



# Cardiology & Heart Surgery

2017 YEAR IN REVIEW



**357**

FACULTY MEMBERS

**\$30M+**

NIH FUNDING

**490+**

TRANSCATHETER  
VALVE PROCEDURES

# Contents

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## 1 INTRODUCTION

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## 2 FACTS & FIGURES

---

## 4 2017 IN BRIEF

---

## 10 2017 IN DEPTH

11 Heart Valve

13 Heart Failure

15 Prevention

17 Vascular Disease

19 Research

---

## 21 ACADEMIC ACTIVITY

---

## 23 LEADERSHIP

## INTRODUCTION

It is with great pride that we share with you the extraordinary work that has taken place at NYU Langone Health over the past year. Our program ranks among the top cardiovascular programs in the nation, but we are always striving to achieve the next level of clinical care, education, and research excellence.

In 2017, the new Heart Transplant Program, part of the Transplant Institute, officially opened, fulfilling our promise to provide individualized, comprehensive care for patients with advanced heart failure. Led by a team of world-renowned surgeons and cardiologists, and supported by our Extracorporeal Life Support Organization (ELSO)-recognized extracorporeal membrane oxygenation (ECMO) program, the transplant service stands out from other programs by offering expedited evaluations and testing in order to improve our patients' time to transplant.

We continue to lead the way in the development of new devices and therapeutic options for valvular disease. Our Heart Valve Center, among the most active and experienced heart valve programs in the nation, led the trial that this year earned Food and Drug

Administration approval for one of the new transcatheter aortic valve replacement systems, as well as performed the first implants for another new delivery system. Our team of experts are also pioneers in early ambulation and discharge for valve replacement patients.

In vascular disease, NYU Langone has also led important clinical research, assessing a new device for endovascular stenting of the iliac vein in May-Thurner syndrome, and is pioneering a minimally invasive system for creating arteriovenous fistulas in kidney dialysis. Our Heart Rhythm Center has piloted novel catheter designs aimed at improving the delivery of radiofrequency energy in catheter ablation for cardiac arrhythmias.

New clinical studies from our nationally ranked team of investigators have focused on the importance of lifestyle modifications in the prevention

of cardiovascular disease (CVD) in patients with diabetes and peripheral artery disease and those with CVD risk factors. Our basic science researchers have elucidated a number of mechanisms involved in the pathophysiology of CVD. Meanwhile, we have begun building a new data core that will help to optimize our use of this wealth of research information for the benefit of our patients and others around the world.

Thank you for taking the time to read about these and many other important contributions made by NYU Langone to improve the field of cardiovascular medicine over the course of 2017.

## FACTS & FIGURES

# Cardiology & Heart Surgery

### PATIENT VOLUME

**490+**

TRANSCATHETER VALVE  
PROCEDURES

**300+**

MINIMALLY INVASIVE SURGICAL  
VALVE PROCEDURES

**1,384**

CARDIAC ABLATIONS

**200+**

PEDIATRIC CONGENITAL  
HEART SURGERIES

**2,082**

FETAL ECHOCARDIOGRAMS

**6,419**

PEDIATRIC ECHOCARDIOGRAMS

**38,750**

ADULT ECHOCARDIOGRAMS

**7,812**

CORONARY CARDIAC  
CATHETERIZATION PROCEDURES

### RESEARCH & FUNDING

**280**

SCIENTIFIC PUBLICATIONS

**\$30M+**

NIH FUNDING

**113**

ACTIVE CLINICAL TRIALS

### ACHIEVEMENTS & HONORS

#### First in the Country

**THE LEON H. CHARNEY DIVISION  
OF CARDIOLOGY AT NYU SCHOOL  
OF MEDICINE**

is among the oldest and most renowned cardiology programs in the United States. Founded in 1911, when the John Wyckoff Cardiology Clinic opened its doors at Bellevue Hospital Center, it became the first ambulatory cardiac clinic in the United States

#### First and Only

**IN NEW YORK STATE**

to be accredited by the Adult Congenital Heart Association (ACHA) as an Adult Congenital Heart Disease Comprehensive Care Center

### FACULTY & FELLOWS

**357**

FACULTY MEMBERS

**53**

FELLOWS

**Top 5–12%**

**AGGREGATE PROGRAM SCORE**

On the annual American College of Cardiology In-Training Exam (ACC-ITE) of fellows (among 240 participating cardiology training programs)



# NYU Langone Health

View of NYU Langone Health's main Manhattan campus, including renderings of the new Science Building (left) and the Helen L. and Martin S. Kimmel Pavilion (right), both set to open in 2018. (Image credit: Ennead Architects)



## #19

### IN THE NATION

and nationally ranked in 12 specialties: Rehabilitation, Orthopedics, Rheumatology, Neurology & Neurosurgery, Geriatrics, Urology, Cardiology & Heart Surgery, Gastroenterology & GI Surgery, Diabetes & Endocrinology, Pulmonology, Cancer, and Nephrology



## #12

### IN THE NATION BEST MEDICAL SCHOOLS FOR RESEARCH

and a leader in innovation in medical education, including accelerated pathways to the MD degree



## Leader

### IN QUALITY CARE AND PATIENT SAFETY

For the past four years, NYU Langone has received top rankings for overall patient safety and quality of care from Vizient, Inc., formerly the University HealthSystem Consortium. In 2017, NYU Langone received two significant awards from Vizient—the Bernard A. Birnbaum, MD, Quality Leadership Award and the Ambulatory Care Quality and Accountability Award for demonstrated excellence in delivering high-quality, patient-centered outpatient care.

## 5 Star Rating

### FROM CMS HOSPITAL COMPARE

NYU Langone Health is the only full-service hospital in New York State and one of 9 percent of hospitals nationwide to receive a five-star rating from the Centers for Medicare and Medicaid Services (CMS). The rating reflects overall safety, quality, and patient experience.

# Transforming the Future of Cardiovascular Medicine

## Leading the Way in Heart Valve Replacement

Among the most active and experienced heart valve programs in the nation, led by Mathew R. Williams, MD, associate professor of cardiothoracic surgery and medicine, the Heart Valve Center at NYU Langone Health is enhancing and expanding the range of advanced treatment options available for valve replacement and repair. One such trial this year earned Food and Drug Administration approval for Medtronic's CoreValve™ Evolut™ PRO system—a pioneering transcatheter aortic valve replacement (TAVR) system for severe aortic stenosis. For patients whose conditions limit surgical options,

the team performed the first implant of another new delivery system, and is testing its efficacy as part of a national trial.

Across conditions and procedures, NYU Langone continues to lead the way in early ambulation and discharge for valve replacement patients, using an advanced telehealth system to keep patients at home—and on the most optimal path to recovery.

