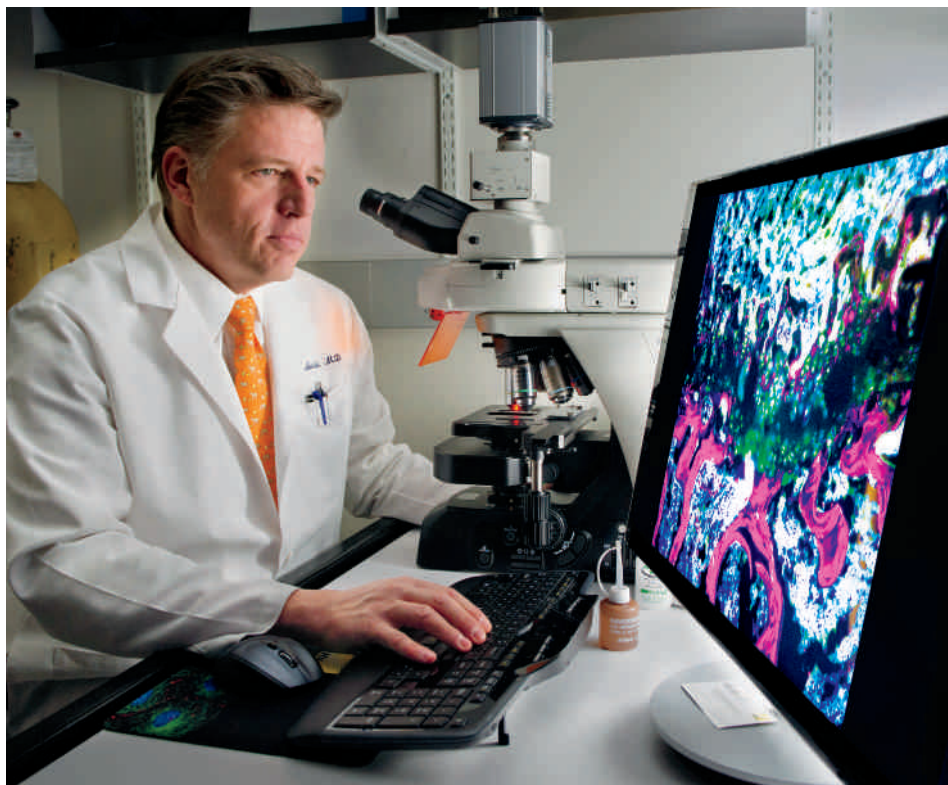


Discovery to Recovery

CLINICAL AND RESEARCH HIGHLIGHTS AT HSS | SPRING 2014

HOSPITAL
FOR
SPECIAL
SURGERY



At the Nexus of Research and Clinical Care

Kellen Award Program Fosters Emerging Physician-Scientists

Essential to Hospital for Special Surgery's leadership in breakthrough research are its physician-scientists, the dedicated orthopedists and rheumatologists who balance clinical care with the rigorous pursuit of medical research. To cultivate the next generation of physician-scientists, HSS has established the Anna-Maria and Stephen Kellen Physician-Scientist Career Development Award program.

This unique program, launched with \$1.8 million in funding from the Anna-Maria and Stephen Kellen Foundation, supports scientific

investigations by emerging HSS physicians. The Foundation recently granted another \$2.5 million of further support.

Supporting New Discoveries

The Kellen Award program provides key funding for research and encourages mentorship. Each of the early career recipients is paired with one or more senior scientists in the Hospital's Research Division.

"I like to fund projects that directly help people," says Marina Kellen French, vice president of the Anna-Maria and Stephen Kellen Foundation and a Trustee of HSS.

Aaron Daluiski, MD, and his team are developing nanotechnology to deliver bone healing medication directly to fracture sites.

"I have always had a great interest in supporting young clinicians who would like to dedicate part of their careers to scientific endeavors. I am especially pleased that the Clinician Scientist program, which is a key part of the research mission at HSS, allows me to fulfill my lifetime interest in this area," says Ms. Kellen French.

"Physician-scientists have a deep understanding of patients' needs and priorities, and they drive research that will directly impact patient outcomes," says Thomas P. Sculco, MD, surgeon-in-chief and Korein-Wilson Professor in Orthopaedic Surgery, who has played a key role in developing this program. "We are so honored that the Anna-Maria and Stephen Kellen program provides crucial financial support for promising young physicians who aspire to advance medicine through research as well as patient care."

"The purpose of research at HSS is to translate our discoveries into improving outcomes for patients, and the Kellen Awards play a critical role in supporting the talented physician-scientists who make these discoveries," says Steven R. Goldring, MD, chief scientific officer and Richard L. Menschel Research Chair. "It gives them the 'protected time' they need to maintain their busy clinical practices while pursuing research in the laboratory. Without this support, financial constraints could force them to abandon their research."

Through a competitive peer-review process, candidates are selected to receive five-year awards that provide \$500,000 for specialized

research tools, laboratory and technical support, and equipment.

The program's first round of awards was granted in August 2012 to six HSS physician-scientists with wide-ranging projects, two of which are discussed here. To read about additional research supported by the Kellen program, please visit the HSS blog at www.hssonthemove.com.

Bone Healing through Nanotechnology

Aaron Daluiski, MD, an orthopedic surgeon specializing in pediatric and adult hand, wrist, and elbow surgery, is using his Kellen Award to investigate bone healing following fracture. With his mentors Dr. Goldring and orthopedic surgeon Mathias Bostrom, MD, Dr. Daluiski's investigation is two-fold: basic science research into how patients heal following bone fractures, and the development of new drug therapies to improve bone healing without surgery.

The first phase of the study looked at how fracture healing differs in the young and the old. "We know that kids heal so quickly that we typically treat fractures in children nonoperatively with a cast or a splint and they heal in about three weeks," says Dr. Daluiski. "For some reason, we lose that capacity to heal as we age. We are looking at this phenomenon to understand which genetic pathways are involved in the bone healing process. We are investigating those pathways to find specific drugs to augment healing. Even a modest reduction in healing time would be a tremendous benefit to patients."

