

# Rehab *progress*

News from the University of Pittsburgh Medical Center Institute for Rehabilitation and Research Spring/Summer 2009

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Mark your calendar for IRRDay 2009

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New Grand Rounds publication offers CME

No-Fee CME

## From the Director's Desk



**Dr. Boninger**

### Cure or care, do we need to choose?

I will walk again. We have all heard this statement/plea from our patients. But what is the correct response? For many patients we can agree. Walking is a powerful motivator, and when that goal is attainable it becomes our patients'

single measure of success in rehabilitation. But what do you say when the chance of walking out of the hospital is exceedingly remote, as in a patient with complete spinal cord injury (SCI) or a child with muscular dystrophy who has started using a wheelchair reluctantly for the first time?

The answer is not an easy one. For patients with SCI there is a wealth of information on cures readily available on the internet. A cure for SCI can easily become the patient's focus. But there is danger in a focus on cure. One obvious danger is related to patients traveling overseas for treatments that are at best unproven, and, at worst, dangerous. A more subtle risk is associated with patients becoming focused on the cure or walking to the point where they don't make the needed adjustments to life in a wheelchair.

Research from the UPMC Institute for Rehabilitation and Research (IRR) has shown that patients who leave the hospital walking and then transition to a wheelchair have more pain and lower participation scores a year after discharge than patients who leave rehabilitation in a wheelchair. This was true even though the group discharged in a wheelchair had greater impairment.<sup>1</sup>

So what is the right answer? Our patients need encouragement to be as independent as possible with their impairment, while holding out hope for the cure. The hope should be tempered with realism and an understanding that the cure has been five years away for 25 years. The focus on full participation with all the assistive technology and help needed must be complete. But discussing hope for a cure in the context of the absolute need to adjust can soften the blow of a devastating new injury.

At UPMC IRR we are proud to have research that spans from care to cure. In this issue of *Rehab Progress*, the UPMC Department of Physical Medicine and Rehabilitation's (PM&R) latest recruit, Martin Oudega, PhD, gives a brief overview of his work to cure paralysis. This complements the award-winning work of Fabrisia Ambrosio, MPT, PhD, on stem cell transplantation for muscular dystrophy and other muscle injuries. While our research is as diverse as the field of rehabilitation, our clinical focus is always on the independence for our patients today.

### Michael L. Boninger, MD

Director, UPMC Institute for Rehabilitation and Research  
Associate Dean for Medical Student Research  
University of Pittsburgh School of Medicine  
Professor and Interim Chairman  
Department of Physical Medicine and Rehabilitation

1. Furui T, Boninger ML, Hunt PC, Rice I. Social participation of individuals with spinal cord injuries making the transition from walking to using a wheelchair. *Proceedings of the 20th Japanese Conference on the Advancement of Assistive and Rehabilitation Technology (RESJA)*, Saga City, Japan, September 2005:188-189.

## Spinal cord repair at UPMC



**Martin Oudega, PhD**  
Assistant Professor  
University of Pittsburgh Department of Physical  
Medicine and Rehabilitation

**Dr. Oudega**

In the United States, about 12,000 people suffer from spinal cord injury (SCI) each year. While there is significant research related to treating paralysis, there are no therapies available that result in significant recovery of motor function.

### What happens and what is needed to repair the spinal cord?

The primary injury in SCI is to the axons. For axons to repair, they need to be stimulated to grow over long distances and coaxed towards the appropriate areas where they then need to be encouraged to reconnect with other neurons. This needs to be accomplished in the already damaged spinal cord where many other destructive events are ongoing. It is this complex situation that fuels the thought that one intervention alone (a "silver bullet") will not be sufficient to restore function after SCI. Spinal cord repair may be accomplished using a combination of interventions. While therapies are being developed in the laboratory, there is a parallel need to better understand the mechanisms that underlie tissue destruction and functional impairment after SCI.

### Degeneration after spinal cord injury

There are a number of destructive events initiated in the spinal cord after an injury that contribute to the overall damage. In the *acute* phase (minutes to days), neural cells and blood vessel cells die due to the forces of the impact, resulting in tissue loss and lack of oxygen and nutrients. In the *sub-acute* phase (days to months), an inflammatory response among other pathological events contributes to the formation of a toxic environment which leads to additional tissue loss (secondary injury). In the *chronic* phase (months to years), cystic cavities develop at and near the injury site.

### Endogenous regeneration occurs transiently in the injured spinal cord

There are several signs within the damaged spinal cord that point to an attempt to self-repair. Neurons from which the axon has been damaged transiently upregulate the expression of genes that encode for molecules that stimulate regeneration. Many of the damaged axons, in fact, form sprouts soon after an injury. Unfortunately these sprouts grow only over a short distance before they retract (abortive sprouting). Long-distance growth of newly formed sprouts is blocked by growth-inhibitors associated with cells and cellular debris mainly present in the scar.