→ [Read more on](#)  
**PAGE 11**



↑ Muhamed Saric, MD, PhD, and Ricardo J. Benenstein, MD

## Building a Cardiovascular Data Repository to Empower Clinical Practice

Informatics expert Jason M. Kreuter, PhD, associate professor of medicine, has joined NYU Langone Health as director of data and analytics for cardiovascular services. Dr. Kreuter leads a program-wide effort to establish a comprehensive cardiology system that will be a national model for the collection and utilization of cardiovascular data. Over the past year, Dr. Kreuter has conducted an extensive site assessment across the enterprise and has developed a series of projects, which will both start to increase the use of structured clinical documentation in the electronic health record (Epic), and lay the groundwork for the cardiovascular data repository.

“We are using informatics principles to evolve clinical documentation that is considerate of how clinicians wish to document in their practice. The goal of the new documentation is to generate structured data, which will enable outcomes analyses to improve clinical practice,” Dr. Kreuter says. Once fully implemented, the comprehensive cardiology system will provide an opportunity for physicians locally and across the country to reference a database of state-of-the-art cardiovascular interventions for information about treatments and outcomes.

## Smart Devices Strengthen Cardiac Electrophysiology Practice

The Cardiac Electrophysiology Program, part of NYU Langone's Heart Rhythm Center, one of the busiest in the nation, has experienced tremendous growth in patient volume, with a 200 percent increase in ablation procedures for atrial fibrillation and pacemaker implantation since 2009. The program has recently been testing two new technologies aimed at improving communications and treatment delivery.

The center follows thousands of patients remotely with pacemakers, defibrillators, and implantable recorders, giving them round-the-clock access to clinical experts for device follow-up and detection of potentially treatable rhythm disturbances. Center director Larry A. Chinitz, MD, the Alvin Benjamin and Kenneth Coyle, Sr. Family Professor of Medicine and Cardiac Electrophysiology, and clinical director of the Leon H. Charney Division of Cardiology, reported on the group's experience with MyCareLink Smart™, a Medtronic app-based monitor that is used with a smartphone, in the June 2017 edition of *EP Lab Digest*. "The system has proven particularly helpful for monitoring patients with language barriers or cognitive impairments," he says. "We have also found that it eases patient stress, lowers monitoring costs, and improves clinician workflow."

Heart Rhythm Center investigators are also involved in testing novel catheter and system designs to improve the delivery of radiofrequency energy in catheter ablation while minimizing collateral damage to surrounding healthy tissue. Dr. Chinitz is a lead investigator on the SMART-SF trial of the new Biosense Webster, Inc. THERMOCOOL SMARTTOUCH® SF contact-force sensing catheter. The catheter features a 56-hole porous tip. For patients being treated with catheter ablation, it is designed for improved cooling and reduced fluid delivery compared with a standard six-hole open-irrigated catheter. Strong initial safety data was published in *Europace* in August 2017.

## New Heart Transplant Program Enhances Options for Advanced Heart Failure

With the approval of its new heart transplant program, the NYU Langone Health Transplant Institute now offers a complete continuum of care for all patients with end-stage heart failure. Opened in December 2017, the Heart Transplant Program is led by internationally renowned cardiothoracic surgeon, Nader Moazami, MD, professor of cardiothoracic surgery, and medical director of heart transplantation Alex Reyentovich, MD, associate professor of medicine. The program is supported by an Extracorporeal Life Support Organization (ELSO)-accredited extracorporeal membrane oxygenation (ECMO) program, along with the latest bridge-to-transplant therapy and durable ventricular assist devices, which provide a full complement of mechanical circulatory support for the most critical of heart failure patients.

[➔ Read more on  
PAGE 13](#)



↑ Alex Reyentovich, MD, and Stuart D. Katz, MD





↑ Jeffrey S. Berger, MD, and Judith S. Hochman, MD

## Focus on Cardiovascular Disease Prevention

Last year, investigators at NYU Langone Health released key findings related to the prevention and diagnosis of cardiovascular disease. Jeffrey S. Berger, MD, associate professor of medicine and surgery, led an eight-year national study revealing that most patients with peripheral artery disease do not receive the preventive medications and lifestyle interventions demonstrated to be effective in reducing complications for this high-risk population. An aggressive prevention strategy is critical in mitigating the risk of cardiovascular disease among patients with type 2 diabetes, according to another major study led by Jonathan Newman, MD, MPH, the Eugene Braunwald, MD Assistant Professor of Cardiology. The national IMPACT trial, which assessed the efficacy of behavioral consults for patients undergoing cardiovascular interventions, yielded important insights into which patients benefit from different strategies. And based on new research presented at the American Heart Association Scientific Sessions, our clinician-scientists urged that cardiac MRI be used in all patients with a presumed diagnosis of Takotsubo syndrome to differentiate it from an apical myocardial infarction.

→ [Read more on](#)  
**PAGE 15**

## Interventional Cardiology Program Treats More Complex Diseases

In 2017, NYU Langone's Cardiac Catheterization Laboratory, part of the Interventional Cardiology Program, performed more than 600 peripheral arterial intervention procedures, and strengthened its peripheral arterial disease program, which trains physicians worldwide to perform complex endovascular procedures in patients with advanced diseases, such as critical limb ischemia and chronic total occlusions.

NYU Langone is helping to lead the field, as one of only a few institutions in the country to offer peripheral angiography utilizing CO<sub>2</sub> gas instead of iodinated contrast medium for patients with poor renal function. "This method helps to protect the kidneys from the toxicity of the contrast medium and opens up peripheral angiography procedures to individuals who previously would not have been able to undergo them," says Anvar Babaev, MD, PhD, professor of medicine and director of endovascular interventions in the Cardiac Catheterization Laboratory. Reduction of the radiation exposure to the patient and the operator is another area of active research in the lab. We are developing a protocol allowing us to perform procedures using ultrasound guidance, minimizing and sometimes completely eliminating radiation exposure.

The program is also recognized for its excellence in the treatment of coronary artery disease. NYU Langone interventional cardiologists are among the highest volume operators nationally and treat patients with more complex conditions with non-surgical procedures than anyone would have thought possible even a few years ago. "With our expertise in complex coronary intervention, we can use percutaneous approaches to treat people with left main coronary disease, diffuse multivessel disease, reduced left ventricular function, and chronic total occlusion," says Michael J. Attubato, MD, associate professor of medicine and director of the Interventional Cardiology Fellowship Program. "These patients have often been told that they need bypass surgery or can only be treated medically, and we can significantly improve their quality of life by opening their occluded coronary arteries."

Program experts are active in clinical investigation, now leading or actively involved in more than 20 major clinical trials, including studies on in-stent restenosis, pharmacological regimens used to prevent stent thrombosis, new stent designs, chronic kidney disease, and medical therapy for coronary artery disease and drug-eluting stents for peripheral arterial disease. In 2017, the program received the American Heart Association's Mission: Lifeline® Silver Quality Achievement Award for STEMI care.



