Number 25, Summer 2014

Reeve-Irvine Research Center Publication

Spinal Connections

Reeve-Irvine Medal goes to Marie Filbin

This year's Reeve-Irvine Research Medal was awarded posthumously to Dr. Marie Filbin, Distinguished Professor at City University of New York Hunter College in New York and a world-renowned expert in axonal regeneration. The medal recognizes Dr. Filbin's huge contributions to our understanding of molecules in myelin that block axon regeneration and for her studies of ways to overcome the inhibitory effects of these molecules by manipulating a signaling molecule called cyclic AMP. Her findings are universally recognized as having stood the test of time and scrutiny, which is the hallmark of the research of Reeve-Irvine Medal recipients. Her studies laid the groundwork for identifying strategies that have subsequently enhanced regeneration in clinically relevant animal models of spinal cord injury.

Some of Marie's most pivotal findings came from collaborations with other leaders in the field, and she co-authored dozens of primary research papers with colleagues from the world's leading institutions. Marie said she collaborated for two reasons: to help the field by sharing what she knew, and because collaborations allowed her to advance the field by working with others to rapidly translate her findings into spinal cord injury models.

Dr. Filbin lost her decades long battle with cancer on January 15, 2014, and so the Reeve-Irvine Medal was presented to Marie's sister Elizabeth Filbin at a day-long memorial symposium held in Marie's honor at Hunter College. The cash prize was donated to Hunter College, who will use it to provide scholarships for rising students planning to pursue a career in neuroscience research.

Marie was a friend to many of us at RIRC, a highly respected scientist, a generous collaborator, and a mentor to many. Luckily, the kind of translatable basic research that Marie held most dear to her heart helped to extend her own lifespan after her initial cancer diagnosis, by over two decades, during which she made her most significant scientific discoveries, as well as inspiring many trainees to pursue a career in research.

RIRC
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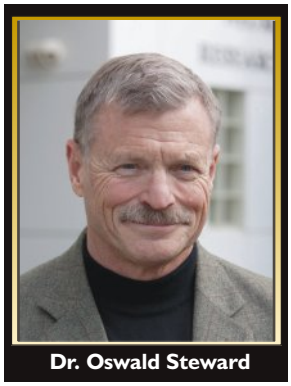
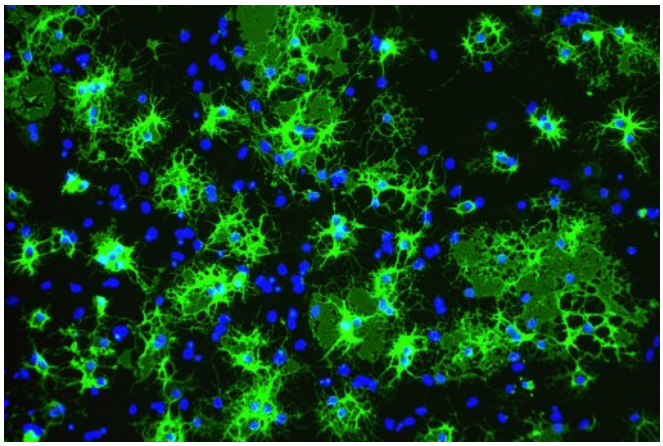
Abandoned Geron Clinical Trial Re-launched with Support from CIRM


