Number 13, Summer 2008

Reeve-Irvine Research Center Publication

Spinal Connections

Kim Anderson Inducted into the SCI Hall of Fame!

In a ceremony on November 6, 2007, Dr. Kim Anderson was inducted into the Spinal Cord Injury (SCI) Hall of Fame in the Research in Basic Science category. Formed by the National Spinal Cord Injury Association (NSCIA) in 2005, the SCI Hall of Fame was created to celebrate and honor individuals and organizations that have made significant contributions to quality of life and advancements toward a better future for all individuals with spinal cord injury.

Dr. Kim Anderson & Tim Erisman

2007 SCI Hall of Fame inductees were announced at the third annual SCI Hall of Fame induction ceremony at the John F. Kennedy Center for the Performing Arts in Washington DC on the evening of November 6th. With more than 160 nominees, Dr. Anderson and 14 others were honored for their "significant contributions to quality of life and advancements toward a better future for all individuals with spinal cord injury or disease." Others inducted into the SCI Hall of fame this year included Dean Kamen, inventor of the iBot Mobility System (Assistive Technology), Extreme Makeover: Home Edition, Emmy award winning ABC-TV program helping families with home accessibility (Entertainment), Susan Harkema, rehabilitation director of the Kentucky Spinal Cord Injury Research Center and the director of research at Frazier Rehabilitation Institute (Research in Quality of Life) and Renee Tyree, Paralympic gold, silver and bronze medalist (Sports).

Dr. Kim Anderson is an Assistant Adjunct Professor in the Department of Neurological Surgery at the University of California, Irvine, and a core faculty member of the Reeve-Irvine Research Center. Her research focuses on translational investigations and bridging the gap between basic science and clinical science, in relation to spinal cord injury. Recognizing a discrepancy between the focus of outcomes in SCI basic science and the needs of the population living with SCI, Dr. Anderson is working to elucidate the clinically relevant problems people living with SCI face on a daily basis and convey this information to SCI researchers. Recent studies have included a survey of the SCI population to identify the greatest perceived improvement on quality of life of various types of functional recovery. Although the majority of SCI basic science research has looked at walking, the priorities of the SCI population are: 1) regaining arm and hand function for tetraplegics (quadriplegics), 2) regaining sexual function for paraplegics, and 3) recovering bladder and bowel function for both tetraplegics and paraplegics. These results have had an impact on the basic science community and further studies are now addressing multiple aspects of SCI instead of only locomotion. Dr. Anderson has published an in-depth study

Continued on page 9...

In this issue...

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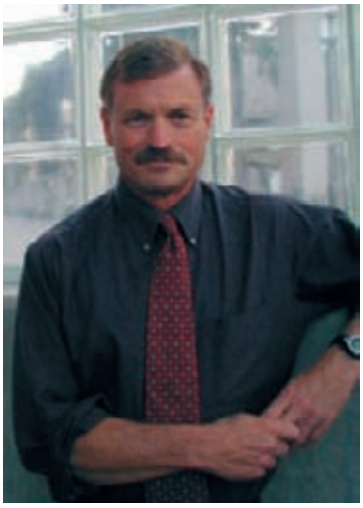
The Spinal Cord Injury Clinical Initiative



Dr. Oswald Steward

In December of 2007, the Reeve-Irvine Research Center hosted the launch of a new Clinical Spine Initiative at the University of California Irvine. The initiative will create a comprehensive Spine Center dedicated to providing a continuum of clinical care and the infrastructure for cutting-edge, life saving and life changing research.

The first stage will establish a medical unit in the university hospital that will focus on acute care of patients with diseases, disorders and injuries affecting the spine and spinal cord. This acute spine unit will be THE place to come for individuals with any disease or disorder affecting the spinal cord, especially for people who have just suffered a traumatic spinal cord injury but also people with spinal tumors, Transverse Myelitis, Multiple Sclerosis, and spinal stroke. The unit will coordinate services between the current outpatient clinics at UCI Medical Center, as a first step toward a comprehensive spinal care clinic.

But care is only half the story. Spinal cord injury research is at a turning point, evidenced by the emergence of several potential new treatments for spinal cord injury over the last few years. The Reeve-Irvine Research Center is creating basic science discoveries that are ready for translational study in the clinical setting.

UCI Clinical Spine Initiative - Creating an unparalleled comprehensive Spine Center dedicated to providing a continuum of clinical care and the infrastructure for cutting-edge, life saving and life changing spine research.

Very few institutions have the clinical research infrastructure to carry out human spine research and the UC Irvine Clinical Spine Initiative brings together all the necessary pieces to create a unique, world-class clinical care and research center.

The comprehensive spinal cord injury care and clinical research program will encompass a multidisciplinary approach to everything having to do with the spinal cord. Currently involved in the program are the departments of Trauma, Emergency Medicine, Orthopaedic Surgery, Neurosurgery, Neurology, Physical Medicine & Rehabilitation, and Urology, with several other departments indicating they plan to participate as the program grows. In addition to consolidating beds into a specialized unit in the existing hospital, UC Irvine is recruiting new expert physicians in both Orthopedics and Neurosurgery who will be the leaders of this new program.

“There was remarkable unanimity of opinion that a program in spinal cord injury was feasible and highly needed for the southern California region” said Dr. Ranjan Gutpa, Chair of Orthopedic Surgery at UC Irvine and a major participant in the Clinical Spine Initiative.

The senior administration of the UCI Medical Center, including our new Vice Chancellor for Health Sciences and Dean of the Medical School Dr. David Bailey, has enthusiastically supported the development of the acute spine unit and the clinical spine initiative.

Although the need for an acute spinal care and clinical research program is great and would be of immense benefit in the California region, this cannot be established without help from the community. Accordingly, we are launching a capital campaign to begin raising funds to make this dream a reality. To recruit the best and the brightest clinicians and scientists to UC Irvine, support ground-breaking translational research and build a world-class comprehensive clinical care and research facility within the new University Hospital we need your help. The Clinical Spine Initiative has made incredible strides with support from the School of Medicine, the new University Hospital and UC Irvine, however to bring this program to fruition and accomplish our goals we need community friends and champions. For more information please contact Pat Carew at pcarew@uci.edu or Tania Cusack at tcusack@uci.edu.

Our vision is to establish a resource that would be without parallel in southern California, indeed in the entire state of California. UC Irvine has the people, the expertise, and the drive to create the premier spinal care and clinical research facility in the world, with your help we can make it happen.

On December 11th 2007, the Reeve-Irvine Research Center hosted the launch of the new Clinical Spine Initiative at a Holiday Gala attended by more than 130 people. In addition to wonderful food and a special wine tasting, the gathering was entertained by prodigy guitarist and UC Irvine

RIRC takes the lead in developing a Spinal Cord Injury Disease Team

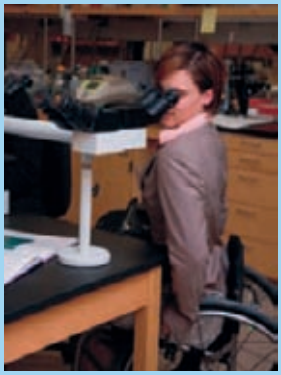
In the fall of 2007, the California Institute for Regenerative Medicine (CIRM), the state agency that provides funding for stem cell research in California, announced a grant opportunity to study potential stem cell therapy applications for various diseases. The Disease Team Initiative's primary focus is "…to explore a new method of integrating and organizing the highest quality basic, translational, and clinical research with the specific aim of producing a therapy for a particular disease or group of diseases whose research is poised for the development of therapies." These Disease Team grants will award investigators multi-million dollars over a 5+ year time with a goal of applying for an "investigational new drug" (IND) with the FDA within 5 years. Prior to starting human clinical trials in the US, the FDA must approve the proposed therapy or drug after pre-clinical experiments have proven its safety and efficacy.

RIRC
Reeve-Irvine Research Center
University of California, Irvine

As a disease entity, spinal cord injury (SCI) is a prime target for stem cell therapies. Without an ongoing degenerative process, there are multiple discrete target areas to study potential repair strategies using stem cells. California has drawn an exceptionally strong and close-knit scientific community who have been collaborating their SCI research efforts since 2000.

To get a jump start last fall, RIRC director Os Steward organized a meeting involving prominent SCI investigators throughout the state to discuss strategies and priorities for the Disease Team Initiative. This initial "think tank" meeting laid the groundwork for future meetings to discuss opportunities and approaches. In the upcoming year, teams of investigators will have the opportunity to submit grant applications for Disease Team Funding. The exact date for the proposal submission has not yet been announced by CIRM.

Clinical Spine Initiative Holiday Gala



Professor John Schneiderman. A special moment was provided by the very talented entertainer Rene Bondi, who sang two songs with messages of hope. Ms. Bondi shared her experience of being told she would never sing again due to her high cervical spinal cord injury. Her courage, perseverance and positive attitude make her a role model for all of us.

The evening began with tours of the Reeve-Irvine Research Center laboratory and information about the new initiative. Dr. Oswald Steward and Dr. Ranjan Gupta gave presentations outlining the vision of the new spine initiative, from the first steps underway right now to the where we might go with community help in the future. The electricity and excitement in the air made this an event to remember!

