University of Maryland Medicine

FOR PHYSICIANS
**SUMMER 2019**

# University of Maryland Medicine ROUNDS

Clinical and Research Updates
from the *University of Maryland School of Medicine* and the *University of Maryland Medical Center*

## In this ISSUE



## Hypertrophic Cardiomyopathy Program is Maryland's Only Center of Excellence for the Disease

**The patient was in his 40s and suffering from hypertrophic cardiomyopathy (HCM) and ventricular tachycardia (VT). He complained that his implantable defibrillator repeatedly shocked him and that his medications made him feel lousy. His cardiologist referred him to the University of Maryland Heart and Vascular Center.**

At the UM Heart and Vascular Center, the patient was scheduled for VT ablation, but it could not be carried out due to a left ventricular thrombus. Instead, a UM thoracic surgeon performed a cardiac sympathectomy — an antiadrenergic intervention that prevents the heart from being over-stimulated. The patient has been stable without recurrent VT event or ICD shocks since the intervention and is tolerating his current medical regimen.

In the meantime, a cardiologist with the UM Hypertrophic Cardiomyopathy Program co-manages the patient's HCM with the referring cardiologist, and the electrophysiology team treats his arrhythmia. The patient's primary care provider is also continuously updated on the patient's progress, and consulted by the cardiologists as needed.

## KEY POINTS

- Hypertrophic cardiomyopathy (HCM) can show up in many different ways and doesn't always conform to the textbook descriptions.
- HCM can be complex to diagnose and treat, requiring expertise in multiple cardiology subspecialties.
- The University of Maryland HCM Program comprises general cardiologists, electrophysiologists, echocardiography specialists, interventional cardiologists, heart-failure specialists, pediatric and congenital cardiologists, radiologists, geneticists, gynecologists and cardiothoracic surgeons.
- Surgeries and procedures offered at UMMC include heart transplantation, device implantation, arrhythmia evaluation and treatment, surgical myectomy and alcohol septal ablation.
- Patients are offered genetic counseling and nutrition counseling in the HCM program.

***"Hypertrophic cardiomyopathy can appear in many different ways and it doesn't always conform to the textbook description."***

"The HCM Program is a comprehensive resource that a referring cardiologist can turn to," says **Libin Wang,** MD, PhD, assistant professor of medicine at the University of Maryland School of Medicine (UMSOM) and director of the HCM Program. "Together, we work with the referring cardiologist to co-manage the patient for the long term. We can provide the range of disciplines needed, from the sophisticated imaging, the genetic testing and family screening."

HCM can be complex to diagnose and treat, requiring expertise in multiple fields and a team approach. The HCM Program at UMMC comprises general cardiologists, echocardiography specialists, interventional cardiologists, electrophysiologists, heart-failure specialists, pediatric and congenital cardiologists, radiologists, geneticists, gynecologists and cardiothoracic surgeons. The program also has a social worker to help patients with issues such as insurance, as well as nutritionists to consult with patients who are unable to exercise.

"Hypertrophic cardiomyopathy can appear in many different ways and it doesn't always conform to the textbook description," says electrophysiologist **Vincent See,** MD, assistant professor of medicine and co-director of the HCM Program. "Because of this, patients can sometimes benefit from a fresh, big-picture look. The resources here allow us to look at a case more carefully and do things in a comprehensive way that leads to better diagnosis and management."

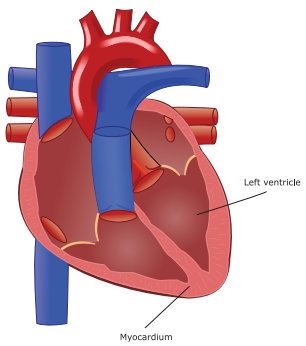
Dr. Wang and Dr. See have collaborated studying HCM genetics since their postdoctoral research in cardiovascular genetics at Harvard Medical School and Howard Hughes Medical Institute more than 10 years ago.

For the patient, HCM can be a traumatic diagnosis, says **Kim Reck,** CRNP, cardiovascular disease nurse practitioner.

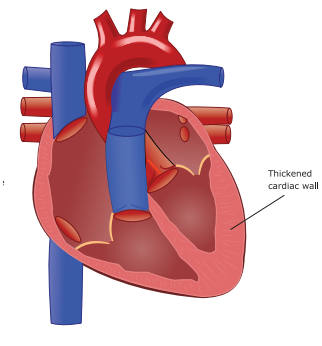
HCM will have all sorts of lifestyle implications. Patients will need to know about medications, physical activity and even childbearing and how to know if their children might also have the disease.

"It is a disease that can take your life in an instant," Reck says. "Some people run away from it and others do everything they can to manage it. We not only have clinical expertise, but we also help people navigate the losses that come with it."

**Normal Heart**




**Hypertrophic Cardiomyopathy**




**PROGRAM OFFERINGS**

Created in 2017, the Hypertrophic Cardiomyopathy Program was

designated a Center of Excellence in 2018 by the Hypertrophic Cardiomyopathy Association.

Criteria for the designation include expertise, volume, research quality, patient communication and responsiveness, patient and medical education, and facilities. It's the only center with this distinction in Maryland and one of about three dozen in the country. Since the launch of the program at UMMC, its patient population has grown six-fold – clearly demonstrating the need for it among patients and their primary cardiologists.

The program offers a wide range of treatments, beginning with medication management. The most commonly prescribed medications are beta blockers and calcium channel blockers. In selected cases, an antiarrhythmic medication called disopyramide can be used. Diuretics can help in certain patients.

The program also offers the following procedures:

- Device implantation, specifically pacemakers and implantable cardioverter-defibrillators (ICDs)
- Arrhythmia evaluation and treatment including risk assessment, drug therapy, and ablation procedures for sudden cardiac death, ventricular arrhythmias, and atrial fibrillation.
- Surgical myectomy, a procedure in which a small amount of the septal wall is removed to widen the outflow tract from the left ventricle to the aorta. If the thickened muscle fibers have affected the mitral valve's function, a mitral valve repair may be performed concurrently.
- Alcohol septal ablation
- Heart transplantation
- Genetic counseling

Parents who carry a genetic mutation for HCM have a 50% chance of passing the gene on to their children, so the program has a robust genetic counseling component. Patients and family members considering testing meet with a genetic counselor who can provide risk assessment, education and support. If the person decides to follow through with testing, a saliva sample is sent to a lab and screened for the genes known to cause HCM.