Dr. Oswald Steward

It is great news that the clinical trial that was abandoned by Geron in 2011 is back on track. This trial was based on the pioneering work by Hans Keirstead here at the RIRC (Keirstead et al., 2005, J. Neuroscience), which tested oligodendrocyte precursor cells (OPCs) derived from human embryonic stem cells (hECSs) as a potential therapy for spinal cord injury. The scientific rationale was that part of the loss of function in SCI is due to the loss of myelin from otherwise intact axons and that OPCs could restore myelin so as to improve function. Five patients received transplants prior to the trial's discontinuation, and in a report filed May 22, 2014, it was reported that none of the five patients had experienced serious side effects from the treatment or developed immune responses to the transplanted cells. This was a phase I trial designed only to test safety, so the absence of any adverse effects means that so far, the trial is a success. The trial was resurrected by the company "Asterias" which was founded by Geron founder Michael West and former Geron CEO Thomas Okarma. Asterias purchased Geron's interests in stem cells in 2013. Asterias then submitted a grant to CIRM to continue the trial, and the grant was funded by CIRM in June, 2014. In the original trial, treatment was limited to people with functionally complete thoracic injuries, but the resurrected version of the trial will involve patients with cervical injuries. Of course the landscape has changed a lot since the original trial was launched by Geron in 2010, and other stem cell therapies are also being tested in clinical trials for SCI. StemCells Inc has treated 12 patients in a safety study of their neural stem cells (see Spinal Connections number18), and plans to launch a more advanced trial to test efficacy later this year. This trial is based on the pioneering work of Aileen Anderson and Brian Cummings here at the RIRC. Also, Neuralstem received approval for a clinical trial to test its stem cell product. All this is a good thing because it gives stem cell therapies for SCI multiple shots on goal. Although the trial has re-started, there are still concerns about wether funding will be adequate to complete the trial. Geron spent hundreds of millions of dollars developing their stem cell therapies, but abandoned the SCI trial because of inadequate funds. Asterias will certainly need more than the $15 million provided by CIRM to advance the trial beyond the very early safety testing phase. Still, getting this trial back on track is a major accomplishment, and we all look forward to the results.



Oligodendrocyte progenitor cells (OPC's) initially derived from the Geron study will be utilized in the study revived by Asterias.

In this issue...

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Olfactory cell transplant for SCI causes tumor

A caution flag has been raised by a report of a tumor resulting from a transplant of olfactory cells, which was delivered as experimental therapy for spinal cord injury. The case report appeared in the Journal of Neurosurgery: Spine on July 8, 2014.

The person involved was 18 years old when she suffered a spinal cord injury in a motor vehicle accident. Three years after the injury, she received an "autograft" of olfactory cell mucosa into the spinal cord injury site. An "autograft" means that it comes from the person themselves, so in this case, olfactory tissue was harvested from the patient's own nose and transplanted into the spinal cord. There was apparently no identifiable clinical improvement as a result of the transplant.

Seven years after receiving the transplant, the woman developed progressively worsening back pain, and after suffering from the pain for 1 year, she sought medical help. Diagnostic imaging revealed a tumor within the spinal cord, which was surgically removed. The tumor was examined histologically and found to contain olfactory mucosal glands as well as other tissues of the nose.

How do we think about this unfortunate event? The first thing is that the transplant was of olfactory tissue rather than defined populations of cells. The original idea behind these transplants was that olfactory mucosal tissue contains stem cell-like progenitor cells as well as olfactory ensheathing glia (OEGs), which support axon growth from the nose into the brain. In other experimental therapies, OEGs from nasal biopsies were grown and purified in vitro before being injected into the damaged spinal cord.

As the authors of the paper say, this case should not deter the advancement of stem cell research and bench to bedside clinical trials. This does suggest the need for long term monitoring and follow-up for people who have received cell transplants as an experimental therapy for SCI.

Reference: Dlouhy, B.J., Awe, O., Rao, R.C., Kirby, P.A., Hitchon, P.W. (2014) Autograft-derived spinal cord mass following olfactory mucosal cell transplantation in a spinal cord injury patient. J. Neurosurgery: Spine.

Changes at the RIRC

One of the major strengths of the academic research environment is that it continually evolves. Scientists join the team, accomplish great things, and then move on to the next adventure, drawn by passion to achieve even greater things.

And so, it's with very mixed emotions that we announce that Hans Keirstead, who has been with the RIRC almost from the very beginning, has decided to leave the University to take over as CEO of the company California Stem Cells. We will miss Hans at RIRC. He was a driving force for translational research and responsible for many of the major discoveries for which the RIRC is known. Hans's enthusiasm and passion for moving scientific discoveries to the clinic led to achievements that are rare for any basic scientist. As almost everyone knows, his research over 10 years ago formed the basis for the first FDA approved clinical trial of stem cells for spinal cord injury. This trial, which was launched by Geron, has now been taken up by Asterias Biotherapeutics, who plans to continue patient enrollment with grant support from the California Institute of Regenerative Medicine.

