The KSCIRC Report • Spring 2014

KENTUCKY SPINAL CORD INJURY RESEARCH CENTER

DIRECTORS' UPDATE

Maxwell Boakye, M.D., KSCIRC Clinical Director

Among our goals this year are to increase the extent and quality of our clinical and translational research. I would like to highlight recent studies in which KSCIRC/Department of Neurological Surgery physicians were or will be Investigators. These early phase trials are the end result of basic science, preclinical studies and are critically important to better treatment for SCI patients.

RILUZOLE TRIAL

The University of Louisville is one of six Institutions involved in the North American Clinical Trials Network (NACTN). Riluzole, a sodium-channel blocking medication is Food and Drug Administration (FDA) approved for the treatment of amyotrophic lateral sclerosis (ALS) and has been shown to improve the outcome of SCI in preclinical, animal studies. The NACTN-sponsored SCI trial enrolled 36 patients, with ASIA impairment grades A-C (28 cervical and 8 thoracic) between April 2010 and June 2011. Trial results reported mean motor score improvement of 31.2 points for the 24 cervical injury riluzole-treated patients from admission to 90 days, compared to 15.7 points for 26 matched comparison patients, a 15.5-point difference (p=0.021)[1]. The results suggest Riluzole is a promising pharmacological neuroprotective drug for acute traumatic SCI. Our clinical investigator team is working with NACTN on the design of a follow-up randomized placebo controlled trial to establish efficacy in a larger multicenter pool of patients.

VENTILATOR WEANING TRIAL

The Western Trauma Association Multi-Center Trials Group[2] recently examined outcomes from 14 centers of mechanical ventilation in 344 cervical spinal injured patients who required mechanical ventilator support. They reported that 62.6% of the patients with cervical SCI were ventilator free by discharge. There was a statistically significantly lower rate of ventilator weaning and higher complication rate in SCI patients who underwent tracheostomy compared to an 85.6% success rate among those with no tracheostomy. This study suggests that the majority of cervical SCI patients can be weaned off ventilator prior to discharge from acute care. Second, tracheostomy appears to be associated with major morbidity and the practice of routine early tracheostomy needs to be examined. Based on this trial, one of our goals this year is to examine our ventilator weaning rates and assess the impact of tracheostomy on ventilator weaning rates and outcomes at the University of Louisville.

NEW CLINICAL TRIAL AT UOFL

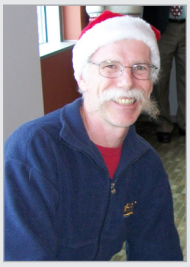
In 2014, we will be participating in The Magnify - AC105 clinical trial, a double-blind, placebo-controlled study of a new investigational drug for patients who have suffered an acute traumatic SCI. AC105 is a proprietary magnesium formulation being developed by Acorda Therapeutics, Inc. In preclinical studies, AC105 has demonstrated neuroprotective properties leading to reduction of ultimate lesion size and improvement of functional recovery in SCI and TBI. Acorda Therapeutics, Inc. is the sponsor of the study and it is partially funded by the United States Department of Defense. The Phase 2 clinical trial will determine the safety, tolerability and potential activity of the investigational medicine, AC105. The trial will enroll approximately 40 patients with acute SCI at 30 centers in the US and Canada.

[1]Grossman et al. (2013) A Prospective, Multicenter, Phase I Matched-Comparison Group Trial of Safety, Pharmacokinetics, and Preliminary Efficacy of Riluzole in Patients with Traumatic SCI. J Neurotrauma 31:239-55.

[2]Kornblith et al. (2013) Mechanical ventilation weaning and extubation after SCI. J Trauma Acute Care Surg 75:1060-9.

Frazier Rehab Institute to participate in Walk to Victory over Paralysis for Christopher & Dana Reeve Foundation's NeuroRecovery Network

Frazier Rehab Institute, part of the Christopher & Dana Reeve Foundation's NeuroRecovery Network, will participate in a nationwide fundraising and awareness event, "Walk to Victory over Paralysis," on Saturday, July 19 through Sunday, July 20, 2014. Go to www.christopherreeve.org for more information on this event.