"About 65% of the time, we can find the pathogenic variant and use that to establish the genetic diagnosis, giving us a tool to screen families," says Dr. Wang. "Any first-degree relative could benefit from screening, and we strongly recommend this. But there are people who may not want to know. Our team helps personalize this informed decision-making process for individual patients and family members to help them each make their own decisions."

**REFERRALS**

Comprehensive evaluation of the HCM patients often starts with a thorough

*Libin Wang, MD*

*Vincent See, MD*

*Kim Reck, CRNP*

***"About 65% of the time, we can find the pathogenic variant and use that to establish the genetic diagnosis, giving us a tool to screen families," says Dr. Wang.***

medical and family history, non-invasive testing that includes cardiac MRI, stress echocardiography, and rhythm monitoring, and genetic counseling and testing if the patient is amenable.

One of the biggest concerns with hypertrophic cardiomyopathy is sudden cardiac death. HCM is the most common cause of sudden cardiac death in young people.

"Identifying people at risk, to prevent sudden cardiac death, is essential, as the first event is usually fatal," says Dr. See.

Wang is an expert at risk stratification. If patients' genetic profiles and family histories indicate they're at high risk for sudden cardiac death, they've had an episode of syncope, and their MRI shows significant fibrosis, or scarring in the heart muscle, they may be candidates for ICD implantation.

"This can be a very difficult decision for a young person to make because you're asking them to refrain from vigorous exercise and competitive sports," says Reck. "The ICD will have all sorts of implications: What happens if my device fires when I am driving? Can I participate in activities that strain my heart without worrying about being shocked? Can I have children?"

"HCM can require a lot of coordination," says Dr. See, "and having a multidisciplinary team under one roof is a great advantage while we partner with patients and their referring cardiologists."

## CLINICAL TRIAL FOR A POTENTIAL HCM MEDICATION

There are no US Food and Drug Administration-approved therapeutic products that can alter the disease process of hypertrophic cardiomyopathy (HCM). Medications such as beta blockers and calcium channel blockers are commonly prescribed to alleviate symptoms, but they do not address the etiology of the disease.

That could change if a drug under investigation continues to demonstrate effectiveness.

The UM Hypertrophic Cardiomyopathy Program is the clinical site of two trials for a drug called mavacamten (formerly MYK 461). One trial targets obstructive HCM and the other trial targets nonobstructive HCM. In the nonobstructive version of the disease, the heart walls are thickened, but the blood flow out of the left ventricle is not obstructed, unlike in the obstructive type.

According to MyoKardia, the biotech company that developed mavacamten, the drug inhibits "the excessive myosin-actin crossbridge formation that underlies HCM's characteristic excessive contractility, left ventricular hypertrophy and reduced ventricular compliance."

**Libin Wang,** MD, PhD, assistant professor of medicine at the University of Maryland School of Medicine and director of the HCM Program, says patient enrollment is ongoing and that the drug could be a game-changer for some patients.

"This is a new option for people who are still symptomatic, despite taking medication or undergoing a procedure like a myectomy," Dr. Wang says. "It's the only drug that has been shown in animal models to slow down the progression of the disease."

# Task Force Leads Multi-Pronged Approach to Manage Pain, Treat Addiction and Prevent Iatrogenic Opioid Dependence

**Opioid addiction often begins with misuse of prescribed opioids, yet physicians, nurse practitioners and others who prescribe opioids must consider how best to manage their patients who are in pain.**

Faculty and staff at the University of Maryland Medical Center (UMMC) are educating prescribers here and statewide about responsible opioid prescribing and pain management. An internal task force monitors prescribing of perioperative opioids, with the goal of preventing iatrogenic addiction while still managing postsurgical pain.

To better support clinicians, the UMMC Opioid Stewardship Task Force was first established in 2017 by **Janine L. Good,** MD, associate professor of neurology at the UM School of Medicine and chief medical officer at UMMC Midtown Campus. The task force works with Baltimore city officials and counterparts from other hospitals to adopt multi-modal approaches to pain management that reduce or eliminate the need for prescribing opioids.

Meanwhile, UMMC and its affiliates provide medication-assisted treatment, clinical counseling and peer counseling to those who have substance use disorders.

The University of Maryland Center for Addiction Medicine, based at UMMC's midtown campus, offers medication-assisted addiction treatment and counseling, as well as clinics that include primary care and infectious disease specialists.

**ALARMING OVERDOSE STATISTICS IN MARYLAND**

The opioid crisis touches every part of the state. Maryland has one of the five highest opioid-related death rates in the US.

Harford County saw a 173% increase in opioid related deaths from 2013 to 2017, and Baltimore City saw a 69% increase. Similar statistics are found in counties across Maryland. Opioid overdose is among the state's top four causes of death.

UMMC has taken many steps to combat Maryland's opioid epidemic, all under the coordination of the multidisciplinary Opioid Stewardship Task Force.

**LOOKING INWARD**

The task force at the downtown campus is currently chaired by **Christopher J. Welsh,** MD, associate professor of psychiatry and medical director of outpatient addiction treatment services, and **R. Gentry Wilkerson,** MD, assistant professor of emergency medicine. The task force at the midtown campus is chaired by **Zachary Dezman,** MD, assistant professor of emergency medicine.

"We produce a monthly report that shows providers what medications they're prescribing. If someone utilizes opiates more than their colleagues, we address their prescribing practices and work to cut down on their opiate prescribing," Dr. Welsh says. "We're increasing our training of all clinicians across the board."

To bolster this effort, the task force has streamlined processes so doctors can better understand patients' opioid histories, and to aid staff in the emergency department (ED) at both

*Janine L. Good, MD*

*Marian Currens, CRNP*

UMMC campuses (downtown and midtown).

