985, Hampden-Sydney College, VA
- 1991-93:** Pre-Doctoral Studentship Award, Rick Hansen Man in Motion Legacy Fund, Canada, Department of Neuroscience, College of Medicine (COM), University of Florida, Gainesville, FL
- 1994:** Graduate Assistant Teaching Award, Medical Neuroscience, COM, University of Florida, Gainesville, FL

- 1994:** “Poster Excellence” Cash Prize Award, 12<sup>th</sup> National Neurotrauma Society Symposium, Miami, FL
- 1999:** National Research Service Award, Postdoctoral Fellowship, NIH/NINDS (University of Kentucky)  
“Mechanisms of bFGF effects after spinal cord injury. \$40,000/year **Declined**”
- 2004:** Provost Retention Award, College of Medicine, University of Kentucky
- 2004-:** SCoBIRC Endowed Chair #1, College of Medicine, University of Kentucky
- 2004-20:** Charles T. Wethington Award, “Excellence in Research,” College Medicine, University of Kentucky
- 2006:** Abraham Flexner Master Educator Award for “Outstanding Teaching Contribution,” Center for Excellence in Medical Education, University of Kentucky
- 2008:** James W. Holsinger Award for “Excellence in Teaching,” Department of Physiology and the College of Medicine, University of Kentucky
- 2010-18:** No Barriers USA, Board of Directors member, Fort Collins, CO
- 2013:** James W. Holsinger Award for “Excellence in Teaching,” Department of Physiology and the College of Medicine, University of Kentucky
- 2016-19:** The National Neurotrauma Society, Council Member
- 2017-:** Independence Place KY, Inc., Board of Directors member, Lexington, KY
- 2018-20:** North American Spinal Cord Injury Consortium (NASCI), Delegate, Executive Council member
- 2018-20:** NASCI Advisory Team to the Bladder/Bowel Working group, Craig H. Neilsen Foundation
- 2018-:** Unite 2 Fight Paralysis, Board of Directors member, Minneapolis, MN
- 2018-:** NextStep Raleigh, Board of Directors member, Raleigh, NC
- 2019:** “Friend of the Year Award,” Friends for Michael, Inc. Spinal Cord injury Organization, Louisville, KY
- 2019:** “Tom Gravitt Advocacy Award,” Kentucky Congress on Spinal Cord Injury, Lexington, KY
- 2020:** “Albert Nelson Marquis Lifetime Achievement Award,” Marquis Who’s Who

#### **TEACHING ACTIVITY at UNIVERSITY OF KENTUCKY**

- 2002:** Medical Neuroscience-MD 817, U.K., “Therapeutic interventions following spinal cord injury: Defining targets of experimental treatments.” (fall)
- 2002:** Physical Therapy-PT 827, U.K., “A surgically implanted ‘Functional Electrical System’ for standing and walking.” (fall)
- 2003-09:** Principles of Human Physiology-PGY 412G, U.K., “Neurophysiology” (spring & fall)
- 2003:** Medical Neuroscience-MD 817, U.K., “Spinal cord injury: Clinical treatment from lab bench to clinical trials.” (fall)
- 2004:** Medical Neuroscience-MD 817, U.K., “Spinal cord injury: Dysfunctions & therapeutic approaches.” (fall)
- 2004:** Advanced Pharmacology-PHA 658, U.K., “Modern viral approaches.” (fall)
- 2005:** Medical Neuroscience-MD 817, U.K., “Spinal cord injury & functional electrical stimulation.” (fall)
- 2005:** Principles of Neurobiology -ANA 605, U.K., “Spinal cord injury models” and “Autonomic dysreflexia after spinal cord injury.” (fall)
- 2006-08:** Dental Human Function-OBI 814, U.K., “Neurophysiology” (fall)

- 2007:** CNS Injury and Repair, Special Topics Course-ANA 780 & PGY 630-U.K., “Spinal cord injury models” and “Autonomic dysreflexia after spinal cord injury” and “Post-traumatic demyelination & remyelination (fall)
- 2008:** Physical Therapy-PT 827, U.K., “Plasticity of both visceral sensory fibers and propriospinal neurons is associated with the development of autonomic dysfunction after spinal cord injury.” (fall)
- 2009-19:** Neurobiology of CNS Injury & Repair-ANA 605 & PGY 605, U.K., “Spinal cord injury models” and “Intraspinal plasticity associated with autonomic dysreflexia after SCI” and “Post-traumatic demyelination & remyelination (fall)
- 2009-19:** Physical Therapy-PT 827, U.K., “Pathophysiology of spasticity and autonomic dysreflexia after spinal cord injury,” and “Spinal cord injury & functional electrical stimulation.” (fall)
- 2010-18:** Elementary Physiology-PGY 206, U.K., “Endocrinology” (spring & fall)
- 2015:** Undergraduate Honors Program-HON 301, U.K., “Where are all the women?” (spring)
- 2015:** Graduate Gerontology Program-GRN 650, U.K., “Research methods and design” (fall)
- 2018:** Neuroscience Seminar-BIO 426, U.K., “Spinal cord injury: Pathophysiology and therapeutics” (fall)

#### TEACHING ACTIVITY at OTHER NATIONAL INSTITUTES

- 2001:** The Reeve-Irvine Research Center, Spinal Cord Injury Techniques Course, University of California at Irvine, Department of Anatomy & Neurobiology, “Growth factor therapy for recovery after spinal cord injury.” (summer)
- 2002:** The Reeve-Irvine Research Center, Spinal Cord Injury Techniques Course, University of California at Irvine, Department of Anatomy & Neurobiology, “Therapeutic interventions following spinal cord injury: clinical treatment to lab bench to clinical trials.” (summer)
- 2003:** The Reeve-Irvine Research Center, Spinal Cord Injury Techniques Course, University of California at Irvine, Department of Anatomy & Neurobiology, “Gene therapy for spinal cord dysfunction,” and “A surgically implanted neuroprosthesis for exercise, standing, and transfers after spinal cord injury.” (summer)
- 2004:** The Reeve-Irvine Research Center, Spinal Cord Injury Techniques Course, University of California at Irvine, Department of Anatomy & Neurobiology, “Dysfunction after spinal cord injury: Clinical and experimental therapeutics.” (summer)
- 2006-07:** Neurobiology-Bio S315, University of North Carolina, Pembroke, Department of Biology, “Spinal cord injury: dysfunctions, clinical treatments, experimental models & therapeutics.” (teleconferences with Dr. Robert Poage, fall)
- 2006-07:** The Reeve-Irvine Research Center, Spinal Cord Injury Techniques Course, University of California at Irvine, Department of Anatomy & Neurobiology, “Plasticity of both sensory axons and propriospinal neurons influences the severity of autonomic dysreflexia after complete spinal cord injury,” and “Basic fibroblast growth factor (FGF-2) therapy for recovery of motor function.” (summer)
- 2007:** Spinal Cord Injury Research Training Program, The NIH and The Ohio State University, Center for Brain and Spinal Repair, “Plasticity of both sensory axons and propriospinal neurons influences the severity of autonomic dysreflexia after complete spinal cord injury,” and “Spinal cord injury & functional electrical stimulation.” (summer)
- 2009-13:** Spinal Cord Injury Research Training Program, The NIH and The Ohio State University, Center for Brain and Spinal Repair, “Modulating the pathophysiology of autonomic dysreflexia after spinal cord injury.” (summer)
- 2016:** Miami Project to Cure Paralysis, University of Miami, Miller School of Medicine, Miami, FL, “Autonomic dysreflexia following spinal cord injury.” (teleconference with Dr. Vance Lemmon, fall)

**ADVISING/MENTORING at U.K.: Students, Post-Doctoral Fellows & Visiting Scholars*****Completed:***

1. **2002:** Janna Hackett, U.K. 2<sup>nd</sup> Year Medical Student, Federal Work Study Program (summer rotation)
2. **2002-05:** Karah Nazor (U.K Gerontology); PhD Dissertation committee
3. **2002-05:** Michael Smith (U.K. Anatomy & Neurobiology); PhD Dissertation committee
4. **2003-04:** Igor Voskresensky, U.K. 2<sup>nd</sup> Year Medical Student, summer-fall rotations (U.K. STEPS Program)
5. **2003:** Leslie Schwindel, undergraduate summer rotation (U.K. STEPS Program)
6. **2003-07:** Kristine Ziemba (U.K. Physiology); PhD Dissertation committee
7. **2003-04:** Dr. Adrian A. Cameron, now faculty associate at University of Melbourne, Australia
8. **2003:** George Day; rotating IBS graduate student
9. **2004-08:** Yiqin Xiong (U.K. Anatomy & Neurobiology); PhD Dissertation committee
10. **2005:** Leslie Phillips (Educational & Counsel Psych); External member of PhD Dissertation committee
11. **2005:** Fujian Zhang (U.K. Nutritional Sciences); PhD Dissertation committee, External Examiner
12. **2005:** Christopher Trimby; rotating IBS graduate student
13. **2005:** Andrew Sauerbeck; rotating IBS graduate student
14. **2005-11:** Christopher Trimby (U.K. Physiology); PhD Dissertation committee
15. **2005-06:** Dr. Sairam Krishnamurthy, now Professor of Pharmaceutics at Banaras Hindu University, India
16. **2005-08:** Dr. Shaoping Hou, now Asst Professor at Drexel University, Dept of Neurobiology & Anatomy
17. **2006-09:** Dr. Hanad Duale, now CEO at Kare Intellex, Inc. Columbus, OH
18. **2006-14:** Dr. Samirkumar Patel, now Research Assistant Professor, Department of Physiology, UK COM
19. **2006:** Erica Fleishaker; rotating IBS graduate student
20. **2007:** Aaron Harris, undergraduate research, U.K. BIO395 Program
21. **2007:** Racine Gue, undergraduate research, U.K. ABT395 Program
22. **2007:** Sarah Reagin, undergraduate research, KYSS Summer Research Program
23. **2007-08:** Joseph Whelan, (U.K. Physiology), Master's thesis advisor, now a Biomedical Scientist at Leidos, Frederick, MD
24. **2008-09:** Jennifer Evans, undergraduate research, U.K. ANA395 Program
25. **2008:** Eva Bach; rotating IBS graduate student
26. **2008:** Darren Miller; rotating IBS graduate student
27. **2008:** Brent Hackett; rotating IBS graduate student
28. **2008:** JaSan Rumph, undergraduate research, U.K. 'Bucks for Brains' Summer Research Program
29. **2008-13:** S. Alex Marshall (Pharmaceutical Sciences); PhD Dissertation committee