Dr. Hagg

Farewell to Dr. Theo Hagg

It was with very mixed feelings that KSCRIC said goodbye to Theo Hagg, MD, PhD, Associate Scientific Director of KSCIRC. On January 1, 2014, Dr. Hagg assumed his new position as Chairman of the Department of Biomedical Sciences at East Tennessee State University Medical School. Dr. Hagg joined the University of Louisville in 2002 as an endowed professor in spinal cord injury research. His research has been outstanding and continually funded by the NIH. He has been, and will continue to be, an active collaborator with many of our faculty and has been an exemplary mentor for both trainees and junior faculty. In all things academic, every member of the KSCIRC faculty is well aware of the 'Hagg bar', a standard of intellectual excellence that has driven many of the decisions we make regarding grants to submit, manuscripts to revise, speakers to invite, and trainee success at journal club. Dr. Hagg assumed a great deal of administrative work for KSCIRC and the University of Louisville for which we are all very grateful. Personally, we will miss his academic integrity and his delightful, unique sense of humor. We wish Theo the best in his new position and are extremely confident that he will continue to be successful as the leader of that program.

SPOTLIGHT on a KSCIRC TRAINEE

KSCIRC trainee defends his Ph.D. Thesis

Nick J. Kuypers joined the doctoral program in Anatomical Sciences and Neurobiology at the University of Louisville in August, 2008. He previously developed a solid research background as an undergraduate at Southern Illinois University Carbondale (SIUC). There, he majored in psychology and physiology while simultaneously working in two neuroscience labs whose focus was on the recovery of function following traumatic brain injury (TBI) in experimental models. It was at SIUC that he discovered his passion for science and he was soon applying to neuroscience PhD programs across the country with the intent of investigating the effects of disease and trauma to the central nervous system (CNS) from a molecular perspective. The UofL School of Medicine's strong dedication to research and close proximity to Nick's hometown of Chicago were certainly two important factors which attracted him to UofL. However, the most influential factor was definitely his desire to work with Dr. Scott Whittemore.

Nick: *"Although I was aware of Dr. Whittemore's lab and his significant scientific contributions through the literature and discussions with my colleagues at SIUC, Scott and I had officially met, coincidentally, while presenting adjacent posters at the National Neurotrauma Symposium in 2008. After a brief discussion, Scott invited me to rotate in his lab. I knew, then, that UofL was the best destination for me."*

Since joining Dr. Whittemore's lab in 2009, Nick's research has focused on microRNAs (miRNAs) and oligodendrocyte biology.

Nick: *"At the time, miRNAs were still a relatively new area of study with little known about their role in oligodendrocytes (a supportive cell within the CNS whose loss results in the dysfunction observed in a variety of demyelinating and traumatic disorders). However, it was becoming increasingly clear that miRNAs play a role in multiple disease pathologies in a cell specific manner. Therefore, we decided to ask whether miRNAs are involved in oligodendrocyte loss and repair and, if so, could we develop a therapeutic approach to manipulate dysfunctional miRNAs in an effort to reverse the pathology (cause, origin and nature of the disease)."*

Put more simply, Nick and colleagues study very small molecules in a subpopulation of brain cells whose misbehavior leads to clinical dysfunction in patients. Their ultimate goal is to find out which molecules are bad and which are good so as to promote better behavior of the bad molecules in an effort to make patients with demyelinating diseases better. Nick has recently accepted a postdoctoral position at the University of Rochester Medical Center where he will continue to pursue his interest in miRNAs and oligodendrocytes. Nick is happily married to his wife of 2.5 years, Mary. Aside from 2 dogs and a cat, Nick and Mary are also expecting their first two-legged creature in June. In his spare time, Nick played ice hockey for the University of Louisville Cardinals, from 2009-2013, a sport he's played his entire life and continues to play, today, at the recreational level. Nick also loves to stay active as an avid runner, gym enthusiast, bicyclist and outdoorsman.