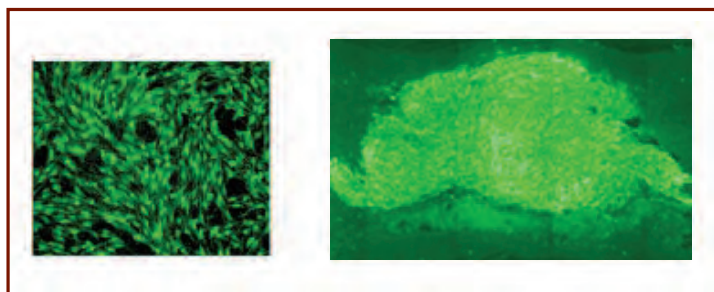
Another contribution to self-repair may result from the actions of macrophages. These cells invade an injury in large numbers and remove cellular debris which may contain growth-inhibitory factors. It also is possible that undamaged axons grow sprouts (collateral sprouting) and these may contribute to the recovery that is sometimes observed after SCI. It is clear that regeneration events are initiated within the damaged spinal cord, but these efforts do not result in life-changing functional improvements.

### What can be done in the laboratory?

There are three major directions in SCI research that are being pursued: *neuroprotective approaches* that could limit tissue loss and/or create better circumstances for later interventions; *axon regeneration approaches* that could result in the formation of new axon circuits; and *rehabilitative approaches* that could activate and/or recruit new axon circuits.

The Spinal Cord Repair Laboratory directed by Martin Oudega, PhD, at the University of Pittsburgh focuses on cell transplantation to promote neuroprotection and axon regeneration in the injured spinal cord. Schwann cells, a type of cell that is involved in repair of the nerves in arms and legs, as well as bone marrow stromal cells, a stem cell-like cell, are being investigated. The potential of these cells to promote axon regeneration and functional restoration after SCI is indisputable, but their overall efficacy needs to be improved before they can be tested clinically.

Dr. Oudega's studies investigate methods to promote the survival of cells after transplantation into the injured spinal cord to profit more from their repair abilities. As is true for all spinal cord repair interventions, Schwann cells or bone marrow stromal cells alone will not be enough to make life-changing improvements in functional restoration. They need to be combined with approaches that strengthen or add to their repair potential. In the Spinal Cord Repair Laboratory, cell transplantation is combined with approaches to stimulate axon regeneration through increasing the level of axon growth-promoting molecules or interference in the actions of growth-inhibitory molecules. Different SCI animal models are being used to test the efficacy of these combination therapies.



**Schwann cells in culture (left) and in the rat spinal cord after injection into an injury site (right). The cells were genetically modified to express a protein that is green fluorescent. This enables identification after transplantation.**

In addition to the development of effective cell-based spinal cord repair strategies, Dr. Oudega also directs studies to better understand the genes and molecules that underlie failing and successful axon growth in the zebrafish. The long-term goals are to integrate molecular, cellular, and rehabilitative approaches into effective spinal cord repair strategies and to bring these into the clinical arena.

**For more information, contact Martin Oudega, PhD, at [moudega@pitt.edu](mailto:moudega@pitt.edu).**

## New Division of Neuropsychology and Rehabilitation Psychology



Dr. Ricker

March 2009 saw the creation of a new division in the University of Pittsburgh Department of Physical Medicine and Rehabilitation: the Division of Neuropsychology and Rehabilitation Psychology.

Directed by Joseph Ricker, PhD, vice chair for Neuropsychology and Rehabilitation Psychology, the new division will offer a strong environment for innovation in clinical care, education, and research. With six doctoral-level neuro- and clinical psychologists, as well as

psychometrists, the division had the critical mass to warrant formation.

Neuropsychology and Rehabilitation Psychology have a unique place in rehabilitation medicine. Many patients are experiencing cognitive, emotional, and psychosocial effects of traumatic brain injury, spinal cord injury, stroke, and many other injuries and illnesses. Our rehabilitation psychologists and neuropsychologists are trained in the integration of brain and behavioral functioning to better understand impairments related to disabilities. Understanding these changes enables them to design rehabilitation regimens that address these specific impairments and enhance participation in rehabilitation, and ultimately community reintegration.

The UPMC Institute for Rehabilitation and Research is one of the largest rehabilitation programs in western Pennsylvania and will soon expand to a newly-dedicated space at UPMC Mercy. The new division will share space with IRR and provide enhanced psychology services to patients and their families.

### Division staff

Joseph Ricker, PhD, comes to his directorship with experience in both clinical and research aspects of neuropsychology and rehabilitation psychology. He holds a doctorate in clinical psychology and is board certified in both clinical neuropsychology and rehabilitation psychology. He is an associate professor in the Department of PM&R, a faculty member of the Center for Neural Basis of Cognition, and the principal investigator on several research protocols. He is widely published in professional journals, serves on three journal editorial boards, and is the editor of two books, as well as a contributor to more than sixteen other books on topics in neuropsychology and rehabilitation psychology. Under his direction the division staff is dedicated to developing a program that will improve the lives of people as much as possible within the challenges of their specific injury or illness.

Patricia McSweeney Arenth, PhD, is an assistant professor in the Department of PM&R, and a member of the research faculty at the Center for the Neural Basis of Cognition. She holds a doctorate in counseling psychology. Dr. Arenth completed a pre-doctoral internship with the Pittsburgh VA Healthcare System, and a post-doctoral fellowship in neuropsychology and rehabilitation psychology. She was recently awarded a K23 grant by the National Institutes of Health, the focus of which is to utilize neuropsychological testing and multiple neuroimaging modalities (fMRI, DTI, and MRS) as methods to study the possible effects of a particular pharmacological agent (CDP-Choline) on working-memory function following traumatic brain injury.