UCI's Stem Cell Center is funded as a "Center of Excellence"

A critical part of Proposition 71 is the plan to fund major research facilities for human embryonic stem cell (hESC) research. Major facilities are required because of the constraints on the use of Federal funds for hESC research; any research involving "non-approved" lines must be done in laboratories built, equipped and staffed with non-federal funds. Approximately $267 million of Prop 71 funds have been authorized for this purpose, and in the fall of 2007, the California Institute for Regenerative Medicine (CIRM) requested proposals from California Institutions for grants of up to $50 million to construct these new facilities.

The calls for proposals for these major facilities went out in early summer 2007 and proposals were prepared during the fall of 2007 by a team at UC Irvine that included RIRC's Dr. Hans Keirstead and Dr. Maura Hofstadter. Other members of the team included Dr. Peter Donovan, Co-Director of the Sue and Bill Gross Stem Cell Center, Dr. Leslie Lock, and Jeanne Ingles, as well as support staff from UCI.

CIRM received 17 proposals for small, medium and large facilities that focused on the basic biology of stem cells, translational research, and/or clinical research. These proposals were reviewed in late 2007 by the CIRM grants working group, a review committee of internationally renowned scientists not residing in California. UC Irvine's proposal for a Center of Excellence focusing on basic, translational and clinical research ranked 3rd out of all the proposals submitted, which is a remarkable achievement given the strong competition in the state of California.

The second stage of review was earlier this year by the CIRM facilities working group, a committee with expertise in building design and construction, finance and real estate. The facilities working group judged the impact of the buildings and their economic benefit to California. Again, UCI's proposal ranked high. And so we are delighted to announce that our proposal for a comprehensive facility was funded!

The drawing below is an artist's conception of the UCI Center of Excellence in Stem Cell Research to be constructed on the main campus of UCI just adjacent to the Gillespie Neuroscience Research Facility that houses the RIRC.

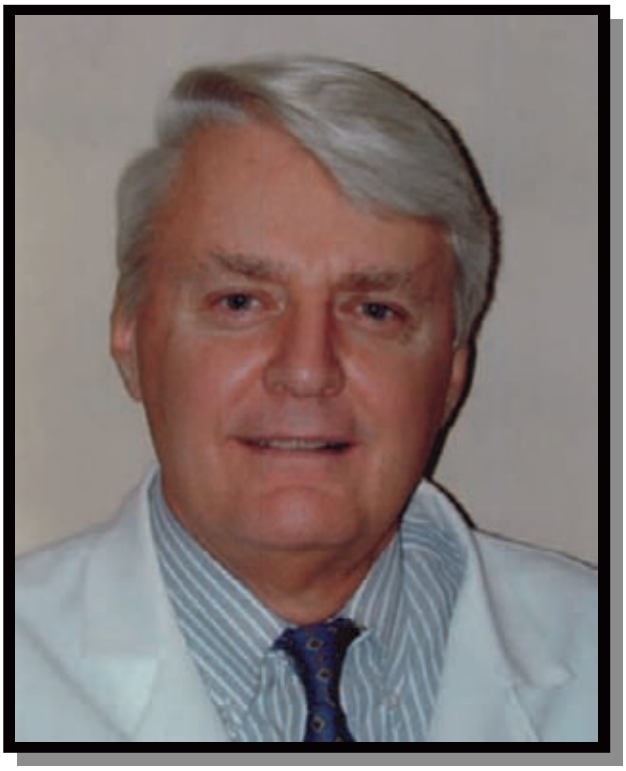
In 1996, the Reeve-Irvine Research Center and Joan Irvine Smith established an annual award for research in spinal cord injury. The award, originally "Christopher Reeve Research Medal", with Christopher's blessing became the "Reeve-Irvine Research Medal" in 2003.

The Reeve-Irvine Research Medal recognizes an individual, or individuals, who have made highly meritorious scientific contributions in the area of spinal cord repair, and whose research has stood the test of time and scrutiny. The medal and a $50,000 cash award is provided through the generosity of Joan Irvine Smith and Athalie R. Clarke Foundation. Their kindness has made it possible to continue to recognize the work of pioneering investigators whose work has brought us closer to cures for afflictions affecting the spinal cord. Dr. Oswald Steward, Director of the Reeve-Irvine Research Center and the Medal Selection Committee have established a symposium to celebrate the achievements of the Medal winners. This year marks the second year of the Reeve-Irvine Medal Symposium entitled: Autonomic Dysfunction following spinal cord injury: New frontiers in research and treatment. The 2007 Reeve-Irvine Research Medal is awarded to Dr. William C. de Groat who is known internationally for his work on urinary dysfunction and pain after spinal cord injury.

The Reeve-Irvine Research Center celebrated Dr. William C. de Groat as the 2007 recipient of the Reeve-Irvine Research Medal.

William C. de Groat, Ph.D.

Dr. William C. de Groat received a Ph.D. in Pharmacology in 1965 from the University of Pennsylvania Medical School and postdoctoral training in Pharmacology at Penn (1965-1966) and in Neurophysiology at the John Curtin School for Medical Research in Canberra, Australia (1966-1968). He joined the University of Pittsburgh in 1968 and was promoted to Professor in 1977. He has been a Visiting Scientist at the NIH (1988-1989) and the University College London (1998). Dr. de Groat is internationally known for his work on urinary dysfunction and pain after spinal cord injury. He has made seminal discoveries illuminating how the nervous system controls urinary function. His work has focused on the molecules and neurotransmitters important in this system, how the nerves communicate, reflex organization and involvement, and plasticity inherent at the neural level. In addition, he has fathered the study of bladder dysfunction following spinal injury, providing significant contributions to our understanding of the underlying causes of bladder problems, but also exploring possible treatments and remedies.



William C. de Groat, Ph.D.

Edition Glossary

Neuron / Nerve Cell
A unique cell type that sends electrical and chemical signals from one part of the body to another.

Stem Cells
A cell that can do two things: make exact copies of itself and turn into other cell types. Stem cells are found in embryonic, fetal, and adult tissues.

Embryonic Stem Cells
Cells that can become all cell types and come from a blastocyst, a hollow ball of cells that develops 4-5 days after fertilization and contains about 30 embryonic stem cells.

IND
An Investigational New Drug Application (IND) is a request for authorization from the Food and Drug Administration (FDA) to administer an investigational drug or biological product to humans.

FDA
The Food and Drug Administration, an agency within the U.S. Public Health Service, which is a part of the Department of Health and Human Services and is responsible for process by which drugs and biologics become available to the public.

Motor Neuron
Motor neurons are the nerve cells responsible for making muscles move.

Continued on page 15...

Spinal cord injury, neuroscience, and medicine have a language all their own. In each issue we discuss different terms, treatments and anatomy that are part of understanding spinal cord injury and spinal cord injury research.

Autonomic Dysfunction

As anyone with SCI knows, paralysis and lack of sensation are only the tip of the iceberg – no bladder or bowel control, sexual dysfunction, no sweating, poor temperature regulation, and blood pressure issues all go along with spinal cord injury. This is because in addition to disrupting systems involved in voluntary movement, spinal injury also disrupts the autonomic nervous system. The autonomic nervous system regulates organs (viscera), like the heart, stomach, and blood vessels, unconsciously controlling dilatation or constriction of the blood vessels, heart rate, pupil dilation, urinary and sexual function. These are very important aspects of bodily function over which we generally have little conscious control. The autonomic nervous system allows us to adapt to our environment. One part (the sympathetic) prepares the body for fight or flight (for example if you encounter a bear on a hike). The other (the parasympathetic) is active during states of "rest and digest". Components of both the sympathetic and parasympathetic systems are located in the spinal cord and are controlled by long connections from the brain (central autonomic pathways), which are disrupted by SCI. In the same way that loss of connections causes paralysis and spasticity of motor systems, loss of central autonomic pathways disrupts the functions of various organs and causes something very similar to spasticity called "Autonomic Dysreflexia".

Autonomic Dysreflexia

Autonomic dysreflexia is a condition in which the sympathetic nervous system runs amok. In the normal "fight or flight" response, sympathetic activation causes increases in heart rate and blood pressure to enable the body to respond maximally to the threat. After spinal cord injury, this system can be triggered by completely innocuous stimuli, causing rapid spikes in blood pressure to life threatening levels in response to some disturbance in the body below the level of injury. Autonomic symptoms are seen following injuries at all spinal levels, but dysreflexia typically affects people with injuries at T6 or above. Common triggers for autonomic dysreflexia include a full bladder, bowel distension, skin irritation (perhaps even an ingrown toenail), and sexual arousal. Usually, these conditions cause messages to be sent up the spinal cord to the brain so that something can be done about the disturbance – for example empty the bladder. However, a SCI blocks the message from getting to brain and instead turns on the sympathetic nerves of autonomic nervous system, which constrict the blood vessels in the abdomen and legs rapidly increasing blood pressure. The brain can sense that blood pressure is too high, but because of the spinal injury, is unable to dilate or open up the blood vessels in the legs so blood pressure continues to increase to dangerous, potentially life threatening, levels. Symptoms of autonomic dysreflexia include pounding headache, sweating above the injury level, goose bumps, and extreme anxiety.