Nick J. Kuypers defended his Ph.D. thesis January 24. Pictured here are his committee members: left to right Michal Hetman, Ph.D., mentor Scott R. Whittemore, Ph.D., Nick and David S.K. Magnuson, Ph.D. all from the Department of Neurological Surgery. Not pictured Meng Sheng Qiu, Ph.D., and Yong Li, Ph.D.

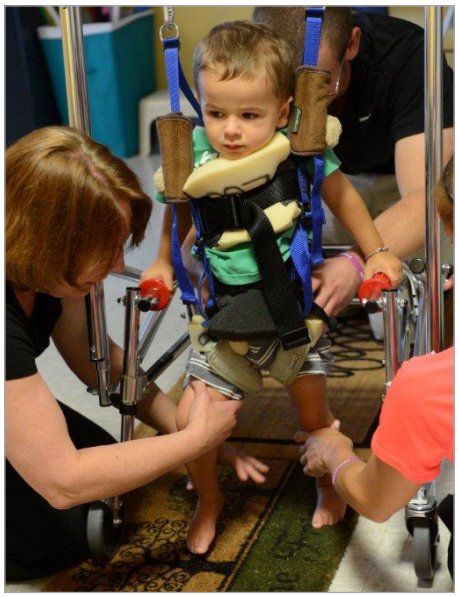
Pediatric NeuroRecovery: A New Initiative

Andrea Behrman, Ph.D.

The Kentucky Spinal Cord Injury Research Center (KSCIRC) has a strong history of success in conducting basic science and translational research targeting recovery after spinal cord injury (SCI) in adults. Building upon that foundation, a new initiative is extending research to children. Some children are born with paralysis due to conditions such as spinal tumors, whereas others suffer injury and disease during their childhood causing paralysis. While the impact of injury due to paralysis and loss of function is similar for adults and children, the intermediate and long-term consequences of injury are multiplied exponentially in children by the abrupt interruption of their normal growth and development. Without the dynamic, physical interaction with the environment, the child's normal neuromuscular and musculoskeletal maturation is radically altered. The immediate and long-term consequences of paralysis for children are well-established and known. Specifically, 100% of children who suffer a SCI before age 10 develop scoliosis (curvature of the spine) and 94% develop hip dislocations. Children also use wheelchairs, braces, and wheeled standers for mobility and their trunks and lower bodies are inactive with a predominantly sedentary lifestyle. Childhood becomes characterized by hospitalizations, pneumonia, and at-risk surgeries which further complicate and alter the course of development. Thus, rehabilitation for children with paralysis is drastically challenged by the confluence of injury and the many critical periods of development that are occurring. The entire lifestyle of the family, parents and siblings, is changed by the care of a child with paralysis. One parent often becomes a primary caregiver increasing the already rising financial burden of caring for a disabled child. The emotional impact on the family and caregiver is tremendous with the sudden loss of hopes and expectations for their child.

THE FOUNDATION FOR A PARADIGM SHIFT IN PEDIATRIC NEUROREHABILITATION

Parents often ask, "Is there any hope?" Hope is the new trajectory of outcomes for children affected by paralysis and their families based on the application of activity-based therapies, specifically, locomotor training.



Plasticity of the developing spinal cord.

Basic science indicates that the excitability and responsiveness of the caudal spinal cord is greater in young animals with spinal cord injuries than older animals. A primary characteristic of the young, developing nervous system is its highly "plastic" nature. Children affected by paralysis, compared to adults, may thus potentially be even more responsive to activity-based therapies that guide and direct a "new" process of development to gain or recover motor abilities. Research in experimental models of injury, led by Dr. Dena Howland (Associate Professor, University of Louisville, Department of Neurological Surgery and KSCIRC) demonstrates greater autonomy or activity of the spinal cord in young animals compared to adults. Capitalizing on such autonomy may lead to more effective rehabilitation and improved outcomes in young children. Compared to adults, children more readily adapt to injury without the immense cognitive and emotional attention to its consequences exhibited by adults. For therapeutic purposes, the keen desire and motivation of children to play, accompanied by a relative lack of cognitive attention to the consequences of the injury, creates a desirable context for pediatric rehabilitation. The child's naturally intense drive to play provides a strong platform on which to create an effective environment in which the neuromuscular system can "respond" in synergy with goal-directed therapeutic 'play'.