**ADVISING/MENTORING at U.K. Completed: (cont.)**

30. **2009:** Ernest Aguilar (Neuroscience; Flinders Univ, AUS); PhD Dissertation committee, External Examiner
31. **2009:** Jenna Gilb, undergraduate research, U.K. BIO395 Program
32. **2009:** Alecia Fields, undergraduate research, U.K. BIO395 Program
33. **2009-12:** Patricia J. Ward (Anatomy & Neurobiology, U. Louisville); PhD Dissertation committee, External Examiner
34. **2009-13:** Shaun Carlson (U.K. Physiology); PhD Dissertation committee
35. **2010:** Dr. Yanling Yang, Foreign Visiting Scholar, Yan'an University Medical School, Yan'an, P.R. China
36. **2010-11:** Oksana Zhurbich, undergraduate research, U.K. BIO395 Program and Federal Work Study Program
37. **2011:** Anthony Gutierrez, Gatton Academy undergraduate summer research fellowship
38. **2011:** Seth Leeds, undergraduate research, U.K. BIO395 Program
39. **2011-13:** Gregory Corder (U.K. Physiology); PhD Dissertation committee
40. **2011:** Jenna VanRooyen; rotating IBS graduate student
41. **2011:** Hyein Jang ; rotating IBS graduate student
42. **2011-12:** Dr. Rachel Hill, now Scientist II in the laboratory of Dr. Edward Hall, U.K.
43. **2011-13:** Taylor Smith, undergraduate research, U.K. CHEM395 Program
44. **2012:** Nathalie Astudillo, undergraduate research, U.K. BIO395 Program
45. **2012:** Nicholas Streck, undergraduate research, U.K. BIO395 Program
46. **2012-13:** Christian Baker, undergraduate research, U.K. BIO395 Program
47. **2012-17:** Jenna VanRooyen-Gollihue, (U.K. Physiology), PhD Dissertation mentor/chair; now postdoctoral scholar in Chris Norris lab, UK Sanders-Brown Center on Aging
48. **2013:** Sarah Figley (Medicine, University of Toronto, CA); PhD Dissertation committee, External Examiner
49. **2013:** Chad Willis, U.K. 2<sup>nd</sup> Year Med Student, Medical Student Research Program (Fed Work-Study)
50. **2013:** Catherine Wang, U.K. 2<sup>nd</sup> Year Med Student, Medical Student Research Program (Fed Work-Study)
51. **2013-14:** Alicia Kaseta, undergraduate research, U.K. Physiology Scholars Program
52. **2013-14:** Jensen Goh, undergraduate research, U.K. Physiology Scholars Program
53. **2013-14:** Katherine Spezzano, undergraduate research, U.K. BIO395 Program
54. **2013-15:** Ana Bahrami, undergraduate research, U.K. BIO395 Program
55. **2014-15:** Catherine Wang, U.K. 3<sup>rd</sup> Year Med Student, Professional Student Mentored Research Fellowship
56. **2014-16:** Jonathan Gardner, undergraduate research, U.K. CHEM395 Program
57. **2014-17:** Jensen Goh, undergraduate research, U.K. BIO395 & KHP395 Programs
58. **2014:** Sang Hee Lee (U.K. Nutritional Sciences); PhD Dissertation committee, External Examiner

**ADVISING/MENTORING at U.K. *Completed: (cont.)***

59. **2014-19:** Khalid Eldahan (U.K. Physiology), PhD Dissertation mentor/chair, now research scientist (pharmacology & molecular imaging) at MI Bioresearch (Covance) Ann Arbor, MI
60. **2015:** Justin Huber, U.K. 4<sup>th</sup> Year Med Student, PGY850 Clinical Resident Program
61. **2015:** Rebecca Joel, undergraduate research, U.K. BIO395 Program
62. **2015:** Ashley Pittman, undergraduate research, U.K. HHS445 Program
63. **2015:** Aileexandria Sandlin, undergraduate research, U.K. ABT301 Program
64. **2015:** Hannah Hollenbach, undergraduate research, U.K. BIO395 Program
65. **2015:** Alex Carter, undergraduate research, U.K. BIO395 Program
66. **2015-19:** Nour Baddar; Doctoral Candidate (Ph.D. U.K. Biology), PhD Dissertation committee
67. **2016:** Kaylin Foreman, undergraduate research, U.K. KHP395 Program
68. **2016:** Meraj Kotwal, undergraduate research, U.K. BIO395 Program
69. **2016:** Carlee Schreiber, undergraduate research, U.K. KHP395 Program
70. **2017:** Christian Baker, undergraduate research, U.K. KHP395 Program
71. **2018:** Alexandra Bruce, undergraduate research, U.K. BIO394 Program
72. **2018:** Sean Dunn, undergraduate research, U.K. BIO394 Program
73. **2019:** Janki Naidugari, undergraduate research, U.K. BIO394 Program
74. **2018-19:** Lydia Boyd, undergraduate research, U.K. PGY394 Program
75. **2019:** Stephen Spezzano, undergraduate research, U.K. PGY394 Program
76. **2019:** Bailee Taylor, undergraduate research, U.K. BIO394/ABT396 Program

***Current:***

77. **2015-:** Dr. Samirkumar Patel, Research Assistant Professor, Department of Physiology, SCoBIRC, U.K. COM
78. **2019-:** Dr. Felicia Mary Michael, Postdoctoral Scholar, SCoBIRC, U.K. COM
79. **2019-:** Cameron Trueblood (Neurobiology & Anatomy, Drexel Univ.); PhD Dissertation committee, External Examiner

**Trainee Awards/Honors:**

- 2007:** Shaoping Hou, PhD – **Outstanding Student Abstract** – *The 25<sup>th</sup> Annual Neurotrauma Society Symposium*, Kansas City, MO
- 2007:** Samir Patel, PhD – **Best Poster, Oral Presentation & Cash Award** – *The 25<sup>th</sup> Annual National Neurotrauma Society Symposium*, Kansas City, MO
- 2008-10:** Hanad Duale, PhD – **Paralyzed Veterans Administration Research Foundation Fellowship # 2561**, (Principle Investigator), *Intraspinal plasticity contributing to autonomic dysreflexia following SCI* (Rabchevsky, Sponsor)
- 2008-09:** Joseph Whelan – **Pre-doctoral Scholar Training grant**, *Therapeutic Strategies for Neurodegeneration Training Grant*, National Institutes of Health-NIDA (1T32 DA022738) (Rabchevsky, Sponsor)

- 2009:** Samir Patel, PhD – **Travel Award recipient**, *The 2nd Joint Symposium of the International and National Neurotrauma Societies*, Santa Barbara, CA Sept 7-11
- 2009:** Samir Patel, PhD – **Awarded Neilsen Foundation Fellowship grant** (7/1/09-6/30/11) **Declined**
- 2012:** Samir Patel, PhD – **Poster Selection for Oral Presentation** – *The 30<sup>th</sup> Annual National Neurotrauma Society Symposium*, Phoenix, AZ July 24
- 2013-14:** Catherine Wang, U.K. 3<sup>rd</sup> Year Medical Student, **Professional Student Mentored Research Fellowship**
- 2013:** Samir Patel, PhD – **Poster Selection for Oral Presentation** – *The 31<sup>st</sup> Annual National Neurotrauma Society Symposium*, Nashville, TN Aug 6
- 2013:** Samir Patel, PhD – **Oral Presentation** – *The 19<sup>th</sup> Annual Kentucky Spinal Cord & Head Injury Research Trust Symposium*, Louisville, KY May 7
- 2014-16:** Jenna VanRooyen – **Pre-doctoral Scholar Training Program grant**, *Neurobiology of CNS Injury and Repair*, National Institutes of Health-NIDA (5T32 NS077889) (Rabchevsky, Sponsor)
- 2015:** Jenna VanRooyen – **Poster Cash Award**, *Bluegrass Society Neuroscience Day*, Civic Center, Lexington, KY, Mar 25.
- 2015:** Jenna VanRooyen – **Travel Award Recipient**, *The 22<sup>nd</sup> Annual American Society for Neural Therapy and Repair Conference*, Clearwater, FL Apr 30 - May 2
- 2015:** Jenna VanRooyen – **Poster Selection for Oral Presentation**, *The 22<sup>nd</sup> Annual American Society for Neural Therapy and Repair Conference*, Clearwater, FL Apr 31
- 2016-17:** Jenna VanRooyen – **NIH/NINDS F31 Grant Award** (Principle Investigator), *Mitochondria transplantation for functional recovery after spinal cord injury* (04/01/16 – 03/31/18) (Rabchevsky, Sponsor)
- 2016:** Jenna VanRooyen – **Poster Award**, *The 4<sup>th</sup> Annual Meeting of the Kentucky Chapter of the American Physiological Society*, BioPharmacy Building, University of Kentucky, Lexington, KY March 24
- 2016-18:** Khalid Eldahan – **Pre-doctoral Scholar Training Program grant**, *Neurobiology of CNS Injury and Repair*, National Institutes of Health-NIDA (5T32 NS077889) (Rabchevsky, Sponsor)
- 2016:** Jenna VanRooyen – **Michael Goldberger Award**, Top (1) ranked poster presentation. *The 34<sup>th</sup> Annual National Neurotrauma Society Symposium*, Lexington, KY June 26-29
- 2016:** Jenna VanRooyen-Gollihue - **Thomas V. Getchell, PhD, Memorial Award**, for excellence in grant writing, *Department of Physiology*, University of Kentucky, Lexington, KY Nov 3
- 2020-22:** Felicia Mary Michael, PhD – **Craig H. Neilsen Foundation Postdoctoral Fellowship #651019** (Principle Investigator), *Chemogenetic silencing of interneurons to modulate autonomic dysreflexia* (06/01/20 – 05/31/22) (Rabchevsky, Sponsor)

#### ADMINISTRATIVE ACTIVITY, UNIVERSITY SERVICE, OUTREACH SERVICE

- Institutional Animal Care and Use committee (IACUC) member, University of Kentucky (U.K.), 2002-2005
- Spinal Cord & Brain Injury Research Center (SCoBIRC) Journal Club Organizer, U.K., 2002-2005
- IACUC “Pain Policy” committee member, U.K., 2004-2005
- SCoBIRC-sponsored Seminar Series Coordinator, U.K., 2003-2005
- Lexington Biannual Kentucky Spinal Cord and Head Injury Research Trust Fund Symposium Organizing committee member, U.K., 2003-2013
- Graduate School Faculty member, U.K. College of Medicine (COM), 2004-present
- SCoBIRC Faculty Search Committee member, U.K., 2004-2008