## Improving Vascular Access and Treatment for Peripheral Vascular Disease

Experts at NYU Langone Health are leading the way on some of the most important trials for new devices and systems to treat peripheral vascular disease.

Todd L. Berland, MD, associate professor of surgery

↓ Ludovic Boytard, PhD; Bhama Ramkhelawon, PhD; and Jordyn Feinstein, BS



and director of Outpatient Vascular Interventions, is leading a national trial of a new iliac vein stent system for the management of May-Thurner syndrome, which causes leg vein compression that can lead to deep vein thrombosis. He is also the national principal investigator of a novel minimally invasive system for creating arteriovenous fistulas that is poised to revolutionize kidney dialysis.

Further contributing to new advances in peripheral artery disease treatment is assistant professor of surgery and cell biology, and director of vascular surgery scientific research, Bhama Ramkhelawon, PhD. In a study published January 2018 in the *Journal of the American College of Cardiology*, Dr. Ramkhelawon has identified a critical pathway in the inflammatory process that leads to peripheral vascular disease: calcium binding myeloid-related protein 14 (MRP-14), a potentially valuable therapeutic target.

➔ [Read more on](#)  
**PAGE 17**

## Understanding Arterial Disease Takes a Team Approach

This year, the Noninvasive Cardiology Laboratory experts at NYU Langone Health collaborated closely with the interventional cardiology team to develop new algorithms, including a patient's age, renal function, type, number and extent of the lesions, to help identify patients who are suitable for ultrasound-guided procedures, all in an effort to minimize the patients' exposure to radiation and iodine contrast. "For many patients with peripheral vascular disease who have a specific, targeted lesion of limited size, we can guide a directional atherectomy through ultrasound," says Ricardo J. Benenstein, MD, assistant professor of medicine and associate director of the Echocardiography Laboratory, who has successfully performed several such procedures.

In conjunction with preventive cardiologists, Dr. Benenstein and his team are focused on developing clinical tools to help identify younger individuals who may be at high risk for advanced

atherosclerotic disease. "We are combining clinical biomarkers with imaging of the volume of carotid plaque that will help us to have a better surrogate for the disease, and for targeted treatment. This approach will allow us to look at lesions in a longitudinal way and have a sense of the stability or progression of disease."

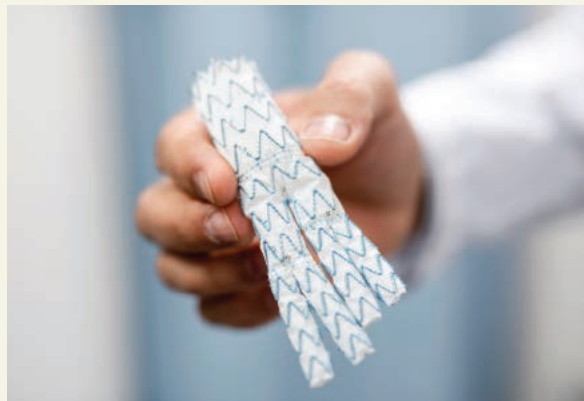
Dual certified sonographers in echocardiography and vascular ultrasound, with strong expertise in renal transplant duplex ultrasound, also work with the transplant nephrology team, part of NYU Langone's Transplant Institute, to identify patients who may be at risk—either immediately or in the longer term—for vascular complications following a renal transplant. "We have had great success with very complex patients, significantly improving the prognosis for these transplants," says Dr. Benenstein.

## NYU Langone Gains Unique Opportunity to Use the Latest Stent Grafts

Patients at NYU Langone Health now have the option to receive one of two new stent grafts for treating abdominal aortic aneurysms. Both stent grafts are only available in a handful of leading institutions in the United States.

NYU Langone was chosen as one of five sites in the nation to pilot a multipart stent graft, designed by Patrick Kelly, MD, a vascular surgeon from Sanford Health. In October 2017, NYU Langone vascular surgeon Thomas Maldonado, MD, the Schwartz Buckley Professor of Surgery, director of the Aortic Disease Center, and medical director of the Venous Thromboembolic Center, treated the first five patients with the novel graft, which features four octopus-like arms that descend from above to selectively stent vessels. The innovative stent graft allows physicians to uniquely treat aneurysms that involve all the branches of the complex thoraco-abdominal region, which is unique to each patient's anatomy. "No one else in the Northeast has access to this device at this time," says Dr. Maldonado.

NYU Langone is also testing a new custom-made graft designed for aneurysms in the thoraco-abdominal region. Industry leader Cook Medical has devised a system of branching grafts that dock into fenestrations on a main endovascular graft and fit together like a puzzle to seal the aorta and the mesenteric, celiac, and renal arteries, preserving blood flow while excluding the aneurysm. "NYU Langone was



↑ New stent helps to treat abdominal aortic aneurysms

chosen as one of the first institutions to work with these grafts because of our advanced operating facilities and years of excellent outcomes in the Vascular Quality Initiative," says Neal S. Cayne, MD, professor of surgery and director of endovascular surgery. Dr. Cayne has successfully placed three of these custom-made devices thus far in patients who were considered unfit for open surgery.



↑ Neal S. Cayne, MD

## Investigators Make Fundamental Strides in Cardiovascular Research

Over the past year, cardiovascular investigators at NYU Langone Health have made fundamental strides in deciphering the multiple mechanisms involved in the pathophysiology of cardiovascular disease, publishing key articles, and earning major federal grants and awards. They have illuminated the function of specific immune cells in removing arterial plaque, called into question conventional wisdom about renin angiotensin system inhibitors (RASi) for patients with stable heart disease, and launched initiatives to study the role of the sodium channel in heart disease and macrophages in obesity, diabetes, and atherosclerosis.

➔ [Read more on](#)  
**PAGE 19**



⬆ (Left to right) Ann Marie Schmidt, MD; Ira J. Goldberg, MD; Kathryn J. Moore, PhD; and Edward A. Fisher, MD, PhD, MPH

### AWARDS & RECOGNITION

**Sripal Bangalore, MD**, associate professor of medicine, and **David S. Park, MD**, assistant professor of medicine, received the Cardiology Today's Next Gen Innovators award.

**Mario Delmar, MD, PhD**, the Patricia M. and Robert H. Martinsen Professor of Cardiology and professor of cell biology, was appointed a member of the NIH Electrical Signaling, Ion Transport, and Arrhythmias (ESTA) study section; appointed vice president of the Cardiac Electrophysiology Society; was Keynote Speaker, Netherlands Heart Institute; and appointed visiting professor at Utrecht University, The Netherlands.

**Glenn I. Fishman, MD**, the William Goldring Professor of Medicine, professor of neuroscience and physiology, biochemistry and molecular pharmacology, was appointed associate editor, *Circulation Arrhythmia and Electrophysiology*; and Leonard Laight Visiting Professor, University of Louisville.

