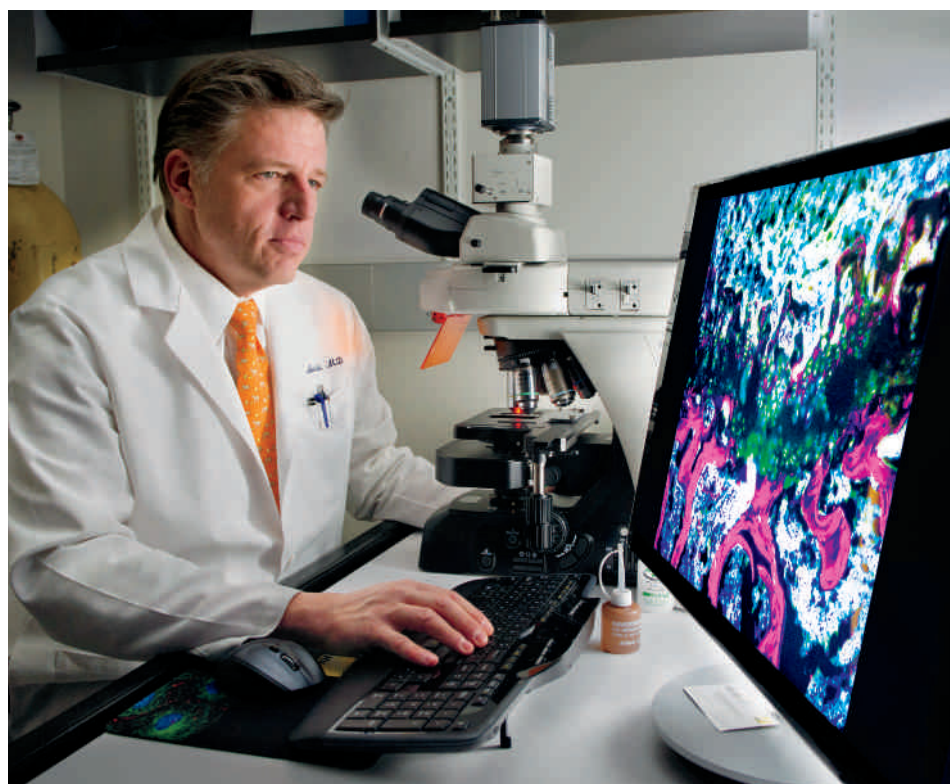


Discovery to Recovery

CLINICAL AND RESEARCH HIGHLIGHTS AT HSS | SPRING 2014

HOSPITAL
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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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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.

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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.”

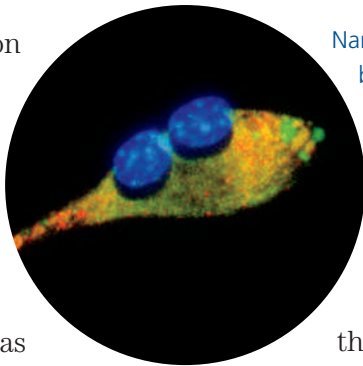
Dr. Hotchkiss says: “The interest of a professional player is always how quickly he can get back on the field, whereas if you’re a patient who works in an office, you want to get back quickly, but you don’t need to throw or catch.”

“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.”

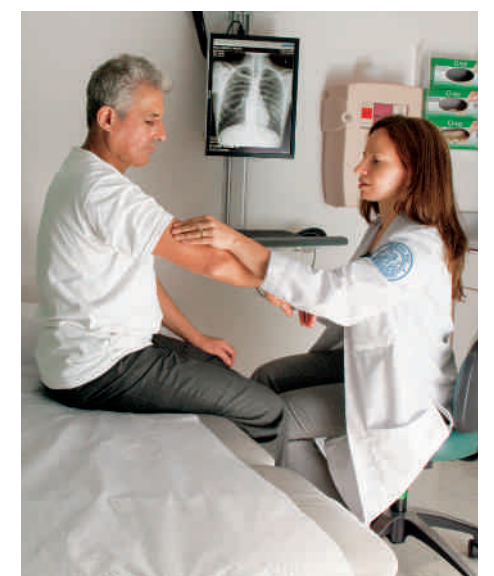
The technique has been used for cancer treatment, but never before for fracture healing. “We’ve been using the medication simvastatin, a cholesterol-lowering drug that also, curiously, has bone healing properties,” says Dr. Daluiski. “This delivery method lets us target the fracture with high doses that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