

NYUPHYSICIAN

The cover features a complex illustration. On the left, a woman's silhouette is shown in profile, with a green circular pattern on her head and a DNA double helix structure overlaid on her body. In the center, a large, detailed heart is depicted in shades of red and orange. To the right, a blue DNA double helix structure spirals upwards, and a pair of blue chromosomes is shown at the top. The background is a textured, brownish-gold color with faint DNA base pair letters (A, T, C, G) scattered throughout.

THE MAGAZINE OF NEW YORK UNIVERSITY SCHOOL OF MEDICINE

WINTER 2011-12
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2

Changing Perspectives on Women's Health

Heart Disease, Breast Cancer Risk, Pelvic Pain

PLUS

- New Children's Hospital
- 2011 Faculty Masters
- HHMI Research Fellow

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**“HOW CAN YOU HAVE
A HEART ATTACK
WITHOUT A BLOCKED
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OPEN ARTERIES.”**



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Improving Women's Health



It has taken a long time for the medical establishment to recognize the fact that women and men do not share the same biology and physiology and are therefore affected differently by disease. Women are more likely than men to die of heart disease, for example, and sometimes their symptoms are deceptively mild. Certain autoimmune diseases such as lupus are far more prevalent in women. Most people with osteoporosis are women, and the list goes on.

The recognition of gender differences in health has begun to refocus medical research to address the specific needs of women. In this issue of the magazine you will learn about some of the efforts under way at NYU School of Medicine and NYU Langone Medical Center to improve women's health. You will find remarkable stories about women's heart disease; a new surgical approach to mastectomy; women at high risk for breast cancer; and women's rehabilitative medicine, a vibrant field that is now emerging.

Most important, you will also meet some of the passionate and dedicated physicians, scientists, surgeons, and physical therapists who have devoted their lives to improving women's health. While much remains to be done, we are learning more about the differences between men and women that affect the way diseases manifest themselves and how to better diagnose and treat them. Our dedication to provide comprehensive patient-centered primary and specialty care to women is reflected in the recent opening of the Joan H. Tisch Center for Women's Health on the Upper East Side of Manhattan in New York City.

In the years ahead, you will be hearing much more about women's health, and I know that NYU Langone Medical Center's physicians and researchers will have much to offer. •

DEAN & CEO ROBERT I. GROSSMAN, MD

Women's Health By the Numbers

35 million

Number of women in the United States age 50 and older who have osteoporosis or are at risk for developing it by 2010*

316,000

Number of women who die each year from heart disease, the leading cause of death for women in the United States**

106,070

Estimated number of new cases of lung cancer in women in 2011***

71,340

Estimated number of deaths from lung cancer in women in 2011***

300,000

Estimated number of new cases of breast cancer—invasive breast cancer and carcinoma in situ (the earliest form of breast cancer) combined—in women in 2011***

40,000

Estimated number of women's deaths from breast cancer in 2011***

75%

Percentage of the 23.5 million Americans with autoimmune diseases (including multiple sclerosis, lupus, rheumatoid arthritis) who are women****

*National Osteoporosis Foundation

**Centers for Disease Control and Prevention, 2006

***American Cancer Society

**** American Autoimmune Related Diseases Association and National Institutes of Health



THE HASSENFELDS:
(from left) Alexander Casdin,
Laurie Block, Michael Block,
Ellen Hassenfeld Block, Blaisdell
Casdin, Sylvia Hassenfeld,
and Susan Block Casdin. Front:
Kinsey Casdin, and, kneeling,
Alan Hassenfeld.

Medical Center Plans New Children's Hospital

A \$50 million gift from the Hassenfeld family of toymakers will support a new state-of-the-art inpatient facility and expanded pediatrics program

A new children's hospital featuring dedicated, comprehensive medical and surgical services and all private single rooms, will become part of NYU Langone Medical Center's eastside campus in 2017, thanks to a \$50 million gift by the Hassenfeld family, owners of Hasbro, one of the nation's largest toy companies. The new hospital, which will be named the Hassenfeld Pediatric Center, will encompass 160,000 sq. ft., and provide a separate entrance on the Medical Center's new Kimmel Pavilion, scheduled to open at the same time.

The gift by the Hassenfeld family, led by Sylvia Hassenfeld, longtime trustee of the Medical Center, is their latest major contribution in support of pediatric services at NYU Langone, including most notably the Stephen D. Hassenfeld Children's Center for Cancer and Blood Disorders. The new Hassenfeld Pediatric Center will provide space devoted exclusively to the care of children in the company of their families, in all private patient rooms and baths—the only such facility of its kind in New York. The gift also supports the full array of children's health services across the Medical Center, where newborns, children, adolescents, and young adults receive comprehensive and advanced care by a team of pediatricians and pediatric specialists in more than 30 medical and surgical disciplines such as cardiology, oncology, and reconstructive plastic surgery.

"The Hassenfeld Pediatric Center is the cornerstone of an exciting new chapter for children's services at NYU Langone," explains Catherine Manno, MD, the Pat and John Rosenwald Professor of Pediatrics and chair of the Department of Pediatrics. "When children are in a hospital, their experience is of a different traumatic magnitude than it is for adults.

"The well-being of children is one of our great passions," Mrs. Hassenfeld said. "The first toys Hasbro made were doctor and nurse kits. I like to think that, with those, we inspired some youngsters who are now practicing pediatric medicine at NYU Langone."

The Hassenfeld gift was announced in October at a festive family event aboard the



Artist's rendering of 34th Street entrance to the Hassenfeld Pediatric Center at northern end of Medical Center campus.

Intrepid Sea, Air, and Space Museum. Barbara Walters served as mistress of ceremonies and speakers included Mayor Michael Bloomberg and Nirav Shah, MD, New York State Commissioner of Health. ●

Surprising Answers Found to ACL Injuries in Women Athletes

Athletes have something to learn from dancers.

Playing sports, as professional and amateur athletes attest, can be ruinous to the knee. A serious and common injury is tearing of the anterior cruciate ligament (ACL), a band of tough fibrous tissue that connects the femur and tibia bones and helps stabilize the joint. Women athletes are particularly vulnerable, suffering the injury at three to five times the rate of their male counterparts. Scientists have long assumed that the unique geometry of women's anatomy or their hormonal makeup is a causal factor. Now, however, a three-year project recently completed by NYU Langone Medical Center researchers is questioning that assumption. The crux of ACL injury for women and men alike, they conclude, may be poor training in landing from jumps.

"We looked at the data and thought, 'This is provocative,'" says Marijeanne Liederbach, PhD, director of research

and education at the Harkness Center for Dance Injuries at NYU Langone Medical Center's Hospital for Joint Diseases. "In our work with professional dancers, we rarely see an ACL injury in either men—or women." Only one dancer per 100,000 classes, rehearsals, or performances sustains ACL damage, a Harkness study revealed. In comparison, the rate of injury among college athletes who play ball sports, like basketball and soccer, is 23 to 28 per 100,000 games and practices.

Other than contact between people, most ACL injuries occur when an individual lands on one leg from a jump. To better understand the landing dynamics, Dr. Liederbach and her team of biomechanics specialists collaborated with researchers from Long Island University (LIU) and Lenox Hill Hospital to study body alignment and the force with which both men and women dancers and men and women

athletes strike the ground. In their initial study of 21 female and 12 male dancers, the investigators found no significant gender differences during landings.

In their latest study, they compared the landing mechanics of 40 athletes and 40 dancers by attaching electrodes and reflective markers to their bodies and having them perform various types of jumps. Both female and male dancers tend to set down softly with knee and ankle bending (in dance terms, in *plié*) and the body neutrally aligned, that is, with knee, hip, and trunk directly over the center of the foot. "They are trained to point their toes and extend their whole leg in the air and use their foot and calf muscles to decelerate on landing," says Marshall Hagins, PhD, of LIU, one of the study's authors.

The athletes, however, landed relatively hazardously—and the women athletes especially so. Female athletes put down with less range of motion and nonneutral alignment, with the hip and the knee turning inward, a position so dangerous that orthopedic surgeons have dubbed it a "heart attack of the knee."

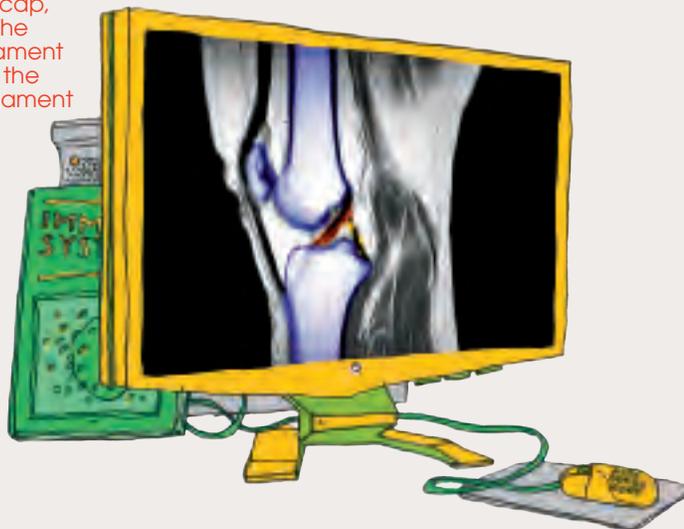
Current evidence suggests the difference in the way men and women athletes land is neuromuscular. For one thing, "female athletes tend to use the front thigh muscles, or quadriceps, more than their hamstrings, or back thigh muscles, during landing, which puts additional stress on the ACL," observes Evangelos Pappas, PhD, of LIU, a co-author of the study.

Whatever the cause, says Dr. Liederbach, young athletes may benefit from exercise programs that incorporate dance skills like postural control, balance, and proficiency in landing on one foot. "Remember Knute Rockne? The Notre Dame football coach who made his players take ballet lessons?" she asks. "He was really on to something a long time ago." ●

— AMY ENGLER



A color-enhanced MRI of a normal knee. The distal femur (above), the proximal tibia (below), and the patella, or knee cap, (left) are light blue. The anterior cruciate ligament (ACL) is orange and the posterior cruciate ligament (PCL) is yellow.