**Judith S. Hochman, MD**, the Harold Snyder Family Professor of Cardiology, was appointed as a member of the 2018 Scientific Program Committee, American College of Cardiology; and named co-chair/chair, Late-Breaking Clinical Trials (LBCT) Deep Dive Sessions, ACC.

**Lowell Kabnick, MD**, associate professor of surgery, was appointed as board member, Intersocietal Accreditation Commission; appointed as chair, committee member, CEC Committee – FDA Venous Vascular Stent Trial; elected president, American Venous Forum Foundation; appointed as chair, committee member, American Venous Forum International Committee; and elected to the Board, Venous News.

**Thomas S. Maldonado, MD**, the Schwartz Buckley Professor of Surgery, was appointed president of the Vascular and Endovascular Surgery Society.

**Kathryn J. Moore, PhD**, the Jean and David Blechman Professor of Cardiology and professor of cell biology, received the R35 Outstanding Investigator Award from the National Institutes of Health/National Heart, Lung, and Blood Institute.

**Harmony R. Reynolds, MD**, associate professor of medicine, was named to the American Heart Association Committee on Cardiovascular Disease and Stroke in Women and Special Populations; and was named to the American College of Cardiology Committee on Cardiovascular Disease in Women.

**James A. Underberg, MD**, assistant professor of medicine, was named president of the National Lipid Association.



2017 IN DEPTH

# Innovations for Treating Complex Cardiovascular Conditions



↑ Cezar S. Staniloae, MD, and Mathew R. Williams, MD



# New Trials Take Valve Disease Treatment Forward

The Heart Valve Center physicians are pushing the boundaries of device efficacies.

With over a dozen trials under way, our surgeons, international leaders in the transcatheter replacement of aortic and mitral valves, have performed the first in-human procedure in a number of implants with new valve replacement systems. Through this work, these devices have been approved for widespread use, and their adoption is increasing, with total patient volume at the center up by 40 percent in 2017.

## SAFETY AND PERFORMANCE OF TAVR SYSTEM

One research pathway is aimed at shedding light on the safety and performance of a new transcatheter aortic valve replacement (TAVR) system for patients with severe aortic stenosis deemed too high risk to undergo surgery. In June 2017, Mathew R. Williams, MD, associate professor of cardiothoracic surgery and medicine, and chief of the Division of Adult Cardiac Surgery, performed the first implant of the Meridian® Transcatheter Aortic Valve and Pathfinder® II Delivery System, under investigation as part of HLT's prospective, non-randomized, single-arm, multicenter RADIANT trial.

Another such trial has identified a potential treatment option for symptomatic patients with severe aortic stenosis at high or extreme risk for open heart surgery. Based on the results of the Evolut™ PRO clinical study, led by Dr. Williams, the Food and Drug Administration (FDA) this year approved the Medtronic CoreValve™ Evolut™ PRO TAVR system as a new valve replacement option for these patients. Outcomes are excellent: At 30 days' post-procedure, patients were found to have a high survival rate, 98.3 percent, and a low rate of

disabling stroke, 1.7 percent. "This innovation represents an important advantage over previous generations of this device, as it can help assist with adequate sealing even in complex cases," notes Dr. Williams, who reported these results at the American College of Cardiology's 66th Annual Scientific Session in March 2017.

The Heart Valve Center has also led the field in developing the transcatheter mitral valve replacement (TMVR)—offering all three systems currently on the market and holding half the world's track record with one: the Caisson TMVR implant. In July 2016, Dr. Williams, who is also director of Interventional Cardiology and the Heart Valve Center, along with his team performed the world's first transseptal transcatheter mitral valve replacements using the fully repositionable and retrievable implant, which enables proper placement and precise control at each step of the procedure. The three patients implanted by Dr. Williams are the first to be enrolled in the PRELUDE (Percutaneous Mitral Valve Replacement Evaluation Utilizing IDE Early Feasibility) study, designed to provide initial safety and efficacy on the device to the FDA. Procedure time has been halved, with our experts now completing it in less than two hours.

New robotic approaches are also being uncovered in the center to facilitate complex mitral valve repairs, with more than 500 robotic repair procedures performed by the NYU Langone team to date using the novel da Vinci Xi® robotic surgical system. "As we build our body of experience using this device, we continue to fine-tune its application—always with the goal of completing mitral valve repair with the least invasive, most precise approach possible," says

Didier F. Loulmet, MD, associate professor of cardiothoracic surgery, director of robotic cardiac surgery, and chief of cardiac surgery.

## TELEHEALTH INNOVATIONS PROMOTE AT-HOME RECOVERY

Regardless of the particulars of each mitral and aortic valve replacement case, the goal following the procedures is shared: early ambulation and discharge of the patient, as soon as possible. Approximately 80 percent of the center's patients are discharged the day after their transcatheter procedure, compared with a national average of three days in the hospital. "In this population of patients, decreasing length of stay is especially important," says Dr. Williams. "If you keep them in bed an extra day, you set them back an extra week."

An advanced telehealth program using a smartphone-enabled system allows

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"As we build our body of experience using this device, we continue to fine-tune its application—always with the goal of completing mitral valve repair with the least invasive, most precise approach possible."

—Didier F. Loulmet, MD

## HEART VALVE

heart valve patients to be carefully monitored once home. At least 300 aortic and mitral valve replacement patients a year are discharged from NYU Langone with this system, which monitors indicators such as blood oxygenation and body weight and feeds the numbers directly to the heart valve team. “We can do things such as change medications and dosages remotely, which keeps the patient at home and eliminates return visits to the hospital,” says Dr. Williams.

Similarly, the experts at the center work jointly with cardiology, radiology, and others, to limit the number of hospital appointments patients require before undergoing their procedure. “Overall, as our technologies become more advanced, our interdisciplinary clinic strives to make the process itself as low-impact as possible for our patients,” adds Dr. Williams.

## AN EXPANDING SUITE OF TREATMENT OPTIONS FOR HYPERTROPHIC CARDIOMYOPATHY

The Hypertrophic Cardiomyopathy Program at NYU Langone is one of the nation’s largest such programs offering both medical and surgical treatment for this genetic disorder, which results in abnormal thickening of the heart muscle. Advanced care for the condition is delivered under the leadership of medical director and cardiologist Mark V. Sherrid, MD, professor of medicine, and surgical director Daniel G. Swistel, MD, associate professor of cardiothoracic surgery, both innovators in their field with more

than 30 years of experience treating it. The range of leading-edge therapies they provide in partnership with interventional cardiologist Louai Razzouk, MD, MPH, assistant professor of medicine, now includes alcohol septal ablation. The minimally invasive procedure employs highly concentrated alcohol inserted through a catheter into an artery near the heart’s enlarged septum, producing thinner, less obstructive scar tissue that improves blood flow.

