UNIVERSITY OF LOUISVILLE®
KENTUCKY SPINAL CORD INJURY RESEARCH CENTER

The KSCIRC Report

SPRING 2010

Helping SCI Patients Breathe

by Alexander V. Ovechkin, M.D., Ph.D

People who experience a spinal cord injury suffer a significant loss of muscle control, leading to paralysis and contracted muscles. When this involves muscles used for breathing, the decrease in the volume of air moving in and out of the lungs becomes a leading cause of death for spinal cord injury patients.

Impaired respiration amplifies an injury's effects by causing fatigue and limiting the patient's ability to participate in physical training and other activities that comprise a good quality of life. Therefore, restoring proper control over these muscles is a major clinical priority.

Standard methods for assessing a patient's respiratory function include measuring how much air can be moved in and out of the lungs and the air pressure that can be developed. However, these measures do not assess the degree and form of disruption that occur within the injured spinal cord.

Novel strategies that will one day make it possible to repair, replace and retune the neural cells controling respiratory muscles are undergoing testing in animals here at the University of Louisville. They include transplantation to replace lost cells, substances that trigger the formation of new nerve fibers and their connections, and training procedures to help restore function.

The Human Factor

Human studies also are under way to learn how to gain details about the cellular connections that remain after an injury. One method measures and records the signals traveling from spinal cord cells to respiratory muscles during breathing so that we can calculate values for comparing the breathing patterns of impaired with unimparied people. When properly validated, this should provide an objective measure of how the treatment affects the neurons that control breathing muscles.

Seeing Results

These parameters have already demonstrated a strong relationship to the pulmonary function outcomes and changes that occur in spinal cord injury patients who have undergone rehabilitation to help them recover their ability to walk. They also are the key outcome measures used in a new Paralyzed Veterans of America-funded study of how training and electrical stimulation affect respiratory muscles. The goal is to find additional factors that describe the vast diversity of disruption seen after an injury, while measuring the degree and rate of improvement in the nervous system's function that results from the treatments being tested.

In the future these tools will be applied to Lou Gehrig's Disease, muscular dystrophy and other neuromuscular disorders that cause respiratory dysfunction. They will also be paired with cardiovascular measures to learn how improved respiratory muscle control affects blood pressure—another clinical priority in managing a spinal cord injury's effects.

Alexander Ovechkin recently received a $150,000 grant from the Paralyzed Veterans of America to study spinal cord injuries and breathing.

KSCHIRT Symposium Set for June 4

Mark your calendars for the 16th annual KSCHIRT Symposium set for June 4 at the Embassy Suites Hotel in Lexington.

The KSCHIRT Symposium's popularity grows each year. Dr. Jorge Miranda, from the University of Puerto Rico, says, "We attend the KSCHIRT meeting every year because it gathers well-known investigators in the field of spinal cord injury, open to discuss their most recent findings with the audience in a friendly environment."

Dr. Julia K. Terzis of the Microsurgical Research Center is another fan. She calls the event a "very worthwhile investment," explaining, "As a restorative microsurgeon, in two days I am exposed to the latest advances in translational research on neurodegeneration, repair and development of the nervous system, spinal motor networks, cortical plasticity, controversies in SCI, human SCI protocols and the latest in drug therapy. With my busy schedule it will be impossible to acquire this knowledge and understanding through literature review in such a short time."

The symposium alternates between UofL and the University of Kentucky. UofK is this year's host. For more information, visit: http://louisville.edu/kscirc

Chair's Corner

Dear Friends and Colleagues,

Welcome to the latest issue of the *KSCIRC News*.

When I joined the University of Louisville last May as interim chair of the Department of Neurosurgery, we were in a transitional phase due to the hiring of several new faculty members, including myself. But over the past year we have all hit the ground running, and I'm proud of the many accomplishments that our department has achieved.