Dr. Daluiski and his colleagues study nonsurgical methods to move bone-healing medication to the

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Where the World Comes to Get Back in the Game



HSS has launched a new advertising campaign featuring patients telling their stories about how HSS changed their lives. Go to www.hss.edu/backinthegame to meet these amazing patients.

(page 5)

Advancing Medicine through Research and Discovery

Healthcare is in the midst of a major transition. Patients are increasingly empowered to choose their hospitals and doctors based on quality and results, and many are willing to travel to those hospitals where they can expect extraordinary outcomes the first time around. Hospitals that will thrive in this landscape are committed to providing patients with the best value today, and also innovating to provide even better results in the future. At HSS, we have always been world leaders in patient care, research, and education in orthopedics and rheumatology. Through research and innovation, we are continuously improving our patients' outcomes and experience.

In this issue of *Discovery to Recovery*, you will read about some of the innovative research by HSS scientists that is transforming the fields of orthopedics and rheumatology. You will read about the Department of Radiology and Imaging's groundbreaking research that has greatly improved the ability to diagnose orthopedic conditions early and accurately for optimal treatment. You will read about our scientists' exploration of nanotechnology to improve bone repair; investigation into the hows and whys of autoimmune disease and potential new treatments; and how our

sports medicine team translates lessons learned from treating the pros to all of their patients.

While HSS research is extensive, its aim is always to improve results for our patients. We have the privilege of treating vast numbers of patients with bone, joint, and autoimmune diseases and injuries. This gives us access to data that other hospitals and research centers simply don't have. We understand that this privilege is also a responsibility to conduct research that will improve patients' lives.

This is an exciting time of new beginnings at HSS. We have launched a major new advertising campaign that focuses on patient experiences; and we are on the cusp of welcoming a new surgeon-in-chief. Our culture of continuous innovation, excellence, and caring ensures that we will enter this new phase in a position of strength and great promise.



Louis A. Shapiro
President and CEO

Thomas P. Sculco, MD
Surgeon-in-Chief

Steven R. Goldring, MD
Chief Scientific Officer

In the News: HSS Radiology and Imaging

Hollis G. Potter, MD, Appointed Chairman

In December, Hollis G. Potter, MD, became the new Chairman of the Department of Radiology and Imaging, an internationally recognized center for musculoskeletal, orthopedic, and rheumatologic clinical imaging and research. As Chairman, Dr. Potter will ensure the Department's continued growth as a leading innovator in clinical research and patient care. She succeeds Helene Pavlov, MD, who has led the Department for the last 16 years.

"Our goal is to implement the foundation of translational research to clinical care, thus providing our patients with the most innovative and effective imaging available worldwide. The future lies in our ability to answer the previously unanswered questions posed by our clinical colleagues, providing noninvasive insight into tissue integrity and, eventually, functional capacity," says Dr. Potter, who has spent the last 22 years at HSS pioneering new magnetic resonance imaging (MRI) techniques and is also the Coleman Chair in MRI Research. "The role of the Department has broadened in recent years. We collaborate with colleagues from a wide variety of specialties and practices with a singular focus: to improve the quality of our patients' lives and to restore their function and mobility."

Many groundbreaking imaging protocols and procedures are tested and used first at HSS. Patients treated at the Hospital have access to the newest technology and procedures, many of which are not available at other hospitals. HSS is a test site for companies that are continually developing and improving new imaging equipment, such as General Electric.

The HSS Department of Radiology and Imaging performs

more than 300,000 musculoskeletal imaging examinations each year, including MRI, computed tomography (CT), and ultrasound (US). Each year, The Coleman Center for Musculoskeletal MRI performs some 30,000 musculoskeletal MRI examinations.

Dr. Pavlov achieved many successes for the Department, including bringing musculoskeletal ultrasound to HSS, developing an Academic Center of Ultrasound Excellence, recruiting top-quality faculty and staff, and establishing the Robert H. Freiberger, MD, Academic Resource Center. Dr. Potter plans to expand on these successes. ●

effective therapies to improve outcomes in patients with ACL injuries and arthritis of the hip," says Steven R. Goldring, MD, chief scientific officer.

Hip Replacement

A four-year grant of \$3 million from the National Institutes of Health will enable HSS scientists to develop MRI technologies to identify patients at risk for early implant failure after hip replacement. The ability to identify patients before symptoms occur would provide an opportunity for early intervention before the development of severe soft tissue damage.

Division, and biomechanical engineers, co-principal investigators Hollis G. Potter, MD, and Matthew F. Koff, PhD, of the MRI Laboratory will develop MRI techniques to noninvasively detect adverse tissue reactions and osteolysis in its earliest stage, prior to the development of implant loosening.

ACL

In another significant grant, HSS is sharing \$1 million from the Arthritis Foundation with the University of California-San Francisco and the Mayo Clinic to validate the use of new MRI techniques and novel blood, urine and joint fluid biomarkers to identify patients who are developing early evidence of knee osteoarthritis after anterior cruciate ligament (ACL) repair. Currently, there are no effective tools to identify early stages of osteoarthritis that have been comprehensively evaluated across different institutions, and thus no established method to evaluate therapies for preventing or slowing the progression of osteoarthritis.

This grant will support research for early detection of osteoarthritis, which frequently develops after an acute ACL injury. Scientists have recently discovered that long before osteoarthritic changes can be diagnosed on X-ray, biochemical changes can be detected in cartilage using newer quantitative MRI techniques. Many studies have also shown that ACL injury is associated with quantifiable changes in biochemical biomarkers that can be detected in synovial (joint) fluid, blood, and urine. Clinicians will correlate fluid biomarkers and quantitative MRI findings with traditional X-ray imaging and clinical and functional outcomes of patients who sustain an ACL injury, and undergo an ACL reconstruction. Dr. Potter is the HSS principal investigator, and sports medicine orthopedic surgeon Scott A. Rodeo, MD, is the co-principal investigator for the overall grant. ●



Dr. Potter collaborates with Assistant Scientist Matthew F. Koff, PhD, and Scott A. Rodeo, MD, co-chief of the Sports Medicine and Shoulder Service.