Richard Barbara, PhD, is a psychologist and clinical supervisor of Behavioral Medicine at the UPMC Institute for Rehabilitation and Research (IRR). Dr. Barbara's primary practice is in the IRR Spinal Cord Injury Program. He focuses on psychological functioning and those issues that negatively impact a patient's ability to improve in rehabilitation, care for themselves, and return to an active and meaningful lifestyle. Dr. Barbara is an expert in medical ethics and ensures that rehabilitation treatment and decisions take place within

clear ethical guidelines. Other areas of interest and practice are adjustment disorders, affective disorders, acute and post-traumatic stress disorders, substance abuse, and acute and chronic pain complaints.

Lee Barolo, PhD, is a clinical psychologist for the UPMC Institute for Rehabilitation and Research and provides a wide range of neuro-psychological service to the division. Dr. Barolo recognizes the importance of family contribution in successful neuropsychological rehabilitation and encourages family involvement in counseling. His clinical duties include individual psychotherapy and completing neuropsychological evaluations. In addition to the division's emphasis on traumatic brain injury, Dr. Barolo's interests include post-traumatic stress disorder and the psychological components of recovery from medical conditions such as burn, stroke, and amputation.

Tad Gorske, PhD, is an assistant professor and licensed psychologist in the outpatient Clinical Neuropsychology Service at UPMC Institute for Rehabilitation and Research. He did doctoral studies in psychology with a joint fellowship in clinical neuropsychology, and addiction medicine. He was awarded a grant from the National Institute on Drug Abuse to study the effects of cognitive test feedback on patient adherence, which he completed in June 2008. Dr. Gorske is the primary author of *Collaborative Therapeutic Neuropsychological Assessment* and has published in peer reviewed journals on the topics of neuropsychology, addiction, and mental health. His professional memberships include the American Psychological Association, the National Academy of Neuropsychology, and the Greater Pittsburgh Psychological Association. He is program and education board chair of the Pennsylvania Psychological Association.

Hilly Rubinsky, PhD, provides a full range of psychological and neuropsychological services for the Inpatient Brain Injury Unit at the UPMC Institute for Rehabilitation and Research. Dr. Rubinsky is a member of the American Psychiatric Association and the Brain Injury Association of Pennsylvania. He helped develop the Cognitive Flow Sheet, an assessment tool that summarizes cognitive, language, and perceptual test results for the cognitive rehab team. Dr. Rubinsky's other areas of expertise include chronic pain rehabilitation, stroke and geriatrics, and sex therapy and research.

## Top ranking in NIH funding

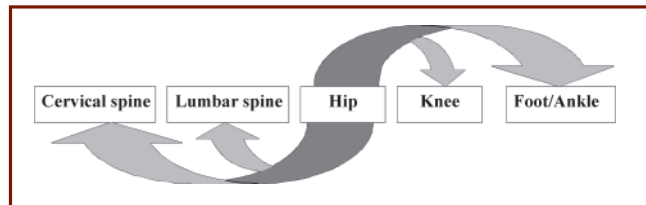
The University of Pittsburgh Department of Physical Medicine and Rehabilitation attained top rank for National Institutes of Health (NIH) funding compared to other academic PM&R departments in the U.S. Using data from the NIH web site, Blue Ridge Institute for Medical Research ([www.brimr.org/NIH\\_Awards/2008/NIH\\_Awards\\_2008.htm](http://www.brimr.org/NIH_Awards/2008/NIH_Awards_2008.htm)) compiled results showing the total amount of grant funding received for each PM&R department. University of Pittsburgh PM&R received nearly \$3.3 million in NIH funding in 2008.

## A golden opportunity for PM&R to impact sports medicine



**Gary Chimes, MD, PhD**  
Sports & Spine Rehabilitation  
Assistant Professor  
Department of Physical Medicine and Rehabilitation  
University of Pittsburgh

In an exciting development in the field of PM&R, physiatrists are now eligible to sit for the Sports Medicine Board Examination, joining family medicine, internal medicine, pediatrics, and emergency medicine specialties. There are already many physiatrists who include sports medicine as part of their scope of practice, and the ability to substantiate our claims of excellence with the same certification acknowledged by other specialties will help in our ability to integrate with the greater sports medicine community. Sports medicine physicians from other disciplines are realizing the benefits of interacting with PM&R-trained sports medicine specialists who have expertise in spine and nerve conditions (lumbar radiculopathy, peroneal neuropathy, post-operative complex regional pain syndrome), as well as adaptive athletics (wheelchair and amputee athletes). As our specialty extends to sports medicine, physiatrist treatment of senior athletes will also grow.