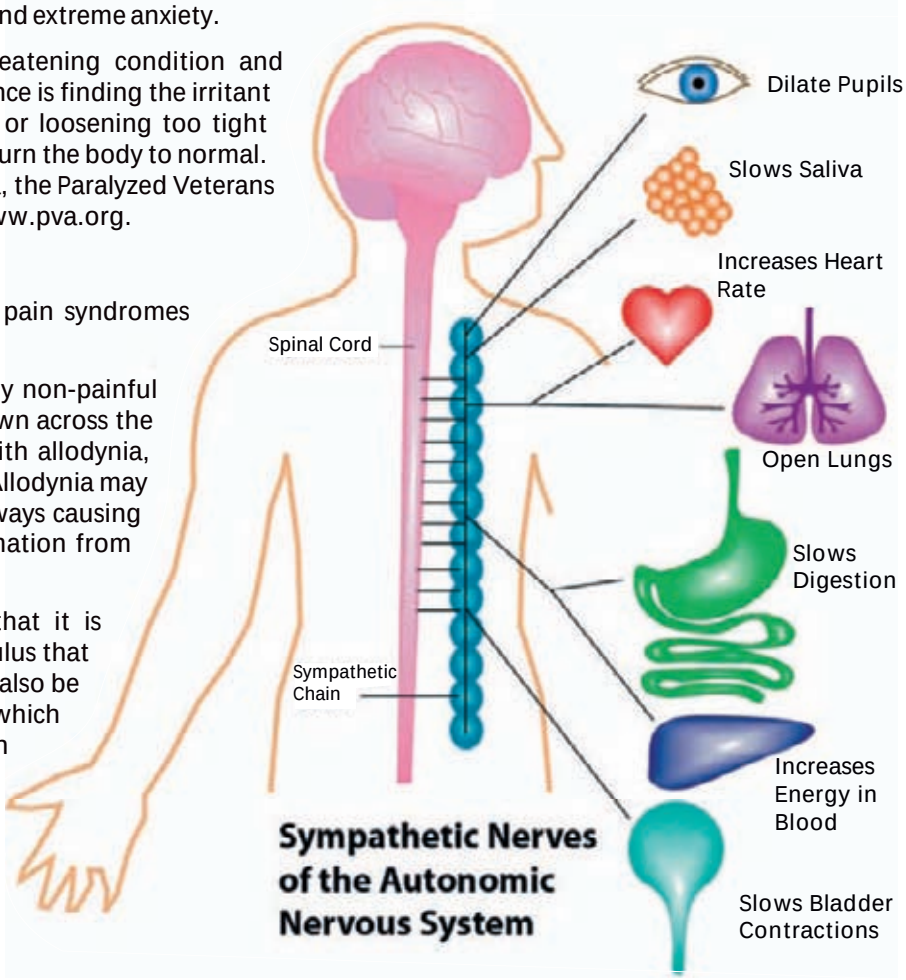
Autonomic dysreflexia is a potential life threatening condition and should be taken very seriously. Of key importance is finding the irritant and removing it, simply empting the bladder or loosening too tight shoes can stop the rising blood pressure and return the body to normal. For more information on autonomic dysreflexia, the Paralyzed Veterans of America has an excellent consumer guide, www.pva.org.

Allodynia and Neuropathic Pain

People with spinal cord injuries may develop pain syndromes called "allodynia" and "neuropathic pain".

Allodynia is the sensation of pain to a normally non-painful stimulus. The touch of a cotton ball softly drawn across the arm is usually not at all painful. In people with allodynia, even something as mild as this is very painful. Allodynia may be due to changes in the of central pain pathways causing them to be more responsive to sensory information from the skin.

Neuropathic pain differs from allodynia in that it is ongoing, rather than being triggered by a stimulus that is normally not painful. Neuropathic pain may also be due to alterations in central pain pathways, which lead to activation of pain centers in the brain. An example of neuropathic pain is phantom limb pain, where there is no source for the pain, the limb is no longer there, and yet signals are perceived and interpreted by the brain as painful.

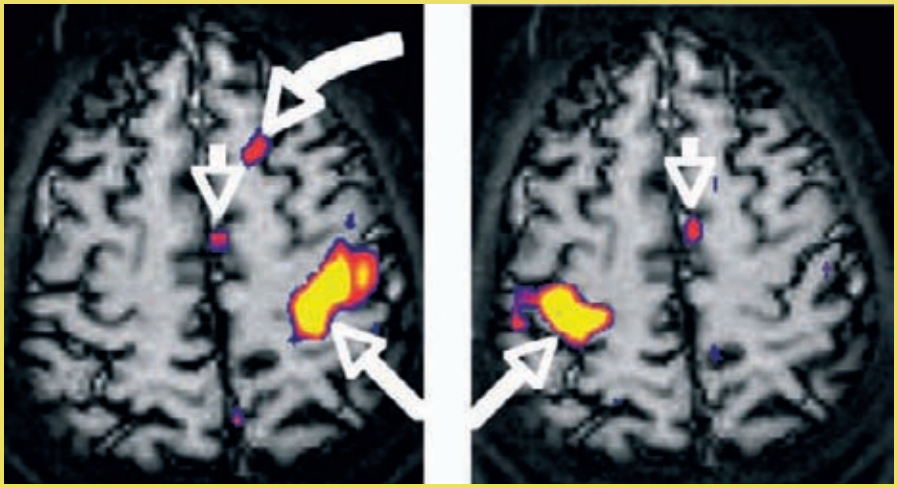


Imagery can change your brain

To move your arm, your brain sends a message down through the spinal cord and out to the muscles. In fact, there are specific areas of your brain devoted to movement (the "motor cortex" for example). So what happens to these brain regions after a spinal cord injury when movement is no longer possible due to paralysis? We know that muscles atrophy, shrink in size and weaken when the neural inputs from the spinal cord are disrupted; does this also happen to the areas of the brain responsible for movement? Do the motor parts of the brain still send out signals at all when those signals don't cause the muscles to move? Questions like these have practical importance for recovery of function after long-term spinal cord injury. We need to know if the brain will be able to control and direct movements when it's reconnected to the body following repair of the spinal cord.

RIRC Center Associate Steve Cramer, M.D., has been working on this issue using functional MRI, a technique that measures brain activity while someone is undertaking a task like tapping a finger or solving a math problem. Areas of the brain that are doing the work use more oxygen, which triggers increases in blood flow to deliver the needed oxygen. Functional MRI measures these changes in blood flow. Dr. Cramer, a noted neurologist at UC Irvine, has found that while many aspects of brain motor areas are unaffected by SCI, there are changes after injury.

Dr. Cramer suggests that restoration of normal activity in the motor areas disrupted by SCI might be an important addition to other therapies, think of it as rehabilitation for your brain. In a study reported in Experimental Brain Research in 2007, Dr. Cramer took the first step in exploring this idea by determining if imagery, thinking about movement, could change brain activity. Obviously people with paralysis can't move voluntarily, but they can think about moving. He and his colleagues asked people with complete SCI and uninjured control subjects to undertake a week-long course of motor imagery on a part of the body that was still under voluntary control, the tongue, and a part of the body that could not longer be moved voluntarily, the foot. Participants imagined their tongue moving in a 5 position sequence followed by their foot moving in a different 5 position sequence.



The white arrows point to places in the brain where blood flow has increased as measured by functional MRI.

Training resulted in increased activity in a motor area of the brain, the putamen, in both uninjured and spinal cord injured people demonstrating that motor imagery can be used to "practice" movement. These findings suggest that future therapies to repair the cord should pay attention to brain changes in order to maximize recovery of function. That imagery can change brain functions in the absence of actual movement means that motor imagery might be potent in combination with other therapies or in preparation for repairative treatments.

Evidence that Exercise Improves Recovery After SCI

Reports on the benefits of exercise in the popular media abound, but what about for people with spinal cord injury? In a 2007 study reported in the European Journal of Neuroscience, RIRC researcher Aileen Anderson and colleagues demonstrate that exercise during the month after injury improves walking in mice with spinal cord injury. Some of the mice, which had injuries similar to those most often seen in humans, were given access to a running wheel 3 or 7 days each week. Unlike many humans, if given the opportunity to run, mice will run! Using several measures of walking ability, the group found that the mice that exercised 7 days a week showed the best recovery, although the mice that exercised 3 day a week also showed better recovery than sedentary mice. This suggests that the amount of exercise might affect recovery of stepping. The team also discovered more serotonin fibers in animals allowed to exercise. Serotonin is an important chemical messenger in the spinal cord and brain that certain nerve cells use to communicate. Anderson and colleagues suggest that the increase in serotonin fibers, perhaps due to new outgrowth from existing injured nerve cells (called sprouting), may be the mechanism behind the improved stepping in mice that exercised. Information from studies like this will help shape rehabilitation strategies after SCI.

RIRC Center Associates Make Sorting Stem Cells easier

Lisa Flanagan, Ph.D.

Reeve-Irvine Research Center Associates Lisa Flanagan, Ph.D. and Ed Monuki, M.D., Ph.D., have found a new way to sort stem cells that should be quicker, easier and more cost-effective than current methods. The technique could in the future expedite therapies for people with conditions ranging from brain and spinal cord damage to Alzheimer's and Parkinson's diseases.

The method uses electrodes on a tiny, inch-long glass slide to sort cells by their electric charges, a technique used in cancer research. The stem cell field suffers from a lack of tools for identifying and sorting cells. This important discovery could add a new tool to current sorting methods, which generally require bulky, half million dollar equipment.

"For therapeutic purposes, we want stem cells to turn into specific cell types once they have been transplanted. The trick to doing this is identifying beforehand which cells will become the desired cell type, such as a neuron," said Lisa Flanagan, lead author of the study and a stem cell biologist at UCI. "We have discovered a new, potentially better way to do this by focusing on the electric properties of the cells."