New Grants for MRI Research

HSS has been awarded two new grants to develop novel magnetic resonance imaging (MRI) techniques that could improve outcomes following total joint replacement and ACL repair. "These studies bring together experts in orthopedics, imaging and basic science with the goal of developing the most

While most people do well after hip replacement, the most common long-term complication, called osteolysis, occurs when foreign particles induce an inflammatory reaction between the implant and the bone, causing bone destruction and implant loosening. Osteolysis may also generate soft tissue damage around the implant. Patients who develop osteolysis may require revision surgery.

Together with multidisciplinary collaborators at HSS, including surgeons, members of the Research

ACR Round-Up

Hospital for Special Surgery had a strong presence at the American College of Rheumatology (ACR) Annual Meeting in San Diego in October, presenting new findings from more than 60 accepted studies.

“HSS rheumatologists demonstrated their strong research productivity and leadership through their presentation of original research, as invited speakers in featured symposia, as moderators for meeting sessions and through participation in ACR committees and collaborative research groups,” says Mary K. Crow, MD, physician-in-chief, Benjamin M. Rosen Chair in Immunology and Inflammation Research and Joseph P. Routh

Professor of Rheumatic Diseases in Medicine. “Our scientists highlighted discoveries that provide new insights into the underlying mechanisms

of rheumatic diseases and presented data that can guide clinical care of patients,” says Dr. Crow. “These investigations provide new concepts that will ultimately improve how we diagnose and treat rheumatologic diseases. Some findings can be immediately applied in clinical practice to optimize patient outcomes.”

Studies ranged from basic science to population health.

Early RA Treatment Makes a Difference

HSS rheumatologist Vivien Bykerk, MD, and colleagues presented findings that early, effective treatment of rheumatoid arthritis (RA) reduces the amount of joint disability patients experienced two years after their diagnosis. This study points to the importance of finding an effective therapy without delay.

“We believe there is a window in which people have a much better chance of getting RA under good control, often with less intense therapy, and the window may well be within the first three months of developing joint inflammation,” says Dr. Bykerk. “The study’s findings should prompt doctors to warn patients about the hazards of delaying therapy and follow patients more often in the initial phases of treatment.”

Strong Support Systems Linked to Less Pain

HSS investigators also presented research showing a connection between social isolation and pain after hip replacement. Previous

studies show that people lacking good social ties are at increased risk of other poor outcomes, such as a heart attack or stroke, compared to those who enjoy the social support of family, friends and community.



Lisa Mandl, MD, MPH, talks with a patient.

Lisa Mandl, MD, MPH, Danielle Ramsden-Stein, MD, and colleagues found that being socially isolated is associated with an almost three times increased risk of having severe pain after hip replacement surgery, even two or more years after surgery.

“We believe further prospective studies should be done to determine whether interventions to evaluate and improve patients’ social ties before surgery could lead to a better pain outcome after hip replacement,” Dr. Mandl notes. “It could be a way to improve outcomes without medication or other costly interventions. I see no downside to helping patients get the social support they may need to improve their quality of life.”

Improving Pregnancy Outcomes

Jane Salmon, MD, senior scientist and Collette Kean Research Chair, and colleagues discovered a biomarker linked to poor pregnancy outcomes in patients with lupus or antiphospholipid syndrome (APS). The study is part of an ongoing, multicenter research initiative led by Dr. Salmon known as PROMISSE, which is funded by the NIH.

“Pregnant women who have lupus or APS are at increased risk for adverse outcomes, particularly preeclampsia, yet identification of those destined for complications has been elusive,” says Dr. Salmon, director of the Lupus and APS Center of Excellence at HSS. The women participating in the study had their blood drawn monthly beginning 12 weeks into pregnancy. HSS scientists then compared clinical information to assays of blood proteins, which led them to identify, for the first time, a biomarker predictive of a poor pregnancy outcome.

Dr. Salmon and coinvestigators found that an imbalance in angiogenic factors (proteins required to support the growth of blood vessels that nourish the developing fetus) is associated with poor pregnancy outcomes in women with lupus.

They discovered that pregnant women with lupus who have increased levels of an anti-angiogenic protein called sFlt1 are at increased risk for placental insufficiency and preeclampsia, a potentially life-

threatening complication. High levels of sFlt1 reduce the activity of other angiogenic proteins that are necessary for the healthy growth of the placenta and maternal blood vessels.

“We now know that measurement of these proteins is a powerful tool to identify pregnant

lupus patients at high risk for poor pregnancy outcomes sufficiently early to intervene,” Dr. Salmon says. “Hopefully, this will facilitate trials of novel treatments to prevent these devastating complications.”

Identifying Moral Dilemmas

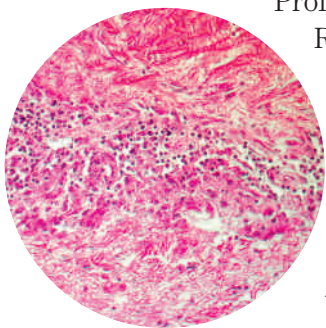
Another study led by HSS rheumatologist C. Ronald MacKenzie, MD, found that many rheumatologists face moral dilemmas when trying

to do what’s best for their patients in the current health care environment. After distributing a survey to ACR members, investigators found that a pressing ethical issue for many rheumatologists is their perceived need to ‘bend’ ethical norms and potentially compromise ethical principles in order to provide the care their patients need.

“Medical care takes place in a social context, and when it includes conditions that are unfair, health-care practitioners may be forced to struggle with ethical conflicts,” Dr. MacKenzie says. “Awareness is the first step in finding solutions to the challenges that physicians face.” The C. Ronald MacKenzie Chair in Ethics and Medicine at HSS supports medical ethics research.

Improving Patients’ Lives

In addition to these studies presented at the conference, HSS rheumatologists continue to investigate root causes and mechanisms of rheumatic disease. Dr. Crow: “We remain dedicated to discovering new approaches for prevention, diagnosis and treatment to improve the lives of our patients.” ●



HSS rheumatologists uncover the hows and whys of disease.