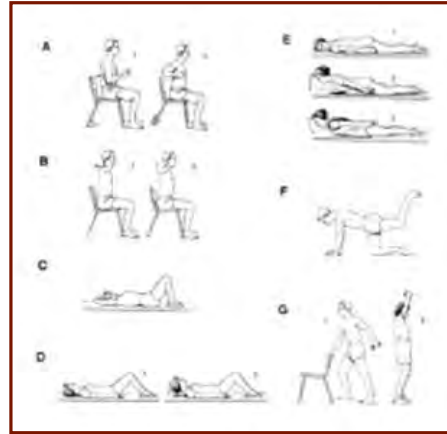


**Kinetic Chain**

Senior athletes are a natural niche for the physiatrist. Senior athletes, also referred to as masters athletes or aging athletes, are simply older adults who are actively engaged in exercise with the goal of self-improvement. The defining characteristic of sports medicine is how injury affects sports participation and performance. Goals of the senior athlete can be as basic as a bicycle ride with grandchildren or masters competition. Care of senior athletes requires treating the whole patient, rather than just a specific body part.

As with all athletes, the initial assessment of a senior athlete should focus on a kinetic chain assessment. After identifying the pain generator, it is essential to determine whether the painful structure is injured because of something intrinsic to that structure or whether the painful structure is a "victim" of faulty biomechanics elsewhere. While this is important in treating all athletes, this is especially important in treating senior athletes because of their predisposition toward thinning of the bone (osteoporosis and osteopenia) and age-related loss of muscle mass (sarcopenia).

Sarcopenia is a particularly important factor for senior athletes. While physiatrists are aware of loss of muscle mass in some of our more common rehabilitation diagnoses (spinal cord injury, stroke, and general debility), loss of muscle mass is common in even healthy and active older adults. Bed-rest studies conducted by Kortebein et al. demonstrated that short periods of bed rest lowered muscle mass, muscle protein synthesis, knee extension strength, and the ability to climb stairs. Perhaps even more important, however, was that most of these adults were in negative nitrogen balance before the study even started, suggesting that loss of muscle mass may be a norm in older adults, and not an exception.



**Sinaki (2003): non-pharmacologic interventions**

From *Nonpharmacologic interventions, exercise, fall prevention, and role of physical medicine*. Sinaki M. *Clin Geriatr Med*. 2003 May; 19(2):337-59.

Of particular concern is associated endocrine abnormalities that may accompany loss of muscle mass in older athletes, especially older male athletes. Most physiatrists have struggled with patients who are "non-responders," patients who, despite our best treatment algorithms, never feel quite right. Over the past decades, we have recognized the frequency with which these non-responders may have the comorbidities of depression or hypothyroidism. However, a very common but often missed diagnosis in these older males is symptomatic late onset hypogonadism (SLOH). SLOH can resemble depression or hypothyroidism because of the presence of systemic symptoms of fatigue, anhedonia, and general malaise. Symptoms that are relatively more specific to SLOH include decreased libido and decreased explosive strength. Clinicians should have a high index of suspicion for SLOH in any older male patient who is simply not functioning at his prior level of performance. In these patients, in addition to the standard kinetic chain assessment, it is important to check for relevant labs (including total and free testosterone and sex hormone binding globulin), and possibly work with an endocrinologist to help correct the endocrine abnormalities that are contributing to decline in function.

Other important considerations for the aging athlete include a focus on fall prevention. There is strong evidence for the use of tai chi as an aid in fall prevention. Athletes appreciate using a proactive approach to prevent falls, rather than simply presuming falls are inevitable and treating them with bisphosphonates. Another useful protocol to incorporate into the exercise regimen of the senior athlete is the osteoporosis prevention exercises described by Mehrsheed Sinaki.

Finally, a comprehensive treatment program for senior athletes should include appropriate nutritional management. Because many of the common problems of senior athletes are related to bone and muscle depletion, it is important to make sure senior athletes have adequate supplies of the substrates needed to maintain healthy bone and muscle, including calcium and vitamin D for bone and amino acids (particularly the essential amino acids and arginine) for muscle.

Caring for senior athletes can be among the most enjoyable parts of a physiatrist's practice. Senior athletes tend to be highly motivated and their improvements are tangible and easily appreciated.

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2. Kortebein P, Symons TB, Ferrando A, Paddon-Jones D, Ronsen O, Protas E, Conger S, Lombeida J, Wolfe R, Evans WJ. Functional impact of 10 days of bed rest in healthy older adults. *J Gerontol A Biol Sci Med Sci*. 2008 Oct;63(10):1076-81.
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## Awards

Our faculty continue to be recognized for their groundbreaking work. Recent awards include:



**Gwendolyn Sowa, MD, PhD  
with John Whyte, MD, PhD**

**Gwendolyn Sowa, MD, PhD,**  
AAP Young Academician Award  
Gwendolyn Sowa, MD, PhD, received the prestigious 2009 Association of Academic Physiatrists (AAP) Young Academician Award. The award, presented at the AAP Annual Meeting in Colorado Springs in February, honors an academic physiatrist who has demonstrated outstanding performance in the areas of teaching, research, and/or administration.

Past recipients of the award at the University of Pittsburgh include Michael Boninger, MD, interim chair and professor, Department of PM&R (1998), and Amy Wagner, MD, associate professor and associate director of research (2005). The awards are indicative of the high caliber of faculty and recruits at the UPMC Department of Physical Medicine and Rehabilitation.

### **Giovanna Distefano, MSc, PT**

2009 AAP Outstanding Poster Presentation. "Neuromuscular Electrical Stimulation and Stem Cell Transplantation into Dystrophic Skeletal Muscle." Ms. Distefano is a graduate student researcher under the direction of Fabrisia Ambrosio, PhD, of the Department of PM&R. Presented at the AAP Annual Meeting in Colorado Springs, Colo., February 2009.