- “Early Mobility Task Force” committee member, U.K. Chandler Hospital, 2005-2008
- Medical and MD/PhD Student Admissions Interviewer, U.K. COM, 2007-present
- “Society for Promotion of Undergraduate Research” (SPUR), Faculty participant, 2009
- Office of Research Integrity (ORI) Program Review Committee member, Office of the Vice President for Research, U.K. COM, 2009
- Senate Hearing Panel member (Privilege and Tenure), Office of the President, U.K., 2011-2014
- Council of Endowed Professors and Chairs, Steering Committee member, U.K., 2011-2014
- SCoBIRC Faculty Retreat Planning Committee member, U.K., 2012
- New Financial Budget Model Research Work Team, U.K. Office of VP for Research, 2013
- Neuroscience Faculty Search Committee, Department of Biology, U.K., 2015
- Curriculum Subcommittee (Basic Science), U.K. COM, 2016-2019
- Department of Physiology Research committee, U.K. COM, 2018-2022
- Biomedical Education Committee, U.K. COM, 2018-2022

## PROFESSIONAL ACTIVITIES, PUBLIC SERVICE AND PROFESSIONAL DEVELOPMENT

### *Professional Memberships:*

- American Society for Neural Transplantation; Neural Therapy and Repair (1994-present)
- Society for Neuroscience (1995-present)
- National Neurotrauma Society (1996-present)
- Sigma Xi, Scientific Research Society (1997-present)
- Society for Neuroscience, University of Kentucky chapter (1997-present)

### *Local/National/International Service:*

- Co-Chair (Dr. Mary Bunge), ***Neuroprotective and regenerative therapies for spinal cord injury***. The 19<sup>th</sup> Annual National Neurotrauma Society Symposium, San Diego, CA (2001)
- Chair, ***Visceral function and pain in spinal cord injury***. The 10<sup>th</sup> International Symposium on Neural Regeneration, Asilomar Conference, Pacific Grove, CA (2003)
- The National/International Neurotrauma Society Symposia; *Scientific Program Committee, Faculty Poster Judge, Student Abstract Competition* (2004-2011)
- Co-Chair (Dr. Edward Hall), ***Spinal cord injury and neural prostheses***. The 1<sup>st</sup> Translational Neuroscience Conference, Lexington, KY (2005)
- Chair, ***Spinal cord injury, autonomic nervous system and dysfunction***. The 4<sup>th</sup> Congress of the International Society for Autonomic Neuroscience, Marseille, France (2005)
- Co-Chair (Dr. Pat Kochanek), ***Tissue engineering, neurobionics and transplantation***. The 25<sup>th</sup> Annual National Neurotrauma Society Symposium, Kansas City, MO (2007)
- Invited consultant, Spinal Cord Outcomes Partnership Endeavor (SCOPE) Workshop panel. ***Functional Recovery after Spinal Cord Injury: Implications of Different Spinal Injury Patterns and Distinct Therapeutic Targets on Clinical Trial Outcomes***,” Crystal City Hyatt Regency, Arlington, VA (2008)



- Invited Stakeholder, Spinal Cord Injury Research Program (SCIRP), *DOD & Congressionally Directed Medical Research Programs* (CDMRP), Hyatt Dulles, Herndon, VA (2009)
- Moderator of Panel Discussion, *Spinal cord injury and issues unique to this condition*. The 3<sup>rd</sup> Annual Kentucky Appalachian Rural Rehabilitation Network Health Summit, *Issues Related to Spinal Cord Injury and Stroke*, The Center for Rural Development, Somerset, KY (2011)
- Chair, *No Barriers University Scientific Symposia*. No Barriers USA Summit, Winter Park, CO (2011)
- The National Neurotrauma Society, *Strategic Planning Committee member* (2011-2012)
- Moderator of Panel Discussion, *Aging with spinal cord injury from the clients point of view*. The 4<sup>th</sup> Annual Kentucky Appalachian Rural Rehabilitation Network Health Summit, *Issues Related to Spinal Cord Injury and Stroke Across the Life Span*, Eastern Kentucky University, Richmond, KY (2012)
- Invited panelist, NIH/NINDS Workshop (June), *Optimizing the Predictive Value of Preclinical Research*, Washington Plaza Hotel, Washington, DC (2012)
- Chair, *No Barriers University Scientific Symposia*, No Barriers USA Summit, Telluride, CO (2013)
- Moderator of Panel Discussion, *Health and wellness living with spinal cord injury*. The 5<sup>th</sup> Annual Kentucky Appalachian Rural Rehabilitation Network Conference, *Issues Related to Spinal Cord Injury, Stroke and Brain Injury*, The Perkins Conference Center, Eastern Kentucky University, Richmond, KY (2013)
- Debate Team Captain-Pro, *The barrier to axonal regeneration is intrinsic to the neuron*. The 15<sup>th</sup> International Symposium on Neural Regeneration, Asilomar Conference, Pacific Grove, CA (2013)
- Moderator of Panel Discussion, *Issues relating to SCI and TBI and caregivers*. The 6<sup>th</sup> Annual Kentucky Appalachian Rural Rehabilitation Network Conference, *Issues Related to Spinal Cord Injury, Stroke and Brain Injury*, The Perkins Conference Center, Eastern Kentucky University, Richmond, KY (2014)
- Chair, *No Barriers University Scientific Symposia*, No Barriers USA Summit, Park City, UT (2015)
- Moderator of Panel Discussion, *Impact of the ACA from the patient and caregiver point of view*. The 7<sup>th</sup> Annual Kentucky Appalachian Rural Rehabilitation Network Conference, *Healthcare Accessibility for Individuals with Disabilities*, Perkins Conference Center, Eastern Kentucky University, Richmond, KY (2015)
- The National Neurotrauma Society, *Planning Committee member for 34<sup>th</sup> Annual Meeting* (2015-16)
- Panel Discussion member, *How to move from animal models of spinal cord injury to clinical implementation. Pre-course #2 - Progress in Translational Research*. The 42<sup>nd</sup> Annual Meeting of the American Spinal Injury Association (ASIA), Philadelphia, PA (2016)
- Chair, *Management of acute autonomic dysfunction after spinal cord injury*. The 34<sup>th</sup> Annual National Neurotrauma Society Symposium, Lexington, KY (2016)
- Co-Chair (Dr. Lumy Sawaki), *Engineering approaches for functional restoration after spinal cord injury*. The 34<sup>th</sup> Annual National Neurotrauma Society Symposium, Lexington, KY (2016)
- Invited panel participant, NIH/NINDS Workshop (Oct), *Spinal Cord Injury Preclinical Data Workshop: Developing a FAIR Share Community*, 6001 Executive Blvd., North Bethesda, MD (2016)
- Panel Discussion Member, *Communication and self-advocacy; Real world situations and solutions*. The 8<sup>th</sup> Annual Kentucky Appalachian Rural Rehabilitation Network Conference (Sept), *Engagement, Communication & Access*, Perkins Conference Center, Eastern Kentucky University, Richmond, KY (2017)
- Panel Discussion Member, *Exercise as a therapy for spinal cord injury: How to move physical training from animal models to clinical implementation*. The 17<sup>th</sup> International Symposium on Neural Regeneration, (Dec) Asilomar Conference, Pacific Grove, CA (2017)

- Panel Discussion member, *NIH SCI 2020: Launching a Decade for Disruption in Spinal Cord Injury Research: Session 1: Fire and Smoke* - Opportunities in the acute post-injury phase [NINDS, OD-ODP]; *Session 3: With Us, Not for Us: Community activity and priorities* [NINDS/ NCMRR/NINR], (Feb) NIH Natcher Conference Center, Bethesda, MD (2019)
- Co-Chair (Drs. Grace Griesbach and Amy Wagner), *What Does Function Mean to Me? Function After SCI & TBI & Advocacy-Roundtable Lunches*. The 37<sup>th</sup> Annual National Neurotrauma Society Symposium, Pittsburgh, PA (June 29-July 3, 2019)
- Co-Chair (Dr. Dianne Langford), *Targeting mitochondrial medicine to improve functional outcome after CNS injury*. The 37<sup>th</sup> Annual National Neurotrauma Society Symposium, Pittsburgh, PA (2019)

### ***Outreach Service: Local, National and International***

- Coordinator of SCoBIRC “Day in a Wheelchair” experience, in collaboration with Cardinal Hill Rehabilitation Hospital (2006-2007)
- Spinal Cord Injury Unit “Support Group” member, Cardinal Hill Rehabilitation Hospital (2007-2009)
- “Brain Awareness Day,” Faculty volunteer, Explorium of Lexington, KY (Mar 2009)
- “Fayette County Science Fair,” Faculty volunteer, Bryan Station High School, Lexington, KY (2009-2013)
- U.K. “Kentucky Appalachian Rural Rehabilitation Network (KARRN),” advisory board member (2009-present)
- No Barriers USA, “Board of Directors member,” Fort Collins, CO (2010-present)
- Volunteer, “Big Brothers Big Sisters of the Bluegrass,” Lexington, KY (2010-2015)
- “Spinal Cord Injury Peer Alliance Program,” KARRN & Cardinal Hill Rehab Hospital (2010-present)
- Elkhorn Park Neighborhood Association, “Board of Directors member,” Lexington, KY, (2011-2018)
- “Inaugural Kentucky Congress on Spinal Cord Injury,” co-organizer, moderator and keynote speaker, Civic Center, Lexington, KY (May 10, 2013)
- “Second Annual Kentucky Congress on Spinal Cord Injury,” co-organizer and moderator, Clarion Hotel, Lexington, KY (June 18, 2014)
- “Third Annual Kentucky Congress on Spinal Cord Injury,” Vice President and co-organizer, Marriot Griffin Gate Hotel, Lexington, KY (June 18, 2015)
- Invited by Governor Steve Beshear to the Capitol in Frankfort, KY where he signed a proclamation recognizing the KCSCI on the 25<sup>th</sup> anniversary of the Americans with Disabilities Act (ADA) (July 27, 2015).
- “Fourth Annual Kentucky Congress on Spinal Cord Injury,” Vice President and co-organizer, Cardinal Hill Rehabilitation Hospital, Lexington, KY (Sept 15, 2016)
- “Fifth Annual Kentucky Congress on Spinal Cord Injury,” Vice President and co-organizer, Cardinal Hill Rehabilitation Hospital, Lexington, KY (October 6, 2017)
- “Inaugural North American Spinal Cord Injury Consortium (NASCI),” Representative of KCSCI, Airport Hilton, Miami, FL (October 12, 2017)
- NASCI Delegate and Executive Council member (2018-present)
- Disability Awareness Day, “Life in a Wheelchair,” Seton Catholic Elementary School (October 18, 2017)
- Independence Place KY, Inc., Board of Directors member, Lexington, KY (2017-present)

- Unite 2 Fight Paralysis., Board of Directors member, Minneapolis, MN (2018-present)
- “Sixth Annual Kentucky Congress on Spinal Cord Injury,” Vice President and co-organizer, North East Christian Church in Hamburg, Lexington, KY (September 21, 2018)
- “Seventh Annual Kentucky Congress on Spinal Cord Injury,” Vice President and co-organizer, North East Christian Church in Hamburg, Lexington, KY (October 18, 2019)
- “Eight Annual Kentucky Congress on Spinal Cord Injury,” Vice President and co-organizer, Virtual Symposium to over 150 registrants-Covid-19, Lexington, KY (October 9, 2020)