Reducing the Risk of Miscarriage in IVF Pregnancies

A new genomics technique offers hope to couples struggling with recurrent miscarriages.

Couples who experience recurrent miscarriages may find hope in a new genetic screening technique that identifies embryos unlikely to survive a pregnancy. Known as array comparative genome hybridization (array CGH), the technique shows whether an embryo has a normal number of chromosomes and is therefore likely to result in a healthy baby.

Array CGH, which was first used for genetic testing at a fertility clinic in Britain in 2008, reveals DNA copy number variations, typically an excess number of chromosomes, one of the main causes of miscarriage. Based on a recent study of couples with a history of miscarriages, the technique substantially reduced miscarriage rates, from 35 percent to 6 percent. Led by James Grifo, MD, PhD, chief of the Division of Reproductive Endocrinology and professor of obstetrics and gynecology, the study evaluated the embryos of 177

couples undergoing in vitro fertilization (IVF) in five fertility centers in the United States and Canada.

“Instead of waiting for nature to produce a normal embryo, we give the patient a more efficient way of getting there,” says Dr. Grifo, director of NYU Langone Medical Center’s Fertility Center, who reported the results of the study at a recent meeting of the American Society of Reproductive Medicine. Reproductive medical specialists, he adds, hope that the accuracy of the technique may someday allow the implantation of only one healthy embryo in the uterus, thus avoiding the risk of multiple births.

Dr. Grifo has been trying to help couples who suffer from recurrent pregnancy loss for more than two decades. In the early days of his research, it was possible to biopsy only one cell and test just a few chromosomes on day 3 of an embryo’s

development. Array CGH, he explains, provides greater accuracy because it allows physicians to test multiple cells from the embryo on day 5 of development. By that time, the embryo has survived two more days of natural selection and has grown from 8 cells to hundreds of cells.

Dr. Grifo and his team selected couples with recurrent miscarriages and an average maternal age of 36. After fertilization through IVF, DNA samples were extracted from several different cells of the embryos. To detect abnormalities, all 23 pairs of chromosomes were compared with 4,000 normal samples of DNA scattered across normal chromosomes. The array CGH tests were performed at Reprogenetics, a private genetics laboratory based in Livingston, New Jersey.

After testing 1,517 embryos, 63 percent were confirmed to be chromosomally abnormal and only 33 percent were healthy. However, of the women implanted with healthy embryos, 40 percent passed their second trimester—nearly a 10 percent increase over the national average for women ages 35 to 37 undergoing IVF. Compared to an older preimplantation genetic diagnosis technique known as FISH, array CGH reduced miscarriage rates by an extra 40 percent, according to the study. Dr. Grifo points out that even when an embryo is healthy, a certain number of miscarriages may be caused by health problems affecting the mother.

Currently array CGH costs about \$6,000; despite the cost, Dr. Grifo and his team hope the technology can help couples who struggle with recurrent miscarriages either to maintain a pregnancy with a healthy embryo or avoid a pregnancy with an unhealthy one. “Psychologically, a negative pregnancy test is easier to handle than multiple pregnancy losses,” says Dr. Grifo. ●

—SHARON KAY



Light micrograph of a human embryo at the blastocyst stage. This blastocyst, four to five days old, appears as a hollow ball of cells. On around day six, the embryo will begin to implant into the wall of the uterus.

Genetic Snippets May Provide Key to Understanding Spread of Melanoma

The noncoding part of our genome begins to yield its secrets.

Less than a decade ago, no one suspected that tiny molecules buried within seemingly useless portions of our genetic code, the so-called junk DNA that doesn't yield proteins, might hold the key to understanding which cancers can spread throughout the body and how they do so.

Scientists have since found that these genetic snippets, named microRNAs, can precisely regulate multiple genes, acting like master switches that turn off a home security alarm so thieves can move undetected through a house. More than 1,400 microRNA molecules have now been identified in humans, and the accompanying research boom has linked dozens of these switches to a growing list of cancers.

Groundbreaking experiments by Eva Hernando, PhD, assistant professor of pathology, suggest that the aggressive

skin cancer known as melanoma may rely heavily on this unique control mechanism. Melanoma forms in the melanocyte cells that produce skin pigment and is infamous for the stealthy and lethal advance of metastasizing tumor cells that migrate far from the site of the primary cancer. More than 90 percent of deaths from solid tumors like melanomas and breast cancers have been blamed on metastatic cells. The disease process, however, requires colonizing tumor cells to escape the primary mass, avoid detection while in transit, and then establish themselves elsewhere.

In a recent issue of *Cancer Cell*, a study led by Dr. Hernando and graduate student Avital Gaziel-Sovran identified a cluster of two microRNA molecules that may allow melanoma to invade and under-

mine immune surveillance as it spreads. Understanding the biological basis of this support might in turn give researchers better indicators of disease severity and new drug targets.

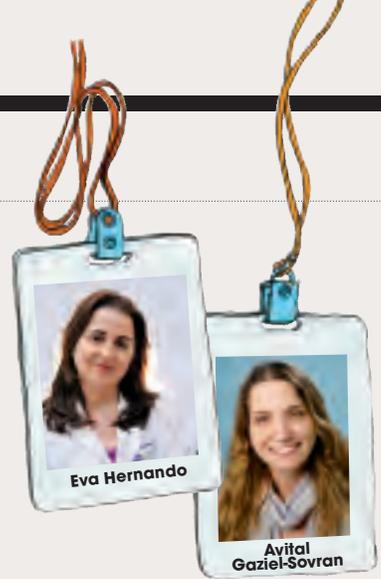
An analysis of patients' melanoma samples showed that higher levels of the microRNA cluster corresponded with more severe cancer, a shorter time to recurrence, and shorter overall survival. "It's very associated with a more aggressive disease," Dr. Hernando says.

In another study nearing completion, her team has found that the activity levels of certain microRNA combinations can predict which patients will have a recurrence of melanoma. "This is amazingly powerful, because you could tell a patient, 'Okay, you're in the low-risk category,' or 'You're in the high-risk category, now we need to do more frequent checkups on you,'" she says.

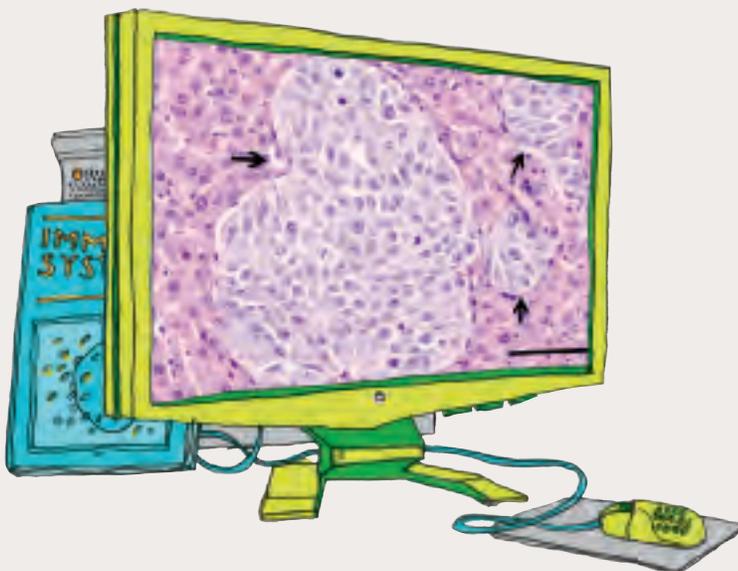
Antoni Ribas, MD, PhD, a noted melanoma researcher at the David Geffen School of Medicine at UCLA, says experiments like those led by Dr. Hernando could clarify the underlying behavior that drives the cancer's aggression. "I think that's the most tangible and immediate promise of microRNA research, which is to understand the biology of the cancer by studying a system that controls a whole bunch of gene programs," he says.

Despite some early proof-of-principle experiments that show promise for therapeutic interventions, both Dr. Ribas and Dr. Hernando caution that more basic research must be conducted before any clinical applications can become a reality. Even so, Dr. Hernando says she's "moderately optimistic" that the widening investigation of microRNAs may deliver new leads that finally help doctors outwit melanoma's shifty, deadly ways. ●

—BRYN NELSON



MicroRNAs may increase aggressive melanoma, as seen in mouse liver below.





A Microbe's Sparse Genome Is Revealed

Study increases knowledge about how bacteria influence health.

More than 40 years ago researchers first described segmented filamentous bacteria (SFB) living in the guts of mice. They knew little about the microorganism, except that it sported long filaments resembling shaggy hair. Two years ago the once-obscure microbe was pushed into the limelight when researchers led by Dan Littman, MD, PhD, implicated it as a key player in regulating the immune system of mice. A new analysis of its bare-bones genome may provide an unprecedented opportunity to understand the basis of the microbe's remarkable effect on the mouse immune response.

The scientists initially found that SFB can recruit specialized T cells called Th17 cells that protect mice from disease-causing *Citrobacter rodentium* bacteria, but it can also make the rodents more susceptible to harmful inflammation and autoimmune arthritis. "What has become clear in the last couple of years is that individual bacteria can specifically influence particular branches of the immune system," says Dr. Littman, the Helen L. and Martin S. Kimmel Professor of Molecular Immunology, professor of pathology and microbiology, and a Howard Hughes Medical Institute Investigator. Through their examination of SFB's surprisingly small genome, Dr. Littman and his collaborators may help uncover general mechanisms used by other intestinal flora to influence their hosts' immune function.