Although we will miss Hans's immediate presence at RIRC and at UCI's Stem Cell Center, we also celebrate the fact that he is making the move to CSC because he passionately believes that this is the best way to speed up the process through which therapies are brought to patients. For now, CSC is focusing on indications other than SCI, and has major late-stage trials involving stem cell applications for cancer. Hans says, however, that he is only "taking a sabbatical" from SCI, and that he plans to return to the problem of spinal cord injury from the perspective of moving other therapies through the development pipeline.

We wish Hans the very best in his new endeavor.

Havton Laboratory Update

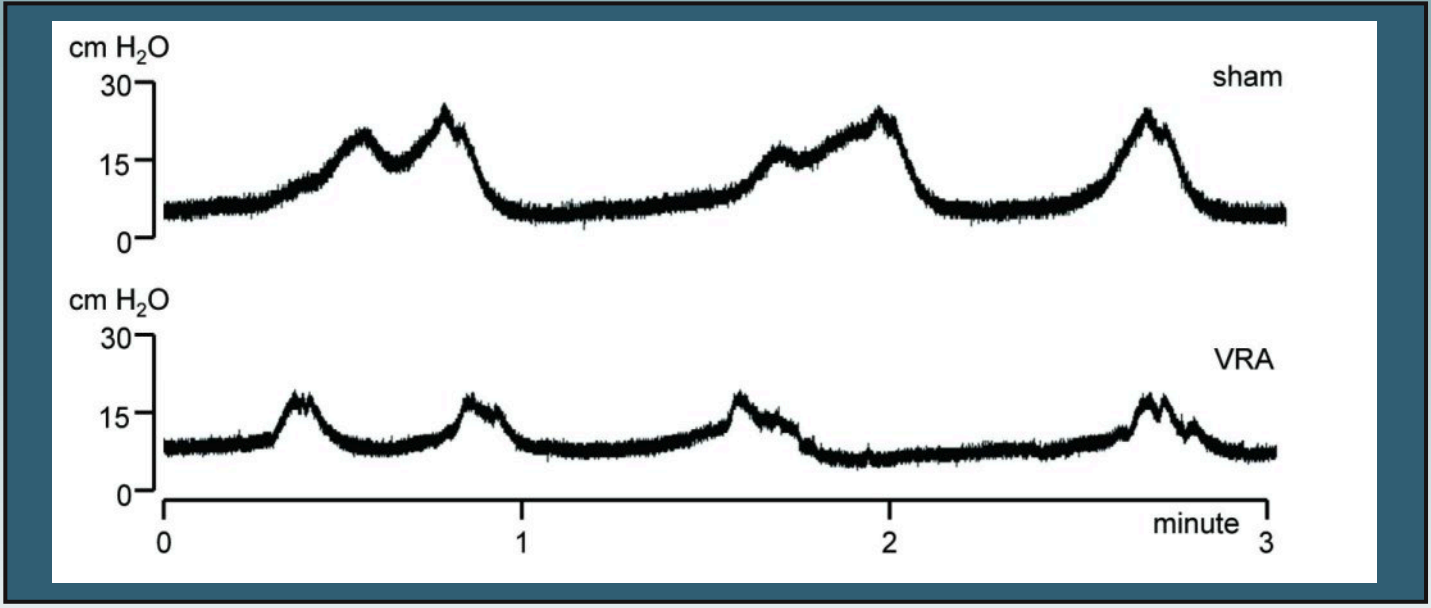
The Underactive Bladder - an Understudied Complication of Spinal Cord Injury

The term "underactive bladder" is used to describe a clinical problem that is characterized by a reduced strength of the bladder contractions, inability to fully empty the bladder within a normal time span, and a tendency for incomplete emptying of the bladder. An underactive bladder may be caused by an injury or a disease process affecting the lumbosacral portion of the spinal cord (AKA conus medullaris), lumbosacral nerve roots (AKA cauda equina), peripheral nerves that innervate the bladder and the urethra, or the detrusor muscle itself in the bladder wall. For a basic description of the bladder and how it works please see spinal connections number 23, summer 2013 page 10-11 (the Anatomy 101 section).