HSS Scientist Wins Grant to Uncover Link Between Smoking and RA

HSS scientist Alessandra Pernis, MD, Peter Jay Sharp Chair in Lupus Research, has received a new Innovative Research Grant of \$400,000 from the Rheumatology Research Foundation to uncover the link between smoking and rheumatoid arthritis (RA). The adverse health effects of cigarette smoking are well known with respect to lung disease, cancer and heart disease. Studies have shown that smoking is also an environmental risk factor for the development of RA.

Dr. Pernis will investigate how and why smoking increases an individual’s risk for developing RA with the goal of improving treatment options for patients. “The mechanisms linking exposure to cigarette smoke to RA are not fully understood,” Dr. Pernis says. “Given that tobacco exposure could influence not only the development and severity of RA, but also the responsiveness of RA patients to therapy, understanding these mechanisms could provide important insights into specific treatments that might be effective.”

Cigarette smoking has been shown to activate a family of molecules known as ROCKs. With support from the NIH and others, Dr. Pernis and colleagues previously found that abnormal activation of the ROCKs occurs in mice in which arthritis has spontaneously developed. In addition, Dr. Pernis and colleagues discovered that the administration of inhibitors that block the activity of the ROCKs reduced the development and severity of arthritis in mice.

“Our study will provide a better understanding of whether exposure to cigarette smoke can trigger and/or exacerbate RA by activating the ROCKs,” Dr. Pernis says. “Therapies that inhibit these molecules are in development for the treatment of cardiovascular disorders and, so far, have demonstrated only minimal side effects. Therefore, this knowledge could be rapidly translated into novel therapies for patients with rheumatoid arthritis who have a history of tobacco exposure.” ●



Alessandra Pernis, MD

THE R

HAPPENINGS AROUND THE HOSPITAL

Treating U.S. Olympians >

Team USA athletes have long trusted Hospital for Special Surgery physicians to provide the medical care they need to keep them in peak performance. In preparation for the 2014 Olympic Winter Games, the United States Olympic Committee (USOC) designated HSS as the first National Medical Center of its newly formed National Medical Network, comprised of national and regional medical centers entrusted to care for elite United States



U.S. OLYMPIC NATIONAL MEDICAL CENTER

athletes. Members of the HSS medical staff have a long history of service to the USA Swimming, USA Volleyball, and USRowing teams, and as members of the U.S. Olympic Medical Team served at the Athens 2004, Beijing 2008 and London 2012 Olympic Games. As with all of our patients, we are committed to keeping members of Team USA healthy and strong so they can compete at the highest level.



Clowning Around for a Good Cause ^

A record-breaking \$430,000 was raised at the 7th Annual Big Apple Circus Benefit to support pediatric care and research at HSS. The sold-out event at Lincoln Center was attended by more than 500 physicians, employees, patient families, and friends of the Hospital. "The generous donations support pediatric care and research at HSS and the Hospital's efforts to ensure that every child with musculoskeletal disease has the opportunity to live a happy and healthy life," says Roger F. Widmann, MD, chief of Pediatric Orthopedic Surgery. Eight-year-old Jack Gore, HSS pediatric patient and a star of *The Michael J. Fox Show*, served as guest ringmaster, thanking HSS for his care and welcoming guests to the show. Children enjoyed face painting, juggling, a stilt walker, caricaturists, a photo booth and much more at the Fun Festival before watching the fabulous show.



< Marathon Monday

After running 26 miles, participants of the 2013 ING New York City Marathon experienced more than the average runner's aches and pains. The day after the race, physical therapists and performance coaches from the HSS Rehabilitation Department led the ING

New York City Marathon Monday Recovery event. More than 300 runners warmed up on stationary bikes, were evaluated and then properly stretched by HSS physical therapists inside the Marathon Pavilion. "The most common complaint we heard was tightness in the legs and feet leading to pain in ITB (iliotibial band), on the outside of the knee, and foot pain, respectively," says Theresa Chiaia, PT, DPT, section manager of The James M. Benson Sports Rehabilitation Center and Tisch Sports Performance Center at HSS. "We were able to instruct and lead the runners in proper foam rolling



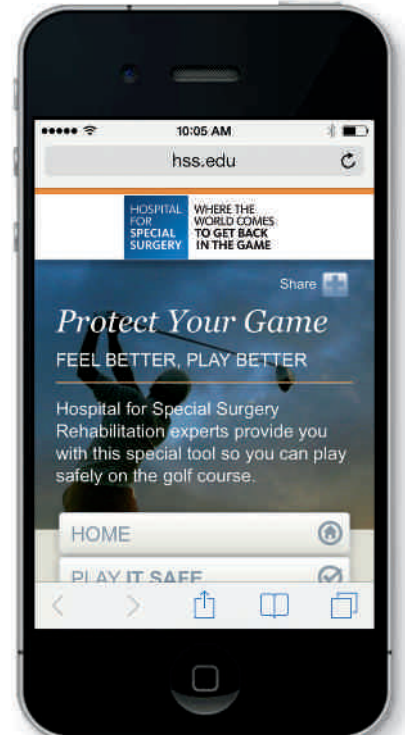
techniques, to help release the connective tissue surrounding the muscles, known as fascia, and in proper stretching."

DUALSEE



< Where the World Comes to Get Back in the Game

HSS is breaking hospital marketing conventions with new advertising focused on inspiring outcomes. Titled “Where the World Comes to Get Back in the Game,” the campaign celebrates the stories of patients from all walks of life, and all over the world, who return to what they love most as a result of the care received at HSS. The campaign appears in airports in New York, California and Florida; on television; and online. Each ad invites a deeper experience of a diverse array of patient stories via a specially designed micro-site at hss.edu/backinthegame.



Getting into the Swing ^ of Injury Prevention

Golfers now have access to performance improvement and injury prevention tips and videos 24 hours a day. HSS has developed a free helpful online tool called “Protect Your Game.” To access and share this injury prevention portal visit: www.hss.edu/hssgolf. “The website is a user-friendly way for HSS sports medicine and rehabilitation experts to help golfers wherever they are. It’s an opportunity for us to answer golfers’ questions about improving their game and preventing injuries,” says JeMe Cioppa-Mosca, PT, MBA, vice president of Rehabilitation.