### **Stephen O'Connell, DO**

AAP Outstanding Oral Scientific Paper Presentation. Dr. O'Connell, a PM&R resident, was awarded outstanding presentation for "Cell Death in Bupivacaine Exposed Human Intervertebral Disc Cells." Research was completed at the Ferguson Laboratory under the mentorship of Gwendolyn

Sowa, MD, PhD. Presented at the AAP Annual Meeting in Colorado Springs, Colo., February 2009.

### **Arun Rajesekhar, BS**

2009 AAP Outstanding Poster Presentation of "Investigating serum biomarkers in a rabbit model of disc degeneration" presented by Arun Rajesekhar, BS, a medical student at the University of Pittsburgh and one of four recipients of the 2008 RREMS sponsored by AAP and the Foundation for PMR. Mr. Rajesekhar is mentored by Dr. Sowa. Presented at the AAP Annual Meeting in Colorado Springs, Colo., February 2009.

### **Fabrisia Ambrosio, MPT, PhD**

Best Junior Faculty Presentation. "Neuromuscular Electrical Stimulations Rejuvenated Muscle Stem Cell Regenerative Potential," at the University of Pittsburgh Institute on Aging 2008 Research Day, December 2008.

### **Anthony E. Kline, PhD**

American Psychological Association and Diversity Program in Neuroscience Alumni Achievement Award for Research recognizing outstanding early career accomplishments, including the publishing of important scientific works and the achievement of high levels of federal funding. Presented in Washington, DC, November 2008.

### **Benjamin Wells de Witt (PGY-2, UPSOM)**

Stephen Phillips Award from the Dean's Summer Research Program (SRP) for Medical Students, University of Pittsburgh School of Medicine. The award is given to medical students for outstanding research while enrolled in SRP. Mr. deWitt was mentored and guided by Anthony E. Kline, PhD, in his lab at the Safar Center for Resuscitation Research.

### **Michael C. Munin, MD**

Pittsburgh Magazine's 2009 Top Doctors list for Physical Medicine and Rehabilitation. Dr. Munin has been on the Top Doctors list since 2005 and has been recognized annually in America's Top Doctors, Castle Connolly Guide since 2001.

## Recently published

### A small sample of representative papers by IRR faculty members

#### Peer-reviewed papers

Whyte J, Boninger ML, Helkowski W, Braddom-Ritzler C. The Rehabilitation Medicine Scientist Training Program: Impact and lessons learned, *Am J Phys Med Rehabil*. 2009;88(3):169-179.

Ambrosio F, Kadi F, Lexell J, Fitzgerald GK, Boninger ML, Huard J. The effect of muscle loading on skeletal muscle regenerative potential: An update of current research findings relating to aging and neuromuscular pathology, *Am J Phys Med Rehabil*. 2009;88(2):145-155.

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Reddy CC and Collins, MW. Sports concussion: management and predictors of outcome. *Curr Sport Med Rep*. 2009 Jan-Feb;8(1):10-5.

Chang C, Munin MC, Skidmore ER, Huber L, Weber DJ. Effect of baseline spastic hemiparesis on recovery of upper limb function following botulinum toxin A injections and post-injection therapy. *Arch Phys Med Rehabil* 2009

Russell K, Scanlon JM, Arenth PM, Ricker JH. Lower level language deficits after traumatic brain injury. Presented at the 37th annual meeting of the International Neuropsychological Society, February 12, 2009, Atlanta. Abstract published in *J Intl Neuropsychol Soc* 2009;15(Suppl. 1):76.

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Kline AE, Hoffman AN, Cheng JP, Zafonte RD, Massucci JL. Chronic administration of antipsychotics impede behavioral recovery after experimental traumatic brain injury. *Neurosci Lett*. 2008 Dec 31;448(3):263-7.

Hoffman AN, Cheng JP, Zafonte RD, Kline AE. Administration of haloperidol and risperidone after neurobehavioral testing hinders the recovery of traumatic brain injury-induced deficits. *Life Sci*. 2008 Oct 24;83(17-18):602-7.

Cheng JP, Hoffman AN, Zafonte RD, Kline AE. A delayed and chronic treatment regimen with the 5-HT1A receptor agonist 8-OH-DPAT after cortical impact injury facilitates motor recovery and acquisition of spatial learning. *Behav Brain Res*. 2008 Dec 1;194(1):79-85.

#### Books and book chapters

Ricker JH & Arenth PA. Functional neuroimaging in clinical neuropsychology. In JE Morgan & JH Ricker (eds), *Textbook of Clinical Neuropsychology*. 2008; (Chapter 41; pp. 840-847). New York: Taylor & Francis.

Gorske, Tad T., Smith, Steven R. Collaborative Therapeutic Neuropsychological Assessment. *Springer Science+Business Media* 2009; ISBN: 978-0-387-75425-3.

## Recent contributions by IRR faculty

Following is a sampling of topics covered in recent presentations by IRR faculty members.