After a spinal cord injury, it is more common to develop an overactive bladder, at least initially. However, it has become more recognized that an overactive bladder may change into an underactive bladder over time. This is likely due to detrusor hyperactivity with an impaired ability for the bladder to respond to stimuli. Cystometrogram recordings to evaluate the bladder pressure during voiding are a helpful tool to make the diagnosis of an underactive bladder (Figure 1). The distinction between an overactive and underactive bladder is therefore a potentially important aspect to consider for the spinal cord injured patient and research communities, as physicians may treat overactive and underactive bladders differently.

The Havton laboratory is studying the underactive bladder in a variety of laboratory research models with the goal of reversing the symptoms of this important clinical syndrome. Models include injuries to lumbosacral nerve roots and the most caudal portion of the spinal cord, the conus medullaris. In addition to the development of new surgical repair strategies, the laboratory is also investigating other strategies. Dr. Harriet Chang, an Assistant Researcher in the Havton lab, investigates the potential use of novel pharmacological agents, including serotonergic drugs, for the potential treatment of underactive bladder conditions. Dr. Arthi Amin, a postdoctoral research fellow in the Havton lab, studies stem cell strategies in attempts to replace bladder-innervating nerve cells after severe spinal cord and nerve root injuries. If successful, the transplantation of such motor and autonomic neurons may be considered as an approach for the reversal of an underactive bladder after chronic conus medullaris and cauda equina injuries.

Continued on page 10



Cystometrogram* recordings obtained from sham-operated (control) rats and after a lumbosacral ventral root injury that removes the innervation of the bladder on one side. The top trace shows normal voiding cycles with a normal increase in bladder pressure during voiding. The bottom trace shows decreased amplitude of bladder contractions and increased resting pressure. These findings are suggestive of detrusor hypoactivity and an underactive bladder.

*A cystometrogram measures the internal pressure within the bladder. Contraction of the bladder muscle increases internal pressure, which expels urine.

Dr. Allan Levi from The Miami Project speaks at RIRC's Annual Clinical Lectureship

Each year the RIRC hosts a clinical lecture featuring physicians who specialize in spinal cord injury. The annual lecture provides RIRC members, associates and community members the opportunity to discuss current SCI clinical procedures, techniques or research with the physicians that are seeing or performing them on patients regularly. It is a great opportunity and environment for clinicians and basic researchers to discuss ways to improve and propel clinical outcomes for people with SCI.

This year's guest speaker was Dr. Allan D. Levi. Dr. Levi is currently a tenured professor with The Miami Project to Cure Paralysis and the Chief of Neurosurgery at the University of Miami Hospital. Additionally, he serves as the Director of the Neurosurgical Spine Fellowship Program and Co-Directs the Acute Spinal Cord Injury Unit at Jackson Memorial Hospital. Dr. Levi started his Neurosurgery training in Toronto Canada and then did a spine fellowship at the Barrow Neurological Institute in Arizona. From there he worked with Dr. Richard Bunge at the University of Miami to complete his Ph.D in SCI research.

Dr. Levi's interest is in peripheral nerve injury, degenerative disk disease, and spinal cord injury and other spine trauma. He has received numerous awards throughout his career, published over 100 peer-reviewed publications and has written over 25 text book chapters or reviews. Clinically he has experience in all of the latest technology available for spinal applications including artificial discs and complex spinal instruments; including those used to transplant various cells into the spinal cord. Indeed, he has been involved in a number of clinical trials and is currently overseeing the FDA approved trial for autologous human Schwann cells into patients with sub-acute thoracic SCI. Dr. Levi's lecture covered information on clinical trials and outcomes that he has recently been involved in, like the use of hypothermia for acute SCI, and his lecture provided a great opportunity for the SCI community and researchers to learn about various cutting edge clinical procedures being performed in Miami on people with SCI.