Our team members, old and new, have seamlessly merged to carry on the groundbreaking research and superior patient care that have been the trademark of this department for years. Among them are a top-notch group of residents, fellows, Ph.D. candidates and medical students who represent the future of our profession—and judging from what they are already accomplishing, that future is very bright.

It is an honor for me to lead such a promising team and to have the responsibility for expanding the department into new areas. The opportunities for blending clinical services with research here at UofL make this a very exciting time for physicians and researchers who are dedicated to improving the lives of people with conditions affecting the nervous system.

The Department of Neurological Surgery at UofL is one of only a few departments that have an internationally renowned research division with the depth and breadth of research spanning basic science—including stem cell research for repair of spinal cord injury—all the way to innovative rehabilitation therapy.

Another critical component of our research is discovering and creating leading-edge technologies and applying them in a compassionate clinical practice to bring the very best neurosurgical care to our community. One of the more exciting techniques we are working with is called "minimally invasive expanded endonasal endoscopic approaches to skull base surgery." This allows surgeons to approach pathology located from behind the frontal sinus all the way to the second cervical vertebrae through a small incision inside the nose.

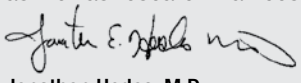
With the addition of Dr. Haring Nauta, over the past year we have expanded our clinical practice and developed new collaborative relationships with other units, both inside and out of UofL's School of Medicine. These include the creation

of a multidisciplinary neuro-oncology clinic with UofL's James Graham Brown Cancer Center and a relationship with the Midwest Proton Radiotherapy Institute, within Indiana University's Melvin and Brenda Simon Cancer Center, to provide proton therapy for patients. Proton therapy allows radiation treatment to zero in on its target, the tumor, with great accuracy.

We also earned reaccreditation for our Level 1 Trauma Center at University Hospital, the region's only adult trauma service. No one else in the region has the staff, resources and technology we have to manage the complex medical care a seriously injured patient can require at a moment's notice. The Trauma Center admits more than 2,400 patients each year—40 percent of whom are referred from other hospitals. We are very proud of the fine work being done here and the lives—and quality of life—being saved as a result.

I also am happy to report continued accreditation of our neurosurgery residency training program. We have been approved (on probation) for a total of 11 residents over seven years, which is an increase from our previous six-year residency. The additional year is for a dedicated year of research.

I want to end by thanking you for your show of faith when I was promoted last October from interim to permanent chairman of the neurosurgery department. I will continue to pursue expansion of our research and clinical faculty and trainees as well as enhancement of our facilities. And I will do everything in my power to see that our department continues its rapid pace in advancing neurological treatments and discoveries, while continuing to provide a quality education for the next generation of neurosurgical and physical medicine and rehabilitation practitioners as well as research trainees.



Jonathon Hodes, M.D

Jonathan Hodes, M.D., Fast Facts

- Named chair of the Department of Neurosurgery in October 2009 after serving as interim chair since May 2009
- Also served as director of UofL's neurosurgery residency program (accredited by the American Council for Graduate Medical Education)
- Earned his master's and medical degrees from the Indiana University School of Medicine
- Completed his internal medicine residency at the Indiana University Medical Center and a fellowship with the National Institute on Aging
- Completed his neurosurgical residency at the University of California San Francisco
- Was a fellow at the University of Western Ontario (neurovascular surgery) and at Lariboisiere Hopistal in Paris (neurointerventional radiology)
- Previously on faculty at the University of California San Francisco, Wayne State University and University of Kentucky (where he was director of gamma knife radiosurgery and neurointerventional radiology)
- Author or co-author of more than 40 scientific papers
- Board-certified by the American Board of Neurological Surgery and the American Board of Internal Medicine, member of the American College of Physicians and a fellow of the American College of Surgeons