Helping Future College and ^ Pro Athletes Stay in the Game

HSS and the global sports, fashion, and media company IMG have joined together to redefine sports rehabilitation and influence the way athletes everywhere prevent and recover from injury. As part of this relationship, HSS will operate IMG Academy’s sports therapy facility in Bradenton, Florida, which tends to the school’s nearly 900 student athletes, while also providing services to the thousands of youth, collegiate, professional and adult athletes who travel to the

campus annually to train or compete. Louis A. Shapiro, president and CEO of HSS says, “We are proud to provide our expertise to IMG’s global network of staff, clients, and athletes while continuing to advance research and innovation in athletic rehabilitation on the campus of IMG Academy.” HSS services will also be extended to the thousands of elite athletes, coaches, industry executives and sports organizations represented by IMG, as well as to its global staff of 3,500.

HSS Healthcare Research Institute Advances Research in Patient Care

HSS has established the HSS Healthcare Research Institute under the leadership of Associate Scientist Stephen Lyman, PhD, to serve as the academic home for clinical and population health research at HSS. HSS has long been a world leader in clinical, translational, and



Stephen Lyman, PhD

basic research in orthopedics and rheumatology. Its scientists and physicians currently publish more than 300 academic journal articles each year.

The HSS Healthcare Research Institute has several functions at the hospital including (1) managing its institutional patient registries that collect patient information including tissue samples, clinical observations, and self-reported outcomes; (2) serving as a resource to further elevate clinical research at HSS through career development and education; and (3) expanding HSS's population health research to have the greatest impact on the future of musculoskeletal care delivery.

"Our scientists and physicians have always been very productive in clinical research. The HSS Healthcare Research Institute will enhance our ability to leverage the enormous breadth of clinical material we have as the nation's largest provider of musculoskeletal healthcare," says Steven R. Goldring, MD, chief scientific officer.

With its state-of-the-art technology, large patient volume in its

specialty areas of orthopedics and rheumatology, and highly skilled "bench to bedside" teams of scientists and physicians, HSS can swiftly translate scientific breakthroughs into clinical treatments. The HSS Healthcare Research Institute is a tremendous resource in advancing musculoskeletal research and patient care.

"The world of healthcare research has moved beyond analyzing the results of a specific surgical procedure among a defined patient population," says Dr. Lyman. "We now need to ask 'how does the procedure compare to other treatments and what is its value in an era of increasingly scarce medical resources?' These new questions require different study designs and new areas of expertise and specialization. The HSS Healthcare Research Institute will enable our institution to continue to conduct clinical and population health research that brings the maximum

benefit to patients in need of musculoskeletal care."

The HSS Healthcare Research Institute faculty and staff is conducting new research, drawing upon HSS registries as well as state and national data sets.

Current research includes an analysis of how and why patients travel for joint replacement surgery; which vulnerable patients do not have access to centers of excellence; the likelihood and causes of weight loss following total knee replacement; and developing a new tool to measure recovery after ACL reconstruction surgery in athletes.

"HSS has unsurpassed access to data and expertise in musculoskeletal medicine. The HSS Healthcare Research Institute ensures that HSS can leverage this data to really make a difference for patients going forward," says Thomas P. Sculco, MD, surgeon-in-chief. ●

Thomas P. Sculco, MD, Champions Planned Giving

After graduating from HSS's orthopedic residency program, Dr. Sculco joined its medical staff in 1977 and became Surgeon-in-Chief in 2003. His commitment to the growth and success of the Hospital is evident not only by his exceptional leadership, but also by his membership in the Hospital's legacy society, The Wilson Society, established for those who have named HSS in their estate planning.

A charter member, Dr. Sculco joined The Wilson Society in 1998 when he included a bequest to HSS in his will. "Bequests, along with other philanthropy, allow the Hospital to achieve its mission. And I believe its mission is not only to be the best musculoskeletal hospital in the country, but in the world," says Dr. Sculco.

Bequests, and other planned gifts, allow the Hospital to continue to provide the best patient care, educate future leaders in their fields, and conduct innovative, life-changing research. Planned gifts have created research chairs, enabled medical breakthroughs, and supported general funds.

"Our mission here is to globally impact what happens. I really believe that what we learn and improve here at HSS, in terms of how we take care of patients, we should disseminate to the world. Philanthropy allows us to have the funds to do the research to make the advances that will affect musculoskeletal care around the world." ●

AAOS Round-Up

HSS had a strong presence at the annual meeting of the American Academy of Orthopaedic Surgeons in New Orleans in March. More than 100 HSS physicians and health professionals attended, presenting compelling findings from more than 50 accepted studies. In addition to sharing their research on a wide range of topics, HSS physicians taught courses, moderated numerous panel discussions, and shared their insights at symposiums.

"The annual AAOS event is the world's largest meeting of orthopedic surgeons and allied health professionals," said Thomas P. Sculco, MD, HSS physician-in-chief. "The strong participation and enthusiasm of our physicians and scientists at this prestigious event underscores our role as a leader in evidence-based research, best practices and patient-centered care."

Weight and Joint Replacement

A study by Geoffrey Westrich, MD, director of research, Adult Reconstruction and Joint Replacement at HSS, focused on how weight change after knee or hip replacement affects outcomes. Dr. Westrich and



Carol Stark resumes her active lifestyle after a total knee replacement.

colleagues found that people who manage to lose excess weight do better in terms of function and activity level two years after surgery.

Investigators reviewed the records of almost 7,000 patients enrolled in the HSS Joint Replacement Registry. While many overweight patients have the

best intentions to lose weight after knee or hip replacement and some do achieve this goal, the study found that equal numbers of patients actually gain weight. However, the majority of patients maintained the same body mass index (BMI) two years after surgery.