↓ Mark V. Sherrid, MD, and Daniel G. Swistel, MD



## Heart Transplant Program Extends Multidisciplinary Transplant Care to Patients with Advanced Heart Failure

In December 2017, NYU Langone Health opened a Heart Transplant Program, becoming the first new program of its kind in New York State in nearly two decades.



↑ Nader Moazami, MD, and Deane E. Smith, MD

Part of the Transplant Institute, the Heart Transplant Program is led by Nader Moazami, MD, professor of cardiothoracic surgery and surgical director of heart transplantation and mechanical circulatory support, and medical director of heart transplantation Alex Reyentovich, MD, associate professor of medicine and director of the Heart Failure Advanced Care Center.

Throughout his career, Dr. Moazami has performed more than 300 heart transplants and has been instrumental in researching and advancing mechanical devices used to treat patients with end-stage heart failure. Joining the team are cardiothoracic surgeons Deane E. Smith, MD, assistant

professor of cardiothoracic surgery, and Zachary N. Kon, MD, assistant professor of cardiothoracic surgery.

“The opening of the new program signals yet another major step forward to advance the Transplant Institute’s commitment to world-class patient care and clinical research, while addressing the state’s public health crisis in organ donation and transplantation,” says Robert Montgomery, MD, professor of surgery and director of NYU Langone’s Transplant Institute.

Over the past decade, the wait list for heart transplant patients in the state has increased 40 percent. “Our goal is to provide comprehensive care in a convenient and accessible manner.

Instead of waiting months for an evaluation, patients will be seen within two weeks of a referral, and complete the transplant evaluation within one to two visits,” says Aubrey C. Galloway, MD, the Seymour Cohn Professor of Cardiothoracic Surgery and chair of the Department of Cardiothoracic Surgery. “Cardiologists from the Heart Failure Advanced Care Center will provide transplant evaluations in Manhattan, Brooklyn, and NYU Winthrop Hospital.”

The heart transplant team joins a center-wide institute comprising transplant surgeons and transplant physicians specializing in cardiology, pulmonology, hepatology, nephrology, endocrinology, infectious diseases, and

radiology, specially trained transplant nurse coordinators, and Rusk Rehabilitation physicians and therapists. This multidisciplinary team approach to transplantation ensures comprehensive, personalized care.

The center's first heart transplant was performed in January 2018.

### ECMO PROGRAM EARNS INTERNATIONAL PATHWAY TO EXCELLENCE RECOGNITION

The multidisciplinary extracorporeal membrane oxygenation (ECMO) program at NYU Langone, which opened in 2015, has earned the Pathway to Excellence in Life Support Award – Silver Level from the Extracorporeal Life Support Organization (ELSO), an international nonprofit consortium that develops and evaluates novel therapies for failing organ systems.

Veno-arterial ECMO for patients in cardiogenic shock, a key component of mechanical circulatory support at NYU Langone, is one of several tools, along with a percutaneous ventricular assist device (VAD) known as the Impella device, which can be used to support an individual's cardiac function as a bridge to transplant.

"We have implanted a number of Impella devices through an axillary approach, going through the chest instead of the groin, to help patients survive the initial insult from cardiogenic shock," says Dr. Smith, who is also the surgical director of the ECMO and Cardiogenic Shock Program. "This approach allows them to be extubated, mobilized from the bed into a chair, and, in ideal situations, even be walking while they recover."

With the launch of the heart transplant program, patients who are bridged out of cardiogenic shock can now undergo immediate evaluation for transplantation. "Some patients may be able to go directly from ECMO or Impella to a transplant, rather than having a durable ventricular assist device placed as a bridge to transplant," says Dr. Smith. "In rare circumstances, some patients may have a

slow recovery from transplantation, and offering mechanical circulatory support during this time allows the heart to recover and gives the transplant an improved chance of success."

### IMPLEMENTING LVADS IN AN ELDERLY POPULATION

A key challenge in mechanical circulatory support is appropriate patient selection. Frailty is a common condition among many elderly patients being considered for durable support, such as a left ventricular assist device (LVAD). "There is a concern that if a person has become too frail, a major surgery like LVAD placement may not be helpful," says Dr. Reventovich. An investigator for a five-center study funded by the National Institutes of Health, Dr. Reventovich examined the appropriate implementation of LVADs in an elderly population. The study's findings, published in September 2017 in the *Journal of Geriatric Cardiology*, indicate that although the LVAD was able to reverse frailty in about half of the patients, the other half did not improve, suggesting the need for a larger study to identify the determining factors for LVAD success in this population.

### MANAGEMENT OF CARDIOGENIC SHOCK

Cardiogenic shock is an acute condition, and if not addressed rapidly will lead to death. NYU Langone's cardiogenic shock team is a rapid response team aimed at systematically managing patients with this otherwise fatal condition. The response team, including cardiovascular interventionalists, cardiothoracic surgeons, and heart failure specialists, is activated by dialing a single extension as soon as a patient is determined to be in cardiogenic shock. "We now have all the technology to support patients in any stage of cardiovascular deterioration, whether chronic or acute," says Dr. Reventovich.

300+

#### HEART TRANSPLANTS

performed by  
Nader Moazami, MD



## Expanding the Exploration of Cardiovascular Disease Prevention

This year, NYU Langone Health investigators released key findings to enhance the prevention and diagnosis of cardiovascular disease, which remains the single greatest threat to our health, killing more U.S. adults than any other disease each year.

### MOST PAD PATIENTS ARE DRAMATICALLY UNDERTREATED WITH PREVENTIVE THERAPIES

Most patients with peripheral artery disease (PAD) are dramatically undertreated with preventive medications and lifestyle counseling, according to a study led by Jeffrey S. Berger, MD, associate professor of medicine and surgery, which appeared in the *Journal of the American College of Cardiology* in May 2017. Dr. Berger and his team reviewed national ambulatory care survey data on nearly 2,000 outpatient visits for PAD that occurred between 2005 and 2012, and found that only about one-third of patients received guideline-recommended statin drugs and antiplatelet therapy. Of the 20 percent of study participants who were current smokers, only one-third received smoking cessation counseling, while diet and exercise guidance was provided to just one in five of all participants. Those 65 and older were less likely to receive these preventive therapies than younger patients.

All of these figures stayed flat throughout the eight-year study period, with no significant improvement seen in any of the behavioral or medical therapy categories. “While much of our focus has been on understanding and treating coronary artery disease, the management of lower extremity disease has lagged behind,” says Dr. Berger. “Although novel therapies for PAD are important, we must focus on established therapies and simple lifestyle changes that can make patients feel better and live longer.”