This study appeared online Dec. 20 in the journal Stem Cells.

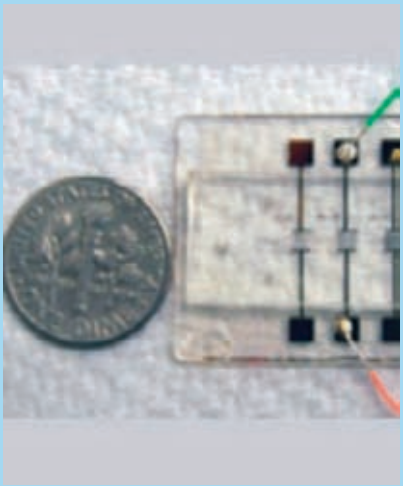
The technique used by the scientists, called dielectrophoresis, is based on the premise that different types of cells have different electric properties. Stem cells that are destined to become neurons, for example, have a different electric charge than stem cells that will become glial cells, another type of brain cell. The scientists discovered that the cells react differently when electric fields are applied. At one frequency, a neuron is attracted to an electrode but a glial cell is not; at a different frequency, a glial cell will be attracted but a neuron will not.

Ed Monuki, M.D., Ph.D.

In this study, Flanagan and Monuki wanted to identify and collect stem cells that were destined to become neurons. Neurons that die as a result of injury or disease do not regenerate, which is why people with neuronal loss suffer problems such as paralysis. Scientists believe that stem cell transplantations might be able to restore part of the lost function.

They first developed a mold, which was then used to create the tiny device that could perform the dielectrophoresis.

"Once the mold is created, these sorts of devices can cost just pennies to make," said Ed Monuki, senior author and UCI developmental biologist. "You could have many for every member of your lab and it wouldn't be prohibitively expensive."



A strong collaborative partnership between UCI biologists and engineers made this discovery possible. With input from biologists, engineers built the device in UCI's Integrated Nanosystems Research Facility. "This represents truly an interdisciplinary effort that expands the horizon in both biology and engineering fields," said Abraham Lee, a study co-author affiliated with the Department of Biomedical Engineering in The Henry Samueli School of Engineering at UCI.

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www.reeve.uci.edu

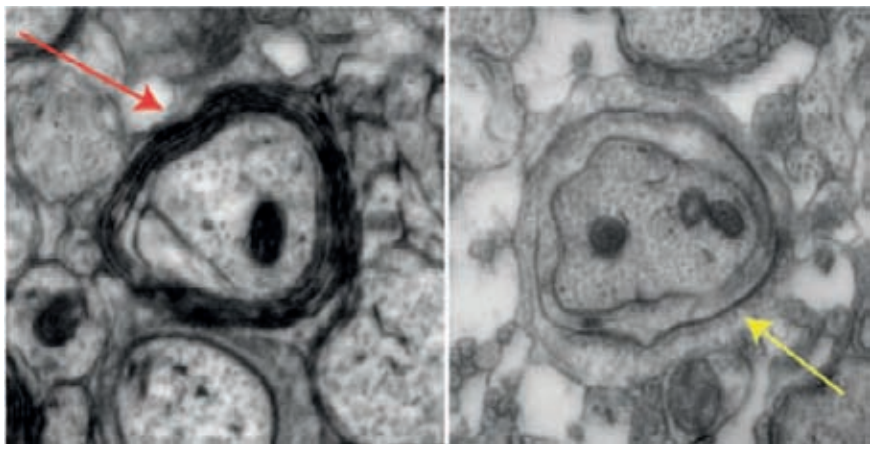
Targets for SCI Therapy May Vary Based on the Type of Injury

There are many different types of spinal cord injuries (SCI) ranging from the crush/contusion injury resulting from vertebral dislocation to injuries resulting from penetration of objects (a bullet, knife, or broken fragment of a vertebra). Therapies that show promise in certain SCI models may not work at all in others, and so it is important to understand the basic biology of different types of injury.

Monica Siegenthaler, a graduate student in Hans Keirstead's laboratory, discovered that different injuries cause different events in the spinal cord (Siegenthaler et al, Journal of Neurotrauma, 2007, 24:1631). She found that contusion injuries trigger a massive immune system response and tissue damage not only at the injury site but also a good distance above and below the injury. Transection injuries, which cut the spinal cord, had a very different injury profile with the tissue damage and immune response localized to the injury site.

Importantly, Siegenthaler found that there is significantly more demyelination following a contusion injury than a transection injury. Myelin is the insulation in the spinal cord that allows nerves to send electrical messages, and myelin damage following SCI is thought to contribute to functional loss. Siegenthaler's results show that treatments that focus on remyelination, replacing the lost myelin, might only be beneficial following a contusion injury and do little or nothing following a transection injury.

This type of information will be of great importance in selecting patients for clinical trials of new treatments.



The red arrow points to an axon with myelin, the thick black ring. The yellow arrow points to an axon that has lost myelin.

Kim Anderson, continued from page 1

regarding sexual impairments associated with SCI and is completing a study addressing arm and hand function following cervical SCI. She is currently conducting research on metabolic function following SCI to better determine risks for diabetes and other metabolic disorders. This Fall she will be starting a multi-center clinical study involving 22 hospitals across the US to test the reliability and sensitivity of the Spinal Cord Independence Measure III (SCIM III) as an outcome tool to better evaluate functional recovery in humans with SCI.

Dr. Anderson serves on the NIH National Advisory Board for Medical Rehabilitation Research, on the Membership Committee of the American Spinal Injury Association, and on the Board of Directors of the World Spine Society. Dr. Anderson established the Orange County SCI Networking Group, which is a community organization aimed at gathering resource information for both chronically and acutely injured people. She was awarded the Paul H. Silverman Award for Outstanding Work on Science and Ethics in 2005 and the Jerry Stein Independent Living Award in 2006 for being a role model in the SCI community."

Congratulations Dr. Anderson on this much deserved honor and thank you for your hard work!

"Plymouth Rock N Run" off to a great start!

- Tan Rezaei inspired to run!

New Year's Day 5K
raises funds for research at RIRC

The Reeve-Irvine Research Center congratulates a newly established group of fundraisers called "Jump Start"! This group, headed up by Tim and Kathy Johnson held their first event to support our Center by celebrating New Year's day in 2008 in a healthy way and raising funds to support research. Time was short, but Tim and Kathy were on a mission, and with the support of numerous community members and businesses their event was a huge success. They attracted 110 runners from Orange and Los Angeles Counties to support their cause, solicited support from businesses such as Canning Hunger, Snails Pace, OC Broaching and Loma Linda Nursery and even managed to coordinate a raffle!

Their hope was that this could become an annual fundraiser, and now Jump Start, with the adoption of their new and improved name *"Plymouth Rock N Run"*, is proud to announce the 2nd annual 5K Turkey Run. It will be held Thanksgiving Morning 2008 at Yorba Regional Park in Yorba Linda and sponsored by Research For Cure, one of Reeve-Irvine's most supportive fundraising teams.

Events like this are a wonderful way to raise private funds. A huge obstacle in our ability to carry out research on promising projects is a lack of funding, especially for research on chronic spinal cord injuries. Five years ago, Os Steward launched the chronic SCI research project at the RIRC that focuses on interventions for chronic injury. Private funding is critical for this because traditional funding sources focus on short-term projects for acute injuries. Private funding allows our researchers to explore new ideas that are out of the box but could bring us to an entirely new level of understanding. All of us at the Reeve-Irvine Research Center have grown close to our friends who are suffering from chronic injuries or have loved ones facing the challenges of living with a spinal cord injury or related neurological disease. The solution to this problem can come from the efforts of teams of volunteers who continue to work to raise funds for research.

Tan Rezaei, a first time marathon runner wanted to honor his dear friend Bill Chiou. Tan, an Orange County native, worked with Bill at the Irvine Company. They realized they both attended the University of California Irvine where the Research Center is housed and became fast friends. Tan explained that he became inspired by Bill, describing him as upbeat and encouraging despite challenges due to paraplegia and diabetes, a disease that unfortunately is often associated with spinal cord injury. Tan said, "Bill never complains and he is the most positive person I know so I wanted to run for him. When I asked him what charity he wanted to support, without hesitation Bill said the Reeve-Irvine Research Center".

Bill came to Reeve-Irvine when he realized that his previous employer gave much to the community to support worthwhile programs. He felt that the Reeve-Irvine Research Center should benefit from the generosity of the Pacific Life Foundation and with his support the Center received private gifts for two consecutive years. When asked about why he felt he wanted to support Reeve-Irvine Bill said,

"From day one, Reeve-Irvine has been an organization with steadfast focus on seeking treatments to improve the lives of those with spinal cord injuries. Reeve-Irvine has made every effort to reach out and understand the needs and obstacles of those with spinal cord injuries. They have accomplished this with the openness of their research facility and educational offerings such as their summer program. This approach allows the research facility to gear their research towards the discovery of treatments that provide real value to those who live with SCI".