This year we were fortunate in co-hosting the Clinical Lectureship with UCI's Department of Neurosurgery and the lecture was held at the Douglas Hospital in Orange and broadcasted to UCI's School of Medicine. Many thanks to the Department of Neurosurgery for helping to make this year's lectureship so successful!

REHABILITATION CORNER: Pain

Xing Zhao, MD, Maya Hatch, PhD,
Sujin Lee, MD and Eric Chang, MD

Continued from Spinal Connections, number 24

This version of the Rehabilitation Corner is a follow-up article from our last article that described what central neuropathic pain is and how it is classified. This article focuses on some of the common treatments available to manage neuropathic pain.

Current Medications for Pain

Central neuropathic pain can start as early as one month after SCI and it often does not resolve on its own. Treatment during this stage can prevent wind-up or plasticity changes in the central nervous system (CNS) that often lead to chronic central neuropathic pain. However, before drugs are prescribed it is important to confirm that proper etiological factors such as correct seating position, proper transferring techniques, and correct application and use of bracing or other assistive equipment are being employed. If all etiological factors are being employed and pain persists, a wide variety of drugs are available for people suffering from central neuropathic pain. In the past, pharmacological treatment for SCI chronic pain was mainly through anti-inflammatory agents (drugs that reduce inflammation or the immune response). However, evidence has shown that anti-inflammatory drugs are more effective in treating musculoskeletal pain rather than chronic central SCI pain, so other pharmacological agents are being used (commonly used drugs are shown in the table below).

Article continued on facing page

Drug	Class	Action	Comments
Amitriptyline	Tricyclics or Anti-depressants	Inhibits norepinephrine and serotonin reuptake	Sedating effects
Baclofen	Anti-spasmodics	Acts on $GABA_B$ receptors	
Lamotrigine	Anti-epileptic	Blocks sodium channels leading to inhibition of glutamate release	
Gabapentin/ Pregabalin	Anti-epileptic	Increases synaptic concentration of GABA and inhibits glutamate release	- commonly used for SCI central pain - careful use with patients with renal impairment
Morphine	Opioid	Binds to opioid receptors	controversial
SNRI	Anti-epileptic	Increases serotonin and norepinephrine at axon terminals	not used often
SSRI	Anti-depressants	Increase serotonin by blocking reuptake	side effects include GI issues, sexual dysfunction
Tizanidine	Anti-spasmodics	Binds to receptors to block pre-synaptic motor neurons	good tolerability profile
Tramadol	Anti-epileptic	Binds to opioid receptors and weakly increases serotonin and norepinephrine	Large amount of side effects
Tricyclics	Anti-depressants	see Amitriptyline	side effects include increased spasticity

GABA = Gama-aminobutyric acid; SSRI = selective serotonin/norepinephrine reuptake inhibitors

More details about those drugs please……

Below are details about the various medications used for treating central neuropathic pain due to SCI.

Opioids: Opioids or opiates are a class of drugs that are often derived from the poppy plant. They are one of the oldest known drugs used as analgesics (painkillers). One of the most commonly prescribed opiates is morphine and its use in people with SCI is common, yet controversial. Opiates exert their effects by binding to various opioid receptors on nerves and reducing the intensity of pain signals to the brain. Although opiates have been shown to be efficacious in managing acute pain, nowadays they are NOT commonly recommended for central neuropathic pain due to their numerous side effects. Other drugs in this class are Vicodin, Oxycodone and Hydrocodone.

Anti-epileptics: Various anti-epileptic agents are commonly used for the management of central neuropathic pain. Anti-epileptics operate through various mechanisms including blocking sodium or calcium channels, enhancement of the inhibitory effects of GABA, or inhibiting serotonin and norepinephrine reuptake. All of these actions lead to a depression of neuronal activity related to pain. Drugs in this class include Valproate, Tramadol, SNRI and Lamotrigine. Recently large randomized controlled trials on Gabapentin and Pregabalin have shown an improved safety profile over the older antiepileptic agents for people with SCI. Gabapentin and Pregabalin are some of the most commonly used medications for people with SCI with central neuropathic pain due to their mechansims of action.