"We screen all ED patients for their risk of opioid abuse disorder," Dr. Good says. "If they come into the ED with an opioid overdose, we engage a trained peer recovery coach to intervene and guide them to treatment. These are people in recovery themselves who engage with

> *"We're increasing our training of all clinicians across the board."*

patients in the ED and, based on the patient's risk, encourage them to enter a treatment program."

The peer recovery program has seen great success. By December 2018, UMMC had referred 4,480 patients to treatment.

The pipeline from the ED to treatment engages patients when they need help the most. Unlike many other US hospitals, UMMC physicians can prescribe buprenorphine in the ED.

**INFORMING STATE POLICY**

The task force works to inform state policy on patient care and pain management.

"We are at the table advocating on behalf of the complex pain patients we treat at our hospitals and on behalf of our doctors caring for patients," Dr. Good says.

The task force collaborated with the Baltimore City Health Department's formation of a ranking system to measure each hospital's capability and resources to combat the opioid epidemic. UMMC's campuses are the only two hospitals in the city that were awarded top ranking.

"We are leaders in the state for dealing with opioids," Dr. Welsh says.

**A MEDICAL APPROACH TO ADDICTION**

The stigma surrounding addiction continues to be an obstacle to treatment that could reduce the death rate.

"People are ashamed. Sometimes they refuse evidence-based treatments because they are pressured by people in their lives to avoid taking the medications that can help," says **Eric Weintraub,** MD, associate professor of psychiatry and director of the Division of Addiction Research and Treatment at the School of Medicine.

"The medical model that we follow affords more respect for our patients' medical issues and diminishes some of the stigma," says **Marian Currens,** CRNP, director of the UM Center for Addiction Medicine.

Aside from counseling services, the center offers some specialized clinics, such as one that partners with the UM Institute of Human Virology to treat infectious diseases such as HIV and

*Dr. El-Metwally with her patient in the NICU*

*A recent nationwide survey found that nearly half of adults who live in rural communities have been directly affected by opioid addiction. These communities often have a severe shortage of doctors and clinics willing and able to provide addiction treatment.*

hepatitis C. The clinics have recently expanded to offer primary care and a drop-in center that provides a safe place for clients to relax, with snacks and games. Another clinic focuses on the needs of female patients and pregnant women with opioid use disorders.

"The clinic has a play center where women can leave their children while they're in counseling. It removes a barrier to treatment," Dr. Welsh says.

**NEONATAL ABSTINENCE SYNDROME IN THE NICU**

**Dina El-Metwally,** MB, BCh, PhD, associate professor of pediatrics and medical director of the Neonatal Intensive Care Unit at the University of Maryland Children's Hospital, treats newborns withdrawing from opioids. The mothers include those who may have been taking prescribed opioids to manage pain. Dr. El-Metwally, along with the NICU nurses and volunteer "cuddlers" manage these infants with careful monitoring and kangaroo care, while social workers and addiction specialists work with their mothers to begin recovery or taper off their prescribed opioids.

**MULTI-MODAL PERIOPERATIVE ANALGESIA AND ANESTHESIA**

For patients who are susceptible to drug addiction, reducing or eliminating perioperative opioids can help prevent them from relapsing into drug abuse,

## PREVENTING ADDICTION: ALTERNATIVES FOR CHILDREN IN PAIN CAN LIMIT OPIOID EXPOSURE

**Joshua M. Abzug,** MD, associate professor of orthopaedics and pediatrics and a pediatric orthopaedic surgeon at the University of Maryland Children's Hospital, worked with his colleagues at the Pediatric Orthopaedic Society of North America on groundbreaking research to explore the opioid crisis' role in pediatric orthopaedics. The review he co-authored was published in the *Journal of Pediatric Orthopaedics* in 2018 and continues to provide strategies for pain management, education, research and advocacy.[1]

Research shows that nearly 1 in 4 high school seniors has been exposed to prescription opioids. Unfortunately, even legitimate opioid prescriptions increase a child's risk of future misuse. In fact, 80% of high school seniors who reported recreational opioid use once had legitimate prescriptions.[2]

To limit opioid prescribing, Dr. Abzug and his colleagues looked at alternative pain relief methods. For example, administering gabapentin before surgery lowered children's overall narcotic consumption afterward. Over-the-counter pain relievers, such as acetaminophen, were enough to relieve postsurgical pain.

*Joshua M. Abzug, MD*

**REFERENCES**

1. Raney EM, van Bosse HJP, Shea KG; Abzug JM, Schwend RM. Current State of the Opioid Epidemic as it Pertains to Pediatric Orthopaedics From the *Advocacy Committee of the Pediatric Orthopaedic Society of North America*

2. McCabe SE, West BT, Teter CJ, Boyd CJ. Medical and Nonmedical Use of Prescription Opioids Among High School Seniors in the United States. *Arch Pediatr Adolesc Med.* 2012;166(9):797–802. doi:10.1001/archpediatrics.2012.85

while still managing their injury and pain. Anesthesiologists at the R Adams Cowley Shock Trauma Center at UMMC are able to quickly address the intense pain from traumatic injury by administering a regional nerve block.

Regional nerve blocks are not new, but the more recent innovation of using ultrasound to guide placement of the injected anesthetic allows much faster and more accurate administration without the risk of damaging a nerve. Injecting anesthetic preparations directly in the area of injury can reduce or even eliminate the need to administer opioid medications.

**TELEMEDICINE TREATS ADDICTION IN RURAL COMMUNITIES**

A recent nationwide survey found that nearly half of adults who live in rural communities have been directly affected by opioid addiction. These communities often have a severe shortage of doctors and clinics willing and able to provide addiction treatment. University of Maryland School of Medicine psychiatrists are now using telemedicine — live videoconferencing — to provide addiction treatment to patients throughout rural Maryland. The program is led by Dr. Weintraub and Dr. Welsh. The project has treated hundreds of patients at four sites, and researchers are working to expand to other states with rampant addiction in rural areas. "This is a deadly epidemic," Dr. Weintraub says, needing multiple approaches to end it. "It cuts across all segments of society. We all need to pull together to combat this disease."