Locomotor training and dramatic results in children.

Dr. Andrea Behrman (Professor, University of Louisville, Department of Neurological Surgery and KSCIRC) pioneered research and clinical application of locomotor training to the pediatric population after SCI. During locomotor training, the child is suspended in a harness over a treadmill and facilitated by therapists to step and stand with the timing and movements similar to those used prior to injury or that are age-appropriate, i.e. "train like you walk". LT is an intensive, activity-based therapy designed to activate the spinal cord below the level of a SCI and restore function in weak or paralyzed muscles. Specific sensory cues are used along with a body weight support system on a treadmill to activate age-expected movement patterns for standing, walking and trunk control. Newly developed motor skills are then applied to the child's everyday activities (off the treadmill). This is in stark contrast to traditional approaches, such

Continued on pg. 4

The Todd Crawford Foundation gave a donation of $8,000 this year which will go to support Crawford Kids and Crawford Scholars who participate in the Pediatric NeuroRecovery laboratory of Dr. Andrea Behrman and Dr. Dena Howland. The TCF has donated over $75,000 to the KSCIRC in the past eight years for research endeavors.

For information on Todd's foundation's 2014 fundraising events please go to www.toddcrawfordfoundation.org

PEDIATRIC NEURORECOVERY

Continued from pg. 3

as the primary use of wheelchairs, braces, and assistive devices, which focus on compensation for injury-induced weakness and paralysis.

The remarkable recovery of stepping by a child, deemed unable to walk or stand sixteen months post-severe and chronic SCI, during locomotor training laid the foundation for the Kids STEP Study. In this study, led by Drs. Behrman and Howland and conducted with Shelley Trimble, Pediatric Research Physical Therapist, three/six children with severe, chronic SCIs and unable to stand or walk, began to stand and take steps during locomotor training—ultimately achieving community ambulation. Other important benefits occurred in some children including achieving the ability to sit independently and perceive and/or control bladder emptying functions. At Frazier Rehab Institute, this team initiated a Pediatric NeuroRecovery program providing locomotor training as part of SCI out-patient services and the Reeve Foundation NeuroRecovery Network. During the inaugural year (2013), eight children with paralysis ranging from age 2-10 years received locomotor training resulting in improved abilities to sit, stand, transfer, balance, and step—exceeding the expectations of current rehabilitation practice.

THE VISION FOR PEDIATRIC NEURORECOVERY: RAISING THE BAR

Led by Drs. Behrman and Howland, a comprehensive and aggressive research program is underway to rapidly translate findings to achieve a new era of rehabilitation and hope for recovery in children with paralysis. The team is in the early stages of research and clinical application of locomotor training as a means to promote recovery and achieve a new trajectory of outcomes for children with paralysis. There is an urgency to advance the effectiveness of locomotor training, document short- and long-term effects, improve the impact of locomotor training, and develop other activity-based therapies for clinical use so that children, once paralyzed, are able to more actively participate in their world and be spared surgeries, scoliosis, and hospitalizations.

SUPPORTING PARTNERS

KOSAIR CHARITIES recently donated a $7.3 million award to the University of Louisville to establish and support the Kosair Charities Center for Pediatric NeuroRecovery beginning October 2014. The Center will be a regional, national and international hub for 1) delivery of state-of-the-art activity-based therapies to affected children with paralyis, 2) training of rehabilitation clinicians and researchers, and 3) conducting ground-breaking research guiding clinical decision-making. Visit http://youtu.be/l22Evii7oZs — Kosair Charities gift helps UofL spinal cord injury research.

THE TODD CRAWFORD FOUNDATION has established a fund to support Crawford Kids and Crawford Scholars. Crawford Kids are young children with spinal cord injury. The Crawford Foundation provides additional financial help for families to support their child's participation in annual follow-up evaluations and booster locomotor training sessions. Crawford Scholars are Physical Therapy, Graduate, Medical or Undergraduate Students who will be supported for research fellowships with the Pediatric NeuroRecovery laboratory. We are excited about the possibilities that this support will enable.