### ASSESSING PREVENTION STRATEGIES FOR PATIENTS WITH CVD RISK FACTORS UNDERGOING CARDIOVASCULAR PROCEDURE: THE IMPACT TRIAL

Prevention strategies, which provide education and suggestions for medication change at the bedside, are thought to be a promising tool for cutting the elevated risk of future cardiovascular events in patients undergoing angioplasty and other cardiac procedures. “They are at a heightened point where they may be susceptible to interventions aimed at behavior change,” says Eugenia Gianos, MD, associate professor of medicine and co-clinical director of the Center for the Prevention of Cardiovascular Disease.

Dr. Gianos reported on the results of the Investigation of Motivational Interviewing and Prevention Consults to Achieve Cardiovascular Targets (IMPACT) trial, which assessed the efficacy of such consults in 400 patients post-cardiovascular intervention, at the American College of Cardiology Scientific

Sessions in December 2016. The study compared three cohorts: a control arm that received no consultation; a group that received the preventive cardiology consult alone, and a group that received both the prevention consult and an outpatient component with motivational interviews.

The primary endpoint of the trial, reduction in non-HDL cholesterol, was not reached, says Dr. Gianos, but the trial showed trends for that endpoint as well as other secondary endpoints (including other lipid parameters and weight) moving in the right direction. Further, patients in the intervention group were significantly more likely to be using high-potency statins, or statins of any kind, six months after the consultation.

“We have learned a lot of lessons about who benefits from different strategies and are now looking to see how to tailor these strategies to patients matching their preferences and their individual risk profiles,” Dr. Gianos says.



↑ Binita Shah, MD; Eugenia Gianos, MD; and Harmony R. Reynolds, MD

### **PRIMARY PREVENTION OF CARDIOVASCULAR DISEASE IN DIABETES MELLITUS**

Individually tailored, aggressive management of multiple cardiovascular risk factors simultaneously is critical to reduce mortality and morbidity in people with type 2 diabetes (T2D), according to a new review from Jonathan Newman, MD, MPH, the Eugene Braunwald, MD Assistant Professor of Cardiology. Fully one-third of U.S. adults are predicted to have T2D by 2020, and cardiovascular disease (CVD) remains the leading cause of death for these individuals, but less than half meet recommended clinical guidelines for the prevention of CVD, Dr. Newman and colleagues reported in the *Journal of the American College of Cardiology* in August 2017.

Dr. Newman and colleagues reviewed the current state of evidence and guidelines for the prevention of CVD in patients with T2D. The comprehensive review addressed lifestyle risk factors, including exercise, nutrition, weight management, and smoking cessation; as well as cardiovascular disease risk factors such as blood pressure, cholesterol, blood lipids, glycemic control, and the use of aspirin. The team recommends the use of statins, aspirin, glucose-lowering therapies, and that blood pressure reduction be combined with intensive lifestyle management including exercise, nutrition, and weight management in all T2D patients. “The uniform use of proven medical therapies could meaningfully impact the morbidity and mortality for the diabetic patient over his or her lifetime,” says Dr. Newman. “It is imperative that we expand the use of therapies proven to reduce CVD risk in patients with type 2 diabetes.”

### **CARDIAC MRI CRITICAL IN DIAGNOSING TAKOTSUBO SYNDROME**

Takotsubo syndrome—also known as broken heart syndrome, or stress cardiomyopathy—is a weakening of the left ventricle, the heart’s main pumping

chamber. Far more common in women than in men, it usually occurs as the result of severe emotional or physical stress. Takotsubo syndrome can be difficult to distinguish from other reasons for myocardial infarction (MI) with non-obstructive coronary artery disease. In research presented at the American College of Cardiology Scientific Sessions in March 2017, Harmony R. Reynolds, MD, associate professor of medicine, associate director of the Cardiovascular Clinical Research Center, and co-leader of the Sarah Ross Soter Center for Women’s Cardiovascular Research, recommended that cardiac MRI be used in all patients with a presumed diagnosis of Takotsubo syndrome, to differentiate it from apical MI.

The group reviewed 833 consecutive patients with MI who underwent angiography between April 2014 and September 2016, and found that 20 had left ventricular wall motion abnormalities suggestive of Takotsubo syndrome. Seven of these patients underwent cardiac MRI, and two were found to have transmural late gadolinium enhancement in the left ventricular apex, diagnostic of MI rather than Takotsubo syndrome. This is important in clinical care, because treatment of MI often differs from treatment after Takotsubo syndrome. Twenty-nine percent of patients with wall motion pattern abnormalities consistent with Takotsubo syndrome undergoing cardiac MRI ultimately were diagnosed with apical infarction.

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### **ISCHEMIA TRIAL REACHES IMPORTANT MILESTONE**

The global ISCHEMIA trial, led by Judith S. Hochman, MD, the Harold Snyder Family Professor of Cardiology, associate director of the Leon H. Charney Division of Cardiology, and senior associate dean for clinical sciences, has reached an important milestone with the randomization of more than 5,000 participants. The largest strategy trial to date in stable ischemic heart disease, the NHLBI-funded ISCHEMIA trial compares the effectiveness of a conservative versus invasive treatment strategy in patients with stable ischemic heart disease and moderate to severe ischemia.

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### **BODY WEIGHT FLUCTUATIONS LINKED TO MORE DEATHS IN PEOPLE WITH CORONARY ARTERY DISEASE**

According to the latest study, published in the *New England Journal of Medicine* in April 2017, by Sripal Bangalore, MD, associate professor of medicine, and colleagues, patients with heart disease who experience fluctuations in body weight have a higher risk of heart attack and other cardiovascular events, including death. Doctors frequently advise heart disease patients to lose weight, but they often regain it. To determine whether cyclic weight loss followed by weight gain harms health, the researchers analyzed data from 9,509 patients with coronary artery disease who had previously participated in a statin study. The greater the fluctuations, the bigger the risk, they found, and the results were unaffected by other factors that increase cardiovascular risk.

## Innovative Devices, New Approaches to Treating Vascular Disease

May-Thurner syndrome is a rarely diagnosed condition in which the right iliac artery compresses the left iliac vein, decreasing blood flow and increasing the risk of deep vein thrombosis (DVT) in the left leg.



↑ Thomas Maldonado, MD, and Todd L. Berland, MD

According to Mark A. Adelman, MD, the Frank J. Veith, MD Professor and Chief of Vascular and Endovascular Surgery, this natural anatomical variant is thought to occur in more than 20 percent of the population, although it is often missed in the differential diagnosis of DVT.

Anticoagulant therapy is often insufficient to prevent recurrent DVT resulting from May-Thurner syndrome, which is most commonly diagnosed in young women between the ages of 20 and 40, and endovascular stenting of the iliac vein has become an increasingly common approach to managing this condition. Todd L. Berland, MD, associate professor of surgery and director of Outpatient Vascular Interventions, is leading a national clinical trial of a new iliac vein stent, the Abre™ venous self-

expanding stent system developed by Medtronic, which will begin enrollment early 2018.