The genomic analysis, published in the September issue of *Cell Host and Microbe*, concludes that SFB is genetically distinct from the 1,200 bacterial genomes known to date, adding a new branch to the family tree. With 1.57 million letters of DNA, it is about one-third the size of its closest relatives and lacks many of the genes needed to survive on its own, such as those for making amino acids and other essential nutrients. As a result, SFB is

highly dependent on its host or on other gut-dwelling bacteria for food. Many of the microbe's 1,500 genes, however, allow it to interact extensively with the host and its environment, suggesting that it is well suited for life in the small intestine.

"One of the major goals in the study was to get some insight into what might be going on in the human gut," Dr. Littman says. Although the study didn't uncover definitive signs of SFB within us, Dr. Littman says he'll be surprised if the bacteria haven't colonized certain human populations. Even if the species isn't found in our intestinal tract, scientists could still apply the lessons learned to microorganisms that do dwell within us.

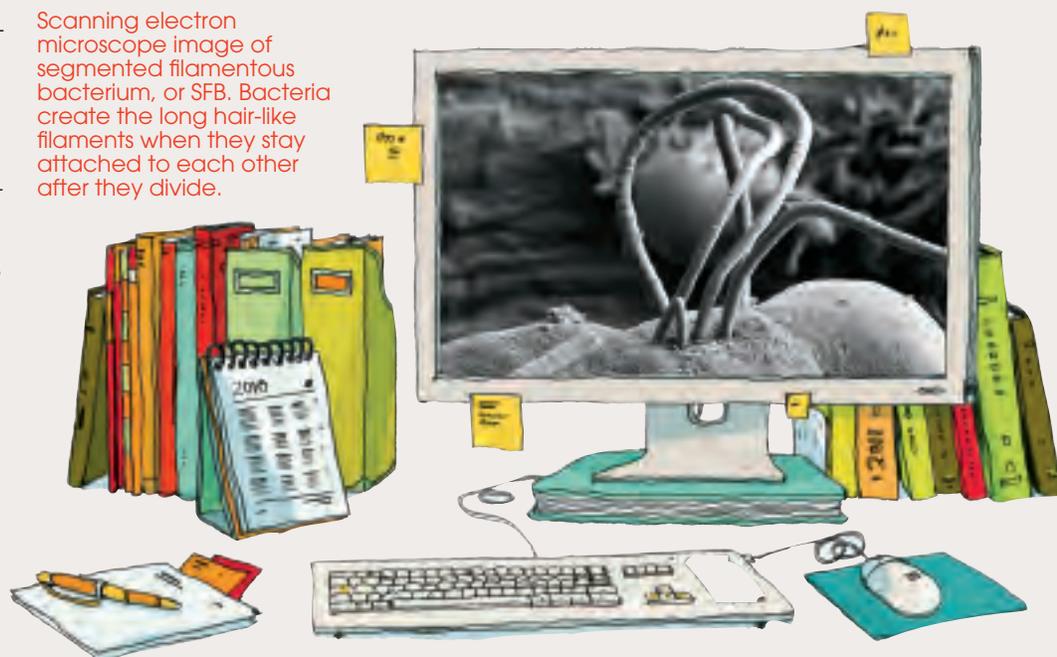
"Maybe in humans, there is another bacterium that is different from SFB but behaves functionally in the same way,"

says study co-author Ivaylo Ivanov, PhD, who conducted much of the latest analysis as a postdoctoral researcher in Dr. Littman's lab. "Our goal is to try to identify the functionally important genes. Then when we know what these genes are, we can look for homologues in humans," says Dr. Ivanov, who is now at Columbia University Medical Center.

In collaboration with other NYU researchers, Dr. Littman may already have found a similarly behaving microbe in the intestinal tract of rheumatoid arthritis patients. In Japan, researchers recently isolated other gut-dwelling, immune system-regulating microbes. The task now, Dr. Littman says, is to identify the distinct bacterial signals and components that can help maintain—or thwart—our finely balanced system of defense. ●

—BRYN NELSON

Scanning electron microscope image of segmented filamentous bacterium, or SFB. Bacteria create the long hair-like filaments when they stay attached to each other after they divide.





The Toll of Heart Disease in Women

Research on women has lagged, but recent studies are shedding light on the mechanisms that cause **heart attacks** in women.

By Jane Bosveld

Illustrations by Vivienne Flesher

NEW YORK FASHION MERCHANDISER JOAN KENNEDY GOLDMAN WAS HAVING A HEATED DISCUSSION WITH A CO-WORKER FOUR YEARS AGO WHEN SHE SUDDENLY STARTED TO FEEL SICK. "NAUSEOUS," SHE SAYS, "THEN CHEST PAINS." SHE ENDED THE MEETING AND TRIED TO CALM DOWN, BUT THE PAIN CONTINUED. "I KNEW THERE WAS SOMETHING WRONG," GOLDMAN SAYS. SHE CALLED HER CLOSE FRIEND, FELICIA B. AXELROD, MD, WHO WORKS AT NYU LANGONE MEDICAL CENTER. DR. AXELROD HURRIED OVER, EXAMINED HER, AND CALLED 911. (DR. AXELROD IS THE CARL SEAMAN FAMILY PROFESSOR OF DYSAUTONOMIA TREATMENT AND RESEARCH AND PROFESSOR OF PEDIATRICS AND NEUROLOGY.)

Goldman was admitted to NYU Langone, where blood tests confirmed she was having a heart attack. Her angiogram, however, was another story. An angiogram measures arterial blood flow, and an angiogram taken in the midst of a heart attack should show an obstructed artery. The cause of most heart attacks is a buildup of plaque in artery walls that blocks blood flow to the heart. "But Ms. Goldman did not have any significantly closed arteries," says Harmony R. Reynolds, MD, assistant professor of medicine.

How can you have a heart attack without a blocked artery? It's a question that intrigues cardiac specialists, especially because many more women than men have heart attacks without a major blockage. In fact, according to a study led by Dr. Reynolds and published in *Circulation* in September, as many as 32 percent of women who experience a heart attack have open arteries. The fact is that women's heart attacks can be very different from those that are typical for men. As one of the study's authors, Judith Hochman, MD, director of the Cardiovascular Clinical Research Center and co-director of the Clinical and Translational Science Institute, puts it, "there are other mechanisms that cause heart attacks besides a blocked artery, and they are more common in women than they are in men."

Understanding these other mechanisms is central to treating and preventing the disease, particularly in women. But research on women has lagged. Studies have focused on men and even

A TEMPORARY BLOCKAGE ISN'T THE ONLY UNUSUAL CAUSE OF HEART ATTACKS IN WOMEN.

means that women may not be getting effective treatment. A lot of women underestimate their risk of heart disease or ignore warning signs of heart attack, which can be deceptively mild in some women (see box). The result can be deadly. In fact, more American women die of heart disease each year (about 315,000) than from any other disease, including breast cancer.

Moreover, women are 1.5 times more likely to die within a year of having a heart attack and are twice as likely as men to die after bypass surgery. Perhaps most distressing, the mortality rate from heart disease for young women is growing.

Researchers like Dr. Reynolds are working to change all that by getting a better picture of what is actually going on in women's hearts during a heart attack. "No one had really systematically looked at women patients using multiple imaging techniques that would give a clearer picture of what was happening," Dr. Reynolds explains. To get a better look, Dr. Reynolds employed two sophisticated scanning techniques: intravascular ultrasound, which highlights the walls of arteries, and cardiac MRI, which images the heart as it's beating to give a detailed

picture of cardiovascular function and where heart damage may have occurred.

The enhanced imaging revealed that nearly 40 percent of the women had had a plaque rupture that likely produced an artery-clogging blood clot and caused a heart attack. By the time of their angiograms, the blockage had dissolved. Dr. Reynolds suspects this is what happened to Goldman. "We think," she explains, "that her artery was temporarily blocked by a blood clot at the time of the heart attack, but that the clot must have been broken down by the body before the angiogram was taken."

The distribution of plaque varies in each patient and even within different arteries in the same patient. In some the sticky substance tends to build up on the artery walls, narrowing the interior canal that carries the blood. This narrowing is what shows up on an angiogram. But, in others, plaque is typically

now, most of the subjects in heart-related clinical trials are male. "Newer research studies include larger proportions of women than older studies," Dr. Reynolds says, "but it is still unusual to find one in which even half the participants are female."

The focus on men means less is known about heart disease in women. It also



deposited in the artery walls, expanding the vessel rather than clogging it. So the plaque doesn't impede blood flow unless it ruptures and causes a blood clot, which explains why some women's angiograms may not show any blockage. "Some doctors," Dr. Reynolds says, "can't get past the idea that if you can't see the closed artery, it never existed." Consequently these patients may not get standard treatment, such as aspirin and statins, a class of drugs that lower cholesterol. "But," Dr. Reynolds argues, "many of their heart attacks were caused by plaque rupture, so we believe the treatment should be the same."

A temporary blockage isn't the only unusual cause of heart attacks in women. Dr. Reynolds reports that some women appear to have had heart attacks triggered by spasms in the coronary arteries. Arteries have muscles within their walls that can contract or spasm just as a calf muscle can cramp. The spasm closes down the inside of the vessel, completely blocking blood flow. Although researchers don't yet know for sure what causes arterial spasms, in some cases they may occur when certain abnormal cells that are sometimes present on plaque, even minimal plaque, interact with chemicals that regulate tension in the artery. These chemicals control how relaxed or tight the artery becomes. "People with plaque can have an overstimulation of these chemicals, leading to a spasm," says Dr. Hochman, the Harold Snyder Family Professor of Cardiology. Some patients who have had such spasms, however, had normal vessels, with no plaque. "In those cases, we don't know why they have a spasm," Dr. Hochman says. "It's still a mystery."