THE UNIVERSITY OF LOUISVILLE is providing $2.7 million in matching funds to support an endowed chair in pediatric rehabilitation research and clinical translation and immediately launch the pediatric research program. Dr. Behrman serves as the Executive Director and Principal Investigator (PI) of these awards; Dr. Dena Howland is the Scientific Director, and Shelley Trimble, Research PT leads the translation to clinical practice in pediatrics. Establishment of long-term evaluations with complementary experimental assessments of children with paralysis throughout their childhood and adolescence are critical to determining the effects of activity-based therapies on a child's growth and development, prevention of bony and musculoskeletal deformities, and a new trajectory of outcomes for children with paralysis.

The extension to pediatrics has been a long-term vision for the KSCIRC led by Dr. Scott Whittemore and Dr. Susan Harkema (Department of Neurological Surgery, University of Louisville, KSCIRC) who were instrumental in the recruitments of Drs. Behrman and Howland in 2012. During this past year, the basic structure, funding and foundation for a pediatric specific-team with expertise in neurobiology, rehabilitation and neurorecovery spanning research and clinical practice has been put in place. This team will continue to expand its breadth of expertise to address the myriad of challenges faced by these children across multiple systems from breathing to bladder control. With this inaugural year of the pediatric initiative, people of all ages with paralysis will have the opportunity to benefit from the research and clinical application of findings by the KSCIRC.

Andrea Behrman, Ph.D. wins John H. P. Maley Lecture Award

Alexandria, VA, July 22, 2013 – Physical therapist and member of the American Physical Therapy Association (APTA) Andrea L. Behrman, PT, PhD, FAPTA, received APTA's John H. P. Maley Lecture Award during the APTA Conference & Exposition held in Salt Lake City, Utah, June 26-29, 2013. The John H. P. Maley Lecture Award honors APTA members who have made distinguished and sustained contributions to the profession of physical therapy and who possess acknowledged skills in the organization and presentation of written or oral communications. Behrman will present the John H. P. Maley lecture at the 2014 APTA Annual Meeting in Charlotte, North Carolina, June 13."

Ruth O'Bryan

KSCIRC Executive Administrative Associate

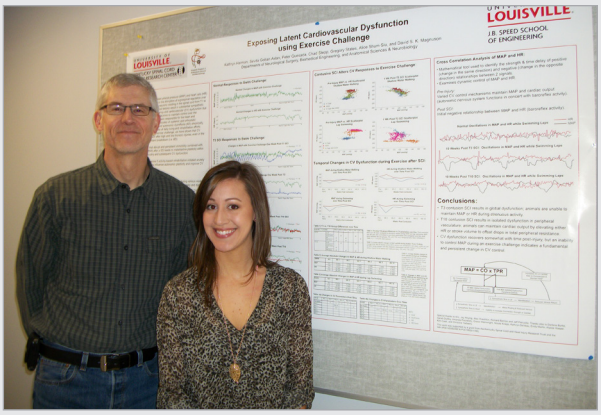
Lucy Liu, Ruth, Lilly Hope and Gracie Mae

Ruth O'Bryan has been with the University for 24 years. In her early positions, she was previously in the School of Education in the department of Education Counseling and Psychology where she worked with a group on a drug prevention education grant called Bridge to Success where sixth graders were taught drug prevention skills to help incoming fifth graders have a drug free transition from grade school to middle school. She then went to the Vice President for Student Affairs Office where she helped run the International Service Learning Program where students from five different disciplines took their spring break and went to Belize to work in a community assisting in supporting community safety, a program in sports training, a town business plan, etc. She began working at KSCIRC following its founding in 2001. Currently, Ruth is the Executive Administrative Associate for Scott R. Whittemore, Ph.D., Scientific Director of the Center. When asked what she does, she says "a little of everything." Dr. Whittemore is a bit more specific, as he says "Ruth runs the Center." She also rides herd on 9 other faculty members and approximately 40 trainees and lab personnel. She's sometimes called the "mother" of the Center.