**To refer a patient to the UM Center for Addiction Medicine, call 410-225-8240.** *Physicians may also give this phone number to patients to call.*

*Dr. Welsh (left) and Dr. Weintraub*

## KEY POINTS

- To better support clinicians, UMMC established its Opioid Stewardship Task Force in 2017.
- The University of Maryland Center for Addiction Medicine, based at the midtown campus, offers medication-assisted addiction treatment and counseling, as well as clinics that include primary care and infectious disease specialists.
- Patients who come to the ED at both UMMC campuses are screened for problematic substance use and offered a trained peer recovery coach to guide them to long-term treatment.
- The Neonatal Intensive Care Unit at the University of Maryland Children's Hospital treats newborns withdrawing from opioids. The mothers include those who may have been taking prescribed opioids to manage pain.
- For surgical patients who are susceptible to drug addiction, multi-modal analgesia and anesthesia, such as a regional nerve block, can reduce or eliminate opioids, thus preventing them from relapsing into drug abuse.
- University of Maryland School of Medicine psychiatrists are now using telemedicine — live videoconferencing — to provide addiction treatment to patients throughout rural Maryland.

***US News & World Report* Ranks UMMC No. 10 for Ear, Nose and Throat and No. 16 for Cancer** ***(See p. 15)***

# Unlocking the Secrets of Cellular Lifespan

**ENT and biochemical researchers at University of Maryland School of Medicine are studying the ZSCAN4 gene, hoping to target cancer cells but also to advance regenerative medicine on a larger scale.**

A short time ago, it was a mystery why some cells – including cancer cells – have a seemingly perpetual lifespan, while most of the body's cells age and eventually die.

**Michal Zalzman,** PhD, assistant professor of biochemistry and molecular biology at the University of Maryland School of Medicine (UMSOM), is a stem cell research pioneer who discovered that the ZSCAN4 gene allowed cells to evade the aging process. She now leads a team of researchers in the Department of Otorhinolaryngology-Head and Neck Surgery studying cell immortality.

Greater knowledge of how the ZSCAN4 mechanism works could transform two areas of medicine: cancer treatment and regeneration of healthy tissues.

Before coming to UMSOM, Dr. Zalzman, as a researcher for the National Institutes of Health (NIH), discovered the function of the gene ZSCAN4 that imbues mouse embryonic stem cells with the ability to reconstruct and lengthen their telomeres. In effect, ZSCAN4 renders stem cells immortal. Her seminal research in this area was published in an article in *Nature* in 2010.[1]

Since coming to UMMC in 2013, Dr. Zalzman has partnered in some of her research with **Rodney Taylor,** MD, MSPH, associate professor and interim chair of the Department of Otorhinolaryngology-Head and Neck Surgery. Dr. Taylor already had a strong interest in cancer and cancer-related surgical defects that could be addressed using regenerative medicine and partnered with Dr. Zalzman to develop protocols for isolating mesenchymal stem cells found abundantly in tonsillar tissue.

Dr. Taylor and his colleagues surgically treat high volumes of head and neck tumors – the most in Maryland – including cancers that are usually very treatable but too often result in poor cosmesis or cause sequelae such as dysphagia. Accordingly, UM Department of Otorhinolaryngology surgeons, physicians and researchers concentrate on advancing treatments that can lead to better cosmetic outcomes and quality of life. In the past few years, the department has risen to No. 14 in the nation in NIH funding for otorhinolaryngology research.

Even when they are not conducting research into better treatments, University of Maryland ENT surgeons seek to offer patients minimally invasive head and neck surgery whenever possible so patients can experience easier recoveries with less trauma. Their high surgical volumes and good patient outcomes have propelled the University of Maryland Medical Center (UMMC) to the No. 10 spot on the *U.S. News & World Report* Best Hospitals list for Ear, Nose & Throat, higher than any other medical center in Maryland.

## THE MECHANICS OF CELL AGING

While the body's cells divide to replenish tissues, the telomeres at the end of their chromosomes act as a biological clock.

*Michal Zalzman, PhD*

*Rodney Taylor, MD, MSPH*

Telomeres contain repeated sequences of DNA covered with proteins that protect the integrity of the genetic code and gradually become progressively shorter until they are too diminished to permit further cellular division. This process is known as cellular aging or senescence. As people age, senescent cells accumulate in their tissues and begin to predominate, leading to age-related disorders and diseases. However, stem cells and cancer cells can activate mechanisms to evade this process.

## FINDING THE KEY TO AN ENDLESS CELLULAR LIFESPAN

"ZSCAN4 may be the trigger commonly used during the early stages of embryogenesis and by embryonic stem cells to 'reset' the clock, rebuild telomeres and reverse the effects of cell aging," says Dr. Zalzman, who holds a secondary research appointment in otorhinolaryngology.

Given that cancer cells have a similar ability to avert the process of cell aging, Dr. Zalzman intuited that they might also express ZSCAN4. She discussed this possibility with Dr. Taylor, and the two collaborated on discovering the mechanism that gives head and neck squamous cell carcinoma cells their indefinite replicative lifespan.

In a paper currently under peer review, Dr. Zalzman and Dr. Taylor show that like stem cells, cancer cells utilize the ZSCAN4 gene to avoid cell aging, and ergo apoptosis. (At senescence, cells develop immunogenic susceptibility and can be readily targeted and destroyed by T cells.) Armed with this knowledge, the research team is now laying the groundwork for targeting ZSCAN4 in cancer cells to develop a new drug approach that takes aim at cancer immortality.

**HARNESSING THE POWER OF ZSCAN4 FOR POTENTIAL REGENERATIVE MEDICINE**

The work on ZSCAN4 at the University of Maryland also has implications for regenerative medicine. Using small amounts of tonsillar tissue procured by biopsy following tonsillectomies performed at UMMC, Dr. Taylor and Dr. Zalzman have generated mesenchymal stem cell (MSC) lines from adults.[2] Their team has been able to differentiate these tonsillar MSCs into bone, cartilage and fat cells, including the progenitors of neurons.