### Molecular Mechanisms of Aging and Age-Related Diseases Conference

**Puerto Vallarta, Mexico, March 3 to March 6**

Fabrisia Ambrosio, PhD, MPT, presented "Neuromuscular electrical stimulation rejuvenates muscle stem cell regenerative potential." Co-authors included Joshua Plassmeyer and David Groscoast, PM&R student researchers under Dr. Ambrosio's direction; Elke Brown, MD, and Michael Boninger, MD, Department of PM&R; Bret Goodpaster, PhD, Department of Endocrinology; G. Kelley Fitzgerald, PhD, PT, OCS, Department of Physical Therapy; and Johnny Huard, PhD, Department of Orthopaedic Surgery.

### Association of Academic Physiatrists 2009 Annual Meeting

**Colorado Springs, Feb. 24 to Feb. 28**

#### Instruction

Gary Chimes, MD, PhD, Department of PM&R, contributed to the instructional courses "Geriatric Medicine," "Disability Sports Medicine," and "Applying Statistics to Clinical Applications," and led a course in teaching the fundamental of spinal.

Brad Dicianno, MD, director of PM&R's Rehabilitation Research Experience for Medical Students, presented the course "Establishing a Medical Student Research Program."

#### Research

Brad Dicianno, MD, director of PM&R's Rehabilitation Research Experience for Medical Students, presented the poster "Control Algorithms to Improve Computer Target Tracing for Individuals with Spasticity or Rigidity." Other authors were Harshal Mahajan, a graduate student in rehabilitation science; Rory Cooper, PhD, professor and chair of the Department of Rehabilitation Sciences and Technology; and Geoffrey Gordon, PhD, professor in the Department of Machine Learning at Carnegie Mellon University.

Gwendolyn Sowa, MD, PhD, assistant professor, Department of PM&R, presented "The Measurement of Metalloprotease Enzyme Activity in Normal and Degenerative Disc Cells." Research on the enzyme activity was conducted at the Ferguson Laboratory of the Department of Orthopaedic Surgery. Contributing were Andrew Chiao, summer intern with the Pittsburgh Tissue Engineering Initiative; Paulo Coelho, MS, Department of PM&R; Rachel Studer, PhD; Nam Vo, PhD; and James Kang, MD; all of the Ferguson Laboratory/Department of Orthopaedic Surgery.

Arun Rajesekhar, BS, medical student at the University of Pittsburgh and one of four recipients of the 2008 RREMS sponsored by AAP and the Foundation for PMR, presented the paper, "Investigating Serum Biomarkers in a Rabbit Model of Disc Degeneration." Co-authors are Gwendolyn Sowa, MD, PhD, and Paulo Coelho, MS, both of the Department of PM&R; and Edward Westrick, MD, Barrett Woods, MD, Steven Leckie, MD, Nam Vo, PhD, Rebecca Studer, PhD, and James Kang, MD, all of the Department of Orthopaedic Surgery, Ferguson Laboratory.

Gary Chimes, MD, assistant professor, Department from PM&R, worked with Michael Herndon, DO, Department of PM&R, University of Arkansas, on "Hypotestosteronemia in Chronic Pain in the Absence of Opioid Treatment: A Case Series."

Michael Boninger, MD, presented the paper "Neuromuscular electrical stimulation: The Skeletal Muscle Fountain of Youth?" Co-authors are Fabrisia Ambrosio, PhD, MPT, Joshua Plassmeyer, and Elke Brown, MD,

both of the Department of PM&R; Bret Goodpaster, PhD, Department of Endocrinology; G. Kelley Fitzgerald, PhD, PT, Department of Physical Therapy; and Bridget Deasy, PhD, Department of Orthopaedic Surgery, Live Cell Imaging Laboratory.

#### Department residents and trainees

"A Rehabilitative Treatment Approach to Non-Systemic Vasculitis Neuropathy," Shailen Greene, MD, resident, with faculty mentor, John Horton, MD.

"The Occurrence of Lymphedema in an Adult Spina Bifida Population," Angela Garcia, MD, with faculty mentor, Brad Dicianno, MD.

"Critical Illness Neuropathy in People with Multivisceral Transplantation," Steven Brose, DO, with mentor John Horton, MD.

"Inpatient Rehabilitation of Conversion Disorder after Concussion," resident Maria Twichell, MD, with Cara Camiolo Reddy, MD (faculty mentor) and Hallie Zaleznik, PT.

"Rehabilitation Course after Heat Stroke," Tejas Parikh, MD, and faculty mentor Cara Camiolo Reddy, MD

"Stimulation and Stem Cell Transplantation into Dystrophic Skeletal Muscle," Giovanna Distefano, MS, PT; Joshua Plassmeyer, BS; Ricardo Ferrari, MS, PT; Michael Boninger, MD; and Fabrisia Ambrosio, PhD, MPT, all of the Department of PM&R; G. Carvell, PhD, PT, and G. Kelley Fitzgerald, PhD, PT, OCS, of the Department of Physical Therapy, and Johnny Huard, PhD, of the Department of Orthopaedic Surgery.

"Cell Death in Bupivacaine Exposed Human Intervertebral Disc Cells," Stephen O'Connell, DO; Paulo Coelho, MS; and Gwendolyn Sowa, MD, PhD, of Department of PM&R, with H. Lee, MD; G. Vadala, MD; Nam Vo, PhD; and James Kang, MD, of the Ferguson Lab, Department of Orthopaedic Surgery.