## PEER REVIEW ACTIVITIES

### *Journal Editor:*

- Frontiers in Integrative Physiology: *Guest Editor* of Special Topic Series (2012-13)  
“Plasticity of primary afferent neurons and sensory processing after spinal cord injury”  
[http://www.frontiersin.org/Journal/SpecialTopicDetail.aspx?name=integrative\\_physiology&st=571&sname=Plasticity\\_of\\_primary\\_afferent&x=y](http://www.frontiersin.org/Journal/SpecialTopicDetail.aspx?name=integrative_physiology&st=571&sname=Plasticity_of_primary_afferent&x=y)
- Frontiers in Physiology, section Integrative Physiology, *Associate Editor* (2011-)
- World Journal of Neuroscience, *Associate Editor* (2011-)
- Public Library of Science (PLOS) One, *Editorial Board member* (2014-)

### *Journal Ad hoc Reviewer:*

American Journal of Physiology, Autonomic Neuroscience: Basic and Clinical, BMC Veterinary Research, Brain Research, Burns and Trauma, Cell Reports, Clinical Neurophysiology, European Journal of Neuroscience, Experimental Neurology, Experimental Physiology, Expert Opinion in Pharmacotherapy, Frontiers in Neuroscience, Frontiers in Physiology, Glia, Journal of Applied Physiology, Journal of Comparative Neurology, Journal of Histochemistry and Cytochemistry, Journal of Inborn Errors of Metabolism and Screening, Journal of Integrative Neuroscience, Journal of Neurochemistry, Journal of Neuroimmunology, Journal of Neuropathology & Experimental Neurology, Journal of Neuroscience, Journal of Neuroscience Methods, Journal of Neuroscience Research, Journal of Neurotrauma, Journal of Physiology, Journal of Spinal Cord Medicine, Journal of Translational Engineering in Health and Medicine, Mayo Clinic Proceedings, Neurobiology of Disease, Neuropharmacology, Neuroscience, Neuroscience Letters, Pain Management, Public Library of Science (PLOS) One, Scientific Reports, Spinal Cord, Trends in Neurosciences, The Scientific World, World Journal of Orthopedics

### *Grant Reviewer (study sections, ad-hoc memberships, data safety monitoring boards):*

- American Heart Association (AHA) – (2006-2008)
- Canadian Institutes of Health Research (CIHR) – (2007, 2008)
- Christopher and Dana Reeve Paralysis Foundation – (2004, 2007, 2010)
- Congressional Directed Medical Research Program (Spinal Cord Injury Research Program) – (2010-2013)
- Craig H. Neilsen Foundation (SRB) – (2010-12 *ad hoc*; 2013- *permanent member*)
- Daniel Heumann Foundation – (2003-2004)

- International Spinal Research Trust (Spinal Cord Foundation, UK) – (2004, 2006, 2010, 2011)
- Keck Institute, NJ, Data & Safety Monitoring Board, W81XWH-14-2-0190, Gail Forrest (PI) (2014–present)
- New Jersey Commission on Spinal Cord Research – (2005-2012)
- New York State Spinal Cord Injury Research Program – (2006, 2009)
- NIH: Rare Diseases Clinical Research Consortia (ZRG1 HOP-Y (50) R) – (2009)
- NIH: ARRA RC4 Sustainable Community-Linked Infrastructure Panel (ZRG1 HDM-D (58) – (2010)
- NIH/NINDS: NST-1 Subcommittee member (K Awards in Neuroscience/Neurology) (2011-2013)
- NIH/NINDS: Clinical Neuroplasticity and Neurotransmitters-CNNT, ad hoc member (2016-2017)
- Ontario Research Fund - Research Excellence program – (2010-2011)
- State of South Carolina, Spinal Cord Injury Research Fund – (2003)
- Veterans Health Administration, RRD0 (RR&D Merit Review Award) – (2010-2011)

### ***SPEAKING ENGAGEMENTS – INVITED LECTURES and SEMINARS***

#### ***LOCAL:***

1. ***Basic fibroblast growth factor (bFGF) reduces tissue damage and enhances recovery following spinal cord injury to the rat*** • Annual KSCHIRT Symposium, University of Kentucky, Lexington, KY 1998
2. ***Effects of basic fibroblast growth factor (bFGF) therapy on spinal cord injury*** • University of Kentucky, Spinal Cord & Brain Injury Research Center, Lexington, KY 2000
3. ***Effects of basic fibroblast growth factor (bFGF) and combination therapy on spinal cord injury*** • Annual KSCHIRT Symposium University of Kentucky, Lexington, KY 2000
4. ***Growth factor and gene therapy for functional recovery after spinal cord injury*** • University of Kentucky, Department of Physiology, Lexington, KY 2001
5. ***Modulating the pathophysiology of autonomic dysreflexia after spinal cord injury*** • University of Kentucky, Department of Physiology, Lexington, KY 2011
6. ***Autonomic dysreflexia, electrical implants, no barriers: Perspectives from a paraplegic neuroscientist*** • Appalachian Health Summit, *Quality of Life Following Neurotrauma*, Civic Center, Lexington, KY March 29, 2012
7. ***Experimental design: Applying scientific method, power and avoiding bias*** • University of Kentucky, Spinal Cord and Brain Injury Research Center, Lexington, KY August 8, 2012
8. ***Novel targets for spinal cord injury therapeutics: Bioenergetic and autonomic dysfunctions*** • University of Kentucky, Department of Physiology, Lexington, KY October 31, 2012
9. ***Keynote Address*** • Inaugural Kentucky Congress on Spinal Cord Injury, Civic Center, Lexington, KY May 10, 2013
10. ***Changing serotonin receptor 2C splice variants to combat spasticity after spinal cord injury*** • University of Kentucky, Department of Molecular & Cellular Biochemistry, Lexington, KY September 26, 2017

**STATE:**

11. ***Basic fibroblast growth factor (bFGF) enhances functional recovery and tissue sparing after spinal cord injury*** • Annual KSCHIRT Symposium, Louisville, KY 1999
12. ***Growth factor therapies and transplantation strategies for spinal cord injury*** • University of Louisville, Department of Neurological Surgery, Louisville, KY 2000
13. ***Growth factor and steroid therapy for recovery after spinal cord injury*** • Annual KSCHIRT Symposium, *Frontiers in Spinal Cord Regeneration*, Louisville, KY 2001
14. ***Combination therapies for recovery after spinal cord injury: steroids and growth factors*** • Annual KSCHIRT Symposium, *Frontiers in Spinal Cord Regeneration*, Louisville, KY 2003
15. ***Experimental potentials and clinical pitfalls of SCI therapeutics: Perspectives from a neuroscientist with SCI*** • Annual KSCHIRT Symposium, University of Louisville, Louisville, KY 2007
16. ***Mitochondrial targeted therapeutics for treatment of spinal cord injury*** • Kentucky Spinal Cord Injury Research Center, University of Louisville, Louisville, KY February 27, 2015

**NATIONAL/INTERNATIONAL:**

17. ***Intraspinal transplantation of microglial cells into the injured rat spinal cord*** • University of Paris, XII, School of Medicine, Créteil, France 1995
18. ***Therapeutic interventions following spinal cord injury: Defining the targets of experimental treatments*** • Johns Hopkins University, Depts of Biomedical Engineering & Neurology, Baltimore, MD 2000
19. ***Effects of basic fibroblast growth factor (bFGF) therapy on spinal cord injury*** • University of British Columbia, Department of Zoology and International Collaboration on Repair Discoveries (iCORD), Vancouver, B.C., Canada 2000
20. ***Mechanisms of autonomic dysreflexia following spinal cord injury and A surgically implanted neuroprosthesis for exercise, standing, and transfers*** • The 5<sup>th</sup> International Spinal Research Trust Network Meeting, City University, London, U.K. 2002
21. ***Keynote Address*** • The 1<sup>st</sup> National-International Neurotrauma Society Symposium, Tampa, FL, 2002
22. ***Bowel and sexual dysfunction after spinal cord injury*** • Symposium on Autonomic Dysfunction after Spinal Cord Injury: Mechanisms, Prevention and Treatment, Banff, Alberta, Canada 2003
23. ***Clinical and experimental approaches to improve function after spinal cord injury*** • Case Western Reserve University, Department of Biomedical Engineering & Cleveland FES Center, Cleveland, OH 2004
24. ***Pathways influencing autonomic reflex dysfunction following spinal cord injury*** • The 4<sup>th</sup> Congress of the International Society for Autonomic Neuroscience, Marseille, France 2005
25. ***Plasticity of both sensory axons and propriospinal neurons influences the severity of autonomic dysreflexia after complete spinal cord injury*** • Drexel University, College of Medicine, Department of Neurobiology and Anatomy, Philadelphia, PA 2006

26. ***Perspectives on neuroprosthetics from the view of a neuroscientist and user*** • The National Academies Keck's Future Initiative, *Smart prosthetics: Exploring assistive devices for the body and mind*, Beckman Center, Irvine, CA 2006
27. ***Perspectives on neuroprosthetics from the view of a neuroscientist and user*** • No Barriers USA Festival, Squaw Valley, CA 2007
28. ***Plasticity of lumbosacral propriospinal neurons is associated with the development of autonomic dysreflexia after thoracic spinal cord transection*** • Second annual Reeve-Irvine Medal Symposium (honoring William C. de Groat), University of California, Irvine, CA 2008
29. ***Plasticity of both visceral sensory fibers and propriospinal neurons is associated with the development of autonomic dysfunction after spinal cord injury*** • Touro University, School of Osteopathic Medicine, Henderson, NV 2008
30. ***Stance on functional neuroprosthetics: from bench side to bedside and back and Plasticity of visceral sensory fibers and lumbosacral propriospinal neurons is associated with autonomic dysfunction after spinal cord injury*** • University of Alberta, Department of Cell Biology, Edmonton, Alberta Canada 2009
31. ***Plasticity of visceral sensory fibers and lumbosacral propriospinal neurons is associated with autonomic dysreflexia after spinal cord injury*** • University of Miami, Project to Cure Paralysis, Miami, FL 2009
32. ***Plasticity of both visceral afferents and propriospinal neurons is associated with manifestation of autonomic dysreflexia after complete spinal cord injury*** • Cellular & Network Functions in the Spinal Cord Symposium, University of Wisconsin-Madison 2009
33. ***Intraspinal plasticity of sensory fibers and propriospinal neurons is associated with autonomic dysreflexia after spinal cord injury*** • University of Florida, McKnight Brain Institute, Gainesville, FL 2009
34. ***Intraspinal plasticity is associated with autonomic dysreflexia after spinal cord injury*** • Uniformed Services University of the Health Sciences, Neuroscience Program, Bethesda, MD 2009
35. ***The patient perspective: What should I hope for, what should I know?*** • The 36<sup>th</sup> Annual Meeting of the American Spinal Injury Association (ASIA), *For the Clinician: Participating in Translational Research*, Nashville, TN 2010
36. ***Modulating the pathophysiology of autonomic dysreflexia after spinal cord injury*** • *Current advances in spinal cord injury research*, UMDNJ, New Jersey Medical School, Newark, NJ 2011
37. ***Modulating the pathophysiology of autonomic dysreflexia after spinal cord injury*** • Indiana University Purdue University (IUPUI) School of Medicine, Stark Neurosciences Research Institute, Indianapolis, IN 2011
38. ***Modulating the pathophysiology of autonomic dysreflexia after spinal cord injury*** • The 32<sup>nd</sup> Annual Meeting of the Australian Neuroscience Society, *Autonomic and sensory changes in spinal cord injury: Impact and prospects for treatment*, Gold Coast, Australia January 30, 2012
39. ***Spinal cord injury and functional electrical stimulation (FES); Perspectives from the view of a neuroscientist and user*** • Royal Talbot Rehabilitation Centre, Melbourne, Australia February 3, 2012
40. ***Intraspinal plasticity associated with pathophysiology of autonomic dysreflexia after spinal cord injury*** • University of Melbourne Brain Centre, Melbourne, Australia February 6, 2012