An even rarer type of heart attack that women seem to experience more than men is takotsubo cardiomyopathy, also known as broken heart syndrome. Dr. Reynolds reports that about 1 percent of women who have heart attacks have this syndrome, which occurs during extreme stress or trauma, such as seeing someone you love killed in a car accident or coming near death yourself. "Takotsubo cardiomyopathy is a temporary, but severe, heart muscle dysfunction that seems to be triggered by very high levels of adrenaline and other related stress hormones," Dr. Reynolds explains. Of course, what is traumatic for one person may not be for another, and it's even possible for worry to become so intense it affects the heart. One of Dr. Reynolds's patients, for example, experienced takotsubo cardiomyopathy while watching her son play football. "She was so afraid he might get hurt, she had a heart attack," Dr. Reynolds says.

Advances in the treatment of heart disease have led to a decline in the mortality rate for men between the ages of 35 and 45, but that's not the case for women that age. According to a study published in the *Journal of the American College of Cardiology* in 2007, the mortality rate among women aged 35 to 44 has been increasing on average by 1.3 percent each year since 1997. The question is, why? "Perhaps they are not being given as aggressive treatment," Dr. Hochman conjectures, "or we're not addressing the different mechanisms that cause their heart attacks."

Recognizing the risk that heart disease poses to younger women can change screening and treatment. When Nieca Goldberg, MD, clinical associate professor in the Department of Medicine, started her residency in the 1990s, she administered a stress test to an African American woman in her forties who had been complaining for months about shortness of breath, throat tightness, and fatigue after exertion. Not surprisingly,

WOMEN'S HEART ATTACK SYMPTOMS

| | |
|--|---|
| Pressure or fullness in the chest that lasts for more than a few minutes or that recurs. | Unexplained or excessive sweating or breaking out in a cold sweat. |
| Pain or discomfort in one or both arms, shoulders, neck, jaw, back, or upper part of the stomach (not below the belly button). | Unusual tiredness or lack of energy. It can come on suddenly or be present for days. More than half of women having a heart attack experience muscle tiredness or weakness unrelated to exercise. |
| Severe shortness of breath that comes on suddenly, even when you are resting or engaged in minimal physical activity. You may struggle to breathe or feel like you need to take deep breaths. Shortness of breath can be the only symptom of a heart attack. | A sudden feeling of dizziness or light-headedness. Nausea, vomiting, or indigestion, especially in the presence of other symptoms. |

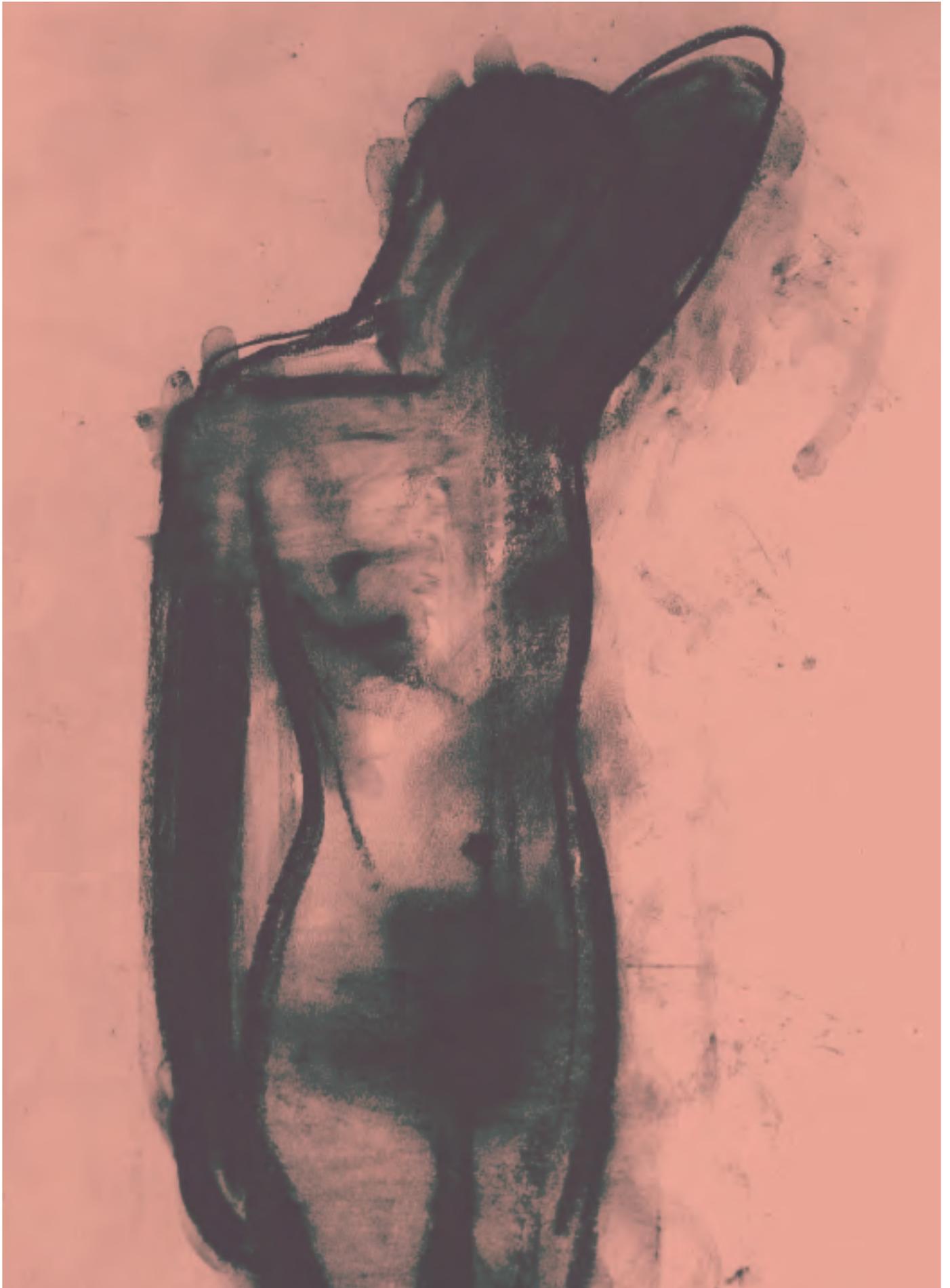
**From Womenshealth.gov, a project of the U.S. Department of Health and Human Services Office on Women's Health.*

her stress test was abnormal, but when Dr. Goldberg told the woman's doctor, he said, "Oh, she couldn't possibly have heart disease." Dr. Goldberg sent the patient for an angiogram anyway; it revealed a 99 percent blockage in her left anterior descending artery, which supplies most of the blood to the heart. "The patient had successful angioplasty and did well," Dr. Goldberg says. But Dr. Goldberg also realized that younger women needed better healthcare for their hearts.

One way of improving care, Dr. Goldberg realized, would be for all physicians, from primary care to gynecology, to check cardiovascular health during visits. That's what happens at the Women's Heart Center, a multidisciplinary center that opened as part of the Joan H. Tisch Center for Women's Health in September. Dr. Goldberg, who serves as medical director, explains that the center has a variety of specialists, who "all screen for heart disease symptoms in their patients."

But part of the responsibility for treating heart disease falls on women themselves. Climbing rates of obesity contribute to heart disease, particularly in younger women. And, Dr. Goldberg stresses, women need to be aware of the warning signs of heart attack and get to the hospital. "Compared to men, women delay an hour or more before getting help," Dr. Goldberg says. That can be the difference between little or no heart damage and severe heart damage, or even death.

Like many women, when Joan Goldman started to feel sick and had chest pain, she was reluctant to call 911; fortunately her physician friend knew better. "I was in denial for years," Goldman admits. "Now at least I can say I had a minor, minor, minor heart attack. And next time I get into an argument, I'll end the conversation before the pain starts." ●



BREAST CANCER RISK

Researchers hope to give women a more precise assessment of their personal risk of developing breast cancer.

By Anastasia Toufexis
Illustration by Vivienne Flesher

THE

PAST FEW DECADES HAVE SEEN MAJOR ADVANCES IN EARLY DIAGNOSIS AND TREATMENT OF BREAST CANCER. AS A RESULT, MORE AND MORE WOMEN ARE SURVIVING THE DISEASE; TODAY MORE THAN 80 PERCENT OF WOMEN ARE STILL ALIVE 10 YEARS AFTER DIAGNOSIS. RESEARCHERS ARE NOW ADDRESSING ANOTHER AREA: GIVING WOMEN A MORE PRECISE ASSESSMENT OF THEIR PERSONAL RISK OF DEVELOPING BREAST CANCER.

“The ability for us to predict which individuals will get breast cancer has improved overall but we still need work to be able to offer precise risk estimates to individual women,” says Freya Schnabel, MD, professor and director of breast surgery at NYU Langone Medical Center. “If we could give a woman a more precise understanding of her unique risk, we could better tailor surveillance and therapy strategies, providing the least intrusive screening and the least obnoxious therapy to protect her health.”

Today, doctors can provide a woman with only imprecise, and often subjective, predictions derived from studies of groups of women. But risk is a complex interplay of many factors, and each woman perceives and weighs them very differently. “It’s a lot like crossing a street in New York City,” Dr. Schnabel says. “You have to consider any number of things to figure out how imminent the threat is to your safety. Is the light green? Is a car coming? How fast? What baggage am I carrying? How lucky do I feel today?”

In breast cancer risk assessment, family genetics, personal medical history, and lifestyle must all be weighed (see box). At NYU, Dr. Schnabel is spearheading an effort to understand these

Dr. Freya Schnabel



variables, particularly in women with high susceptibility, and move toward individualized evaluations. For example, clinicians know that inherited mutations in certain genes, formally named BRCA1 and BRCA2, put women “in the highest risk bucket,” Dr. Schnabel says. “But even in BRCA families, there’s diversity. Some families get more breast cancer, some get more ovarian cancer. Some get their cancers extremely early on, and some later. We’re trying to comprehend what’s responsible for that effect. What modifies the expression of these genes?” Scientists are also searching for other inherited anomalies. “BRCA genes are not the whole picture.”