"Our findings represent the largest study to date and the first report to present evidence that weight loss is associated with improved clinical outcomes in terms of function and activity level, while weight gain is associated with inferior outcomes," says Dr. Westrich. "As physicians, we should convey to our patients the importance of maintaining good health and an appropriate weight, and help them to achieve this goal."

EMG and Nerve Transfer

The spotlight was on the HSS Center for Brachial Plexus and Traumatic Nerve Injury when its research team presented a study on the role of electromyography (EMG) in nerve transfer surgery. EMG is used to objectively measure muscle and nerve function.

Joseph Schreiber, MD, and senior author Scott Wolfe, MD, director of the Center, reported that EMG determination of donor nerve quality can improve the outcome of nerve transfer surgery for patients with a brachial plexus injury. The brachial plexus is a network of nerves that extends from the spinal cord, under the collarbone and down the arm, and is responsible for controlling motion and sensation of the entire upper limb. Nerve transfers are performed to connect functioning portions of "donor" nerves to nerves that are so severely damaged that they cannot recover on their own.

"Our study found that pre-operative electromyography should be considered a critical component of the donor nerve selection process when planning brachial plexus nerve transfers," Dr. Wolfe says. "Traditional clinical measures of muscle strength are inadequate to predict which nerves will be sufficiently active to regenerate functional muscle activity." ●

To learn more, please visit www.hss.edu.

New York Giants Team Physicians on Caring for Their Patients



Hospital for Special Surgery has shared a relationship with the New York Giants for more than 30 years. Each football season, HSS physicians are on the sidelines treating the players. Caring for pro athletes gives these physicians valuable learning experiences that they bring back to their patients who are not professional athletes, but people who want to remain as active and healthy as possible.

“I think caring for professional athletes makes you a better doctor,” says Scott A. Rodeo, MD, co-chief of the Sports Medicine & Shoulder Service. “The professional athlete setting is optimal with all the

resources. So you learn from that and say ‘how can this translate to my average patient? What’s the optimal way for the weekend warrior to recover from the same injury?’”

Robert N. Hotchkiss, MD, director of research in the Hand & Upper Extremity Service says, “There are things we learn about from caring for pro athletes – recovery, speed of recovery, tolerance of a certain injury and its consequences – things you wouldn’t necessarily see in the general population.”

Treating professional athletes also gives physicians the opportunity to observe how injuries occur and evolve. During a game, doctors

examine a player moments after an injury occurs and then closely monitor its progression in the days and weeks to come. Physicians can review videotape of the point of injury, filmed from various angles, and obtain a greater understanding of how an injury happened. Understanding the injury’s precise mechanisms leads to specific treatments that allow players to recover seamlessly. The physicians then transfer these insights to the care of their other patients.

Surgeon-in-Chief Emeritus Russell F. Warren, MD, has been head team physician for the Giants since 1983. “One of the unique things about treating football players is that they will stress whatever you’ve repaired, so if you can get it to work on the field, it’s likely to work in a more recreational environment,” he says.

When a professional athlete returns to the field after recovering from an injury, fans are reminded that they, too, can return to all the activities they enjoy after being hurt. “With a post surgery treatment plan that includes physical therapy, most patients see phenomenal results, but usually not quite as quickly as the professional athletes often do,” says Bryan T. Kelly, MD, co-director of the Center for Hip Preservation. “Patients will come in and say ‘well, you operated on some professional athlete and he got back in a certain

time frame – why is it taking me twice as long?’ It can be challenging to explain that there are a lot of variables that affect the ability to return to play at a high level.”

The HSS team physicians say that their non-pro patients, who make up most of their practice, can often have improbable expectations because of what they see on television. Dr. Rodeo stresses to his patients that the professional athletes he treats have advantages when it comes to recovering from a musculoskeletal injury. “A pro athlete has a lot more time to devote to physical therapy, plus access to equipment and facilities. Taking care of themselves is what pro athletes do.”

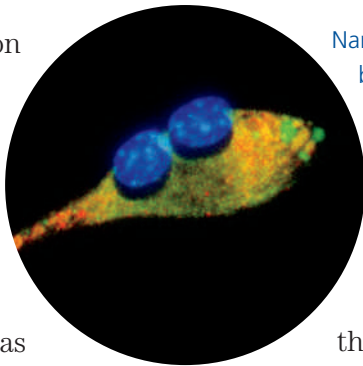
Dr. Hotchkiss says: “The interest of a professional player is always how quickly he can get back on the field, whereas if you’re a patient who works in an office, you want to get back quickly, but you don’t need to throw or catch.”

“Despite the differences between professional and recreational athletes, there isn’t a great difference in what physicians do,” says James J. Kinderknecht, MD, team physician for primary care sports medicine for the NY Giants. “Most of my patients want to return to 100 percent.” ●

Watch a follow-up video at www.hssonthemove.com.

At the Nexus of Research and Clinical Care continued from page 1

fracture site. Medication can be directly injected into the fracture site, but only if the exact location of the fracture can be readily detected by touch or by using imaging techniques such as ultrasound. Deep fractures



Nanoparticles containing bone-inducing agents can be delivered to cells at fracture sites, avoiding the need for surgery. Picture of cell after nanoparticle (green dots) uptake.

The team is now in the process of refining the technique using simvastatin and testing other drugs with other types of nanoparticles. Dr. Daluiski credits his collaboration with his mentors for much of the project’s progress: “I couldn’t ask for a better team.”

Seeking a Solution for Scleroderma

Scleroderma is a rare autoimmune connective tissue disorder that can affect multiple organs including the musculoskeletal system, skin, heart, lung, kidneys, and the gastrointestinal tract.

“Of all the conditions we see in rheumatology, scleroderma has the highest rate of morbidity and mortality,” says rheumatologist Jessica K. Gordon, MD. “Patients have an increased risk of death due to internal organ manifestations of the disease. There are currently not many universally effective treatments. We can definitely improve quality of life, but there is no cure.”

of the pelvis or the spine, which are common in older patients, present a major hurdle. “We can’t easily get there with an injection,” says Dr. Daluiski. To solve this problem, the research team has turned to innovations in nanotechnology – tiny, microscopic particles called nanoparticles – to explore ways of delivering the bone-healing drugs to the deepest fractures. “We find a vein, the particle is injected intravenously, it circulates safely through the bloodstream and then targets the fracture, where it is filtered by the fracture site and delivers the drug to the target cells.”