In 2012, in the aftermath of Superstorm Sandy, which greatly impacted NYU Langone Health—operating rooms were backed up and elective surgeries had to be rescheduled—Dr. Berland utilized the outpatient surgical suites to accommodate peripheral artery disease (PAD) patients, making NYU Langone one of only a few sites in the region to offer outpatient PAD balloon angioplasty treatment safely and conveniently. Even after hospital schedules returned to normal, the advantages of the outpatient setting for treating PAD had become clear. “Our outpatient facility is completely equipped to perform these procedures,” Dr. Berland says. “The angioplasty takes

about 20 minutes, and after remaining flat for two hours to minimize bleeding, the patient can simply walk out of the office. It reduces the need for pre-surgical testing and anesthesiology, improves efficiency in the hospital while saving the health system money, and provides a much better experience for the patient.” Dr. Berland and his team will be presenting on the safety and efficacy of this approach at the annual Vascular & Endovascular Surgery Society meeting.

In December 2018, Dr. Adelman and the expert team of H. Leon Pachter, MD, the George David Stewart Professor of Surgery and chair of the Department of Surgery; Akhilesh K. Sista, MD, associate professor of radiology and section chief of Vascular Interventional Radiology; and Michael P. Recht, MD, the Louis Marx Professor of Radiology and chair of the Department of Radiology, will open a new state-of-the-art outpatient arterial intervention facility in Manhattan.

### A LEAP FORWARD IN DIALYSIS ACCESS

For more than five decades, arteriovenous (AV) fistulas have been the gold standard of vascular access for hemodialysis. Until now, more than 3 million people have had to undergo open surgery to create the fistula, a procedure associated with failure rates as high as 60 percent.

Dr. Berland is the national principal investigator on a new trial of a next-generation endovascular system for creating fistulas, the everlinQ™ endoAVF System. Two thin, flexible magnetic catheters are inserted into an artery and vein within the arm. Once aligned, a small amount of radiofrequency energy is used to connect the artery and vein in order to



create the fistula. The catheters are then removed, and a brachial vein is coil-embolized, enabling future dialysis.

In 2016, Dr. Berland became the first surgeon in the world to create an AV fistula using this system, performing the procedure in Paraguay. In January 2017, he presented the results of the single-arm, prospective, multicenter Novel Endovascular Access Trial (NEAT) study at the Leipzig Interventional Course (LINC) in Germany, which showed high fistula maturation (91 percent) and low rates of clotting.

“This has the potential to revolutionize kidney dialysis,” he says. “It takes just a few minutes as opposed to an hour-long surgical procedure, avoids scarring, and is much easier on the patient. In addition, surgically created fistulas often require balloon dilation multiple times a year as the body tries to close them, but we have found that the re-intervention rate for endovascular patients is between four and five times lower than that of open surgery.”

Dr. Berland will perform the first endovascular AV fistula procedure in the United States in early 2018.

### PLATELET PROTEIN MRP-14 PROVIDES INSIGHT TO PERIPHERAL ARTERY DISEASE

The incidence of PAD is on the rise and affects more than 200 million people worldwide. Activated platelets have been identified as a key trigger in the development and progression of PAD. A new study led by Bhama Ramkhalawon, PhD, assistant professor of surgery and director of vascular surgery scientific research, in collaboration with Jeffrey S. Berger, MD, associate professor of medicine and surgery, identifies a critical new pathway by characterizing how activated platelets can drive an inflammatory response in PAD. These findings were published in the *Journal of the American College of Cardiology* in January 2018.

Using a high throughput genetic RNA sequencing approach in a clinical cohort of patients with symptomatic PAD, the first time such a platelet screening has been performed in this population, the investigators found significantly increased

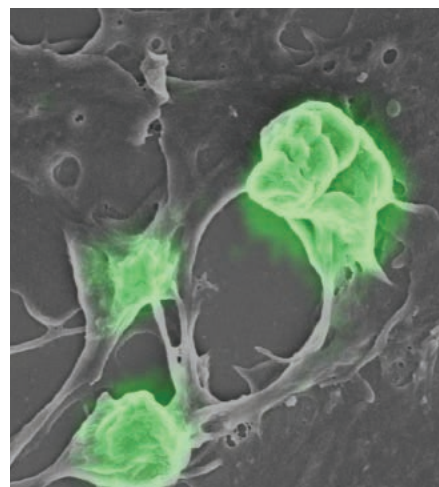
### VEITHSYMPOSIUM™ 2017: HIGHLIGHTED THE LATEST VASCULAR DISEASE TREATMENT ADVANCES

The 44th Annual VEITHsymposium™ on Vascular and Endovascular Issues, chaired by NYU Langone Health professor of surgery, Frank J. Veith, MD, was held November 2017 in New York. The symposium brought together world-renowned vascular specialists to focus on the latest advances in treatment, changes in diagnosis and management, and current vascular disease controversies. Chief of the Division of Vascular and Endovascular Surgery, Mark A. Adelman, MD, the Frank J. Veith, MD Professor of Vascular and Endovascular Surgery, serves on the VEITHsymposium™ Scientific Committee.

The symposium featured over 500 speakers, including more than a dozen from NYU Langone who offered key presentations, including:

- ➔ **Neal S. Cayne, MD**, professor of surgery and director of endovascular surgery
  - “Unusual Open Surgical Limb Salvage Techniques To Save Limbs Deemed “Unsalvageable”: They Often Work”
  - “Role Of 3D Fusion Imaging And Guidance With The Siemens Artis Zeego System For Complex Vascular Interventions: Advantages And Limitations”
- ➔ **Caron B. Rockman, MD**, the Florence and Joseph Ritorto Professor of Surgical Research and professor of vascular surgery
  - “Why ACE Inhibitors And Angiotensin Receptor Blockers Should Be Stopped 24 Hours Before Vascular Surgery And What Is Optimal Antiplatelet Drug”
  - “Therapy In Vascular Patients: Based On The EUCLID Trial”
- ➔ **Mikel Sadek, MD**, assistant professor of surgery and chief of vascular surgery at Bellevue Hospital
  - “Angiovac Venous Thrombectomy: Where, When, And How”

levels and activity of calcium binding myeloid-related protein 14 (MRP-14)—levels that correlated with the severity of a patient’s disease. The team compared MRP-14 levels found in the PAD patients with those of patients with carotid artery disease, and found that MRP-14 levels were higher in the PAD population, indicating MRP-14 upregulation is specific to PAD. “These results suggest that targeting MRP-14 in platelets may reduce inflammation and offer a valuable therapeutic target in peripheral arterial disease,” says Dr. Ramkhalawon.