"Plymouth Rock N Run"
Shealin, Tim, Kathy, Tom & Cherelle Johnson

Tan Rezaei runs his first marathon to honor his friend Bill Chiou and raise funds for RIRC

We are grateful to Tan Rezaei, Bill Chiou, and Tim Johnson's Plymouth Rock N Run team for all they have done to help us work to raise funds for those in need. If you would like to help the Reeve-Irvine Research Center you don't have to participate in a Major Marathon. All you need is your willingness to help. Our fundraising teams are always in need of dedicated volunteers, in this case runners! Run in honor or memory of a friend or loved one to help support research that could potentially benefit the many people who suffer from spinal cord injury. Or if you would like to create your own fundraiser please contact us. With your support you can help the Reeve-Irvine Research Center to research possibilities that would otherwise go undiscovered.

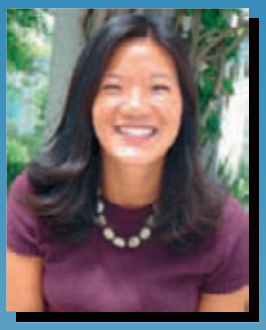
Tan Rezaei and Bill Chiou

ResearchforCure
www.researchforcure.org

Reeve-Irvine Research Cent

For questions regarding our educational and scientific programs or general information on the Reeve-Irvine Research Center, please contact:

Suzy Kim, M.D.
rirc@uci.edu
949-824-3993



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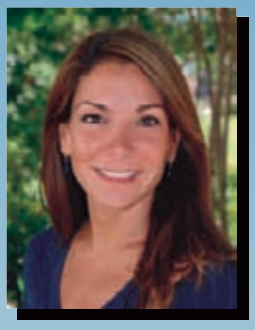

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Roman Reed Research Awards

Since 2000, the state of California has supported spinal cord injury research through the Roman Reed Spinal Cord Injury Research Act. Approximately $1.5 million per year is used to fund the Roman Reed Core Laboratory and Roman Reed Research Awards. The Core Lab, directed by Os Steward, allows for the rapid translation of ideas into research by making it possible for scientists with novel ideas to immediately undertake experiments in well-developed animal models. The Core Laboratory has state-of-the-art equipment, animal facilities, committed laboratory space, and trained technical personnel dedicated to spinal cord injury research.

Roman Reed

Roman Reed Research Awards are used to launch unique, creative research projects by scientists throughout the state of California. The program provides seed funds for highly innovative projects that are stepping stones for new federal and private funding. These awards differ from more traditional grants in that scientists who receive these funds become part of the Roman Reed Research Consortium. This group, along with other spinal cord injury / neural regeneration researchers from California, meets each year to discuss ways of cooperating, communicating and collaborating, thereby significantly enhancing the caliber and quantity of spinal cord injury research undertaken in the state of California.

How do we chose who receives Roman Reed Research Awards? The Reeve-Irvine Research Center administers the Roman Reed Program and oversees the award process. A private consulting firm is engaged to handle the proposal review. This is critical to avoid conflict of interest issues. The firm invites leading spinal cord injury researchers outside of California to evaluate the 30-40+ proposals in a day-long meeting. Every proposal is reviewed, discussed and then ranked on the basis of scientific merit and appropriateness for the program goals of the Roman Reed Project. A detailed report of the reviewers' comments on each project is generated. Based on the rankings provided by the outside review committee, the California Roman Reed Scientific Steering Committee, five SCI experts from the state of California, decide how to distribute the funds. Thus, the final decisions on the California state funds are made by Californians. This process ensures that the best projects are funded in a fair and ethical manner.

Since 2000, the Roman Reed Spinal Cord Injury Research Fund has allowed 110 projects to move forward and has supported the career development of 57 students, who are the next generation of SCI researchers.

Leveraging Roman Reed Funds

The vast majority of research dollars come from the federal government through the National Institutes of Health (NIH). Research is expensive, and spinal cord injury research especially so. To carry out studies hundreds of thousands of dollars are needed – and that's just for one project! To receive funding from the NIH, a project must have solid data suggesting that the proposed study will indeed work. Funding to get a project off the ground and generate the "pilot" data for NIH and other grants is often very difficult to find. This is why the Roman Reed Research Awards are so valuable to spinal cord injury research in California. With discoveries made through a Roman Reed project, the scientist can then go to major funding agencies, like the NIH, and leverage their state funded project into a large grant to support a major SCI research program.

The Roman Reed Fund has achieved a remarkable degree of success. The total amount of Roman Reed funding from the program's beginning in 2000 through 2007 is $10,956,000. These funds have been leveraged into $38,963,844 in new funds being brought into the state. In addition, more than 135 research articles have been published and two patents are pending. This represents a tremendous augmentation of our scientific knowledge about SCI and potential SCI treatments.

The Roman Reed Spinal Cord Injury Research Fund has made a significant impact on research within the state of California. Both the Roman Reed Core Laboratory and state funded research awards are expanding the number of scientists working on spinal cord injury research, which will accelerate progress towards treatments. We wish to thank the state of California and the University of California for their forward thinking approach to the devastating problem of spinal cord injury. Research is the only way we will find solutions, and the Roman Reed Spinal Cord Injury Research Fund is moving us more rapidly towards relief from disability, loss of earning power, and loss of personal freedom associated with spinal cord injury.

2007 Roman Reed Research Awards

13 grants totaling $1,177,586

Corinna Darian-Smith *Stanford University*	*Characterization of reactive neurogenesis in the rodent following a dorsal root transection injury. A comparison with a central dorsal column lesion.*	*$71,693*
V. Reggie Edgerton, Ph.D. *UCLA*	*Is the spinal circuitry that generates spinal stepping refined or expanded in response to locomotor training?*	*$100,022*
Christine Gall, Ph.D. *UC Irvine*	*Ampakine enhancement of axonal outgrowth and functional recovery following spinal cord damage***	*$89,768*
Yuh Nung Jan, Ph.D. *UC San Francisco*	*Investigating the mechanisms of capase activation in nerve degeneration by using dendrite pruning of Drosophila sensory neurons as a model system*	*$60,000*
Thomas Lane, Ph.D. *UC Irvine*	*CXCR2 and spinal cord injury ***	*$61,560*
Edwin Monuki, M.D., Ph.D. *UC Irvine*	*Dielectrophoretic cell sorting directed to SCI transplant therapies*	*$75,000*
Linda Noble, Ph.D. *UC San Francisco*	*L-selectin and spinal cord injury*	*$70,510*
Lawrence Recht, MD *Stanford University*	*Replacing cortical motor neurons with embryonic stem (ES) cells A potential adjuvant treatment for spinal cord injury*	*$100,000*
Roland Roy, Ph.D. *UCLA*	*Can maintaining hind limb muscle mass improve locomotor recovery after a complete thoracic SCI?*	*$115,655*
Oswald Steward, Ph.D. *UC Irvine*	*Do cortical motoneurons undergo retrograde cell death after spinal cord injury?***	*$83,773*
Niranjala Tillakaratne, Ph.D. *UCLA*	*Is cyclic AMP element binding protein (CREB) essential for spinal learning?*	*$76,847*
Mark Tuszynski, M.D., Ph.D. *UC San Diego*	*University of California Primate Consortium: Axonal plasticity and regeneration in chronic primate SCI*	*$185,100*
Binhai Zheng, Ph.D. *UC San Diego*	*Role of EphA4 in spinal cord injury and axon regeneration*	*$87,658*

*** Will use the Roman Reed Core Laboratory*

Total $1,177,586

PLANNED GIVING

Are you considering including Reeve-Irvine in your estate plans?

Your planned gift can help create tomorrow's cures.

For information please contact:
Tania Cusack, Director of Community Development
(949) 824-5925 or email tcusack@uci.edu

Highlights of 2008 Roman Reed Research Projects

Is the Spinal Circuitry That Generates Spinal Stepping Refined or Expanded in Response to Locomotor Training?

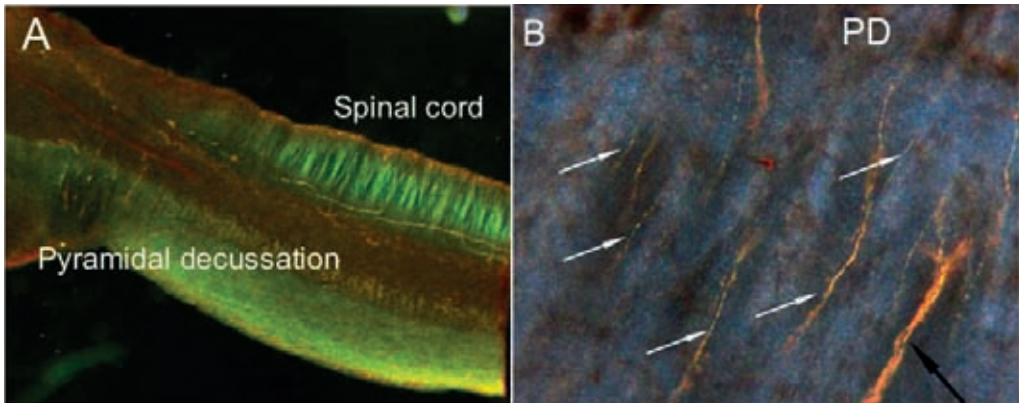
Dr. V. Reggie Edgerton and colleagues at UCLA are working to improve walking ability following injury through exercise training. Treadmill training has been shown to greatly improve stepping capacity in both experimental animals and humans after a spinal cord injury, but the mechanisms underlying such improvement are only poorly understood. Dr. Edgerton's project seeks to identify changes in specific groups of nerve cells in the spinal cord that are directly involved in the improvements in stepping ability. This understanding is critical for several reasons. First, knowing such details will allow therapists and researchers to improve the effectiveness of treadmill training interventions. Second, it is known that after injury the spinal cord changes drastically. Treadmill training tends to maintain the spinal cord in the state that it was before the injury. Dr. Edgerton believes that any new regenerative strategies will have a better chance of succeeding if the injured spinal cord is maintained in a state that is as close to normal as possible.