### International Neuropsychological Society

**37th Annual Meeting,  
Atlanta, Ga., Feb. 11 to Feb. 14**

#### Research

Kathryn Russell, MS, presented "Lower Level Language Deficits After Traumatic Brain Injury." Contributing authors, Joelle Scanlon, PhD, Patricia Arenth, PhD, and Joseph Ricker, PhD, of the Department of PM&R.

### Winter Conference on Brain Research

**Cooper Mountain, Colo., Jan. 24 to Jan. 31**

#### Instruction

Douglas Weber, PhD, assistant professor, Department of PM&R, chaired a session entitled "Sensible Neuroprosthetics." While attending the conference Dr. Weber contributed to the conference's School Outreach Program by presenting "Getting Plugged in: Connecting Brains to Computers...Literally" to advanced science students at Summit High School, Summit, Colo.

### Orthopaedic Research Society (ORS)

**Las Vegas, Nev., Feb. 22 to Feb. 25**

#### Instruction

Gwendolyn Sowa, MD, PhD, assistant professor, Department of PM&R, discussed the "Toxicity of Bupivacaine on Nucleus Pulposus Cells" in intra-articular versus intradiscal injection.

Recent contributions by IRR faculty (Continued from Page 6)

## Research

Research by Dr. Sowa and her research teams at the Ferguson Laboratory resulted in two presentations at the ORS: "The Effects of Compression on Intervertebral Disc Cell Gene with Expression," with Paulo Coelho, MS, Department of PM&R; Kevin Bell, MS; Nam Vo, PhD; Rebecca Studer, PhD; and James Kang, MD, of the Department of Orthopaedic Surgery, Ferguson Laboratory; and Patrick Smolinski, PhD, of the Department of Mechanical Engineering and Materials Science and Department of Bioengineering. "Live Cell Imaging Demonstrates Notochordal Cell Differentiation into Chondrocyte-like Cells in Vitro," with co-authors Joo Han Kim, MD; Hyoung-Yeon Seo; Rebecca Studer, PhD; Nam Vo, PhD; Helga Georgescu, MS; and James Kang, MD, of the Ferguson Lab; and Bridget Deasy, PhD, of the Department of Orthopaedic Surgery, Live Cell Imaging Laboratory.

## International Seating Symposium

Hosted by the University of Pittsburgh  
Orlando, Fla., March 10 to March 14

### Instruction

Brad Dicianno, MD, Department of PM&R; Mark Schmeler, PhD; Kendra Betz, PT; and Diane Collins, OTR/L, PhD, of the Department of Rehabilitation Science and Technology, led pre-symposium workshops "Introduction to Manual Wheelchairs," "Introduction to the RESNA Position Paper on Power Seat Functions," and "Pathophysiology of Impairment Specific Conditions Affecting Mobility."

Dr. Dicianno also led discussions on the "Scientific Summary of the Current Mobility-Related RESNA Position Papers" during a paper session. The RESNA papers dealt with such topics as assistive technology interventions assisting both user and supplier in decision making and justification of technology; seating and wheeled mobility; and transportation, ultra-lightweight manual wheelchairs, and stationary standing devices. Dr. Dicianno discussed "Enhanced Controls for Persons with Movement-Related Disorders" as part of a VA Research Session.

## Spina Bifida World Congress

Orlando, Fla., March 15 to March 17

### Instruction

Brad Dicianno, MD, Department of PM&R, led instruction in two important issues in the spina bifida community: "Medical Complications in Adults with Spina Bifida Research Mobility" and "Spina Bifida in the Transition Years." Dr. Dicianno is director of the UPMC Adult Spina Bifida Outpatient Clinic, the only state funded clinic for people with spina bifida in Pennsylvania.

## U.S. Paralympics Amazing Leaders Conference

Olympic Training Camp, Colorado Springs, Colo., April 18

### Instruction

Brad Dicianno, MD, Department of PM&R; Rory Cooper, PhD, chair of the Department of Rehabilitation Sciences and Technology; and Ian Rice, MS, a researcher at Human Engineering Research Laboratories presented "Measuring and Improving Athletic Performance in Adaptive Sports."



Douglas Weber, PhD, with summit High School science students

## NIH training program comes to UPMC PM&R

The UPMC Department of Physical Medicine and Rehabilitation (PM&R) has been selected by the National Institutes of Health (NIH) to receive the Rehabilitation Medicine Scientist Training Program (RMSTP) grant. Michael Boninger, MD, interim chair and professor, Department of PM&R, has been appointed principal investigator and program director for the RMSTP. Dr. Boninger previously served on the training program's advisory board and in July 2004 became associate program director of the RMSTP.

The RMSTP grant provides research training, mentorship, and career development support for physiatrists committed to developing productive careers in academic medicine and research. The aim of the grant is to increase the number of rigorously trained, extramurally competitive, and scientifically productive faculty members in PM&R departments to contribute to the development of psychiatric research and rehabilitation science.

The RMSTP was guided for its first five years under the direction of James Lieberman, MD, and for last seven by John Whyte, MD, PhD, as principal investigator and program director. Dr. Boninger and Dr. Whyte have worked together in the selection of candidates for the program, teleconferencing with trainees, and in the design and direction of workshop curriculum offered annually at the Association of Academic Physiatrists (AAP) meeting.