"Mesenchymal stem cells tend to live along blood vessels, so the tonsils, which are very vascularized, are a rich source of them," Dr. Taylor says. He points out that most patients do not have access to their umbilical cord blood – which, along with bone marrow, is another excellent source of MSCs. However, if they still have their tonsils, they carry with them a ready and rich source from which their stem cells can be harvested through an in-office biopsy. From the modest quantities of less than a gram of tonsillar tissue collected, University of Maryland researchers were able to cultivate in vitro at least 50 million MSCs from each of their research subjects.

There are potential pros and cons to using MSCs for regenerative purposes. The benefits are that MSCs are more ethical and feasible to source and do not lead to teratoma tumors, as other types of stem cells can. However, like normal cells, MSCs are susceptible to telomere shortening, and therefore they eventually lose their function and potential for differentiation as patients age.

Dr. Zalzman is the principal investigator of R01 and R21 NIH grants that will overcome this obstacle through the application of ZSCAN4 to MSCs so that they will repair and lengthen their telomeres. Specifically, for the R01 grant, Dr. Zalzman and Dr. Taylor's team will harness ZSCAN4 so that autologous bone grafts can be created. Without the application of ZSCAN4, MSCs can generate bone tissue grafts of only a few millimeters in size, but the team's preliminary lab work has demonstrated that ZSCAN4 looks promising in permitting MSCs to develop into larger, clinically useful bone grafts cultivated on 3D-printed scaffolds. The R21 grant is likewise exploring how ZSCAN4 might be applied to MSCs to treat Parkinson's disease.

While many other discoveries will need to be made by a concert of research teams before this highly innovative discovery can be applied clinically, Dr. Zalzman and Dr. Taylor's collaboration has shown that the easily procured source of tonsillar stem cells has promising potential for being harnessed to repair tissues damaged by injury or disease.

*Visit the UM Cancer Network Physician Briefs online at* **umm.edu/HeadNeckCancer** *to learn more about research at the UMSOM Department of Otorhinolaryngology as well as minimally invasive head, neck and skull base surgery at UMMC.*

**REFERENCES:**


1. Zalzman M et al. ZSCAN4 regulates telomere elongation and genomic stability in ES cells. *Nature.* 2010 Apr 8;464(7290):858-863.

2. Khatri R, Arad M, Ortlip T, Portney BA, Meltzer WA, Diaconu S, Silipino LE, Wang Y, Kaetzel DM, Taylor RJ, Zalzman M. Harvesting multipotent progenitor cells from a small sample of tonsillar biopsy for clinical applications. *Stem Cell Res Ther.* 2017 Jul 2;8(1):174.


*Dr. Taylor (far left) with Dr. Zalzman and members of her research laboratory.*

# Shoulder-Preservation Techniques for Rotator Cuff Tears in Active Adults

**For active middle-aged adults whose rotator cuff tears are beyond repair, but who are not candidates for joint replacement, shoulder-preserving techniques at University of Maryland Medical Center (UMMC) and University of Maryland Rehabilitation & Orthopaedic Institute include superior capsule reconstruction and trapezius transfer.**

Shoulder reconstructive surgeons **Syed Ashfaq Hasan**, MD, associate professor, and **Mohit Gilotra,** MD, assistant professor, both in the Department of Orthopaedics at the University of Maryland School of Medicine (UMSOM), use innovative techniques to repair massive rotator cuff tears in middle-aged, active adults. Although technically demanding, these breakthrough treatments help to preserve the shoulder for patients whose other options are limited and who might otherwise remain in pain and have limited shoulder function.

### IDEAL CANDIDATES FOR SPECIALIZED SHOULDER PRESERVATION TECHNIQUES

The ideal candidates for the surgery are young, active patients in their mid-40s to nearly age 60 who have a massive irreparable rotator cuff tear that is affecting their range of motion and function, but who still have a well-preserved joint — that is, a joint that is not arthritic.

"So it's not a huge group of patients who need this surgery," says Dr. Hasan, who also is chief of the Shoulder and Elbow Program in his department. "It's a relatively narrow indication but it also is a problem that is very difficult to treat."

### A UNIQUE MUSCLE-TENDON UNIT

The muscle-tendon unit of the rotator cuff is different from any other muscle-tendon unit in the body. It lives in a challenging environment, as it is found in a narrow space with bone above and bone below. It doesn't have a great blood supply. For those reasons, the muscle-tendon unit of the rotator cuff can tear spontaneously. Out of 100 people who are age 65 and have never had a day of shoulder pain in their life, 50% would show some evidence of rotator cuff tears in an MRI, even if they are not yet complaining of symptoms, so there are a significant number of tears that develop and can progress to causing symptoms.

Attempts to repair a chronic massive rotator cuff tear often don't succeed, because the muscle atrophy is irreversible once the tendon rips off the bone. Dr. Hasan gives his patients the following example: If you injure your leg and your leg is put in a cast for a month, the muscles will be atrophied once you remove the cast. When you move your knee and start physical therapy, the muscle will regain its normal bulk because the tendon is still attached.

What's different about a rotator cuff injury is that once the tendon tears away from the bone, the muscle of the rotator cuff is no longer feeling any resistance or pulling against anything, Dr. Hasan says. If the tendon remains torn and not attached to bone for an extended period, the muscle starts to atrophy. Even if the tendon is repaired, the atrophy in most cases is not reversible.

"Maybe you can technically fix the tear arthroscopically, but as I once heard a French colleague describe it in a meeting, it would be like putting new tires on a car with no motor," says Dr. Hasan. "That's where tendon transfer comes into place. The tendon transfer brings in a healthy thick muscle to power the shoulder so you are not just replacing the tendon, but the muscle itself. That's where the tendon transfer makes a huge impact."