Replacing Cortical Motor Neurons With Embryonic Stem (ES) Cells: A Potential Adjuvant Treatment for Spinal Cord Injury

Although some amount of recovery often occurs after spinal cord injuries, it is rarely complete. Of the many potential reasons underlying failure to recover, one that is mostly overlooked is that many of the cells in the cortex that project to the spinal cord may die after injury. Whether or not there is significant death of cortical neurons is being assessed in another Roman Reed project (Os Steward's project described on the next page). If cortical neurons do die, they obviously cannot regenerate their axons or participate in other ways in recovery of function. Dr. Lawrence Recht, Stanford University, has found that it is possible to replace these cerebral cortical cells with properly conditioned embryonic stem cells (i.e., differentiated to assume the appearance of neural progenitor cells). Such cells not only differentiate appropriately, but also connect in the brain with subcortical targets, including the spinal cord. The ability to reconstitute such a critical cell population could eventually lead to a better functional outcome for people with SCI.

Ampakine Enhancement of Axonal Outgrowth and Functional Recovery Following Spinal Cord Damage

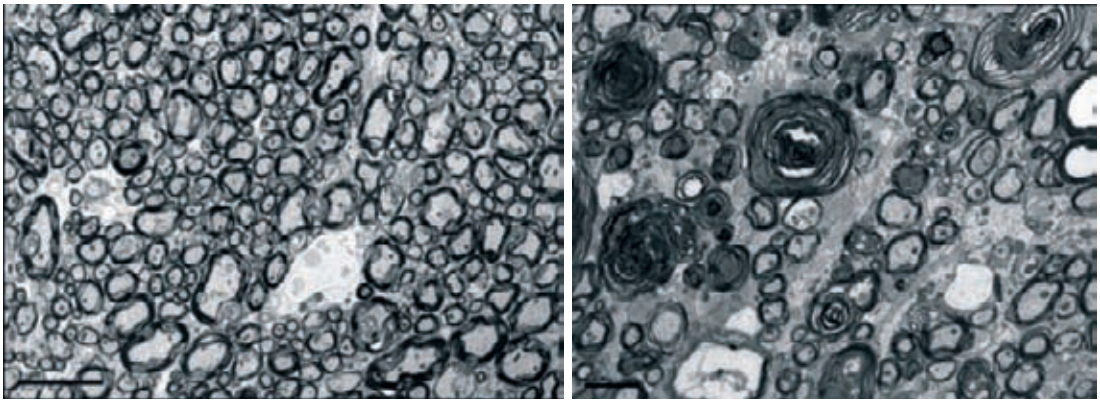
Neurotrophic factors are naturally occurring proteins that support the survival and growth of neurons in the brain and spinal cord. There is evidence that direct application of specific neurotrophic factors to the injured spinal cord can stimulate axonal growth, reduce tissue loss, and in some cases improve functional outcome. Studies in Dr. Christine Gall's laboratory at UC Irvine have shown that a family of drugs called 'ampakines' that can be given orally or by injection, diffuse into the brain and spinal cord and increase levels of a growth factor called "Brain-Derived Neurotrophic Factor" (BDNF) and, to lesser extent, the related "Nerve Growth Factor" (NGF). BDNF enhances cell survival and growth following spinal cord damage and, no deleterious side effects of increasing BDNF production have so far been found. In studies using neurons grown in culture, Dr. Gall recently showed that ampakine treatment increased BDNF production and stimulated axonal growth. The hope now is that ampakines might increase BDNF production and stimulate cell survival in the spinal cord following traumatic damage. Dr. Gall is testing this hypothesis in rats with cervical and thoracic spinal cord injuries to determine if these drugs reduce tissue loss and promote functional recovery. Positive results would provide support for a novel therapeutic strategy for minimizing tissue loss and supporting functional recovery following spinal cord damage. Importantly, ampakines are already in clinical trials for other disorders, which would accelerate their approval for experimental use in a SCI context.



(A) Axons from transplanted stromal stem cells in to the motor cortex of the brain extend axons into the spinal cord.
(B) Higher power view showing multiple axons entering the spinal cord.

Do Cortical Motoneurons Undergo Retrograde Cell Death After Spinal Cord Injury?

Efficient development of therapies for spinal cord injury (SCI) requires a tight focus on valid therapeutic targets. In this regard, restoring connections that were destroyed, especially the long descending motor and ascending sensory pathways is a top priority. Although a great deal of work has been focused on the problem of triggering or enhancing regenerative growth of cut axons, manipulations of this sort require that the cell body of the damaged axon survive the injury. Until recently, it was thought that upper motoneurons that give rise to the corticospinal tract (CST) did not undergo significant cell death following SCI, in which case their axons would survive and be available for interventions to promote regeneration. However, this optimistic view was challenged by data indicating substantial degeneration of upper motoneurons following SCI. If there is significant retrograde death of cortical motoneurons, then preventing this death would be a pre-requisite for therapies that seek to enhance regenerative growth of CST axons. Dr. Oswald Steward, Director of the Reeve-Irvine Research Center at UC Irvine, plans to answer this single key question definitively to either rule in or rule out degeneration of cortical motoneurons as a valid therapeutic target after SCI. In his view, eliminating a potential therapeutic target is as valuable as identifying a new target (perhaps more so) because eliminating a target will inform resource allocation and direct research away from dead ends and towards other viable alternatives.



(A) Axons traveling through the brain after a cervical injury show no signs of degeneration.
(B) Axons in the same part of the brain after damage to the cortex show extensive degeneration.

Glossary continued from page 5

Myelin
Myelin is the insulation around nerves in the central nervous system. It is formed by a special cell, the oligodendrocyte, and is made up of multiple wraps of the membrane of the oligodendrocyte around the axon.

Demyelination
Loss of myelin through trauma or disease resulting in an impairment of the nerve's ability to send electrical signals.

Oligodendrocytes
Glial cells that wrap around axons in the central nervous system and create insulating myelin.

Sprouting
Process where an axon exhibits a type of growth response in which new branches sprout and grow over short distances.

Gray Matter
Areas of the brain or spinal cord that contain the cell bodies and dendrites of neurons.

White Matter
Areas of the brain or spinal cord that contain bundles of myelinated axons.

Upper Motor Neuron
Upper motor neurons have cell bodies in the brain and axons (the wires of the nervous system) that travel down into the spinal cord. Lower motor neurons have cell bodies in the spinal cord and axons that travel out to muscles.

California Institute for Regenerative Medicine
CIRM is the state agency that oversees research and facilities grants from the $3 billion approved by California voters with the passage of Proposition 71 in November 2004.

Independent Citizens Oversight Committee
The ICOC, a 29-member governing board, is the decision making body for CIRM and has representatives from academic and research institutions as well as patient advocacy groups and the biotechnology industry.

Differentiate
The process a cell undergoes to become more specialized.

Corticospinal Tract
A bundle of axons going from the brain through the spinal cord that, in humans, carries information on movement; has a specific location in the spinal cord.

Pluripotent Stem Cells
Stem cells that have the ability to become almost every cell type in the body.

Carl W. Cotman, Ph.D., Professor, Department of Neurobiology and Behavior

The Reeve-Irvine Research Center has a unique organization. Rather than have a large faculty that is funded and housed by the Center, we have opted to have a fairly small group that actually works within the Center walls and a very large group that is closely associated. This means that the Center benefits from a large, diverse group of scientists without having to support each one's laboratory. We find that this system not only saves critical funds, but also expands the amount, type, and quality of spinal cord research within the Center.

The Center currently has 15 Associates; all are faculty at UCI and have their own laboratories and research programs. Each works on problems that in some way relate to spinal cord injury. Because the spinal cord injury research being done by this group is fascinating, we would like to highlight different Associates to let you know more about the work underway here at the Reeve-Irvine Research Center.

In this issue we discuss the work of Carl Cotman, Ph.D., Professor, Department of Neurobiology and Behavior.

Dr. Carl W. Cotman

The goal of Dr. Cotman's Institute for Braln Aging and Dementia is to determine the nature of natural healing processes in the nervous system and to develop new therapeutic interventions. In most organs, cells can divide and thus replace those lost due to injury or disease. In contrast, most nerve cells do not divide. Therefore, for many years, the brain and spinal cord were believed to have little if any ability to repair damaged circuitries. This belief, however, conflicted with clinical experience showing that patients at least partially recover from minor injuries, i.e., trauma, stroke, and short-term degenerative diseases. Dr. Cotman's research focuses on studying the mechanisms by which recovery may be achieved and on facilitating such recovery, e.g., by enhancing the growth and compensatory reorganization of remaining connections, and injecting factors that facilitate the repair of damaged circuitries.

His work and that of others has shown that following the loss of neurons in a brain region called the hippocampus in rodents, the remaining fibers from healthy nerve cells sprout and make new connections, called synapses, to replace those lost, a process known as "reactive synaptogenesis". Reactive synaptogenesis may facilitate functional recovery in cases involving partial cell loss within a defined neuronal population by stabilizing the circuitries, counteracting further cell loss, and preventing potentially greater functional decline. It is the natural repair process for cell loss in the central nervous system (brain and spinal cord).