An additional inquiry is focusing on another vulnerable group: those with abnormal, though not malignant, breast cells. “Women who have these atypical hyperplasias have about a 25 percent lifetime risk for breast cancer, double the baseline population risk,” Dr. Schnabel says. In February 2011 she launched a registry to track women with atypical hyperplasias as well as genetic mutations. So far, 205 patients, average age 52, are enrolled in this high-risk cancer registry.

One of the goals is to find the best way to monitor these high-risk patients. The basic surveillance strategy is mammography. Doctors add ultrasound for women with dense breast tissue and MRI for those at high risk. “Do these patients really need

an MRI every single year, or every other year?” Dr. Schnabel asks. Researchers also hope the registry will help evaluate risk-reducing interventions. “What happens 10 to 15 years down the road to BRCA carriers who have prophylactic mastectomy or take tamoxifen to prevent the disease? We’re trying to figure out how to use resources in a smarter and more focused way.”

Looking into the future, Dr. Schnabel sees refinement of individual risk prediction going in two ways. “One will be an in-depth analysis of a person’s genetics—what she has inherited from her parents, what’s in every one of her cells. The other is looking at breast tissue to see different factors that influence the patient’s risk prediction. In other words, a cell-based or tissue-based test.” Dr. Schnabel hopes these efforts will be aided by a biorepository of breast tissue samples from high-risk patients that has been created at NYU. The biorepository, which is funded in part by Cure in Our Lifetime, will be linked to the high-risk registry. ●

Risk Factors for Breast Cancer

Some of the factors in breast cancer have been known for a while, others have been only recently discovered, and others are still being teased out. They fall into three main categories:

Genetics. A family history of breast cancer in female or male relatives elevates risk, as does a history of cancers associated with breast cancer, including ovarian, prostate, and pancreatic. At highest risk are women with mutations of the BRCA genes. Certain populations, such as Ashkenazi Jews, have a higher incidence of the mutations. “However, BRCA carriers constitute only a small fraction of the total population of women with breast cancer and only about 20 percent or 25 percent of women who have breast cancer have any family history of the disease at all,” Dr. Schnabel says.

Personal Medical History. At top risk are women who have already had breast cancer. A woman who has had a biopsy that revealed abnormal, but not cancerous, cells is also in significant danger. “One other possible high-risk condition is if a woman has had Hodgkin’s disease and was treated with radiation to the chest area, particularly in late adolescence. That gives her an 11 times increase in the risk

of getting breast cancer later on.”

The picture is less clear for most women and depends on a number of variables. One is exposure to estrogen, which can accelerate differentiation and proliferation of breast tissue cells. The more exposure, the greater the risk. Doctors consider the age at which a woman reached puberty and estrogen production began, the amount of time spent breast-feeding (which suppresses hormone production), age at menopause (when estrogen production drops dramatically), and whether she’s had hormone replacement therapy. “Postmenopausal women who have had HRT for five years increase their risk of breast cancer by 20 percent,” Dr. Schnabel notes.

Lifestyle. “Lately, we’re recognizing more and more that there are lifestyle factors that can also increase one’s risk for breast cancer,” Dr. Schnabel says. “Certainly in postmenopausal women, obesity is now very well described as a risk for breast cancer. Smoking and alcohol are also increasingly well established as risk factors for breast cancer.” The big question is how to weigh these factors. ●

WOMEN OF COLOR AND BREAST CANCER

Aiming to Change a Grim Picture

By Gina Shaw

Two years ago, when the U.S. Preventive Services Task Force announced that it recommended against screening mammography in women between the ages of 40 and 49, Kathie-Ann Joseph, MD, was dismayed. “The women I treat need more screening, at a younger age, not less!” she says.

Dr. Joseph, assistant professor of surgery, is particularly concerned about the disparities in breast cancer care for women of color. In 2010 she returned to NYU School of Medicine—where she completed her general residency and a two-year research fellowship in surgical oncology—after eight years at Columbia University Medical Center, to help lead the expansion of NYU’s

[Dr. Kathie-Ann Joseph](#)



breast cancer programs for underserved women, including those of African American, Hispanic, and Asian descent.

Black women, in particular, face grim odds. Although they are diagnosed with breast cancer less often than Caucasian women, they die from it at a rate that’s 35 percent higher. In fact, according to the U.S. Department of Health and Human Services’ Office of Minority Health Resource Center, black women between

the ages of 35 and 44 are twice as likely to die from breast cancer as white women.

There are a host of intertwining factors behind these shocking statistics, but many black women are dying from breast cancer because they’re developing it at a younger age, when it is often more aggressive. “That’s why the task force’s mammography recommendations did women of color such a disservice,” Dr. Joseph says. “These are women who need to be screened more, before the age of 40, and doing more breast self-exams.”

One of the reasons why Dr. Joseph returned to NYU was the opportunity to direct breast services at Bellevue and at Woodhull Hospital in Williamsburg, Brooklyn, where the patient population is primarily black, Hispanic, and Asian—and often surprisingly young. “I’ve seen so many young women with breast cancer,” she says. “I’m now treating a 31-year-old African American single mom with three kids under 10. She has a strong family history of the disease and should have been

having screening mammograms all along.”

At her office in Bellevue Hospital, dominated by a glass-topped table repeatedly etched with the word *love* in dozens of languages, Dr. Joseph discusses how to change the breast cancer survival statistics for women of color. These numbers have barely budged over the past three decades even as overall survival numbers have improved.

Cultural barriers prevent many young, high-risk women from getting the early screening for breast cancer they need, Dr. Joseph explains. “Many women of color just don’t go in for screening. They have more immediately pressing issues, like job, family, and insurance—or the lack of it. And they’re scared. There’s the perception that once you get that diagnosis, it’s over. They’d rather just not know.”

Language can also be a barrier. At least half of Dr. Joseph’s high-risk patients have another primary language, mostly Mandarin or Spanish. “It’s hard enough to explain BRCA mutations, family history, lifetime risk, and screening recommendations in English,” Dr. Joseph says. Women are offered resources, support, and a common language through the programs at Bellevue and Woodhull hospitals, she notes. They’re guided through their options by one of four experienced patient navigators—two of whom speak Mandarin, and one of whom speaks Spanish. Two navigators are breast cancer survivors themselves. Emergency Medicaid or other resources are also used to help women without any insurance.

Of course Dr. Joseph would prefer to reach these women before they become cancer patients. She has just submitted a grant proposal to fund a high-risk navigator—an individual delegated to shepherd patients with a strong family history or BRCA mutations through the healthcare system and also educate those in other clinics within Bellevue about the need to identify women who need breast cancer screening. “Cancer is obvious. It’s an immediate problem,” Dr. Joseph says. “But being high risk is not so obvious, and our clinic systems are set up for immediate problems. If we’re going to change the picture for women of color and breast cancer survival, we have to change the system.” ●



Minimizing Disfigurement

**Breast surgeons
are offering a new
kind of mastectomy
surgery that helps
women feel better
about their bodies.**

By Aubin Tyler

Breast cancer surgeon Dr. Deborah Axelrod sees patients at NYU Clinical Cancer Center. She is performing mastectomy surgery that preserves the nipple and areola.

IN

HER 1977 BOOK, *ILLNESS AS METAPHOR*, ESSAYIST SUSAN SONTAG IDENTIFIED WARFARE AS THE PROMINENT METAPHOR FOR CANCER AND ITS TREATMENT. MALIGNANT TUMORS INVADE. TREATMENT KILLS. THE METAPHORS AREN'T SURPRISING, CONSIDERING THAT AT THE TIME SONTAG WAS RECOVERING FROM A RADICAL MASTECTOMY. THAT AGGRESSIVE BREAST CANCER SURGERY REMOVED ALMOST HALF OF THE CHEST—ALL BREAST TISSUE, ALL OVERLYING SKIN, BOTH FAN-SHAPED CHEST MUSCLES UNDER THE BREASTS, AND THE UNDERARM LYMPH NODES.

Sontag lived another 30 years. As the decades progressed, doctors learned more about breast cancer and found that less extensive surgeries offered equally good protection against tumor recurrence. The promising outcomes led surgeons to consider new ways of doing mastectomies that would minimize disfigurement, too.

Over the past five years, a new mastectomy technique has been gaining acceptance; the less drastic procedure removes the breast while sparing its blood supply and outer envelope of skin—including the nipple and areola. In reconstruction, an implanted saline- or silicone-filled pouch or tissue from the patient's own belly or back replaces the internal breast tissue, preserving the breast's appearance.

"Coupled with reconstruction, the cosmetic results are so superior to traditional mastectomy—simply amazing," says Richard Shapiro, MD, associate professor of surgery and director of surgical oncology operations and services at NYU Clinical Cancer Center. Since 2010 Dr. Shapiro has performed 134 of the operations in 71 patients, 30 percent of them young women without breast cancer who are at high risk because of their family

history or genetics.

Nipple and areola sparing is the most recent advance in mastectomy technique after skin sparing, first reported in 1991, in which surgeons saved the breast skin but routinely cut out the nipple and areola. If the patient wanted it, an artificial nipple could be created and a false areola tattooed in place. Because most breast cancer arises in the milk ducts leading to the nipple, oncologists worried that cancer could recur in residual tissue in and around the area. But over the past decade, a growing body of literature indicates that cancer in the retained nipple is a rare event.

"Most of us believe that nipple sparing is safe," Dr. Shapiro says. "If you look at the risk of recurrence in the nipple, it's low." But he acknowledges that long-term outcome data is lacking, though studies are ongoing. As with any mastectomy, he says, there is still a 3 to 9 percent risk of tumor recurrence or a new primary tumor.

"Women need to consider that we don't have long-term data yet on nipple sparing," cautions oncologist Julia Smith, MD, PhD, director of Breast Cancer Screening and Prevention Programs at NYU Cancer



Tammi Fox chose to have a nipple-sparing mastectomy.