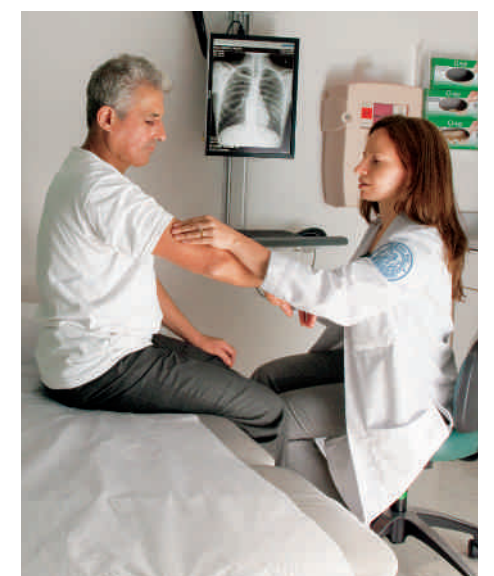
The technique has been used for cancer treatment, but never before for fracture healing. “We’ve been using the medication simvastatin, a cholesterol-lowering drug that also, curiously, has bone healing properties,” says Dr. Daluiski. “This delivery method lets us target the fracture with high doses that would otherwise be toxic to the body.”

A Kellen Award recipient, Dr. Gordon collaborates with senior scientists Mary K. Crow, MD, physician-in-chief and Benjamin M. Rosen Chair in Immunology and Inflammation Research, and Robert Spiera, MD, director of the Vasculitis and Scleroderma Program, to investigate new medications for scleroderma. Using biological samples from ongoing clinical studies at HSS, the team seeks to determine which patients will benefit the most from different kinds of therapies. The funding supports the study of the use of molecular analysis to search for biomarkers for disease diagnosis, identify the disease mechanisms and predict the response to treatments. The scientists extract RNA from tissue samples and measure levels of gene expression on microarray gene-chips. “With just a little drop of RNA you can measure large numbers of genes,” says Dr. Gordon. “With so much data, it allows us to test many hypotheses at one time.”

With IRB approval, Dr. Gordon and her team also run clinical trials of existing medications. The goal of Dr. Gordon’s research is to enable rheumatologists to quickly determine which therapy will work best for each specific patient with scleroderma. This is called “personalized medicine,” which is also a

priority of the David Z. Rosensweig Genomics Research Center at HSS.

Preliminary results show that scleroderma patients who responded to a drug called nilotinib had different changes in their gene expression than those who didn’t. “It’s early, but it’s conceivable that as we look at patients we could one



Jessica K. Gordon, MD, conducts research to improve treatment options for people with scleroderma.

day determine what kind of treatment is suited for each individual. These studies offer a lot of hope to patients,” says Dr. Gordon.

Dr. Gordon says of her mentors: “They are tremendously supportive. They taught me how to do clinical and translational research.” ●

Franck Barrat, PhD, gave a talk at Biogen Idec in Cambridge, MA, “TLR Recognition of Self Nucleic Acids in Acute and Chronic Inflammation.”

Carl Blobel, MD, PhD, Virginia F. and William R. Salomon Chair in Musculoskeletal Research, received a two-year Medical Research Program Discovery Award from the Department of Defense/Army to study “iRhom2, A New Target for Treatment of TNF-Alpha-Dependent Pathologies.”

Adele Boskey, PhD, Starr Chair in Mineralized Tissue Research, was a member of the NIH Research Core Center Grants (P30) Special Study Section.

Yen Hsun Chen, BS, received a new two-year TL1 Training Award from the NIH via the Weill Cornell Medical College Clinical and Translational Science Center for “Systemic Augmentation of Age-Related Impaired Fracture Healing.”

Chitra Dahia, PhD, was session moderator for “Mechanisms of Disc Degeneration: Genetics” at the Second International Philadelphia Spine Symposium.

Christopher Dy, MD, MSPH, received a new one-year Orthopaedic Research and Education Foundation Young Investigator Grant to study “The Effect of Health Care Supply on Hip Fracture Treatment: A Population-Based Approach to Identify New Opportunities for Quality Improvement.”

Doruk Erkan, MD, gave invited talks at the 14th International Congress on Antiphospholipid Antibodies & 4th Latin American Congress on Autoimmunity held in Rio de Janeiro, Brazil, on “Antiphospholipid Syndrome Treatment Trends Task Force Report & Recommendations” and “Future of Antiphospholipid Syndrome Treatment.”

Mary Goldring, PhD, Ira DeCamp Fellow in Musculoskeletal Genetics, was an invited speaker at the Annual American College of Rheumatology (ACR) Meeting, Basic Science Research Symposium held in San Diego, and gave a talk on “Epigenetics and Cartilage Biology.”

Steven Goldring, MD, Richard L. Menschel Research Chair, was a guest speaker at the 8th International Congress on Glucocorticoid-Induced

Osteoporosis held in Pisa, Italy; and keynote speaker at the 2nd Annual Musculoskeletal Repair and Regeneration Program at Albert Einstein College of Medicine and Montefiore Medical Center. Dr. Goldring presented the “Year in Review: Basic Science Lecture” at the Annual ACR Meeting. He served as chair of a National Institutes of Health Osteoimmunology and Aging Study Section.

Lionel Ivashkiv, MD, David H. Koch Chair in Arthritis and Tissue Degeneration, was an invited speaker at the Annual ACR Meeting on “Epigenetic Regulation of Inflammation in Rheumatic Diseases.”

George Kalliolias, MD, PhD, received a new one-year Arthritis National Research Foundation grant to study “TNF-alpha Modifies FLS Chromatin Landscape to Induce Disease State.”

Matthew Koff, PhD, and **Hollis Potter, MD**, Coleman Chair in Magnetic Resonance Imaging Research, received a new four-year award from the NIH/National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) to study “Magnetic Resonance Imaging as a Biomarker for Adverse Local Tissue Reaction.”