Research over the past ten years on sprouting and reactive synaptogenesis using the rodent hippocampus as a model system has progressed to the point where it is possible to predict which responses might occur in humans. In Alzheimer's disease, neurons are lost slowly over time as the brain degenerates. Dr. Cotman's recent data indicate that a selective robust sprouting reaction occurs in the damaged hippocampal pathways within the brain of patients with Alzheimer's disease. In essence, such actions rebuild the circuits to defend the brain from the loss of its neurons.

The main goal of Dr. Cotman's group is to study the molecular mechanisms underlying reactive growth in the brain in order to develop new therapies along the brain's natural lines of defense. Dr. Cotman is working with rodent models and postmortem brain tissue from patients with Alzheimer's disease to analysis of the regulation of neurotrophic factors and the processing and properties of B-amyloid, a protein that accumulates in Alzheimer's disease. His group is also pursuing parallel clinical studies on patients with dementia using new imaging methods [e.g., magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS)] to examine the functions of the brain regions that demonstrate plasticity in Alzheimer's patients. They are conducting parallel animal studies to test the behavioral functions of the same circuitries.

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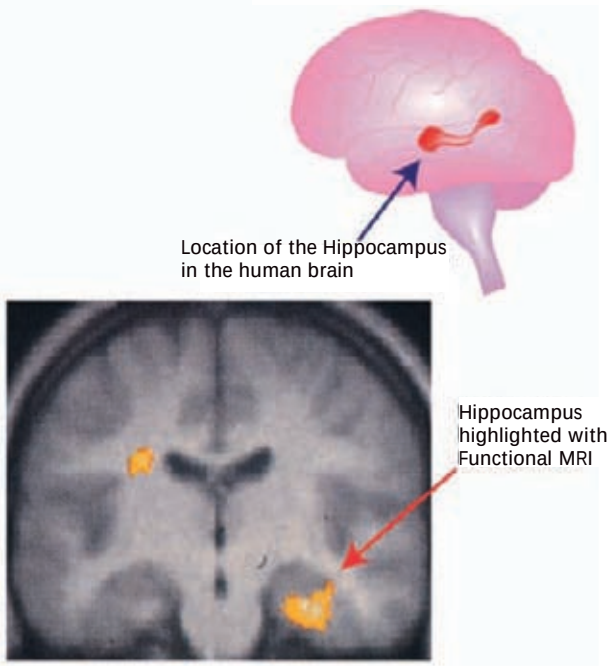
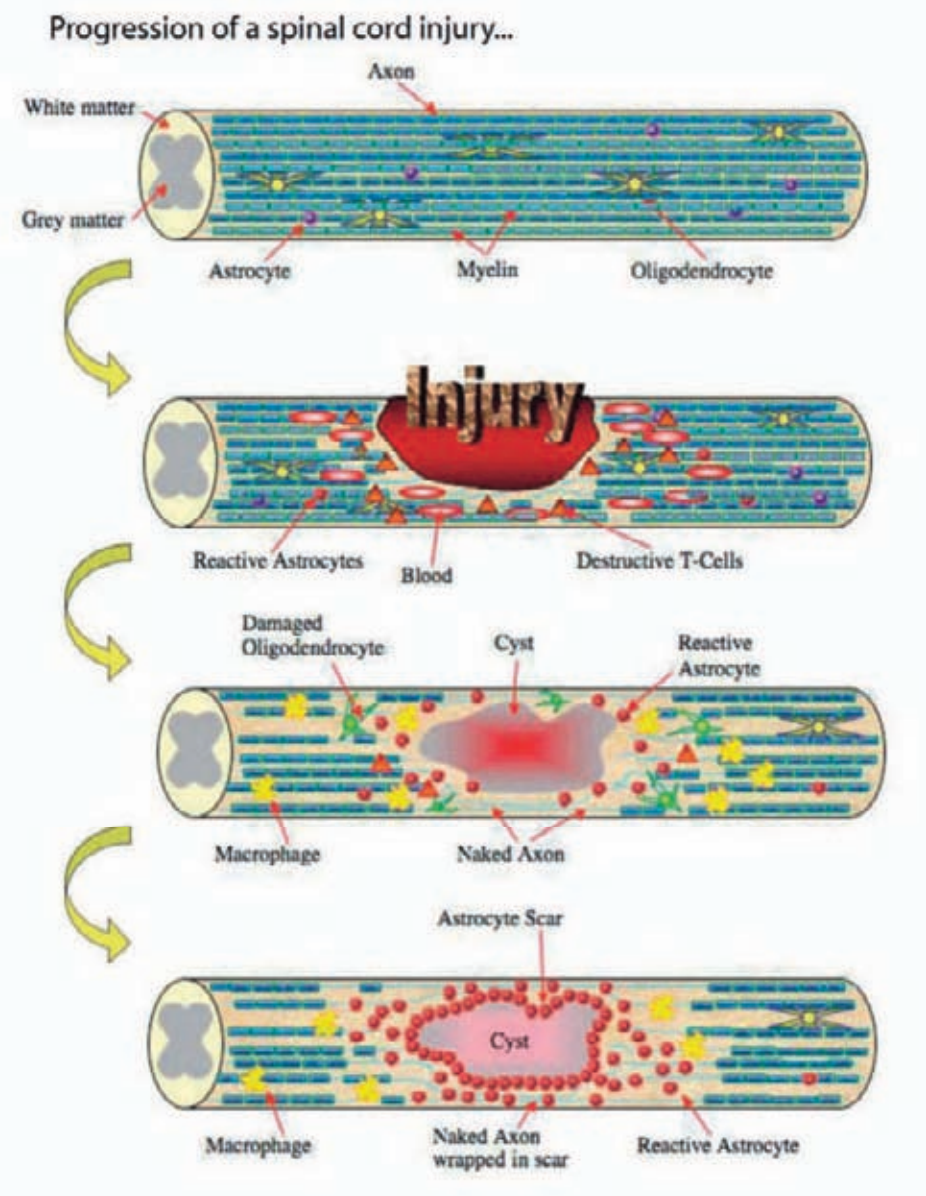


Reeve-Irvine Research Center Supports Chronic Injury Studies



The vast majority of SCI research examines animals with new injuries. Treatments are typically tested hours to days after injury, and results are examined within weeks of injury. A big reason for this is cost. To maintain the animals for months or years requires significant manpower and funds.

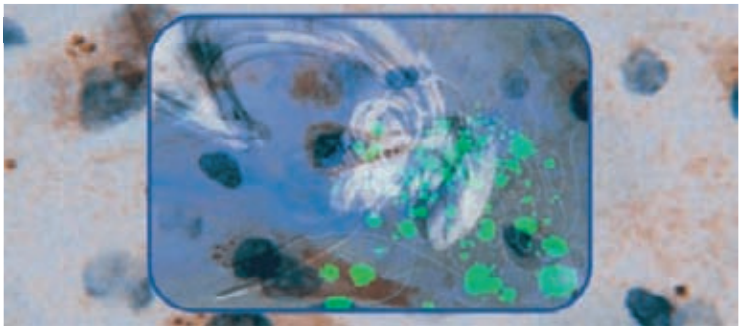
Five years ago, Os Steward launched a program at the Reeve-Irvine Research Center to make chronic injury a primary focus. We maintain spinal cord injured animals for up to 2 years so that treatments can be tested in the chronic injury setting. The idea is to have chronic animal models ready to go when a treatment is ready for testing, rather than having to create the injuries and then wait the year after treatment development for the injury to become chronic. In addition to having test subjects ready to go when new treatments need testing, we have gained a new level of understanding of the basic biology of chronic injuries. We need to understand what the chronic injury looks like at a fundamental level to develop new treatments. It's hard to find treatments if you don't know what goes wrong over the long-term. There is now good evidence that new injuries and old injuries really are different, and so treatment strategies will likely be different or at least variants on a theme.

We would like to thank private donors including "Research For Cure" for providing the significant funds required to maintain animals with chronic injuries, allowing us to pursue treatments for chronic injury at a faster pace.

Dr. Carl W. Cotman,

Continued from the previous page.

Due to his outstanding achievements and work, Dr. Cotman was a 2004 UCI Medal recipient, which is the UC Irvine's highest honor awarded in recognition of excellent support for the University's mission of teaching, research and public service, and the 2005 Reeve-Irvine Medal recipient, which is given to honor individuals who have made critical contributions to promoting repair of the damaged spinal cord and recovery of function. Dr. Cotman earned his B.S. in Chemistry in 1962 from Wooster College and obtained his Ph.D. in 1968 from Indiana University. He is a Professor of Neurobiology and Behavior in the School of Biological Sciences and is a Professor of Neurology in the College of Medicine, and the Director of the UCI Institute for Brain Aging and Dementia.



This image depicts Alzheimer's pathology interacting with a central set of brain structures (the limbic system) which are involved in the development of Alzheimer's Disease.

Suzy Kim, M.D.

The Reeve-Irvine Research Center and UCI Medical Center welcomes Suzy Kim, M.D. back "home" to Orange County.