Institute. “It is a complicated issue. There is no procedure, including bilateral prophylactic mastectomy, that completely eradicates all risk. Therefore, each woman should be given the information and helped to make a decision that best balances her concerns and wishes.”

RECONSTRUCTING THE BREAST

To remove as much at-risk tissue as possible during the surgery, cell scrapings from inside the nipple are sent to the pathologist. If she finds cancer, or any atypical or suspicious cells, the nipple is sacrificed. Because nerves around the nipple are cut, most women lose sensation, though some patients have reported its return.

“It’s women-driven,” says Deborah Axelrod, MD, associate professor of surgery and director of Clinical Breast Programs and Services at NYU Clinical Cancer Center, who, like Dr. Shapiro and a handful of their colleagues, performs nipple- and areola-sparing mastectomies in collaboration with NYU plastic surgeons who rebuild the breast afterward. “Women want it, just like lumpectomy and other types of breast conservation,” she says.

Tammi Fox, 39, couldn’t agree more. The married mother of two had a baseline mammogram at a local imaging center, near her home in Suffern, New York, in July 2010. Though she felt healthy and had no family history of breast cancer, a mammogram and ultrasound revealed a thickening in her left breast near her armpit. Repeat imaging six months later showed it hadn’t changed. When the radiologist suggested she consult a breast specialist, family friends recommended Dr. Axelrod.

Dr. Axelrod used a needle to obtain a small amount of tissue from the thickening and found atypical cells. “Dr. Axelrod didn’t think it was cancer, but based on the results of the fine needle aspiration, she said it should come out,” recalls Fox, a product manager for JP Morgan. In May 2011 Dr. Axelrod removed the mass, working with NYU plastic surgeon Nolan Karp, MD, who was able to minimize the defect with a “lollipop” incision around the areola and nipple and then straight down the center of the breast.

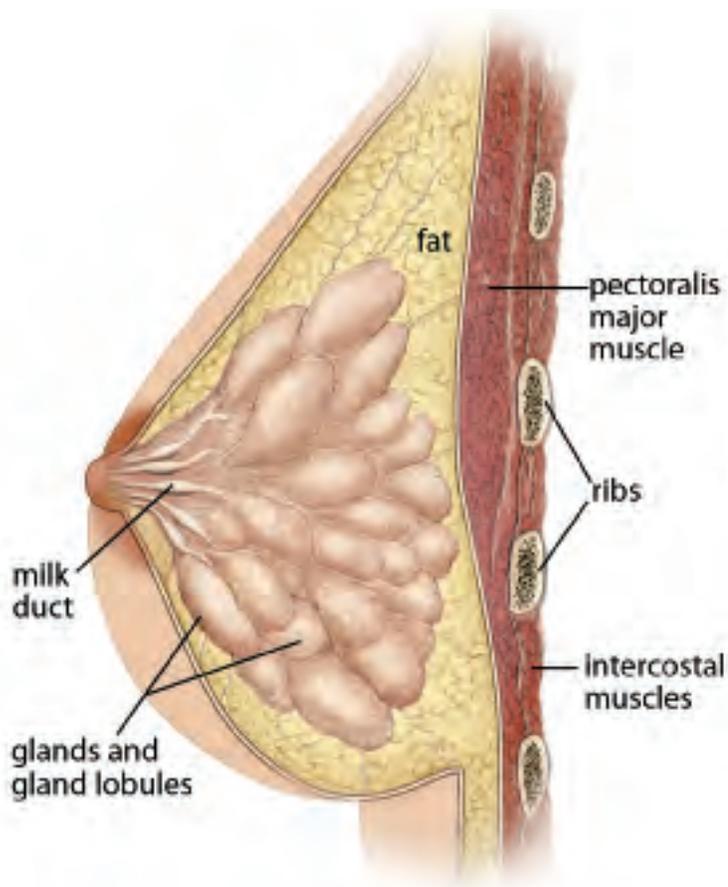
The post-op diagnosis was ductal carcinoma. The only good news: The cancer was still confined to the lining of the milk ducts and had not spread. Dr. Axelrod gave her patient two options: lumpectomy plus radiation or a mastectomy to completely remove all breast tissue.

“That was a tough time,” recalls Fox, whose two young sons are 3 and 5. “It’s been hard on them. I used to be very physical with them. They would sit in my lap and lean against my chest to read books. That’s been kind of sad. I told them that Mommy had ‘owies.’ We don’t use the word ‘cancer.’”

“WOMEN WANT IT, JUST LIKE LUMPECTOMY AND OTHER TYPES OF BREAST CONSERVATION.”

Fox had heard of a genetic mutation common in Ashkenazi (Eastern European) Jewish families like hers. Some 5 to 10 percent of breast cancers are due to hereditary gene mutations; the most important are the BRCA1 and BRCA2 mutations, first identified at the National Institutes of Health in the mid-1990s. “I asked to be tested to see if I had a BRCA genetic mutation because if I tested positive, it would provide a clear-cut answer as to what I should do,” she says.

A woman with one of the harmful BRCA gene mutations has a risk that’s at least five times higher than the 12 percent risk of a woman without such a mutation, according to the National Cancer Institute. Other estimates put the risk as high as 87 percent. For women who are BRCA-positive, the risk of developing cancer in the opposite breast is about 50 percent; in the ovaries, it’s 15 to 40 percent, compared to a 1.4 percent risk in the general population.





Surgeon Dr. Richard Shapiro believes nipple sparing is safe, but acknowledges that long-term outcome data is lacking.

Fox tested positive for the BRCA1 gene mutation. After discussing the options with her oncologist, Ruth Oratz, MD, clinical associate professor of medicine, she elected to have both breasts and her ovaries removed to minimize the risk of future cancers.

Drs. Axelrod and Karp discussed the possibility of nipple sparing with Fox. They told her that usually surgeons wait four to six months after surgical procedures around the nipple before trying nipple-sparing mastectomy, but agreed to push the limit if Tammi were willing to accept the possibility of later nipple loss because her prior surgery was so recent.

Dr. Axelrod performed Fox's second breast surgery in July 2011. For the reconstruction, Dr. Karp inserted balloonlike expanders under the chest muscle, to be inflated with fluid over three months' time and then replaced by breast implants.

"I'm so grateful for the way they partnered together," Fox says. "Keeping this piece of myself—synthetic nipples would never look like mine—I'm glad they're my own."

Even so, not every patient is a good candidate. Each woman needs to discuss her options with her plastic surgeon and oncologist. Among those who are not considered for the nipple-sparing surgery are patients with cancer or other abnormalities in or near the nipple-areola complex; those with bloody nipple discharge, ptotic (drooping) breasts, or large tumors in small breasts; or those with a history of smoking or poor wound healing.

A FAMILY HISTORY OF BREAST CANCER

Though her preference is to preserve the breast, Dr. Axelrod

**EACH WOMAN NEEDS TO
DISCUSS HER OPTIONS WITH
HER PLASTIC SURGEON AND
ONCOLOGIST.**

stresses that cosmetic concerns are always secondary to treatment. However, there's one group that's an exception: women without cancer who elect to have both breasts removed because their family history or a gene mutation greatly heightens their risk. In such cases, prophylactic surgery can reduce some 90 percent of that risk, bringing it down to the same risk as the general population.

Susan Blasberg, of Livingston, New Jersey, was 29 when she decided to get tested for the BRCA mutation. Her mother had been positive for BRCA2 and died of pancreatic and breast cancer in 2009. Before that, she lost her father to lung cancer. Her mother's oncologist told her that because of her family history and the mutation, she had at least an 85 percent chance of developing breast cancer.

"I knew I had the gene but I did nothing about it. Last year my cousin also found out she had the BRCA2 gene," Blasberg says. "Her mother, my aunt, had died of breast cancer in 2008. My cousin decided she was going to have prophylactic surgery after she finished breast-feeding her baby, but they found breast cancer on a routine exam," she says. "It was kind of a big wake-up call for me." Blasberg elected to have both breasts removed with nipple sparing and reconstruction. "I didn't have my ovaries removed—I'm 30 now—and I'd like to have children if I can."

In April Blasberg went ahead with the surgery, performed by Dr. Axelrod and plastic surgeon Mihye Choi, MD, assistant professor of surgery. Blasberg elected to have tissue expanders implanted for three months to stretch the breast skin; in July they were exchanged for silicone-filled implants.

Blasberg, who took over her family business as a sales rep for manufacturers of housewares, can't get over how good she looks. "One of the reasons I decided to keep my nipples is that it made me feel a lot better. I look a million times better than I had hoped for!"

"It takes mastectomy and reconstruction to another level," Dr. Choi says. "To save the nipple and areola, you really preserve the natural shape of the breast. That's so important to a young woman," she adds. "Psychologically she's more confident and happier about her body—that's worth something." ●

LYMPHEDEMA CAN BE MANAGED WITH TREATMENT, EDUCATION

On a sunny day in November, on the fourth floor of the Rusk Institute of Rehabilitation Medicine, Peggy Liegel, 58, sits on a treatment bed in the Lymphedema Clinic while physical therapist Elizabeth Draper measures the circumference of her arm at a number of points from top to bottom. The goal is to detect a reduction in swelling caused by lymphedema, a side effect of Liegel's treatment for breast cancer four years earlier.

Liegel's problems with swelling and pain in her arm began in 2007, after she underwent a lumpectomy of her right breast, followed by chemotherapy and removal of most of her underarm lymph nodes on that side. Further surgery, a mastectomy, plus radiation followed in 2008.

Almost immediately after the lymph node removal, Liegel's right arm became swollen, stiff, and excruciatingly painful, crippling her ability to write or perform other manual tasks with that arm. It forced her to give up making pottery just as she was nearing the potential to show and sell her work.