*Syed Ashfaq Hasan, MD*

*Mohit Gilotra, MD*

### JOINT REPLACEMENT NOT OPTIMAL IN YOUNGER PATIENTS

The surgeons might do a shoulder joint replacement in a patient in their 60s who had a massive tear and an arthritic shoulder. However, patients in their 40s or 50s are not really candidates for a joint replacement because the artificial joint has a finite lifespan. The patient will require a revision at some point.

"If you can preserve the normal joint and preserve normal kinematics of the joint—

# A View from Within

These images, taken by Dr. Gilotra during surgery, illustrate an arthroscopic superior capsule reconstruction in a patient who was 57 years old. The patient is now 3 years post surgery, with an active lifestyle that includes yoga practice.

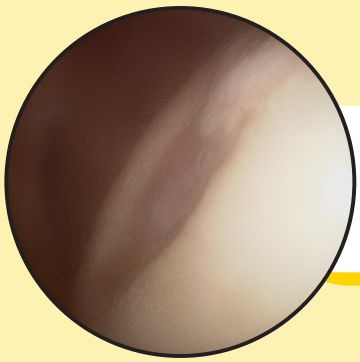


*Image 1: Cartilage wear from lack of cuff*

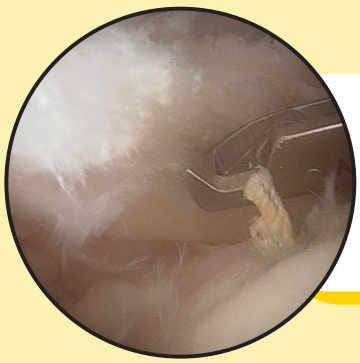


*Image 2: Removing sutures from a previous repair*

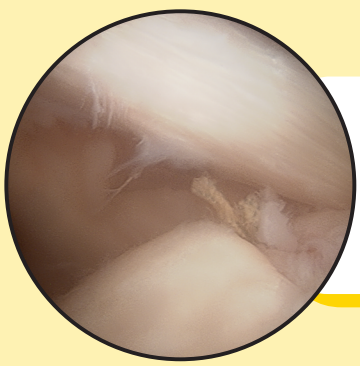


*Image 3: Showing how the humerus is uncovered*

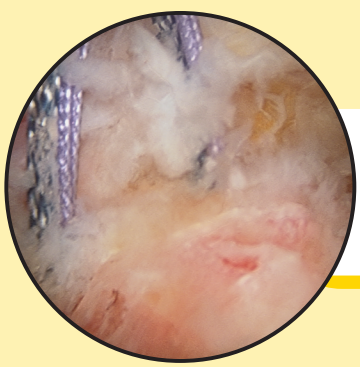


*Image 4: Placement of glenoid anchors*

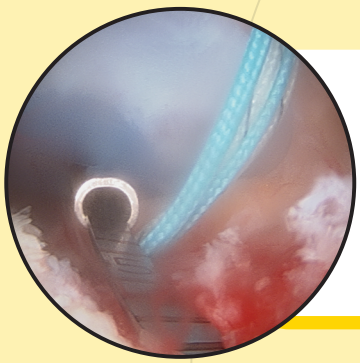
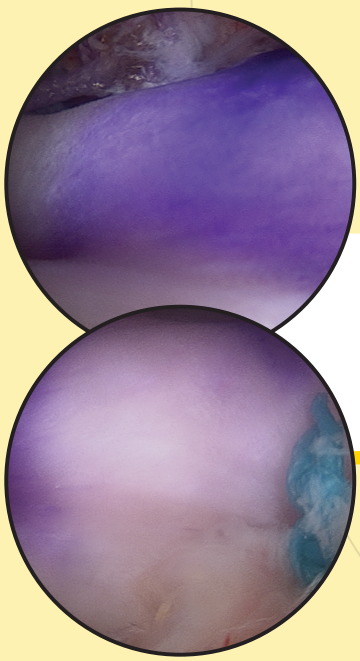


*Image 5: Making measurements for the new rotator cuff*



*Images 6 & 7: The "new" cuff covering the humerus bald spot*

the way the joint works—then that's also a better situation for the patient," says Dr. Hasan.

**MULTIMODAL ANALGESIA AND DECREASED NEED FOR OPIOIDS**

The surgeons and anesthesiologists are able to minimize the administration and prescribing of postoperative narcotics. The team uses multimodal anesthesia and analgesia, including nerve blocks that significantly decrease the need for narcotics postoperatively.

"It is not unusual to have patients come to me at the initial post-op visit who are minimally using narcotics, and instead are able to manage their pain mostly with acetaminophen and/or NSAIDs," Dr. Hasan says.

**PHYSICAL THERAPY AND THE TEAM APPROACH**

Physical therapy is an essential component of recovery for these surgeries. Full recovery can take months.

"One of the advantages of the trapezius transfer as compared to the more traditional latissimus dorsi transfer is that the physical therapy is easier because of the mechanics of the transfer," says Dr. Hasan. The way they route the tendon is more in line with the patient's normal anatomy.

"We keep them in a brace for six weeks," Dr. Hasan says. "We start rehab within the first month. It's a good three- to six-month recovery for the trapezius transfer."

According to Dr. Gilotra, the only patients with massive rotator cuff tears who would not be candidates for surgery would be people who feel they can live with the pain, decreased motion or decreased function.

"The only reason to have the surgery for a chronic massive cuff tear is if the patient feels bad enough to undergo an operation, as well as the long intense rehab and retraining of the muscle necessary in tendon transfers," he says.

Dr. Hasan stresses that this type of shoulder surgery specifically requires a team approach.

"You need an integrated care team to optimize results—a surgeon, anesthesia team, nursing staff and physical therapists. We have a system built in to optimize results," Dr. Hasan says.

**SUPERIOR CAPSULE RECONSTRUCTION**

Superior capsule reconstruction (SCR) is a technique that rebuilds rotator cuff characteristics for supraspinatus tendon tears. In Japan, surgeons reconstruct the cuff using the iliotibial (IT) band because they don't have broad access to allografts. In the United States, however, dermal skin allografts from cadavers are used, avoiding the need to make a large incision in the patient's thigh to remove the IT band.