Dr. Kim brings a new clinical dimension to the Reeve-Irvine Research Center. She will have dual faculty appointments as Director of the Clinical Spinal Cord Injury Program and Scientific Liaison at the Reeve-Irvine Research Center and as Assistant Clinical Professor in the Orthopedic Surgery Department at UCI Medical Center. With her clinical appointment, she will play a key role in the development of the Clinical Spine Initiative, a multi-disciplinary spinal cord injury program which will offer specialized acute hospital medical care and rehabilitation in a clinical research setting. Dr. Kim will continue to develop programs and publications to educate the public about research findings and clinical treatment options as a true liaison between scientists and clinicians at UCI.

Growing up in Laguna Hills, Dr. Kim is a southern California native who is excited to practice in her community. After graduating from UC Berkeley with a B.A. in Psychology, she received her M.D. from USC Keck School of Medicine with a unique perspective from a wheelchair. During her third year of medical school, Dr. Kim sustained a cervical spinal cord injury while body surfing in Laguna Beach. With her competitive athletic background, she then completed her residency training in Physical Medicine and Rehabilitation at the top ranked Rehabilitation Institute of Chicago and Northwestern Memorial Hospital. Today, Dr. Kim is a board certified rehabilitation physician (sometimes called a physiatrist) and one of 500 physicians in the U.S. with a subspecialty board certification in Spinal Cord Injury Medicine. While her medical specialty choice seems obvious after her injury, she states, "I made a conscious decision to pursue a career where improving one's quality of life and function is a medical treatment. I am committed to patient advocacy, translational research and hopefully by demonstration, living a fulfilling productive life." As a rehabilitation physician and primarily a clinician, she specializes in treating patients with functional impairments caused by neurologic disorders such as spinal cord injuries, brain injuries, and strokes. Her patient care focuses on developing a medical treatment plan to minimize secondary medical conditions such as neuropathic pain and spasticity that may cause additional disability, as well as a personalized rehabilitation program to maximize functional outcome. Dr. Kim's clinical interests include the management of neurogenic bladder, cardiovascular fitness, spasticity, musculoskeletal injuries related to repetitive use and rehabilitation technology.

Dr. Suzy Kim

Joining the faculty at RIRC and UCI Medical Center, Dr. Kim brings her clinical expertise in treating newly spinal injured individuals and consulting their families throughout the continuum of care after spinal cord injury: initial hospitalization, inpatient and outpatient rehabilitation and community integration. Prior to joining RIRC, she was the Associate Chief in Physical Medicine and Rehabilitation and Medical Director of the Inpatient Spinal Cord Injury Rehabilitation Program at Santa Clara Valley Medical Center in San Jose, California. As the Northern California Regional Spinal Cord Injury and Traumatic Brain Injury Model System of Care*, she gained extensive clinical experience in the medical and peri-operative management of newly injured individuals. *(The National Institute on Disability and Rehabilitation Research (NIDRR), sponsored by the U.S. Department of Education designates specialized centers as Model Systems of Care based on excellence in clinical care, research and education). Dr. Kim's clinical experience in the early medical management of traumatic and non-traumatic spinal cord injuries is recognized as a field reviewer for the Consortium of Spinal Cord Injury Medicine's clinical practice guidelines publications, sponsored by the Paralyzed Veteran's Association. She then joined Kaiser Permanente in Walnut Creek to develop an outpatient practice in neurologic rehabilitation including specialty clinics for gait abnormalities, orthotic and prosthetic management for amputees, and spasticity management following brain injuries, stroke, multiple sclerosis and spinal cord injuries. While at Kaiser, Dr. Kim quickly became the regional specialist involved in the care of individuals with spina bifida, poliomyelitis and neurologic impairments due to degenerative spinal myelopathies.

Her clinical expertise is further demonstrated by the numerous lecture presentations at national and international spinal cord injury conferences. She has been honored by resident physicians (physicians in specialty

Continued on the next page...

RIRC Participates in Neurotech Leaders Forum

Neurotechnology is "the application of electronics and engineering to the human nervous system" and there are literally hundreds of devices available and in production that are improving lives. For example, neurostimulation products are restoring hearing and movement, and providing pain relief to hundreds of thousands of people. While the Reeve-Irvine Research Center is working hard to find treatments to repair the damage caused by spinal cord injury, assistive devices can make a huge impact on quality of life today.

At the Neurotech Leaders Forum held in Newport Beach, CA on October 25, 2007, RIRC Assistant Professor Kim Anderson and External Advisory Board member Bob Yant participated in a panel discussion with neurotechnology business leaders. The goal was to discuss critical issues such as how consumers get their knowledge regarding health care issues for their disability, fear of devices (the "last resort syndrome"), drugs vs. devices options, and considerations in the decision to use a device."

The session was moderated by Jennifer French of Neurotech Network, a non-profit organization that focuses on education about neurotechnology for persons with impairments and associated medical professionals. The 4 member panel fielded numerous questions about where to turn for information on health care issues and disabilities.

All panelist agreed that the internet was their primary source for information, but also indicated they relied on news, association magazines/newsletters, and local and national condition-based societies to stay on top of medical and technological advances.

Something as simple as knowing where people with SCI are looking for information can dramatically improve the ability to find information. NeuroTech leaders are looking for ways to get the word out about their products, which potentially could improve function, so knowing where to post and advertise is critical. During the session, one panelist demonstrated his neural prosthesis for foot drop due to stroke. Without the device he could barely make it to the end of the room and back, while with the device, walking appeared almost normal. Discovering technologies like this might make a major impact on quality of life while researchers are working to find repairative treatments.

Visit the NeuroTech Network website for more information, http://www.neurotechreports.com/index.html. A video of the session may be found on youtube.com.

Dr. Suzy Kim,
Continued from the previous page.

training) by receiving the "Excellence for Teaching" awards from the Rehabilitation Institute of Chicago and by her colleagues as a Clinical Instructor in the Orthopedic Surgery/Physical Medicine Departments at Stanford Medical Center.

As a clinician and individual living with a spinal cord injury, Dr. Kim remains hopeful for future treatments to restore neurologic function for more than 250,000 Americans living with spinal cord injuries today. She adds, "This is such an exciting time for melding neuroscience and rehabilitation. With the scientific progress at Reeve-Irvine Research Center in developing potential treatments for all stages following spinal cord injury, we will be able to offer treatment options to enhance neurologic function unavailable and unimaginable in the past." While recognizing that no current FDA approved human clinical treatments are available for spinal cord injuries in the U.S. yet, she states, "I advise my patients that maintaining optimal health now is critical to be considered for future clinical treatments. I ask them 'Would you run a marathon without any training?' My shared vision with the Reeve-Irvine Research Center and the UCI Medical Center is to establish a comprehensive center that offers state of the art excellence in medical, surgical and rehabilitation for individuals with spinal cord injuries or disease throughout the entire continuum of care." Dr. Kim emphasizes the value of a program that addresses the medical, emotional, vocational and social issues to help individuals and their families rebuild their life after injury or disease.

Dr. Kim with a patient

Ways to Give....

Since there are a variety of ways one can support the Reeve-Irvine Research Center at the University of California, Irvine, it's important you choose the options that are most appropriate for you. Planned giving enables a donor to arrange charitable contributions in ways that maximize his or her personal objectives while minimizing the after-tax cost. Listed below are just a few ways to send your gift to support the critical spinal cord injury research happening today and in years to come.

Should you have questions or if you would like to receive more information on giving, please contact:

Tania Cusack at (949) 824-5925 or e-mail tcusack@uci.edu.

Those wishing to make a donation directly may send checks payable to the UCI Foundation/Reeve-Irvine to the address below:

Tania Cusack,
Director of Community Development
Reeve-Irvine Research Center
University of California, Irvine
2107 GNRF
Irvine, CA 92620-4292

Or donate on line by visiting our website at www.reeve.uci.edu and selecting School of Medicine, then Reeve-Irvine Research Center.

Join C.U.R.E. S.C.I.

Campuses Understanding Responsible Education about Spinal Cord Injuries (C.U.R.E. S.C.I.) aims to educate young adults about safety, spinal cord injury awareness, and to instill in them the values of volunteerism and philanthropic giving.

We will have events and activities, support initiatives of Life Rolls On (such as Stem Cell Research and equality for those with disabilities), partner with the Reeve-Irvine Research Center, volunteer at Life Rolls On events when possible, and much more this summer and throughout the school year!

Whether you are interested in SCI, love surfing or just want to help others, this is the perfect group for you! Come see what we're all about!

Please contact Tiana Martin at ucicuresci@gmail.com if you are interested or have questions or concerns.

You can also stay up to date by visiting www.ucicuresci.blogspot.com.

Blood Sugar Monitoring & Control

The Reeve Irvine Research Center is conducting research studies to both determine how spinal cord injury affects the ability to control sugar levels in the blood and how sugar levels in the blood change during the day and night in persons living with spinal cord injury. The information gained from these studies will be used to help scientists and medical doctors develop experiments addressing these issues, with the aim of developing therapeutic treatments for people living with spinal cord injury.

You may qualify for the Blood Sugar Monitoring Study if:

- You have a spinal cord injury
- Your injury was 1 year ago or more
- You are 18-65 years old

You may qualify for the Study of Blood Sugar Control if:

- You have a cervical SCI or a lower thoracic SCI
- You are 5 or more years post-injury

For more information please contact:
Dr. Kim Anderson at kanderso@uci.edu
or call 949-824-0056.
All information will be kept strictly confidential.

RIRC
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