Susan Harkema (seated, third from left) is the rehabilitation research director at the University of Louisville and Frazier Rehab Institute. She also is a member of the Reeve Foundation's Neurological Outcomes Assessments (NOA) Task Force, an integral part of the North American Clinical Trials Network (NACTN). The task force has begun much-needed work to develop, test and validate improved outcome measures for use in human clinical trials of spinal cord injury. Harkema recently led a training session for her task force colleagues that included (seated from left): Jill Wecht of the James J. Peters VA Medical Center; Andrei Krassioukov, University of British Columbia; Harkema; Naomi Kleitman, NIH/NINDS; Susan Howley, Christopher Reeve Foundation. (Middle row, left to right): James Guest, University of Miami; Anthony Burns, Toronto Rehab Institute; Stephen Burns, University of Washington; Amie Jackson, University of Alabama at Birmingham; Tania Lam, University of British Columbia; Peter Ellaway, Imperial College, London; Milos Popovic, University of Toronto; Zev Rymer, Rehabilitation Institute of Chicago; Molly Verrier, University of Toronto; Robert Grossman, The Methodist Hospital. (Back row, left to right): Graham Creasey, Stanford University; Martin Schubert, University of Zurich; Arthur Prochazka, University of Alberta; Art Sherwood, National Institute of Disability and Rehabilitation Research; Ken Curley, MCMR-RTC; Tim Boone, Weill Cornell Medical College, and Bernard Conway, University of Strathclyde Glasgow.

Paralyzed Veterans' Funding for KSCIRC Supports SCI Research

The Paralyzed Veterans of America (PVA) is a strong supporter of KSCIRC and spinal cord injury research at UofL. Recently, Donald Bell, president of the Kentucky-Indiana Chapter of the PVA, and research director Richard Simers visited KSCIRC to present a $150,000 PVA Research Grant Award to UofL scientist Alexander V. Ovechkin. The grant is funding Ovechkin's study of how training and electrical stimulation affect respiratory muscles. For details, see the full story on page 1.

The PVA also presented KSCIRC's scientific director Scott Whittemore, Ph.D., with a $2,000 check for the center.

From left: Rebecca Nosil, outgoing K/IPVA executive director; Alina Prusak current executive director; Don Bell, the group's president; and Scott Whittemore.

Organizations' Gifts Memorialize and Assist

KSCIRC has several supporters whose fundraising efforts honor or memorialize individuals while also making a huge difference for people with spinal cord injuries. Friends for Michael is among them.

This year the group's fundraising efforts resulted in a $9,000 donation to the KSCIRC to support spinal cord injury research. To view upcoming events, visit www.friendsformichael.org.

The Todd Crawford Foundation to Cure Paralysis is another good friend, giving a donation of $10,000 for 2009. The money was raised at the group's annual run, walk and roll event.

This was only the second year for the foundation. To learn about its upcoming events, go to www.toddcrawfordfoundation.org.

From left: Coach Denny Crum; Matthew Brent, president of Friends for Michael; and Scott R. Whittemore, KSCIRC scientific director.

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The Kentucky Spinal Cord Injury Research Center

Gift to Fund New Chair for Frazier Rehab

A $1.5 million gift from Louisville philanthropist Owsley Brown Frazier will be used to create a new endowed chair in physical medicine and rehabilitation at Frazier Rehab Institute and UofL's School of Medicine.

The funds will allow UofL and Frazier Rehab to recruit a top faculty researcher to help enhance the nationally recognized work already being done here in understanding and treating devastating spinal cord injuries, traumatic brain injuries and movement disorders.

Frazier Rehab, a 135-bed facility and regional care network, offers all facets of rehabilitation from physical therapy to speech and pulmonary therapy. Owsley Brown Frazier, who currently chairs UofL's Board of Trustees, said that in the 1950s his mother helped establish the center that would eventually become Frazer Rehab Institute after she suffered a disabling accident.

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 _____

My gift is in honor of/memory of *(circle one)*:

_____

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.

Please mail this form and your payment to:

University of Louisville
Attn: Larissa Reece
Office of University Advancement
Louisville, KY 40292

If you have questions or would like more information, please contact Larissa Reece at (502) 852-8910 or l.reece@louisville.edu