Anti-spasmodics: Anti-spasticity medications such as Baclofen and Tizanidine are currently being considered for central neuropathic pain in people with SCI. Baclofen acts on GABAB receptors and can be administered orally or intrathecally (into the cerebral spinal fluid). Intrathecally is often preferred due to its direct action on the central nervous system and lower needed doses. Although Baclofen has mostly been utilized in the past for treatment of SCI spasticity, recent studies have shown effective reduction of pain symptoms in people with SCI with central neuropathic pain. Tizanidine is another anti-spasticity medication and it acts by binding and blocking presynaptic motor neurons. It is as effective as Baclophen but has been associated with a better tolerability profile (less side effects and muscle weakness).

Anti-depressant: Tricyclics, like Amitriptyline, are a class of anti-depressants and one of the original medications used for central neuropathic pain. They are hypothesized to exert their effects through the inhibition of the reuptake of sodium and serotonin at nerve terminals. Although tricyclics are beneficial for reducing pain, there has been a lack of evidence for its use for the treatment of SCI central pain, and side effects include increased spasticity, which is not helpful for people with SCI. Other anti-depressants like selective serotonin/norepinephrine reuptake inhibitors (SSRIs) have been studied in neuropathic pain syndromes and shown to be beneficial. Unfortunately, there are minimal studies assessing their effectiveness on pain from SCI.

Beyond medications

In conjunction with pharmacological treatment, a multi-displinary approach to pain treatment that includes administration of cognitive behavioral therapy, psychological therapy, and physical or occupational therapy is recommended. Alternative therapies such as acupuncture, massage, and exercise can also be utilized for pain refractory to standard pharmacological and multi-displinary approaches. This is a new area of pain treatment but some have reported benefits from these approaches already. By furthering the understanding of central neuropathic pain pathophysiology through animal models and additional clinical research studies on people with central neuropathic pain, we hope to improve the overall management and treatment in the near future.

Brain Bee Competition

RIRC Researchers Participate in this Year's Local Brain Bee Competition

On February 2, 2014, UCLA hosted their yearly Brain Bee neuroscience competition for Southern California high school students. The Brain Bee is an international neuroscience competition designed to motivate high school students to learn about neuroscience. It is a program from the non-profit foundation Mankind for International Neuroscience Development Inc (MIND, Inc). There are currently 150 local Brain Bee coordinators in 30 countries worldwide that conduct yearly competitions. Like a Spelling Bee, the Brain Bee allows students to compete with their peers in their knowledge of neuroscience. The competition involves a written exam that includes a practical component involving the neuroanatomy of a real brain. The top ten participants from the written portion then advance to the next round to compete in a jeopardy style Q and A session. The winner from this Local Brain Bee is then invited to compete in the National Brain Bee and if they advance, to the International Brain Bee Championship.

RIRC faculty Drs. Kelli Sharp and Catherine Cahill volunteered in this year's event by prepping students for the local competition and participating in research presentation to students and parents on the event. This was the first year that students from Irvine participated and Drs. Sharp and Cahill met with students for four weeks to tutor them in neuroscience covering many aspects of neuroscience, ranging from developmental neuroscience to CNS diseases. Four of the top 10 students (out of 72 total participants) that advanced to the jeopardy round were from Irvine high schools and Mr. Shyam Chandrasekar (from Beckman High School, Irvine, CA) won the Local Brain Bee competition. He will travel to Washington, DC for the National competition on August 7-10, 2014. We're thrilled with his success and wish him, as well as all the other competitors, a resounding "good luck!"

Dr. Sharp, Shyam Chandrasekar, Avid Hsiou (Irvine High School), Pollyanna Leung (University High School), Dr. Cahill.

RIRC Multi-lab Collaboration

By Maya Hatch, Ph.D.