41. ***Spinal cord injury and functional electrical stimulation (FES); Perspectives from the view of a neuroscientist and user*** • Neuroscience Research Australia (NeuRA), Sydney, Australia February 8, 2012
42. ***Autonomic dysreflexia after spinal cord injury is associated with anomalous intraspinal plasticity*** • University of Western Sydney Campbelltown Campus, Sydney, Australia February 9, 2012
43. ***Autonomic dysreflexia, electrical implants, no barriers: Perspectives from a paraplegic neuroscientist*** • University of North Carolina at Pembroke, Department of Biology, Pembroke, NC April 24, 2012
44. ***Modulating intraspinal plasticity associated with pathophysiology of autonomic dysreflexia after spinal cord injury*** • The 30<sup>th</sup> Annual Meeting of the National Neurotrauma Society, *Functional Deficits after Spinal Cord Injury*, Phoenix, AZ July 24, 2012
45. ***Modulation of intraspinal plasticity associated with autonomic dysreflexia after complete spinal cord injury*** • The 2012 J. Allyn Taylor International Prize in Medicine, *Symposium on spinal cord injury research*, London, Ontario, CA November 19, 2012
46. ***Novel targets for spinal cord injury therapeutics: Bioenergetic and autonomic dysfunctions*** • Drexel University, Department of Neurobiology and Anatomy, Philadelphia, PA April 17, 2013
47. ***Keynote Address*** • University of Toronto Spine Program, Department of Surgery, Toronto, CA, April 25, 2013
48. ***Management of autonomic dysreflexia with gabapentin*** • The 40<sup>th</sup> Annual Meeting of the American Spinal Injury Association (ASIA), San Antonio, TX May 14, 2014
49. ***N-acetylcysteine amide (NACA) promotes mitochondrial bioenergetics and functional recovery following spinal trauma*** • The 14<sup>th</sup> Conference of the International Society of Antioxidants in Nutrition & Health, Paris, France June 13, 2014
50. ***Perspectives of a neuroscientist with a surgically implanted neuroprosthesis for exercise, standing, and transfers following spinal cord injury*** • The 41<sup>st</sup> Neural Interfaces Conference, Dallas, TX June 23, 2014
51. ***Pharmacological management of autonomic dysreflexia: Effects on intraspinal plasticity and inflammation after complete spinal cord injury*** • The 16<sup>th</sup> International Spinal Research Trust Network Meeting, London, UK September 5, 2014
52. ***Novel targets for spinal cord injury therapeutics: Bioenergetic and autonomic dysfunctions*** • The Mayo Clinic, Department of Neuroscience, Rochester, MN October 24, 2014
53. ***Perspectives of a neuroscientist with a surgically implanted neuroprosthesis for exercise, standing, and transfers following spinal cord injury*** • The Mayo Clinic, Department of Physiology and Biomedical Engineering, Rochester, MN October 24, 2014
54. ***Targeting bioenergetic and autonomic dysfunctions after spinal cord injury*** • Penn State University College of Medicine, Department of Physical Medicine and Rehabilitation Hershey, PA March 20, 2015
55. ***Pharmacological manipulation of maladaptive plasticity to mitigate autonomic dysreflexia after spinal cord injury*** • Emory University School of Medicine, Department of Physiology, Atlanta, GA October 15, 2015
56. ***Mitochondrial bioenergetics and functional recovery after spinal cord injury*** • Inaugural Spinal Cord Injury Summit, The Ohio State University Neurological Institute, Columbus, OH May 19, 2017

57. ***Swapping the powerhouse of the cell following SCI: Intraspinal mitochondrial transplantation*** • The 34<sup>th</sup> Annual Meeting of the National Neurotrauma Society, *Novel approaches to target mitochondrial dysfunction following CNS injury: From biomarker to replacing the damaged powerhouse*, Snowbird, UT July 10, 2017
58. ***Transplantation of mitochondria into the injured spinal cord*** • The Cleveland Clinic, Department of Neurosciences, Lerner Research Institute, Cleveland, OH March 7, 2018
59. ***Mitochondrial-targeted pharmacotherapeutics and biopharmaceuticals for spinal cord injury*** • The 3<sup>rd</sup> National-International Neurotrauma Society Symposium, *Perspectives on SCI and TBI Research Going from INTS 2018 to the Future*, Toronto, Ontario, CAN August 16, 2018
60. ***Mitochondrial transplantation for spinal cord injury*** • The International Online SCI Research Seminar series (IOSCIRS) April 16, 2020

## PRESS/MEDIA RELEASES/PUBLIC PRESENTATIONS

9/2011 “**Commonly Used Supplement May Improve Recovery from Spinal Cord Injuries**”

-UK Now – *University of Kentucky News*, <http://uknow.uky.edu/content/commonly-used-supplement-may-improve-recovery-spinal-cord-injuries>

-*Science Daily*, <http://www.sciencedaily.com/releases/2011/09/110928185025.htm>

10/2012 “**J. Allyn Taylor International Prize in Medicine Symposium 2012**”

- *Western University, Ontario, CAN* [https://youtu.be/nQl\\_1Px54UY](https://youtu.be/nQl_1Px54UY)

8/2013 “**Acetyl-L-Carnitine**”

-PN/*Paraplegia News Magazine*, <http://pvamag.com/pn/article/5680/acetyllcarnitine>;

<http://www.healingtherapies.info/Acetyl-L-Carnitine.htm>

10/2015 “**Two University of Kentucky Researchers Awarded Grants from Conquer Paralysis Now**”

-UK Now – *University of Kentucky News*, <http://uknow.uky.edu/content/two-university-kentucky-researchers-awarded-grants-conquer-paralysis-now>

-*The Lane Report*, [http://www.lanereport.com/56323/2015/10/two-uk-researchers-awarded-grants-from-conquer-paralysis-now/?utm\\_source=Faster%20Lane%20Newsletter&utm\\_medium=Email&utm\\_campaign=oct-28-2015](http://www.lanereport.com/56323/2015/10/two-uk-researchers-awarded-grants-from-conquer-paralysis-now/?utm_source=Faster%20Lane%20Newsletter&utm_medium=Email&utm_campaign=oct-28-2015)

11/2015 “**Extraordinary Medicine Episode (12) on SCI/TBI**”

Documentary of Drs. Rabchevsky & Sullivan’s work on mitochondria-targeted interventions for SCI and TBI.

FBR licensed the series to *Discovery Network in Australia and Latin America*, Liz Hodge, Director/Producer, FBR Media

2/2016 “**Motivated by Personal Experience, Scientist Seeks Answers About Spinal Cord Injury**”

-UK Now – *University of Kentucky News*, <http://uknow.uky.edu/content/motivated-personal-experience-scientist-seeks-answers-about-spinal-cord-injury>; <https://youtu.be/938-NOmZkso>

-*Spinal Cord Injury Zone*, <http://www.spinalcordinjuryzone.com/videos/16181/motivated-by-personal-experience-scientist-seeks-answers-about-spinal-cord-injury>

6/2016 “**Mentoring a Key Factor in Spinal Cord Researcher's Success**”

-UK Now – *University of Kentucky News*, <http://uknow.uky.edu/content/mentoring-key-factor-spinal-cord-researchers-success>

11/2016 “**Getchell Memorial Award Honors Graduate Scientist's Persistence in Seeking National Funding**”



-UK Now – University of Kentucky News, <http://uknow.uky.edu/research/getchell-memorial-award-honors-graduate%E2%80%99s-persistence-seeking-national-funding>

1/2020 “Albert Nelson Marquis Lifetime Achievement Award,” Marquis Who’s Who  
-United Press, <http://www.24-7pressrelease.com/press-release-service/470075>