➔ Magnified interaction of platelets, showing fusion of platelets (green) to macrophages



## New Advances in Cardiac and Vascular Research

Several groups of cardiac and vascular investigators reported important findings over the last year.

### RESEARCHERS AWARDED \$12 MILLION NIH GRANT TO STUDY OBESITY, DIABETES, AND ATHEROSCLEROSIS

Three researchers at NYU Langone Health were jointly awarded a \$12 million, five-year grant from the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH) to study the role of the immune cells known as macrophages in obesity, diabetes, and atherosclerosis. Under the leadership of cardiologist Edward A. Fisher, MD, PhD, MPH, the Leon H. Charney Professor of Cardiovascular Medicine, immunologist Kathryn J. Moore, PhD, the Jean and David Blechman Professor of Cardiology, and endocrinologist Ann Marie Schmidt, MD, the Dr. Iven Young Professor of Endocrinology, will collaborate to pinpoint factors that activate or repress macrophage inflammatory activity in each disease. Although macrophages are

normally beneficial, serving as the immune system's first responders against dangerous pathogens, these same macrophages can become the body's worst enemy when an individual becomes obese and develops diabetes or atherosclerosis. "Instead of taking a protective role, the macrophages become inflamed and exacerbate the damage caused by the disease," Dr. Fisher says.

Additionally, Dr. Moore, who is also a professor of cell biology, received the NHLBI's Outstanding Investigator Award, which is designed to provide NHLBI-funded investigators increased freedom to conduct research that breaks new ground or extends previous discoveries in new directions. The award allows investigators to take greater risks and pursue research that requires a longer timeframe.

Dr. Schmidt was also awarded Strategically Focused Research Network

in Obesity funding from the American Heart Association. Together with Ira J. Goldberg, MD, the Clarissa and Edgar Bronfman, Jr. Professor of Endocrinology, and Mary A. Sevvick, ScD, RN, professor of population health, the group will seek to discover the inflammatory and metabolic stimuli that thwart optimal weight loss after surgical or medical interventions. Dr. Fisher and Sean P. Heffron, MD, instructor of medicine, are key collaborators in this work.

### NYU LANGONE SCIENTISTS ZERO IN ON MECHANISM FOR REMOVING ARTERIAL PLAQUE

When low-density lipoprotein deposits form along the walls of coronary arteries, immune cells known as monocytes rush toward them. At the

## Half

### OF ALL DEATHS FROM CORONARY ARTERY DISEASE

are related to sudden cardiac death, often because of an underlying cardiac arrhythmia.



 Glenn I. Fishman, MD

deposit site, monocytes either become M1 macrophages that worsen the inflammatory response or M2 macrophages that dampen inflammation.

In research published in the *Journal of Clinical Investigation* in June 2017, Dr. Fisher, who is also the director of the Marc and Ruti Bell Vascular Biology and Disease Program, along with his team shed light on the process by which monocytes develop into these specific types of macrophages, and how they might be directed to become the healing M2 variety. Their research confirmed that timing is everything: When monocytes arrive in plaques that are regressing, they become M2 macrophages, helping to control inflammation and prevent plaque rupture.

Surprisingly, Dr. Fisher and his team found that Ly6Chi monocytes, a monocyte subset previously thought to contribute only to plaque progression and inflammation, can take on the M2 macrophage role of regressing and resolving inflammation. They are now focusing on therapeutic candidates to stimulate this process, including immune signaling proteins interleukin-4 and interleukin-13. They are also experimenting with nanoparticles inspired by high-density lipoprotein. “We need the next generation of drugs to go beyond cholesterol lowering to address the immune reaction to accumulated cholesterol, and to dismantle plaques as part of reversing or regressing mature disease,” Dr. Fisher says.

#### **LEDUCQ FOUNDATION TO FUND NYU LANGONE RESEARCH ON THE SODIUM CHANNEL**

Half of all deaths from coronary artery disease are related to sudden cardiac death, often because of an underlying cardiac arrhythmia. Normal cardiac rhythm is governed by an organized, regular wave of electrical signals, and the response of cardiac cells to these signals is largely determined by those cells’ sodium channels. Despite its

importance, surprisingly little is known about the sodium channel, and why it is so susceptible to dysfunction in heart disease.

Mario Delmar, MD, PhD, the Patricia M. and Robert H. Martinsen Professor of Cardiology and professor of cell biology, has been named the North American coordinator of a major new Transatlantic Network of Excellence in Cardiovascular Research sponsored by the France-based Leducq Foundation. The Leducq Foundation provides \$6 million over five years to teams of researchers working collaboratively in the areas of cardiovascular and neurovascular disease. Dr. Delmar and his group, including Glenn I. Fishman, MD, the William Goldring Professor of Medicine, will focus on mapping the composition and function of the sodium channel in various types of cardiac cells. After elucidating the role of the sodium channel, they will work to develop small molecules that can modify adversely altered channels, with the ultimate goal of providing treatments to prevent sudden cardiac death.

#### **EFFICACY OF RENIN ANGIOTENSIN SYSTEM INHIBITORS FOR CORONARY ARTERY DISEASE**

Current guidelines advise the preferential use of renin angiotensin system inhibitors (RASi) in all patients with stable ischemic heart disease, but the evidence does not support this blanket recommendation over other antihypertensive agents, according to an analysis published in *British Medical Journal* in January 2017 by NYU Langone Health investigators. Led by Sripal Bangalore, MD, associate professor of medicine, the group reviewed 24 trials involving more than 60,000 patients who were followed for an average of 3.2 years. They found that RASi drugs reduced cardiovascular events and all-cause mortality in comparison with placebo groups, but not when compared with active control groups for all primary outcomes, including all-cause mortality,

cardiovascular death, myocardial infarction, stroke, angina pectoris, and heart failure.

#### **GENE DELETION CAUSES TEMPERATURE-SENSITIVE CARDIAC CONDUCTION FAILURE**

Although fever is part of the immune system’s defense system against infection, it can also cause life-threatening changes in heart rhythm. Dr. Fishman, who is also director of the Leon H. Charney Division of Cardiology, and David S. Park, MD, assistant professor of medicine, have described a key regulator of cardiac cell electrical signals that protects against these irregular rhythms: Fibroblast growth factor homologous factor 2 (FHF2), which is known to modulate the response of cardiac muscle cells to electrical signals. In mice genetically modified to lack FHF2, the investigators found that a core body temperature increase of as little as 3°C caused progressive and life-threatening heart conduction slowing, a condition that reversed by returning to normal body temperatures. The group also identified sodium channel inactivation as the mechanism behind this effect. The research was published in *Nature Communications* in October 2016.

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Discharges

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Outpatient  
Faculty Practice  
Visits

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Births

**3,633**  
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**5,104**  
Nurses

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MD  
Candidates

**85**  
MD/PhD  
Candidates

**263**  
PhD  
Candidates

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