Ruth's passion is helping others and she found a way to contribute to spinal cord and head injury patients by taking her certified therapy dog Gracie Mae, a black labradoodle, with a myriad of tricks that engage the patients to work on their cognitive and physical skills. Gracie is told when the visit begins, "Gracie, this is business" which means she is to be on her best behavior. She can get the patients to work on their physical skills when the therapist can't. They all want to brush her out starting at her head and travelling to her tail which translates into using that arm that doesn't work well after a stroke or head trauma. She has a special trick she does where Ruth puts her in a down position and says "Gracie, UofL and UK are playing basketball and UofL goes for a layup and misses, what do you do? She rolls over taking her paws to hide her eyes. Ruth says: "I hide my eyes too!. Now what do we do when UK misses" and they do a high five. If they walk in to a room covered in UK items, the trick can be switched to favor UK. However, Gracie requires extra treats to support Big Blue. Her late husband, George, also volunteered taking their Morkie (Maltese/Yorkie) "Grand Dog" named Lucy Liu who was born with only one eye. Lucy relates very well to children and adults who love to hold her and give her treats. She has a very calming effect on patients and kids with disabilities as they see that Lucy doesn't let her disability slow her down. Ruth is in the process of training Lilly Hope, her two-year old Morkie, to also work with physically and emotionally challenged patients. Her first accomplishment, now, is looking cute to bring a smile to a patient's eyes and make them laugh; the first trick, at this point, is to get on her hind legs with paws straight up to "start the wave."

There is no faculty, staff, or trainee member of KSCIRC, let alone all of the University of Louisville departments and administration with whom Ruth deals on a routine basis that does not understand the remarkable contribution that she has made to KSCIRC and UofL over the last 13 years. As the Scientific Director of KSCIRC, I recently asked Ruth to be sure not to retire before I do. We both laughed, but I was serious as Ruth's administrative talents include both gentle cajoling and carrying a big stick, both of which she knows when to use most effectively. Ruth is the glue that keeps KSCIRC moving forward. For that, all of us sincerely thank her.

—SRW



Friends for Michael continued support of KSCIRC

The Friends for Michael group presented Dr. Whittemore with a check for $8,000 to go towards support of Katie Harman as the Friends for Michael Scholar in Dr. David Magnuson's laboratory. Katie and Dr. Magnuson are pictured (left) in front of Katie's poster entitled 'Exposing latent cardiovascular dysfunction with exercise challenge' which she presented at the International Symposium on Neural Regeneration at Asilomar CA in December 2013. Friends for Michael has donated $134,500 since 2002 to the KSCIRC.

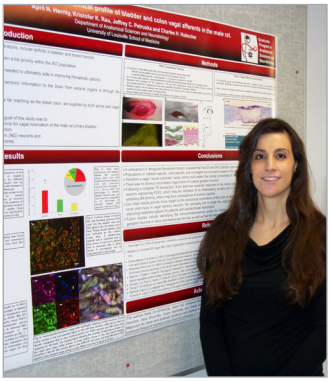
Visit www.friendsfromichael.org for future fundraising events.

KSCIRC Students Win in Neuroscience Day and Research Louisville Poster Competitions and National Competitions

Eric Ewan Ph.D., is a postdoctoral trainee mentored by Theo Hagg, M.D., Ph.D. He won 1st place in the postdoctoral category for Neuroscience day 2013 along with a $300 award. The title of his poster was: Intrathecal acetyl-l-carnitine protects tissue and improves function after a mild contusive spinal cord injury. "We hypothesized that disruption of blood flow after spinal cord injury prevents normal mitochondrial ATP production, a necessary molecule for cellular function, and that this leads to tissue damage and loss of function after spinal cord injury. To test this we investigated the effects of a drug (acetyl-l-carnitine) that improves mitochondrial ATP production in an experimental model of spinal cord injury. Subjects who received the drug walked better and had more intact spinal cord tissue near the injury site than those that did not receive treatment. Since this drug is safe for human use, it may be of benefit for people with spinal cord injuries."