Michael Lockshin, MD, gave the Donato Alarcon-Segovia Memorial Lecture at the 14th International Congress on Antiphospholipid Antibodies & 4th Latin American Congress on Autoimmunity held in Rio de Janeiro.

Marios-Nikolaos Lykissas, MD, PhD; Alexander Aichmair, MD; Andrew Sama, MD; Alexander Hughes, MD; Darren Lebl, MD; Fadi Taher, MD; Frank Cammisa, MD; and Federico Girardi, MD, were given the Outstanding Paper Award for Surgical Science by *The Spine Journal* and North American Spine Society for their paper “Nerve Injury and Recovery after Lateral Lumbar Interbody Fusion with and without Bone Morpho-genetic Protein-2 Augmentation: A Cohort-Controlled Study.”

Theresa Lu, MD, PhD, received a new two-year pilot award from the Weill Cornell Medical College Clinical and Translational Science Center (CTSC) to study “Targeting Dendritic Cells in Fibrosis”; and a new three-year grant from the Alliance for Lupus Research

to study “Targeting a Dendritic Cell-Stromal Axis in Lupus.” Dr. Lu also gave a talk at the 13th International Workshop on Scleroderma Research.

Yan Ma, PhD, received a new three-year research award from the Agency for Healthcare Research and Quality to study “Effects of Missing Data Strategies on Disparities Research Results in Healthcare Cost & Utilization Project (HCUP) State Inpatient Databases (SID).”

Robert G. Marx, MD, edited the textbook *Revision ACL Reconstruction: Indications and Technique*.

Jordan D. Metz, MD, authored the book *The Exercise Cure*.

Alessandra Pernis, MD, Peter Jay Sharp Chair in Lupus Research, received a new two-year Rheumatology Research Foundation Disease Targeted Research Grant from the American College of Rheumatology to study “Smoking-induced Pathways in RA Pathogenesis” and a new three-year award from the Leukemia and Lymphoma Society for “Novel Signaling Pathways in DLBCL.”

Hollis Potter, MD, Scott Rodeo, MD; Steven Goldring, MD; Mary Goldring, PhD; and Matthew Koff, PhD, received a new one-year \$1 million award from the Arthritis Foundation in collaboration with the University of California, San Francisco and Mayo Clinic for “A Multi-Center Feasibility Trial Establishing Imaging and Biochemical Technologies as Measures of Knee Cartilage Composition Following Acute ACL Injury.” Dr. Potter also participated in a National Institute of Arthritis and Musculoskeletal and Skin Diseases long-range planning session.

Cathleen Raggio, MD, was an invited speaker at the Osteogenesis Imperfecta Basic Science meeting.

Scott Rodeo, MD, received a new one-year research grant from the Arthroscopy Association of North America to study “Cell-Based Biological Repair Approach for Partial Meniscectomy.”

Jane Salmon, MD, Collette Kean Research Chair, gave a plenary presentation at the 14th International Congress on Antiphospholipid Antibodies & 4th Latin American Congress on Autoimmunity held in Rio de Janeiro; and a plenary talk entitled

“Angiogenic Factor Dysregulation and Risk of Adverse Pregnancy Outcome in Lupus Pregnancies” at the Annual ACR Meeting. Dr. Salmon was also Rheumatoid Arthritis Investigational Network Visiting Professor at the University of Nebraska Medical Center.

Louis A. Shapiro has been appointed Board Chairman for the Greater New York Hospital Association (GNYHA).

Peter Torzilli, PhD, was a member of the Advisory Council to the Department of Biomedical Engineering at Rensselaer Polytechnic Institute in Troy, NY, and a member of the Orthopaedic & Rehabilitation Devices Panel, Center for Devices and Radiological Health, Food and Drug Administration, Department of Health & Human Services in Gaithersburg, MD.

Timothy Wright, PhD, F.M. Kirby Chair in Orthopaedic Biomechanics, served on the Education Committee for the Knee Society helping to develop the 2013 Members Scientific Meeting held in Toronto, Canada. Dr. Wright also organized and participated in the HSS-Chinese Orthopaedic Association (COA) workshop on total knee replacement. The workshop was held in Beijing, China, at the annual meeting of the COA and was chaired by **Thomas Sculco, MD**. Other HSS participants included **Mathias Bostrom, MD; Joseph Lipman, MS; Edwin Su, MD; and Russell Windsor, MD**.

Phillip Williams, MD, received a new one-year OREF Resident Clinician Scientist Training Grant to study “Scapular Kinematics of Healthy Controls and Individuals with Asymptomatic Rotator Cuff Tears.” ●

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HSS Recognized by Press Ganey

Hospital for Special Surgery has received several major honors from the independent hospital surveyor Press Ganey®, including the Hospital’s first Guardian of Excellence Award in 2013. The Guardian of Excellence Award honors organizations that have reached the 95th percentile for patient satisfaction, employee engagement, physician engagement, or clinical quality performance based on one year of data. HSS’s performance stands out among hospitals nationwide in the area of inpatient services.

For the past 23 consecutive quarters, HSS has achieved the 99th percentile ranking on “likelihood of patients recommending HSS to friends and family” when benchmarked against other high performing hospitals nationwide. “Likelihood to recommend” is a leading indicator of patient satisfaction. Patient satisfaction is vital in today’s increasingly consumer-driven environment, in which patients make choices about where to receive healthcare based on many sources of information, including word of mouth. HSS also continues to achieve in the 99th percentile for overall rating of care.

“It is an honor to be recognized with this award,” says Louis A. Shapiro, president and CEO. “Our

patients are at the center of all we do at HSS and this award is a direct reflection of the high-quality care that members of our staff provide to each patient who walks through our doors.”

HSS was also featured in two articles in the November/December 2013 issue of *Press Ganey Partners* magazine, in which Mr. Shapiro and Physician-in-Chief Mary K. Crow, MD, offered insight into how HSS provides our patients with the highest level of care through innovation and continuous improvement, regardless of challenges posed by the external environment. ●

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