Long thought to be untreatable, lymphedema affects up to 40 percent of patients who've had breast cancer surgery—two out of every five women. Lymph, a clear fluid that contains disease-fighting white blood cells, as well as proteins and fats, is normally flushed from the body by the lymph nodes. When they are removed, the fluid instead can accumulate in the arm. Lymphedema can develop immediately or years after surgery or radiation therapy, one reason why patients are advised not to have blood drawn or blood pressure taken on the side where the arm could be affected.

Manual lymphatic drainage is the mainstay of therapy. In the clinic, Draper lightly performs the therapy along Liegel's arm and explains that lymph flow can slow after removal of lymph nodes, sometimes causing a backup of protein and fluid, resulting in swelling. "We're opening that up," she says. Draper has also shown Liegel a simplified version she can do for herself at home in the shower. Patients are taught techniques to reduce their swelling and pain at home, enabling them eventually to manage lymphedema on their own.

"The program," Liegel says, "has given me the sense that I can become well again. I know now that I don't have to be crippled by lymphedema." The Outpatient Physical Therapy Lymphedema Program at Rusk started more than a decade ago and now has one of the largest clinics treating both men and women in the tristate area. A new approach

combining low-level laser therapy with manual lymphatic drainage in the treatment of breast cancer-related lymphedema is being investigated in the clinic. The combination therapy may provide better results, possibly changing the standard of care.

Lowering risk through education and self-care

Mei R. Fu, PhD, RN, assistant professor at NYU College of Nursing, has spent the last decade working to understand lymphedema in breast cancer patients and help them lower their risk through education and self-care. In a five-year intervention study supported by the Avon Foundation, Dr. Fu has recruited 150 breast cancer patients treated at the NYU Clinical Cancer Center and followed 110 of them for 12 months. Before surgery, all were taught daily exercises to promote lymph drainage and build muscle, which helps clear the 3 liters of lymph fluid that must be removed from the system daily. Before and after surgery and during follow-up visits at 6 months, an infrared perometer measured their lymph fluid levels. Even subtle increases in fluid levels were aggressively managed at follow-up. By one year, fewer than 4 percent of patients developed clinical lymphedema; those patients who did were sent to Rusk for physical therapy.

"We have opened a new chapter in the spectrum of cancer survivorship by intervening preoperatively with behaviors that reduce the risks of lymphedema after surgery and beyond," says breast cancer surgeon Dr. Deborah Axelrod, who works closely with Dr. Fu on lymphedema management. "Our focus is on wellness and the strategies that optimize good health and reduce treatment complications."

To help determine which patients are at highest risk, Dr. Fu has received support from the Oncology Nursing Society to study this group of patients for variations in gene patterns related to inflammation and the lymphatic system. The hope is that the identification of specific genomic risk factors could lead to a screening test. She recently received a grant from the NIH to examine proinflammatory biomarkers called cytokines, as well as genomic variations related to infection and inflammation among lymphedema sufferers, who are prone to skin fibrosis and cellulitis.

Lymphedema is a lifetime condition, Dr. Fu points out, but it can be successfully managed to eliminate symptoms. —Aubin Tyler



The program in women’s rehabilitation medicine at Rusk helps women who suffer from pelvic pain and discomfort, among other conditions. Dr. Jaclyn Bonder (right) directs the program and collaborates closely with Ting-Ting Kuo (left), who specializes in women’s health physical therapy.

A New Field of Medicine Offers Women Relief from Pain

by **GAY DALY**
photographs by
RENÉ PEREZ

The Women's Rehabilitation Program at Rusk Institute considers every aspect of female physiology and anatomy.

MILLIONS OF WOMEN STRUGGLE, often silently, with physical discomfort for which there seems to be no relief. Pelvic pain, for instance, may go unexplained or untreated because it is hard to tease out the complicated relationships of the many organs and muscles, tissues and nerves that coexist in the region formed by the pelvic bones. It may be related to an old tennis injury or a result of the harsh demands of pregnancy and childbirth on this area of female anatomy. It could even be evidence of an underlying disease process. Most confusing, it may be a combination of these factors. It hasn't been easy for women to find a physician who can sort through the symptoms and come to understand and relieve their suffering.

More help is available now because a new field of medicine is being defined by doctors like Jaclyn H. Bonder, MD, medical director of the Women's Health Rehabilitation Program at Rusk Institute. During her residency at NYU School of Medicine, Dr. Bonder spent several weeks studying at the Rehabilitation Institute of Chicago, which pioneered the new approach. A

couple of months later she told Steven Flanagan, MD, professor and chair of Rehabilitation Medicine, that she wanted to develop a program to treat these kinds of problems. "I quickly realized there was very little available for women in New York City—little, in fact, in the Northeast," says Dr. Flanagan. "I decided to address an important unmet need by drawing on the drive and passion of one of our best young doctors."

The Women's Health Rehabilitation team considers every aspect of female anatomy and physiology. Among the medical issues they treat are back, groin, hip, and pelvic pain, pelvic floor dysfunction, urinary and bowel incontinence, osteoporosis, and lymphedema. In the case of pelvic pain and pelvic floor dysfunction, Dr. Bonder says, "Many women don't realize there may be a muscle or joint problem causing these conditions and that nonsurgical management options exist."

Avril Hernandez, one of Dr. Bonder's patients, struggled with pelvic pain throughout her third pregnancy. Hernan-

dez, then 34, and her husband, Harvey Prepetit, already had two children. By the seventh month, she had to quit her job in Manhattan, because the pain had become so intense she couldn't handle the commute from her home in Brooklyn. Fortunately, Prepetit had his own business so they could get by without her income. But who was going to take care of the kids? "It was difficult for me to do any lifting," Hernandez says. "I couldn't bend, couldn't sit. It was hard to do mundane tasks of daily life. My husband really came through for us. He did mostly everything that needed to get done. I would try to stand up long enough to cook dinner."

After the birth of Ethan on July 9, 2010, Hernandez expected relief; instead, the pain grew worse. An X-ray performed in the hospital showed pubic symphysis separation.

The pubic symphysis is the cartilaginous joint uniting the left and right pubic bones (see illustration). Before pregnancy the normal distance between those bones is roughly 4 millimeters. As the joint relaxes to make room for the baby, the

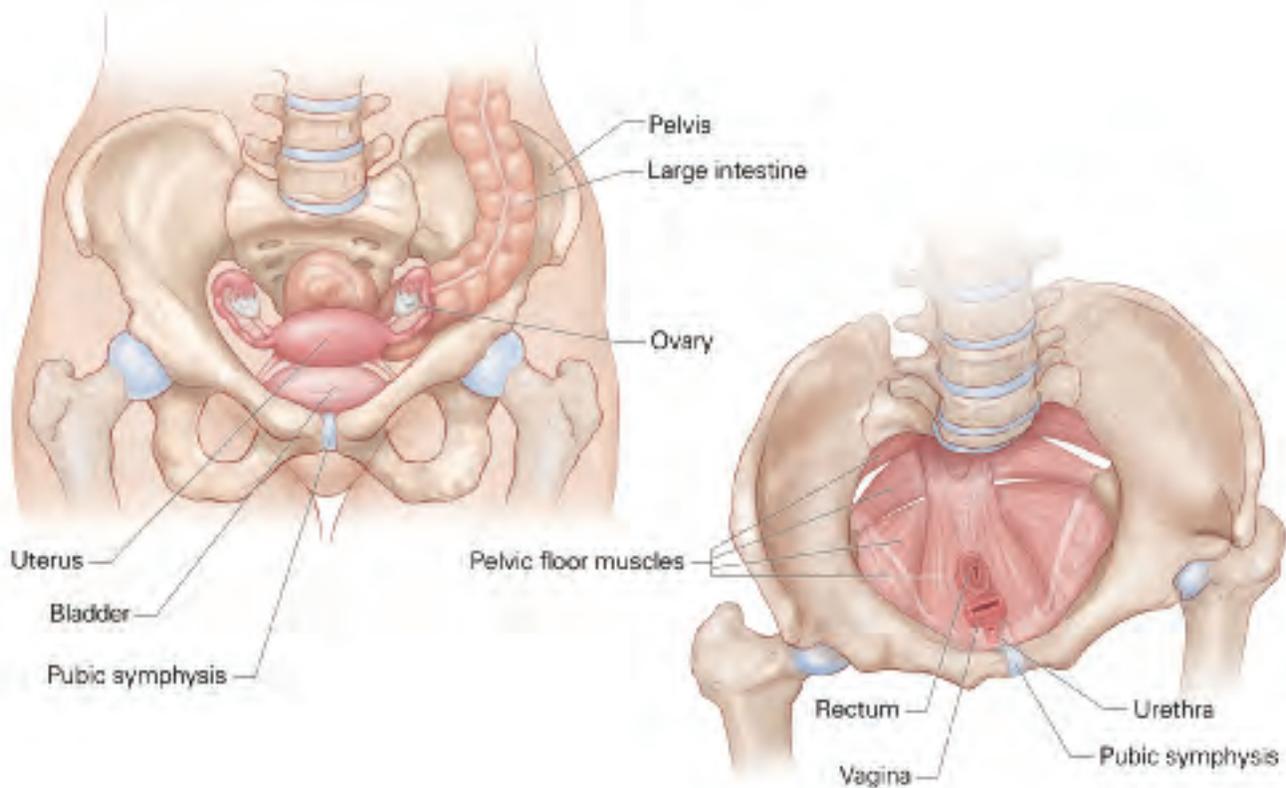
distance increases about 2–4 millimeters. Hernandez’s postpartum X-ray showed a separation twice that wide. As a result, Dr. Bonder says, “There was probably no longer sufficient support for everything from her head to her pelvic organs.” Hernandez describes what she experienced at that moment: “I felt like my uterus was about to fall to the floor. I can’t tell you how painful that was.”