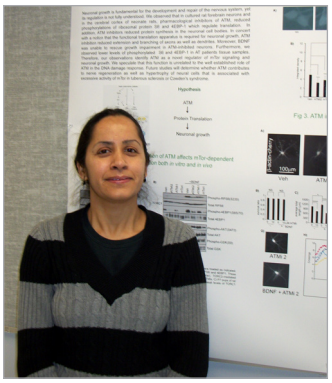
April Herrity won 1st place in the 2013 UofL Neuroscience Day poster competition in the graduate student category. April is a 5th year Ph.D. candidate in the department of Anatomical Sciences and Neurobiology. Her mentor is Dr. Charles Hubscher.

The title of her poster was: The identification and neurochemical profile of bladder and colon vagal afferents in the male rat. Her research endeavors showed that "most of the body's internal organs are supplied by nerves stemming from the spinal cord as well as branches of the vagus nerve, a special nerve which does not travel through the spinal cord. After spinal cord injury, a potential pathway for sending abnormal information from internal organs in the body to the brain is through the vagus nerve. The bladder and colon are two organs that communicate with each other through nerves. Our initial goal was to identify evidence that the vagus nerve is connected to the urinary bladder in the male animal model. We also wanted to see if there was any degree of shared communication or interaction between the bladder and colon through the vagus nerve. Next, we examined properties of the cells of the vagus



nerve, which are located in a structure called the nodose ganglion, in response to chronic spinal cord injury. Our studies helped us gain more insight into the anatomical connections of the male animal bladder and colon, as well as changes that occurred post-injury in the vagus nerve. We ultimately aim to use this nerve to improve treatment options for spinal cord injured patients with bladder and bowel dysfunction."

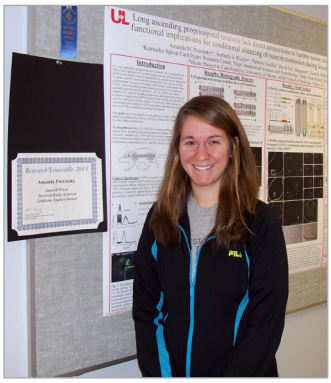
April collaborated with Dr. Jeffrey C. Petruska and his Postdoc Kris Rau on this research endeavor.



Aruna Vashishta, Ph.D., mentored by Dr. Michal Hetman, won 2nd place in the postdoc category for Neuroscience Day 2013. The title of her poster was: Ataxia telangiectasia mutated (ATM): a novel regulator of neuronal growth. Her research endeavors shows that A-T is caused by a defect in the ATM gene; and these patients show neurological problems like ataxia in early childhood. The well established function for ATM is in the DNA damage response and more recent works showed its role in the other processes also. Neuronal growth is fundamental for the development and repair of the nervous system, yet its regulation is not fully understood. We observed in our model of forebrain neurons that the pharmacological inhibition of ATM reduced growth of neurons by affecting extension and branching of axons as well as dendrites. Moreover, addition of growth stimulant was unable to rescue growth defects in neurons treated with ATM inhibitors. Further investigation showed that the ATM inhibitors treated cells have lower levels of newly synthesized proteins. Future studies will determine whether ATM contributes to nerve regeneration as well as excessive growth of neural cells that is associated with many genetic disorders of intellectual disabilities.

Paralyzed Veterans of America and Mission Connect Poster Finalist Award

Amanda Procratsky won 2nd place in Research Louisville 2013 for doctoral basic research. The title of her poster was: Long ascending propriospinal neurons lack direct connections to lumbar motor circuitry: Functional implications for conditional silencing of neurotransmission during locomotion. Amanda's research project showed that long ascending propriospinal neurons anatomically connect the hindlimb locomotor circuitry to that of the forelimbs. She and her collaborators hypothesized that these neurons also

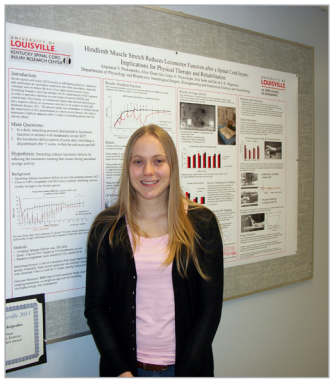


provide local and descending connections throughout the lumbar spinal cord. To test this, we first labeled the propriospinal neurons with a fluorescent retrograde tracer and then made injections with a second tracer throughout the lumbar spinal cord. Any neurons with descending projections would be double-labeled. Surprisingly, they found that these neurons lack direct connections to the hindlimb locomotor circuitry. With the aid of molecular biology, our next goal is to conditionally and reversibly silence these neurons to determine their functional role in forelimb-hindlimb coordination during movement.