## PUBLICATIONS

Complete List: <https://www.ncbi.nlm.nih.gov/pubmed/?term=Rabchevsky>

*Google Scholar h-index = 41*

### Peer-Reviewed Journals:

1. Helke C.J. and **RABCHEVSKY A.** (1991) Axotomy alters putative neurotransmitters in visceral sensory neurons of the nodose and petrosal ganglia. Brain Research 551(1-2): 44-51. 1991 Epub Jun 14 **PMID: 1680528**
2. Ichikawa H., **RABCHEVSKY A.** and Helke C.J. (1993) Presence and coexistence of putative neurotransmitters in carotid sinus baro- and chemoreceptor afferent neurons. Brain Research 611(1): 67-74. Epub 1993 May 14 **PMID: 8100177**
3. **RABCHEVSKY A.G.** and Streit W.J. (1997) Grafting of cultured microglial cells into the lesioned spinal cord of adult rats enhances neurite outgrowth. Journal of Neuroscience Research 47(1): 34-48. Epub 1997 Jan 1 **PMID: 8981236**
4. **RABCHEVSKY A.G.**, Weintz J.M., Couplier M., Fages C., Tinel M. and Junier M.P. (1998) A role for transforming growth factor alpha as an inducer of astrogliosis. Journal of Neuroscience 18(24): 10541-10552. Epub 1998 Dec 16 **PMID: 9852591**
5. **RABCHEVSKY A.G.**, Degos J.D. and Dreyfus P.A. (1999) Peripheral injections of Freund's adjuvant in mice provoke leakage of serum proteins through the blood-brain barrier without inducing reactive gliosis. Brain Research 832(1-2): 84-96. Epub 1999 Jun 22 **PMID: 10375654**
6. Sullivan P.G., Bruce-Keller A.J., **RABCHEVSKY A.G.**, Christakos S., St. Clair D.K., Mattson M.P. and Scheff S.W. (1999) Exacerbation of damage and altered NF-kappa B activation in mice lacking tumor necrosis factor receptors after traumatic brain injury. Journal of Neuroscience 19(15): 6248-6256. Epub 1999 Jul 22 **PMID: 10414954**
7. **RABCHEVSKY A.G.**, Fugaccia I. Fletcher-Turner A., Blades D.A., Mattson M.P. and Scheff S.W. (1999) Basic fibroblast growth factor (bFGF) enhances tissue sparing and functional recovery following moderate spinal cord injury. Journal of Neurotrauma 16(9): 817-830. Epub 1999 Nov 16 **PMID: 10521141**
8. **RABCHEVSKY A.G.**, Fugaccia I. Fletcher-Turner A., Blades D.A., Mattson M.P. and Scheff S.W. (2000) Basic fibroblast growth factor (bFGF) enhances functional recovery following severe spinal cord injury to the rat. Experimental Neurology 164(2): 280-291. Epub 2000 Aug 1 **PMID: 10915567**
9. Sullivan P.G., **RABCHEVSKY A.G.**, Hicks M.R.R., Gibson T., Fletcher-Turner A. and Scheff S.W. (2000) Dose response curve and optimal dosing regimen of cyclosporin A after traumatic brain injury in rats. Neuroscience 101(2): 289-295. Epub 2000 Nov 14 **PMID: 11074152**
10. Zhang P., Abraham V.S., Kraft K.R., **RABCHEVSKY A.G.**, Scheff S.W. and Swain J.A. (2000) Hyperthermic preconditioning protects against spinal cord ischemic injury. Annals Thoracic Surgery 70(5): 1490-1495. Epub 2000 Nov 28 **PMID: 11093475**

11. **RABCHEVSKY A.G.**, Fugaccia I., Sullivan P.G. and Scheff S.W. (2001) Cyclosporin A (CsA) treatment following spinal cord injury to the rat: behavioral effects and stereological assessment of tissue sparing. Journal of Neurotrauma 18(5): 513-22. Epub 2001 Jun 8 **PMID: 11393254**
12. **RABCHEVSKY A.G.**, Fugaccia I., Sullivan P.G., Blades D.A. and Scheff S.W. (2002) Efficacy of methylprednisolone therapy for the injured rat spinal cord. Journal of Neuroscience Research 68(1): 7-18. Epub 2002 Apr 5. **PMID: 11933044**
13. Scheff S.W., **RABCHEVSKY A.G.**, Fugaccia I., Main J.A. and Lumppp J.E. (2003) Experimental modeling of spinal cord injury: characterization a force-defined injury device. Journal of Neurotrauma 20(2): 179-193. Epub 2003 Apr 5 **PMID: 12675971**
14. **RABCHEVSKY A.G.**, Sullivan P.G., Fugaccia I. and Scheff S.W. (2003) Creatine diet supplement for spinal cord injury in rats: influences on functional recovery and tissue sparing. Journal of Neurotrauma 20(7): 659-669. Epub 2003 Aug 12 **PMID: 12908927**
15. Hynds D.L., Rangappa N., Ter Beest J., Snow D.M. and **RABCHEVSKY A.G.** (2004) Microglia enhance dorsal root ganglion outgrowth in Schwann cell cultures. Glia 46(2): 218-223. Epub 2004 Mar 26 **PMID: 15042588**
16. Sullivan P.G., **RABCHEVSKY A.G.**, Keller J.N., Lovell M.A., Sodhi A., Hart R.P. and Scheff S.W. (2004) Intrinsic differences in isolated brain and spinal cord mitochondria: Implication for therapeutic interventions. Journal of Comparative Neurology 474(4): 524-534. Epub 2004 Jun 3 **PMID: 15174070** DOI: 10.1002/cne.20130
17. Cameron A.A., Smith G.M., Randall D.C., Brown D.R. and **RABCHEVSKY A.G.** (2006) Genetic manipulation of intraspinal plasticity after spinal cord injury alters the severity of autonomic dysreflexia. Journal of Neuroscience 26(11): 2923-2932. Epub 2006 Mar 17 **PMID: 16540569, PMCID: PMC3535471**
18. Xiong Y., **RABCHEVSKY A.G.** and Hall E.D. (2007) Role of peroxynitrite in secondary oxidative damage after spinal cord injury. Journal of Neurochemistry 100(3): 639-649. Epub 2006 Dec 22 **PMID: 17181549** DOI: 10.1111/j.1471-4159.2006.04312.x
19. **RABCHEVSKY A.G.**, Sullivan P.G. and Scheff S.W. (2007) Temporal-spatial dynamics in oligodendrocyte and glial progenitor cell numbers throughout ventrolateral white matter following contusion spinal cord injury. Glia 55(8): 831-843. Epub 2007 Mar 29 **PMID: 17390308** DOI: 10.1002/glia.20508
20. Sullivan P.G., Krishnamurthy S., Patel S.P., Pandya J.D. and **RABCHEVSKY A.G.** (2007) Temporal characterization of mitochondrial bioenergetics after spinal cord injury. Journal of Neurotrauma 24(6): 991-999. Epub 2007 Jun 30 **PMID: 17600515** DOI: 10.1089/neu.2006.0242
21. \*Ziemba K.S., Chaudhry N., **RABCHEVSKY A.G.**, Jin Y. and Smith G.M. (2008) Targeting axon growth from neuronal transplants along preformed guidance pathways within the adult CNS. Journal of Neuroscience 28(2): 340-348. Epub 2008 Jan 11 **PMID: 18184776** DOI: 10.1523/JNEUROSCI.3819-07.2008 \*Featured article
22. Hou S.P., Duale H., Cameron A.A., Abshire S.M., Lyttle T.S. and **RABCHEVSKY A.G.** (2008) Plasticity of lumbosacral propriospinal neurons is associated with the development of autonomic dysreflexia after thoracic spinal cord transection. Journal of Comparative Neurology 509(4): 382-399. Epub 2008 June 3 **PMID: 18512692, PMCID: PMC2536612**
23. Patel S.P., Pandya J.D., Sullivan P.G. and **RABCHEVSKY A.G.** (2009) Differential effects of the mitochondrial uncoupling agent, 2,4-dinitrophenol, or the nitroxide antioxidant, Tempol, on synaptic or nonsynaptic mitochondria after spinal cord injury. Journal of Neuroscience Research 87(1): 130-140. Epub 2008 Aug 19 **PMID: 18709657, PMCID: PMC5291118**
24. Patel S.P., Gamboa J.L., McMullen C.A., **RABCHEVSKY A.G.** and Andrade F.H. (2009) Lower respiratory capacity in extraocular muscle mitochondria: evidence for intrinsic differences in mitochondrial composition and function. Investigative Ophthalmology & Visual Science 50(1): 180-186. Epub 2008 Sep 16 **PMID: 18791171, PMCID: PMC2615070**
25. Hou S.P., Duale H. and **RABCHEVSKY A.G.** (2009) Intraspinal sprouting of unmyelinated pelvic afferents after complete spinal cord injury is correlated with autonomic dysreflexia induced by visceral pain. Neuroscience 159(1): 369-379. Epub 2008 Dec 24. **PMID: 19146928, PMCID: PMC3546483**

26. Duale H., Hou S.P., Derbenev A.V., Smith B.N. and **RABCHEVSKY A.G.** (2009) Spinal cord injury reduces the efficacy of pseudorabies virus labeling of sympathetic preganglionic neurons. Journal of Neuropathology and Experimental Neurology 68(2): 168-178. Epub 2009 Jan 20 **PMID: 19151624, PMCID: PMC2748969**
27. Derbenev A.V., Duale H., **RABCHEVSKY A.G.** and Smith B.N. (2010) Electrophysiological characteristics of identified kidney-related neurons in adult rat spinal cord slices. Neuroscience Letters 474(3): 168-172. Epub 2010 Mar 18. **PMID: 20303390, PMCID: PMC2863015**
28. Patel S.P., Sullivan P.G., Lyttle T.S. and **RABCHEVSKY A.G.** (2010) Acetyl-L-carnitine ameliorates mitochondrial dysfunction following contusion spinal cord injury. Journal of Neurochemistry 114(1): 291-301. Epub 2010 Apr 23 **PMID: 20438613, PMCID: PMC2897952**
29. Duale H., Lyttle T.S., Smith B.N. and **RABCHEVSKY A.G.** (2010) Noxious colorectal distention in spinalized rats further reduces pseudorabies virus labeling of sympathetic neurons. Journal of Neurotrauma 27(8): 1369-1378. Epub 2010 Jun 7 **PMID: 20528165, PMCID: PMC2967825**
30. **RABCHEVSKY A.G.**, Patel S.P., Duale H., Lyttle T.S., O'Dell C.R. and Kitzman P.H. (2011) Gabapentin for spasticity & autonomic dysreflexia after severe spinal cord injury. Spinal Cord 49(1): 99-105. Epub 2010 Jun 1 **PMID: 20514053, PMCID: PMC2953609**
31. Onifer S.M., Zhang O., Whitnel-Smith L.K., Raza K., O'Dell C.R., Lyttle T.S., **RABCHEVSKY A.G.**, Kitzman P.H., Burke D.A. (2011) Horizontal ladder task-specific re-training in adult rats with contusive thoracic spinal cord injury. Restorative Neurology & Neuroscience 29(4): 275-86. Epub 2011 Jun 24 **PMID: 21697591, PMCID: PMC3544551**
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#### Submitted Manuscripts/Chapters or In Preparation:

Michael F.M. and **RABCHEVSKY A.G.** (Submitted) Spinal interneurons and autonomic dysreflexia after injury. *Spinal Interneurons*, Elsevier Press.

Danyi S.N., Patel S.P., Spielmann H.P., **RABCHEVSKY A.G.** and Stamm S. (In Preparation) Splice-site changing oligonucleotides targeting the serotonin receptor 2C reduce spasticity after spinal cord injury.

*SEE PUBLISHED ABSTRACTS LISTED AFTER GRANT SUPPORT*

## GRANT SUPPORT

### Active Grants:

#### 1. Neurobiology of CNS Injury & Repair Training Grant

Multiple Principal Investigators: Edward D. Hall and James W. Geddes (07/01/17 – 06/30/22)

Agency: National Institutes of Health-NINDS

Type: 2T32 NS077889 Total Costs: \$1,200,467; Annual Direct Costs: \$143,688

Training Faculty: A.G. Rabchevsky

5%

Broad-based training in modern research concepts regarding the pathophysiology of neurotrauma.