A collaborative study led by Drs. Tom Lane and Jeanne Loring and also involving Os Steward, reports that transplantation of human neural precursor cells (hNPCs) improve recovery in a mouse model of multiple sclerosis. The remarkable thing was that the improvement occurred even though the human neural precursor cells (hNPCs) did not survive in animals longer than 1 week. Therefore, the transplanted stem cells triggered some response in the mice that persisted after the cells themselves had died. The rats treated with stem cells exhibited continual improvement in their motor skills up to 6 months after transplantation. This prolonged recovery, despite transplant cell death, suggests that the transplanted hNPCs were able to modulate the host environment to improve recovery. Although Dr. Lane has previously transplanted human oligodendrocyte progenitor cells and other mouse neural progenitor cells in this same animal model, he stated in a recent Scripps Research release that he "…never saw the clinical improvement that occurred with the human cells that Dr. Loring's lab provided".

Dr. Thomas Lane

Dr. Tom Lane is an immunologist and was an associate of the RIRC for many years while at UCI. He has collaborated on a number of animal projects with both the Steward and Keirstead labs in past years. Dr. Lane's long standing research interest has been in understanding the events that occur in the central nervous system after a viral insult, with a special emphasis on the inflammatory response. One of the objectives in his lab has been to evaluate the therapeutic potential of mouse or human neural precursors for clinical recovery in a virally induced mouse model of multiple sclerosis (MS). Although the exact etiology is unknown, there are reports that MS can be triggered from a viral insult. Similar to human MS, Dr. Lane's viral mouse model displays demyelination caused by an immune mediated attack and subsequent remyelination failure and paralysis; a great model to evaluate the potential effects hNPCs may have on MS.

Dr. Jeanne Loring is a developmental neurobiologist and team leader at the Sanford Consortium at the Scripps Institute in San Diego. Dr. Jeanne Loring's lab is part of a "collaboratory" in San Diego that enables scientists from a number of biological, medical and research institutes to work side by side in a facility to achieve breakthrough discoveries. Dr. Loring's lab is specifically studying the powers of various stem cells to promote diagnoses, treatment and cures for degenerative diseases and injuries and recently her focus has been on turning human stem cells into neural precursor cells, a perfect fit for the Lane lab work. Once the collaboration started they recruited the Steward lab to help with the remyelination analysis, an essential component in the study results.

This study is published Stem Cell Reports and is online now for viewing. This study shows the potential of human stem cells therapies for multiple sclerosis and it is a great step forward for all autoimmune diseases. If this research team can identify key proteins released that are responsible for the clinical recovery it may lead to the production of a drug or therapy that can be delivered to affected patients that doesn't involve the actual use of stem cells. This is very exciting news for the stem cell field and neurodegenerative diseases of the spinal cord.

Article: Chen, L., Coleman R., Leang R., Tran H., Kopf, A., Walsh, C.M., Sears-Kraxberger, I., Steward, O., Macklin, W.B., Loring, J.F., and Lane, T.E. (2014) Human neural precursor cells promote neurologic recovery in a viral model of multiple sclerosis. Stem Cell Reports, 2(6):825-37.

Havton Lab Update
continued from page 4

The clinical, research, and grant funding communities have also become increasingly aware of the clinical problem of the underactive bladder syndrome. On February 20-21, 2014, the 1st International Congress of Urologic Research and Education on Aging Underactive Bladder (CURE-UAB) was held in Bethesda, MD. The meeting attracted physicians, scientists, advocates, and funding agencies, all very interested in increasing public awareness about the underactive bladder syndrome and in stimulating new innovative research projects that address the needs of this underserved patient population. Dr. Harriet Chang was invited to attend this historical meeting and presented a poster on experimental spinal cord and nerve root injury models that are suitable for underactive bladder studies. "It was a very exciting and productive meeting, and we are now all looking forward to more attention to be paid to the understudied medical problem presented by the underactive bladder", states Dr. Chang.

the Reason we are Here

By Tania Jope and Jack Allison

Cindy Lampe is one impressive individual. Critically injured in a devastating auto accident in 1996, Cindy not only survived, but within months was tackling her new life as a quadriplegic with a spirit and attitude rarely seen in such a newly injured person. "I was never really depressed, or overcome with self-pity", Cindy told me when we spoke. "I was happy to have survived". One thing that galvanized Cindy was a phone call from Christopher Reeve. At first she thought it was a joke, until she heard his ventilator over the phone. He encouraged her not to give up hope and to have faith that research could help them. Ironically, Cindy's injury happened shortly after the time that Christopher Reeve was injured.