UPMC PM&R is honored to serve as the new home for this very important grant. For more information on the RMSTP, visit the AAP website at [www.physiatry.org/Research\\_RMSTP\\_K12.cfm](http://www.physiatry.org/Research_RMSTP_K12.cfm).

A recent article on the RMSTP and the accomplishments of its fellows appeared recently in the *American Journal of Physical Medicine & Rehabilitation* (John Whyte, MD, PhD; Michael Boninger, MD; Wendy Helkowski, MD; Carolyn Braddom-Ritzler, EdD. The Rehabilitation Medicine Scientist Training Program: Impact and Lessons Learned. *American Journal of Physical Medicine & Rehabilitation*. 88(3):169-179, March 2009).

## Mark your calendar for IRRDay 2009



IRRDay, our annual research event, is drawing near. IRRDay 2009 will be held Thursday, May 28, from 11:30 a.m. to 5:00 p.m. in the Starzl Biomedical Science Tower, Room BST S100. This year's presenters are John Whyte, MD, PhD, and Alan Jette, PhD. Both are leaders in their fields and greatly respected for the many contributions they have made to rehabilitation research and practice. Dr. Whyte is director of the Moss Rehabilitation Research Institute in Philadelphia. Dr. Jette is research director for the New England Regional Spinal Cord Injury Center based at Boston University Medical Center.

Physicians and other health care professionals who attend IRRDay 2009 are eligible to receive continuing medical education credits. Following tradition, the program, including continuing education credits, is offered at no charge to attendees.

The research day is an opportunity for undergraduate students, fellows, medical students, and UPMC residents to showcase their rehabilitation research. Participants come from disciplines including bioengineering, rehabilitation science and technology, physical therapy, and neuroscience. Research from past years has ranged from bench science on a cellular level to clinical testing of assistive devices. Participation and research has increased each year, making IRRDay one of the most anticipated research events at the University of Pittsburgh.

### Presenters at IRRDay 2009



**Dr. Whyte**

John Whyte, MD, PhD, is a physiatrist and experimental psychologist specializing in traumatic brain injury rehabilitation and a professor of Rehabilitation Medicine at Thomas Jefferson University in Philadelphia. Dr. Whyte's presentation, "Attention Deficits after Traumatic Brain Injury: A Multidimensional Analysis" will reflect his research focusing on recovery from prolonged unconsciousness and attention and executive deficits that result from traumatic brain injury. In addition, he has a longstanding interest in the special methodological challenges presented by rehabilitation research topics, including the definition of rehabilitation treatments and the measurement of treatment effects.



**Dr. Jette**

Alan Jette, PhD, is professor of Health Policy & Management at Boston University's School of Public Health and directs Boston University's Health & Disability Research Institute. He also serves as director of the Boston University Post-Doctoral Research Fellowship in Rehabilitation Outcomes and Effectiveness Research, funded by National Institute on Disability and Rehabilitation Research. Dr. Jette is an internationally recognized expert in the measurement and epidemiology of functional limitations and disability. He has developed numerous instruments that assess function and disability and has published numerous articles on these topics in the rehabilitation, geriatrics, and public health literature. His IRRDay presentation is titled, "Innovations in Rehabilitation Outcome Assessment." Dr. Jette's current research interests include the measurement, epidemiology, and prevention of disability, and the development and dissemination of contemporary outcome measurement instruments to evaluate the quality of health care.

### AFFILIATE LINKS

UPMC Institute for Rehabilitation and Research  
<http://irr.upmc.com>

School of Medicine, Department of Physical  
Medicine and Rehabilitation  
<http://www.rehabmedicine.pitt.edu>

School of Health and Rehabilitation Sciences,  
Department of Rehabilitation Science &  
Technology  
<http://www.shrs.pitt.edu/rst>

UPMC Center for Assistive Technology  
<http://www.com/Services/IRR/aboutus/cat>

Human Engineering Research Laboratories  
<http://www.herlpitt.org>

## UPMC

UPMC is an integrated global health enterprise headquartered in Pittsburgh, Pennsylvania, and one of the leading nonprofit health systems in the United States. As western Pennsylvania's largest employer, with 50,000 employees and nearly \$7 billion in revenue, UPMC is transforming the economy of the region into one based on medicine, research, and technology. By integrating 20 hospitals, 400 doctors' offices and outpatient sites, long-term care facilities, and a major health insurance services division, and in collaboration with its academic partner, the University of Pittsburgh Schools of the Health Sciences, UPMC has advanced the quality and efficiency of health care and developed internationally renowned programs in transplantation, cancer, neurosurgery, psychiatry, orthopaedics, and sports medicine, among others. UPMC is commercializing its medical and technological expertise by nurturing new companies, developing strategic business relationships with some of the world's leading multinational corporations, and expanding into international markets, including Italy, Ireland, the United Kingdom, and Qatar. For more information about UPMC, visit our website at [www.upmc.com](http://www.upmc.com).

For more information about our clinical services or for assistance with patient referrals, please call UPMC MedCall at 412-647-7000 or 1-800-544-2500.