While postsurgical pain improvement after SCR is similar to after joint replacement, SCR results in an overall recovery similar to cuff repair. This is especially important for active patients under age 60, as they can drive soon after the minimally invasive arthroscopic procedure and build greater strength and motion than with joint replacement. SCR also demonstrates a considerably lower major complication rate than with joint replacement.

The recovery time is similar to a traditional joint replacement: four months, with two months of physical therapy. However, unlike joint replacement, there are no lifting restrictions for SCR patients post recovery, and they can regain strength.

**TRAPEZIUS TRANSFER**

Similar to SCR, trapezius transfer is an alternative to joint replacement for substantial cuff tears in patients under age 60. This particular shoulder preservation technique treats infraspinatus tendon tears by utilizing the bottom of the trapezius muscle to reconstruct the rotator cuff. This practice is analogous to the standard tendon transfer method of using the latissimus dorsi muscle to recreate the rotator cuff.

Trapezius transfer is most beneficial to patients who need to gain and employ great strength. This includes younger, active adults with hobbies such as bodybuilding and gardening, or jobs such as assembly-line work, landscaping or loading and unloading heavy items. Recovery after trapezius transfer can take longer than traditional joint replacement for massive cuff tears, but pain relief is achieved with patients

***UMMC is one of 10 centers nationwide to be involved in a study by the American Shoulder and Elbow Society to evaluate the efficacy of these preservation techniques.***

relying on non-narcotic therapies immediately following surgery.

The decision about which of these innovative shoulder preservation techniques to proceed with will depend on the patient's goals, activity level and diagnostic imaging results.

**MULTICENTER STUDY OF SHOULDER PRESERVATION TECHNIQUES**

UMMC is one of 10 centers nationwide to be involved in a study by the American Shoulder and Elbow Society to evaluate the efficacy of these preservation techniques. In 2018, UMMC orthopaedic surgeons won the society's prestigious Charles S. Neer Award for their study findings of preoperative application of benzoyl peroxide to prevent delayed infection in shoulder surgery and surgical wound contamination.

The University of Maryland Department of Orthopaedics comprises surgeons who also are part of the world-renowned R Adams Cowley Shock Trauma Center at UMMC. Both Dr. Hasan and Dr. Gilotra are fellowship-trained in advanced shoulder and elbow reconstruction and continually involved in research and teaching, in addition to clinical care.

***Editor's note:*** *Lisa Clough, director of media relations for UMMC, is the latest of several of our colleagues who have had shoulder surgery at University of Maryland Rehabilitation & Orthopaedic Institute. Her surgery was a standard arthroscopic rotator cuff repair after an acute injury she suffered while walking her dog.*

*"From the initial appointment, to surgery to repair a complete rotator cuff tear just a few weeks later, the process was easy and efficient," Clough says. "Dr. Hasan and his team at both the Camden office and UM Rehabilitation & Orthopaedic Institute were professional, caring and positive in their approach to my care. They explained the injury, my options for moving forward, and answered all of my questions. Once I decided to have surgery, I was scheduled on my timeframe and have since been moving successfully through occupational therapy to restore my range of motion and strength. Their guidance has helped me heal and recover safely so that I can soon be back on the tennis court!"*

## KEY POINTS

- The ideal candidates for these shoulder-preserving techniques are active patients in their mid-40s to nearly age 60 who have a massive irreparable rotator cuff tear that is affecting their range of motion and function, but who still have a well-preserved joint that is not arthritic.
- Patients in their 40s or 50s are not good candidates for a joint replacement because the patient will require a revision at some point.
- Superior ccapsule reconstruction (SCR) results in recovery similar to an average cuff repair. This is especially important for active patients under age 60, as they can drive soon after the minimally invasive arthroscopic procedure and build greater strength and motion than with joint replacement. SCR also demonstrates a considerably lower major complication rate than does joint replacement.
- Trapezius transfer is most beneficial to patients who need to gain and employ great strength.
- UMMC is one of 10 centers nationwide to be involved in a study by the American Shoulder and Elbow Society to evaluate the efficacy of rotator-cuff preservation techniques.

*Dr. Gilotra in his lab*

*To refer a patient to a UM orthopaedic surgeon, call* **410-448-6400** *or visit* **umortho.org** *for more information.*

**Schedule Grand Rounds for your hospital with UM shoulder surgeons:** *Medical Grand Rounds provide updates on advances that affect the practice of medicine and provide a forum for discussion. To schedule a talk, please contact Denise Marino at 410-328-0141 or dmarino@umm.edu.*

# UMMC Rises in *U.S. News* Rankings to No. 10 for ENT, No. 16 for Cancer, and No. 32 for Pediatric Cardiology and Surgery

**The University of Maryland Medical Center (UMMC) is ranked No. 10 in caring for patients with ear, nose and throat (ENT) conditions and No. 16 in cancer care, according to the 2019-20 *U.S. News & World Report* Best Hospitals specialty rankings released July 30.**

UMMC moved up 29 places in the ENT rankings and 16 places in the rankings for cancer compared to the 2018-2019 *U.S. News & World Report* Best Hospitals specialties list.

In June, the Children's Heart Program at the University of Maryland Children's Hospital rose in the *U.S. News & World Report* Best Children's Hospitals top 50 pediatric cardiology and heart surgery centers, moving up nine places to No. 32.

# Rounding Out Care & Research

## BRIDGING GAPS IN BEHAVIORAL HEALTH

The new Adult Psychiatry Day Hospital opened in July on the University of Maryland Medical Center's midtown campus (UMMC Midtown Campus) to serve as a short-term "step-up" program for patients who need more intensive treatment than in the typical outpatient psychiatry setting. The Day Hospital also functions as a step-down program for patients being discharged from inpatient psychiatry care, offering a smooth transition to home.

Admission to the Adult Psychiatry Day Hospital is usually through an inpatient unit transfer, the emergency department or community-based outpatient mental health program. Those who are admitted to the Day Hospital will attend daily sessions from 9 am to 2 pm weekdays with an average length of stay of two to five weeks.