#### 2. Pioglitazone fosters neuroprotection via specific interaction with mitoNEET

Principle Investigator: A.G. Rabchevsky (07/31/17 – 07/30/21) ‘NCE’

12%

Co-Investigators: P.G. Sullivan, S.P. Patel, J.C. Gensel

10%, 55%, 5%

Agency: Craig H. Neilsen Foundation

Type: Senior Investigator Award #476719 Total Costs: \$599,781

These studies will directly test whether pioglitazone affords neuroprotection following SCI by directly ameliorating mitochondrial dysfunction via interactions with mitoNEET using a novel transgenic model (mitoNEET null), as well as a novel specific mitoNEET ligand and an antagonist, alone and in tandem, to mechanistically test our hypotheses.

#### 3. Chronic muscle weakness in sepsis survivors

Principle Investigator: Saito, H (09/15/17 - 08/31/21)

30%

Co-Investigators: M.E. Starr, S.P. Patel, B.M. Evers, A. Stromberg,

T. Butterfield, E. Dupont-Versteegden, A.G. Rabchevsky, D.K. St. Clair 20%, 20%, 1%, 4%, 4%, 4%, 2%, 2%

Agency: National Institutes of Health-NIGMS

Type: R01 GM126181 Total Costs: \$1,162,800; Annual Direct Costs: \$250,000

*Impact Score: 25 Percentile: 7*

These studies will establish mitochondrial damage and dysfunction in sepsis-surviving mice, investigate sarcomeric protein damage and its causal mechanisms long after recovery from sepsis, and formulate therapeutic strategies to ameliorate post-sepsis chronic muscle weakness.

#### 4. TBI-induced exosome release accelerates Alzheimer's disease pathology

Principle Investigator: Bieberich E. (04/01/19 - 03/31/23)

30%

Co-Investigators: Morris A., Spassieva S., Nikolova-Karakashian M., Rabchevsky A.,

Saatman K., Wang G.

15%, 10%, 4%, 4%, 2%

Agency: Veterans Administration Medical Center, Lexington, KY

Type: 1 I01 BX003643-01A2 Total Costs: \$942,187; Annual Direct Costs: \$270,893

Our research showed that even mild TBI elicits shear forces in the brain that make particular cells secrete vesicles called exosomes. These TBI-induced exosomes bind to amyloid peptide and tau protein and enhance their neurotoxicity. Our goal is to interrupt TBI-induced exosome secretion to prevent or delay the onset of Alzheimer's disease in Veterans.

#### 5. Pharmacological induction of mitochondrial biogenesis for the treatment of spinal cord injury

Principle Investigator: Schnellmann, R. (10/01/19 - 05/31/22)

30%

Co-Investigator: Rabchevsky, A.G.

2%

Agency: Department of Defense (CDMRP/SCIRP)

Type: W81XWH1910175 Total Costs: Annual Direct Costs: \$350,000 (\$18,923 Subaward)

Based on preliminary data, we hypothesize that treatment with formoterol following SCI will increase mitochondrial biogenesis (MB), resulting in decreased spinal cord neuron death/dysfunction, increased vascular repair and functional recovery post-SCI. We propose to determine MB, mitochondrial homeostasis (e.g. fission/fusion) and mitochondrial function temporally, and then determine locomotor recovery, vascular recovery and blood-spinal cord barrier integrity in response to formoterol post-SCI in male and female mice.

## 6. Mitochondrial transplantation combined with mitochondrial-targeted pharmaceuticals to treat spinal cord injury

Principle Investigator: Rabchevsky, A.G. (06/01/20 - 05/31/23) 20%  
Co-Investigators: S.P. Patel, P.G. Sullivan, Dziubla T., DeRouchev J. 30%, 8.57%, 2.89%, 2.89%  
Agency: Department of Defense (CDMRP/SCIRP) SC190110;  
Type: W81XWH2010347 Total Costs: \$764,927; Annual Direct Costs: \$254,975

The proposed experiments are designed to test the protective efficacy of drugs we have reported to target and promote mitochondria to maintain the health of host spinal cord cells, both alone and in combination with novel mitochondrial transplantation techniques into the spinal cord for long-term functional recovery following contusion SCI. We will 1) establish that transplantation of isolated mitochondria can be delivered through diffusible hydrogel polymers subdurally into spinal cords, 2) test the hypothesis that mitochondrial transplantation in combination with mitochondrial-targeted pharmaceuticals will ameliorate acute and sub-acute biochemical and cellular outcome measures compared to individual therapies, and test the hypothesis that combinatorial regimens will maximize long-term functional neuroprotection.

## 7. Enhanced mitochondrial viability via engineered hydrogels for intrathecal spinal cord delivery

Principle Investigators (Multi-PI): Rabchevsky, A.G. and Patel, S.P. (10/01/20 - 09/31/25) 25%, 40%  
Co-Investigators: P.G. Sullivan, Dziubla T., DeRouchev J., Stowe A. 7%, 8%, 8%, 5%  
Agency: National Institute of Health/NINDS  
Type: 1 R01 NS119337-01 Total Costs: \$2,250,000 Annual Direct Costs: \$298,963

Determine whether administration of antioxidant (NACA) or alternative biofuel (ALC) known to maintain mitochondrial bioenergetics and promote functional neuroprotection after contusion spinal cord injury (SCI), in combination with novel intrathecal injection of isolated muscle mitochondria embedded in a thermo-gelling, erodible hydrogel system to protect mitochondrial viability fosters greater neuroprotective efficacy.

## 8. Macrophage depletion therapy for spinal cord injury

Principal Investigators (Multi-PI): Gensel J. and Alilain W. (04/01/21 - 03/31/26) 35, 30%  
Co-Investigators: Rabchevsky A.G., Wilson M., Popovich P., Kigerl K. 20%, 5%, 5%, 10%  
Agency: National Institute of Health/NINDS  
Type: 1 R01 NS116068-02 Total Requested Costs: Requested Annual Direct Costs: \$562,747

The goals of this proposal are to examine chronic and level-specific functional changes after acute macrophage depletion using clinically relevant outcomes including pain, autonomic dysreflexia, respiration, and forelimb/hand function. We will study the effects of acute clodronate treatment for up to one year in rodent models of cervical and thoracic SCI.

## Pending Grants:

### **A Danish consortium to investigate the casual role of neuronal excitability in disease progression in Amyotrophic lateral sclerosis**

Lead Team P.I.: Claire F. Meehan (Copenhagen) (09/01/21 – 08/31/23)

Principle Investigator: Rabchevsky A.G. 2%

Co-Investigators: Patel S.P., Sullivan P.G. 20%, 1%

Agency: Lundbeck Foundation (Denmark)

Type: Research Grant Contract Total Requested Costs: \$350, 000 (\$47,775 sub recipient)

Motoneurons are particularly vulnerable to excitotoxicity due to their low Ca<sup>2+</sup> buffering capacity, with mitochondria dysfunction observed in ALS further exacerbating their destruction. A direct causal role of abnormal neuronal excitability in the development of ALS requires the ability to 1) record the excitability of the motor neurons in vivo, in the adult, during disease progression, 2) to be able to alter the excitability of the neurons in vivo and 3) to be able to alter the interaction between mitochondrial function and excitability in vivo. It will be our contribution to establish a pathological role for interactions between mitochondrial dysfunction, calcium buffering and neuronal overactivity in mouse ALS models, and our skills will be combined with international collaborators from the UK and Australia.



**Validation of acute spinal cord injury in pet dogs as a model system for translational research**

Principal Investigator: Jeffery N. (Texas A&M University) 30% (04/01/21 - 03/31/26)  
 (Multi-PI – University of Kentucky site) Rabchevsky A.G., Patel S.P. 5%, 10%

Agency: National Institute of Health/NINDS

Type: 1 R01 NS116068-02 Total Requested Costs: Requested Annual Direct Costs: \$639,588

The project will first ensure a firm foundation by rigorously replicating previous studies on duroplasty in rats to verify the benefit and determine the magnitude of functional effect. Concurrently, in pet dogs undergoing routine spinal surgery, a 50-step walking test, corresponding to similar tests used in human clinical trials, will be validated for its ability to define successful locomotor outcome. Finally, duroplasty will be tested in a formal randomized controlled trial against traditional extradural decompressive surgery in a large population of severely spinal cord-injured pet dogs. Outcomes will include recovery of locomotion and urinary control. The magnitude of effect of duroplasty will be compared between rats and dogs and also with data that will be accumulated in a human clinical trial on duroplasty that has recently commenced.

**Completed Grants:****1. Mitochondrial transplantation strategies to promote recovery after spinal cord injury**

Principle Investigator: A.G. Rabchevsky (04/01/16 – 04/30/19) NCE *Impact Score: 21 Percentile: 5*

Co-Investigators: S.P. Patel, P.G. Sullivan

Agency: National Institutes of Health-NINDS

Type: 1 R21 NS096670-01 Total Costs: \$413,875

This grant comparatively assessed transplantation of mitochondria derived from two cell-type sources (autologous muscle vs cultured cells) in order to provide additional analysis and outcome measures for long-term behavioral studies to generate robust pre-clinical data.

**2. Changing serotonin receptor 2C splice variants to combat spasticity after spinal cord injury**

Principal Investigator (MPI): A.G. Rabchevsky (04/01/17 – 03/31/19) *Impact Score: 20 Percentile: 4*

Principal Investigator (MPI): S. Stamm

Co-Investigator: S.P. Patel

Agency: National Institutes of Health-NINDS

Type: 1 R21 NS098186-01A1 Total Costs: \$413,875

Employ novel oligonucleotides to attenuate muscular spasticity in a chronic SCI model. The aim of these studies were to intrathecally inject oligonucleotides, designed by the dual-PI (Stamm), to inactivate constitutively active 5HT<sub>2C</sub> receptors in the injured spinal cord thought to underlie tail muscle spasticity in chronic stages of SCI utilizing a complete S2 transection SCI model in adult rats by the other dual-PI (Rabchevsky).

**3. Mitochondrial transplantation and alternative biofuel administration to treat spinal cord injury**

Principle Investigator: S.P. Patel (08/15/17 – 02/14/19)

Co-Investigator: A.G. Rabchevsky

Agency: University of Kentucky, Center for Clinical and Translational Science

Type: Pilot and Innovation Research Program Award Total Costs: \$50,000 1013176200

We tested the hypothesis that treating with biofuel (ALC) to promote energy production (ATP) will maintain bioenergetics of both endogenous and transplanted mitochondria to promote greater functional neuroprotection after SCI by establishing whether 1) acute and/or delayed Mito Txp post-injury in combination with ALC results in improved bioenergetics integrity and whether 2) combining/staggering such treatments maximizes neuroprotection.

**4. Continuous sensor-based home-cage recordings for SCI research**

Principle Investigator: Shawn Hochman, Emory University (08/31/16 – 08/30/18)

Subcontract Principle Investigator: A.G. Rabchevsky

Co-Investigator: S.P. Patel

Agency: Craig H. Neilsen Foundation

Type: Senior Investigator Award #T659612 Total Costs: \$600,000; UKRF Sub-Contract \$39,916; Annual Direct

Costs: \$18,144

These studies were designed to leverage affordable miniaturized sensor technologies that report on an individual's physio-behavioral variables to develop an animal-model prototype – in a home-cage – to test its efficacy in assessing physiologic dysfunction after SCI. The subcontract was to calibrate sensors using our hemodynamic telemetry system.