Cindy related to me that the doctors treating her also said that promising research advances existed and they believed that there may still be hope for future therapies. Years ago the belief was that if you suffered a spinal cord injury, there was no hope for recovery. Today there is documented proof that nerve cells can be regenerated, providing much needed hope for those who live with spinal cord injuries. I spoke to Cindy and her mother Sylvia at completely different times. Surprisingly they both made the same exact comment; they stated that they both believed in the Reeve-Irvine Research Center and its researchers. Sylvia and Cindy both expressed the desire for Cindy to potentially benefit from new therapies developed by research. Sylvia said, "When something like this grabs you—you have to think of the future. Why be hesitant? It isn't just Cindy who is injured, its thousands of people who suffer every day." And Sylvia explained why she is a committed donor. "I have what I need so why spend my money on something material? "

Cindy comes from, not only a close family but, a strong one. Her father Joe Cortez is a well-known professional boxing referee who was elected to the World Boxing Hall of Fame in 2007. He is a very charismatic and caring father to Cindy and does everything that he can to support her. Cindy's mother Sylvia is not only strong, but she has a huge heart. When I asked her about the experience of her daughter's accident she said, "As a parent of a child with a spinal cord injury, I had no idea what I was in for and I am glad that I didn't know".

Cindy's accident happened suddenly, and away from their home. Because of their close relationships with friends they were immediately offered a place to stay for as long as they needed while Cindy was being treated in the hospital. Sylvia explained there was an outpouring of support from their friends that was unbelievable, and at a time when her family needed it most. She firmly believes in the idea of "paying it forward" which is another reason for being so supportive of spinal cord injury research at the Reeve-Irvine Research Center. The family formed a fundraising group they appropriately named Las Vegas Friends and held a large fundraising event with their friends and the local community that helped to raise thousands of dollars for spinal cord injury research.

We want to say "Thank You" to Cindy, Sylvia and Joe, for their many years of support and spreading the word about the work being done here at the RIRC. They are a constant reminder to our dedicated team that there are people outside of labs, and away from microscopes that are equally dedicated to finding a way to help.

Scenes from the 2014 Meet the Scientists Forum

Reeve-Irvine Research Center

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

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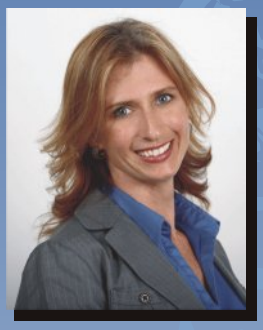

Interested in fundraising or making a donation?

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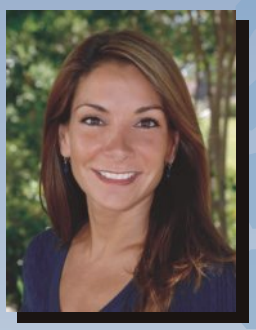

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Ways to Give....

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 Jope
(949) 824-5925 or tania.jope@uci.edu.

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

Tania Jope,
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
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ResearchforCure.org

Annual Golf Tournament To Benefit The Reeve-Irvine Research Center

Saturday, October 11th, 2014

Dryden Golf Course, Modesto, CA

Save the Date!!!

If you would like to sponsor or participate in this event please contact Tania Jope(949) 824-5925 or tania.jope@uci.edu

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Study to understand trunk stability and control.

- Subjects with spinal cord injury will receive truck stability testing.
- The session will be held in Irvine on the UC Irvine campus.
- Participants will receive **$10.00** for completing each session.
  3 session minimum. 10 session maximum.
- If your SCI occurred **at least 1 year ago** you may be eligible.

All personal information will be kept confidential.

If interested, contact Kelli Sharp, DPT
sci@uci.edu or call (949) 824-5145