"Understanding that our patients deal with variety of physical, social, emotional and financial challenges, our goal is to make access to mental health care as seamless as possible," says **Stephanie Knight,** MD, assistant professor of psychiatry and chief of psychiatry at UMMC Midtown Campus. The Day Hospital offers free continental breakfast and lunch daily in addition to different forms of transportation assistance to ensure that patients get to and from their sessions safely.

### EXPANDED, RENOVATED INPATIENT UNIT

The new service complements the newly expanded Inpatient Behavioral Health Unit that opened in January at UMMC Midtown Campus. The new unit has 37 private rooms, all featuring mural artwork commissioned by local artists through a partnership with the Baltimore Office of Promotion & the Arts (BOPA).

"Our team expertly cares for some of our most vulnerable patients across the region, and these new services significantly enhance our comprehensive approach to behavioral health care right here in Baltimore," says **Alison Brown,** MPH, president of UMMC Midtown Campus.

The inpatient teams and the Day Hospital refer patients to a variety of UMMC's outpatient community mental health services, such as the Carruthers Clinic at the midtown campus and the Walter P. Carter Fayette Clinic at 701 W. Pratt St. The teams also help patients access services based in the community, such as mobile treatment, residential recovery programs, inpatient rehabilitation for substance use disorders and crisis stabilization.

**FEEDBACK IS IMPORTANT TO US.**

**Let us know what you think of *University of Maryland Medicine Rounds* content. To complete our survey go to: umm.gd/rounds. The survey will take less than 5 minutes to complete, and participants will be entered into a raffle to win a pair of tickets to a Maryland Terrapins basketball game during the 2019-2020 season.**

*University of Maryland Orthopaedics is the official medical provider for the Maryland Terrapins.*

## One Number puts YOU IN TOUCH

ONE NUMBER puts YOU IN TOUCH with the University of Maryland Medical Center's services and physicians — all day, every day.

OneCall 1-800-373-4111

This number also serves as a connection to University of Maryland ExpressCare and University of Maryland ExpressCare for Kids, which allows for attending physician consultations and streamlined coordination of transfer admissions through ground and air ambulances.

## Get the UMMC MD Referral App

With the UMMC MD Referral App, you can make seamless referrals to select physicians at the University of Maryland Medical Center. Use it for consults or access our clinical resources and team bios 24/7 to make deliberate, informed choices for your patients.

**DOWNLOAD by visiting www.umm.edu/MDReferral**

## UMMC Physician Portal

University of Maryland Medical Center is the flagship academic medical center of the University of Maryland Medical System, and is one of the nation's first teaching hospitals, established in 1823. In keeping with its mission of education, UMMC has a physician portal with a range of content that includes video, Grand Rounds, newsletters, white papers and other resources that provide value to health care professionals.

**Learn more at physicians.umm.edu**

*Learn about upcoming CME events at* **www.medschool.umaryland.edu/CMECalendar**


University of Maryland Medicine

22 S. Greene St.
Baltimore, MD 21201



**NON PROFIT**
US POSTAGE
**PAID**
University of Maryland Medical Center



*University of Maryland Medicine Rounds* is a publication of the University of Maryland School of Medicine and the University of Maryland Medical Center. Originally founded in 1823 as the Baltimore Infirmary, the University of Maryland has an extensive history of providing innovative and compassionate care to the people of Maryland and the surrounding region. As a tertiary/quaternary care center, we heal, we teach, we discover and we care.



**E. ALBERT REECE, MD, PhD, MBA**
Vice President for Medical Affairs
University of Maryland
John Z. and Akiko K. Bowers
Distinguished Professor and Dean
University of Maryland School of Medicine

**MOHAN SUNTHA, MD, MBA**
President and Chief Executive Officer
University of Maryland Medical Center
Professor of Radiation Oncology
University of Maryland School of Medicine

**ALISON G. BROWN, MPH**
President, Midtown Campus
University of Maryland Medical Center

**KELLIE EDRIS**
Vice President, Marketing and Communications
University of Maryland Medical Center

**ANNE HADDAD**
Editorial Director, *UM Medicine Rounds*
System Publications Editor
University of Maryland Medical System

*Editorial Advisory Board*

**CYNTHIA F. BEARER, MD, PhD**
Mary Gray Cobey Professor of Neonatology
Associate Chair, Pediatrics
University of Maryland School of Medicine
Division Head, Neonatology
University of Maryland Children's Hospital

**STEPHEN N. DAVIS, MBBS, FRCP, FACP**
Theodore E. Woodward Professor of Medicine
Professor of Physiology
Chairman, Department of Medicine
University of Maryland School of Medicine
Physician-in-Chief, University of Maryland Medical Center

**JANINE L. GOOD, MD**
Associate Professor of Neurology
University of Maryland School of Medicine
Chief Medical Officer for the Midtown Campus
University of Maryland Medical Center

**MICHAEL R. JABLONOVER, MD**
Clinical Assistant Professor of Medicine
University of Maryland School of Medicine
Senior Vice President and Chief Medical Officer
University of Maryland Medical Center

**ANDREW N. POLLAK, MD**
Professor and Chair, Department of Orthopedics
University of Maryland School of Medicine
Senior Vice President, Clinical Transformation
University of Maryland Medical System

**WILLIAM E. TUCKER, MBA, CPA**
Associate Dean for Practice Plan Affairs
University of Maryland School of Medicine
Chief Corporate Officer, UM Faculty Physicians, Inc.

**DAVID A. ZIMRIN, MD**
Associate Professor of Medicine
Head, Division of Cardiovascular Medicine
University of Maryland School of Medicine


*For questions about* UM Medicine Rounds *or to receive an e-version of this newsletter, please email: rounds@umm.edu*


This publication does not constitute professional medical advice. Although it is intended to be accurate, neither the publisher nor any other party assumes liability for loss or damage due to reliance on this material. Websites not belonging to this organization are provided for information only. No endorsement is implied. Images may be from ©iStock and/or ©Fotolia.©2018 The University of Maryland Medical Center.