**5. Mitochondria transplantation for functional recovery after spinal cord injury**

Principle Investigator: Jenna VanRooyen (04/01/16 – 08/28/17)

Mentor: A.G. Rabchevsky

Agency: National Institutes of Health-NINDS

Type: F31 NS093904 Total Costs: \$93,420

This proposal was designed to study dose-response transplantation of tGFP mitochondria (culture-derived) to optimize acute bioenergetics to inform effective dosage for long-term behavioral improvements.

**6. Autologous mitochondrial replacement strategies to promote recovery after spinal trauma**

Principle Investigator: A.G. Rabchevsky (09/01/15 – 08/31/16)

Co-Investigator: S.P. Patel

Agency: Conquer Paralysis Now

Type: Out of the Box Grant Total Costs: \$49,981

This proposal tested whether supplementing healthy mitochondria isolated from exogenous sources into the contused rat spinal cord maintains bioenergetics and promotes functional recovery.

**7. Ketone body administration to treat spinal cord injury**

Principle Investigator: S.P. Patel (07/01/13 – 06/30/16)

Co-Investigator: A.G. Rabchevsky

Agency: Craig H. Neilsen Foundation

Type: Neilsen Pilot Research Grant #260771 Total Costs: \$298,026

These studies assessed whether ketone body administration post-injury improves acute mitochondrial respiration and whether prolonged treatment results in chronic tissue sparing and hind limb recovery after SCI.

**8. University of Kentucky Spinal Cord & Brain Injury Research Center Core Grant**

Principal Investigator: Edward D. Hall (05/01/05 – 12/31/15)

Agency: National Institutes of Health-NINDS

Type: 2P30 NS051220-07 Total Costs: \$3,441,126

Core D Assistant Director: A.G. Rabchevsky

The Core D was designed to maintain a state-of-the-art microscopy and imaging analysis core

**9. Mitochondrial targeted therapeutics for treatment of spinal cord injury**

Principal Investigator (Dual-PI): A.G. Rabchevsky (06/15/11 – 12/31/15)

Principal Investigator (Dual-PI): P.G. Sullivan

Agency: National Institutes of Health-NINDS

Type: R01 (NS069633) Total Costs: \$1,299,376

These studies evaluated the efficacy ALC and/or NACA on bioenergetics of synaptic and non-synaptic mitochondria to establish a therapeutic time window of ALC/NACA combinatorial administration after acute SCI and whether prolonged ALC treatment results in increased tissue sparing and hind limb recovery after chronic SCI.

**10. Mitochondrial targeted therapeutics for treatment of spinal cord injury *Supplement for MRI imaging***

Principal Investigator (Dual-PI): A.G. Rabchevsky (05/01/13 – 12/31/15)

Principal Investigator (Dual-PI): P.G. Sullivan

Agency: National Institutes of Health-NINDS

Type: R01 Supplement (NS069633-03S1) Total Costs: \$74,177

Using serial MRI imaging we evaluated DTI-based fractional anisotropy in vivo to predict both terminal histopathology and behavioral recovery in the NACA/ALC studies.

**11. Pathophysiology of sensory and sympathetic neurons in SCI-induced autonomic dysreflexia**

Principle Investigator: Jeffrey C. Petruska (01/15/11 – 01/14/15)

Co-Investigator: A.G. Rabchevsky

Agency: Kentucky Spinal Cord and Head Injury Research Trust

Type: KSCHIRT Research Grant #10-10 Total Costs: \$146,874 with U of Louisville subcontract

These studies examined the influence of peripheral inflammation on the severity of autonomic dysreflexia in relation to both cardiac output as well as the function of both sensory and sympathetically correlated neurons.

**12. Mitochondrial-targeted neuroprotection following spinal cord injury**

Principal Investigator: A.G. Rabchevsky (09/01/11 – 08/31/14)

Agency: Craig H. Neilsen Foundation

Type: Neilsen Pilot Research Grant #190115 Total Costs: \$274,964

These studies evaluated ALC and/or NACA efficacy on bioenergetics of total mitochondria (mixed synaptic and non-synaptic) to establish a therapeutic time window of ALC/NACA combinatorial administration after acute SCI and whether prolonged ALC treatment results in increased tissue sparing and hind limb recovery after chronic SCI.

**13. Effects of acetyl-L-carnitine treatment on mitochondrial function, tissue sparing and hind limb locomotor recovery following contusion spinal cord injury**

Principal Investigator: A.G. Rabchevsky (1/15/09 – 1/14/12)

Agency: Kentucky Spinal Cord and Head Injury Research Trust

Type: KSCHIRT Research Grant #8-13 Total Costs: \$298,848

These studies evaluated ALC efficacy of bioenergetics on total mitochondria (mixed synaptic and non-synaptic) to establish a therapeutic time window of ALC administration after acute SCI and whether prolonged ALC treatment results in increased tissue sparing and hind limb recovery after chronic SCI.

**14. Intraspinal plasticity contributing to autonomic dysreflexia following SCI**

Principal Investigator: Hanad Duale (01/01/08 – 12/31/09)

Sponsor: A.G. Rabchevsky

Agency: Paralyzed Veterans of America Research Foundation

Type: Fellowship Grant # 2561 Total Costs: \$98,820

To test if there is increased projection of lumbosacral propriospinal neurons onto disinhibited sympathetic preganglionic neurons in the rostral thoracolumbar spinal cord resulting in hypertension, we injected the transsynaptic retrograde tracer pseudorabies virus (PRV) expressing either green fluorescent protein (PRV-GFP) or red fluorescent protein (PRV-RFP) injected into the left kidney and distal colon two weeks after thoracic (T4) transection versus sham injury, respectively. Dual labelled lumbosacral propriospinal neurons (i.e. co-localization of GFP & RFP) were quantified using established stereological techniques to assess dynamic synaptic remodeling after SCI.

**15. Role of intraspinal plasticity in autonomic dysreflexia**

Principal Investigator: A.G. Rabchevsky (8/2/04 – 4/30/11)

Agency: NIH-NINDS

Type: R01 (NS049901) Total Costs: \$1,841,250

This study employed viral-mediated gene therapy in conjunction with retrograde and anterograde tracing methods to characterize the structural relationships between sprouting visceral afferents and lumbosacral relay neurons after SCI, and between such relay neurons and sympathetic preganglionic neurons which become hyperactive upon noxious stimulation below the SCI level, leading to autonomic dysreflexia.

**16. Transplantation of glial progenitor cells derived from human embryonic stem cells into injured rat spinal cord**

Principal Investigator: A.G. Rabchevsky (01/31/04 – 09/30/05)

Agency: Geron Corporation, Menlo Park, CA

Type: Contract Total Costs: \$99,730

This study sought to determine whether the transplantation of differentiated glial progenitor cells (GPCs), derived from purified human embryonic stem cells (ESCs), improved recovery of hind limb locomotion when transplanted

near the injury site following contusion SCI in adult rats. We were also provided human fibroblasts as control cell injections. After behavioral testing was complete we euthanized the animals and processed the cords for stereological cell quantification of mature oligodendrocytes and/or GPCs, as well as for electron microscopic analysis of the extent of remyelination between transplant groups.

#### **17. Influence of neurotrophins on intraspinal plasticity modulating autonomic dysreflexia**

Principal Investigator: A.G. Rabchevsky (01/15/04 – 10/14/07)

Agency: Kentucky Spinal Cord and Head Injury Research Trust

Type: KSCHIRT Research Grant #3-11 Total Costs: \$297,000

The goal of this study was to use nano-injection of recombinant adenoviruses (Adts) to over-express control green fluorescent protein (GFP), nerve growth factor (NGF) or a specific growth inhibitor (Semaphorin 3a) of primary afferent fibers in the dorsal horns to modulate post-traumatic intraspinal sprouting in order to mitigate the hypertensive crisis termed autonomic dysreflexia that is triggered by uninhibited sympathetic preganglionic neurons which become hyperactive upon noxious sensory stimulation below the level of spinal cord injury.

#### **18. Growth factor-mediated gene therapy for spinal cord injury**

Principal Investigator: A.G. Rabchevsky (11/01/03 – 10/31/04)

Agency: American Paraplegia Society

Type: Seed Grant (#908) Total Costs: \$16,800

This study examined whether Adts over-expression of FGF2 near the site of injury, alone or in combination with other growth factors that influence glial progenitor cell (GPC) proliferation or differentiation, may replenish lost oligodendrocytes and improve functional recovery. GPCs were first isolated from injured spinal cords by FACS and exposed to various factors or combinations to assess their influences on oligodendrocyte differentiation in vitro. Adult rats then underwent moderate SCI followed by injections of FGF2 Adts alone or with those that promote GPC differentiation to assess recovery and tissue sparing.

#### **19. Gene therapy to improve remyelination and function after spinal cord injury**

Principal Investigator: A.G. Rabchevsky (07/15/03 – 06/30/03)

Agency: University of Kentucky

Type: Medical Center Research Foundation Grant (#1051) Total Costs: \$13,500

In an attempt to increase spontaneous recovery of hind limb locomotion normally seen in our contusion spinal cord injury (SCI) model in rats, basic fibroblast growth factor (FGF2) was over-expressed using Adts. This refined approach allowed us to examine the behavioral and histological effects of controlled growth factor expression at the injury site or at more distal locations.

#### **20. Mechanisms of autonomic dysreflexia following spinal cord injury**

Principal Investigator: A.G. Rabchevsky (07/12/02 – 06/11/05)

Agency: International Spinal Research Trust, UK

Type: ISRT Research Grant #STR063 Total Costs: \$213,705

The major goals of this grant were to modify endogenous cells in the T-4 transected rat spinal cord using adenoviral vectors to transfer genes encoding NGF and Semaphorin 3a in an attempt to augment or abolish central sprouting of pain fibers that occurs below the level of SCI. We then correlated this differential sprouting with the severity of autonomic dysreflexia as measured by increased blood pressure following colon distention.

#### **21. Combinational therapies for recovery after spinal cord injury: steroids and growth factors**

Principal Investigator: A.G. Rabchevsky (01/12/00 – 01/13/03)

Agency: Kentucky Spinal Cord and Head Injury Research Trust

Type: KSCHIRT Research Grant #9-17 Total Costs: \$299,247

The goal of these studies was to test the hypothesis that the combination of i.v. methylprednisolone treatment with intrathecal bFGF infusion after contusion SCI will act synergistically to further enhance the functional and histological outcome measures compared to either treatment alone.

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