Amanda is a third year Ph.D. candidate mentored by Drs. Whittemore and Magnuson. Amanda presented a poster at the International Symposium on Neural Regeneration (Monterey California -Winter 2013) The title of her poster was: Selective and reversible silencing of lumbar locomotor circuitry in the adult rat spinal cord. "While using a recently developed molecular biology tool, our goal was to conditionally and reversibly silence neural pathways that are critical for hind limb locomotion. We found that conditional silencing of these pathways induced a hop-like gate that could be restored to normal locomotion. Furthermore, this change in gait could be reproduced one month later. Next, we plan to use this method to functionally dissect pathways that potentially contribute to recovery following spinal cord injury."

Anastasia Prokopenko is a second year Ph.D. student in the Department of Physiology and Biophysics and has an M.S. in Exercise Physiology. She is conducting her research in Dr. David Magnuson's lab. Anastasia won second place in the graduate student category at Research Louisville 2013 for with her poster titled: "Hindlimb muscle stretch reduces locomotor function after a spinal cord injury. Implication for rehabilitation and physical therapy." Why is her finding important?

"Patients with spinal cord injury receive stretching therapy in order to prevent loss of the joints ranges of motion and to decrease muscle spasms that occur after the injury. We showed that stretching therapy given in the animal model with moderately-severe spinal cord injuries has negative effects on the locomotor recovery. Thus, it is possible that stretching, which patients receive daily or at least several times a week, may have an adverse effect on their ability to recover walking. Our goal is to bring awareness of this possible negative effect of the stretching therapy to the physical therapists as well as to seek ways to translate this research into the clinical settings."



KSCIRC Funding Received June, 2012 - January, 2013

Investigator(s)	*Funding Source*	*Amount*	*Start - End Dates*
Dena Howland	Veterans Administration	$111,384	04/01/13 - 09/30/14
David Magnuson	Department of Defense	$684,896	10/01/12 - 09/30/15
Susan Harkema	Christopher and Dana Reeve Foundation	$1,425,265	11/15/12 - 11-14-13
Andrea Behrman	WHAS Crusade for Children	$36,000	09/01/13 - 08/31/14
	Craig H. Neilsen Foundation	$150,000	07/01/13 - 06/30/15 *
	Craig H. Neilsen Foundation	$37,803	02/01/13 - 07/31/13
Scott Whittemore	Kentucky Spinal Cord and Head Injury Research Trust	$300,000	01/15/14 - 01/14/17
David Stirling	Paralyzed Veterans of America	$150,000	01/01/14 - 12/31/15

** Transferred from previous institution*

Kentucky Spinal Cord Injury Research Center
University of Louisville
511 S. Floyd St.
Louisville, KY 40292

UNIVERSITY OF LOUISVILLE®

KENTUCKY SPINAL CORD INJURY RESEARCH CENTER

Kentucky Spinal Cord Injury Research Center

Yes! I want to help support research and education at the Kentucky Spinal Cord Injury Research Center so that we can find new treatments for these devastating injuries.

Enclosed please find my tax-deductible contribution of $ _____ or
I pledge a contribution of $ _____ to KSCIRC over _____ years.

❑ Yes, please send me regular reminders

Name_____

Address _____

City _____State_____Zipcode_____

Phone number_____Email_____

If you would like to designate how your contribution will be allocated, please express your wishes below. If you do not specify an allocation, the funds will be used where there is the most need.

My gift is in honor of/memory of: _____

Please mail this form and your payment to:
Kentucky Spinal Cord Injury Research Center
University of Louisville
Attn: Ryan Coady, Director of Community Relations
511 S. Floyd St., MDR 616
Louisville, KY 40292

If you have questions or would like more information, please contact Ryan Coady at (502) 407-3032 or ryan.coady@louisville.edu