She couldn’t walk, but went home from the hospital without a wheelchair. Her husband, aunt, and uncle had to carry her up the stairs to her bedroom on the

third floor while she sat on a dining-room chair. With two children and a newborn to care for, she was virtually immobile. She put diapers next to her bed so she could change Ethan. Looking for relief, she bounced from doctor to doctor. An orthopedic surgeon suggested surgery might be the only solution to her problem.

Eventually, a doctor suggested she call the NYU Physician Referral Hotline, which referred her to Dr. Bonder. In December 2010 Hernandez first saw Dr. Bonder, who recommended that she not resume therapy immediately. Instead, she

asked her patient to wear back and belly braces and to rest as much as possible so they could see how much healing the body could do by itself. By March Dr. Bonder judged that Hernandez was ready to begin work with Amanda Palmeri, senior physical therapist. Having been off her feet so long, Hernandez had lost muscle mass, so Palmeri started a regimen to rebuild her legs and strengthen core muscles. As Dr. Bonder prescribed, she put Hernandez in the deliciously warm water of the therapy pool to relieve pain in her legs and back, which allowed her to start gait-training



THE FEMALE PELVIC CAVITY: A potential source of pain

The left frontal view shows how the rectum, ovaries, uterus, and bladder, nestled within the pelvic bones, can press down on the pubic symphysis, a small cartilaginous joint that connects the pelvic bones. The pubic symphysis is normally about 4 millimeters wide. During pregnancy, the separation between the pelvic bones increases another 2-4 millimeters to accommodate the growing fetus. If the joint is stretched too far, pain is a likely result, which may increase throughout the pregnancy or more commonly manifest for the first time after childbirth. The drawing on the right is a cutaway version of the pelvic cavity. It identifies the location of pelvic floor muscles, which support all the organs in the pelvic cavity. Pain may result from stress on these muscles due to pressure from the fetus, bladder or rectal spasms, pelvic trauma, injury to the viscera, or damage to ligaments, fascia, connective, or other soft tissue in the area.

exercises. Slowly Hernandez learned to walk again, progressing from wheelchair to walker to cane.

By September Hernandez had progressed to land exercises, and soon Dr. Bonder and Palmeri decided she was ready to fly solo: They prepared her to exercise at home, reassuring her she could call anytime if she had concerns. They attribute her recovery to the discipline and optimism she demonstrated throughout treatment.

Her pain continues to diminish, and today Hernandez walks without a cane. She's happy because she can care for her baby. "Ethan is a climber," she says. "First he climbed out of the walker; then he used it like a ladder. I had to follow him around all day, but I was OK with it because I could do it." She hasn't been able to go back to work; instead, she started an online company [www.aoliviasbaskets.com] at home.

Each case has a unique resolution. Cheryl Greene* reached Dr. Bonder after a series of misadventures. In the summer of 2010 when she was 33, she had a routine gynecological checkup. After the vaginal exam she felt pain around her cervix; soon she felt burning on urination. Bonder confirms what Greene experienced: "A rough exam can trigger pain." This acute discomfort persisted for weeks. "I made myself go to work because I had to," Greene says, "but by the end of the day I would come home crying."

Greene sought a diagnosis. Eventually, she consulted 20 different medical professionals. A succession of drugs was prescribed, but none seemed to help. When a urologist identified tension in Greene's pelvic floor muscles, she prescribed physical therapy that, unfortunately, caused more problems. She developed nerve pain and rectal spasms.

A specialist Greene saw dismissed her as the type of female patient who enjoys going from doctor to doctor; another recommended psychiatric evaluation. In March 2011 Greene made an appointment with Dr. Bonder at Rusk. She appreciated that Dr. Bonder and Ting-Ting Kuo, who became her physical therapist, asked precise questions about the location of the pain. "They took time," she says, "and they didn't shoo me away."



Avril Hernandez sought treatment for pelvic pain after the birth of Ethan, her third child. She is shown with her husband, Harvey Prepetit, and Ethan.

Kuo worked with Greene using a gentle external technique called visceral manipulation therapy (VM) to alleviate symptoms of pain, pressure, and spasms she felt in the area of her pelvic girdle and pelvic floor. The viscera in this case were organs accessible to touch: bladder, uterus, rectum, and associated ligaments.

To do VM, Kuo places her hand lightly on an organ and lets the hand discern how the organ is moving: Sluggishly? Staccato? Smoothly? Up or down? From such subtle indications, she senses restrictions or tightness that stop the organ from operating in its natural movement pattern. Those restrictions may be adhesions left by previous surgery; other possible causes include trauma, injury, and tension.

Once Kuo locates restrictions, she says, "I use my hands to manipulate and release the connective tissue and fascia, freeing the organ to do what it wants to do, which is to move in its natural order." At first this new therapy sounded odd to Kuo, but when she saw patients improve she changed her mind. "I am a person based in

logic," Kuo says, "but I see now that complementary therapies like this one can contribute to the health of the whole person."

Greene remembers: "The visceral therapy didn't hurt at all. Afterward I felt more relaxed and open. I was suddenly able to stand up straighter."

Within a few months, the VM and other therapies that Kuo employed made a profound difference. Dr. Bonder complemented the physical therapy with trials of different medications and eventually found one that gave Greene further relief. When Greene first came to the program, she rated her symptoms at 7 or 8 on a pain scale of 10. Today she rates them at about 3.

Hernandez suffered an extreme form of a not uncommon pregnancy complication. Greene presented with pelvic pain symptoms that affect many women but are often confusing and difficult to treat. Fortunately, the Women's Health Rehabilitation Program was able to offer them both a place where their voices were heard and healing was possible.

*A pseudonym

A Promise Made

HHMI Fellow vows to study breast cancer after the disease claims her mother's life.

When she was diagnosed with breast cancer in 1999, Amanda Valeta's mother almost certainly knew that she wouldn't live to see her 10-year-old daughter graduate from high school. The family was poor and they lived in a small town in Zimbabwe where there were few medical services.

As her mother grew weaker, Amanda vowed to find a cure for the disease that was to claim her mother's life. "I used to tell her, 'Don't worry. I'll go study about cancer and find a cure.' She always believed in me and said, 'I know you'll do it.'"

Even under ordinary circumstances, devoting one's life to cancer research is difficult. That effort is even more arduous in Zimbabwe,

where there are no cancer research centers or large university research programs. But Amanda was undaunted. Her remarkable intelligence and perseverance enabled her to overcome many obstacles, and today she is studying for her PhD at the Sackler

Institute of Graduate Biomedical Sciences at NYU School of Medicine, where she recently won a coveted medical research fellowship from the Howard Hughes Medical Institute.

WHEN HER MOTHER DIED IN 2001, Amanda was barely 13; her younger brother was 9. During her mother's illness, Amanda's father had struggled to pay the medical bills and the cost of his daughter's school. In fact after he lost his job as a technician, Amanda had to leave high

Amanda Valeta and Dr. Robert Schneider study inflammatory breast cancer, an unusually aggressive form of cancer. On the monitor is a digital infrared image revealing the inflammatory cancer in the left breast. This form of breast cancer cannot be picked up by mammograms, but can be detected by thermography.



school. Fortunately her grandmother, aunts, and uncles pitched in to pay for her education, allowing her to graduate from high school.

University seemed out of reach until Amanda and a friend heard about the United States Student Achievers program, which enables students to apply to international universities and pays the application fees. More than 700 Zimbabwean students applied to the program that year, and Amanda was one of just 30 selected to participate. She soon secured a scholarship to Jacobs College in Bremen, Germany, but she didn't have the money to get there. Showing the pluck and resolve that would sustain her throughout her quest to obtain an advanced degree, she went door to door, speaking with business leaders in Harare, the capital of Zimbabwe, asking them to sponsor her airfare. Three weeks before she was due at school, a businessman who was impressed by Amanda's resourcefulness offered to pay for her ticket.

At Jacobs, Amanda earned her bachelor's degree in biochemistry and cell biology and graduated at the top of her class. During her studies, she learned about the work of an NYU School of Medicine researcher named Robert Schneider, PhD. It would change her life.

Dr. Schneider, the Albert B. Sabin Professor of Molecular Pathogenesis, and associate director for Translational Research and co-program leader of the Breast Cancer Research Program at NYU Cancer Institute, does research focusing on late-stage cancer in the developing world—particularly inflammatory breast cancer, a virulent form of the disease that is unusually common in women of African descent and causes a staggeringly disproportionate number of breast cancer deaths. His work inspired Amanda to apply to NYU to pursue her PhD. After she was accepted, she wasted little time e-mailing Dr. Schneider to ask if she could join his lab. He agreed. "When I met her, I was just blown away by how smart she is," Dr. Schneider recalls. He soon learned that she also had a rather extraordinary intuitive capacity to make associations, a critical skill in basic research.

"... if it takes 10 years or 20 years, I will go home and bring my cancer research there."

IN DR. SCHNEIDER'S LABORATORY, Amanda would find her life's work—inflammatory breast cancer research. Appearing frequently as a painfully swollen or itchy breast or as a rash, the cancer is often misdiagnosed as a breast infection or skin condition. Although it may account for 6 percent to 8 percent of breast cancers in the United States, the toll is much higher elsewhere. In Africa and other parts of the world, the cancer may account for as much as 15 percent of all breast cancer cases, according to the Breast Cancer Research Foundation. Worldwide, inflammatory breast cancer causes about 10 percent to 20 percent of breast cancer deaths annually.

Women of African descent are believed to be at twice the risk of developing inflammatory breast cancer as Caucasian women. Amanda didn't know if her mother had that cancer—there were no records. But the rapid progress of her disease makes it a possibility.

Unlike other types of breast cancer, little headway has been made against this form of the disease. "Women die of inflammatory breast cancer at the same rate they did 20 or 30 years ago," Dr. Schneider says. "We haven't made any progress. It's difficult to diagnose and easy to miss until the window of opportunity for a better outcome—when it's still confined to the breast—closes for good."

AMANDA'S CLINICAL INTUITION has already yielded new insights into the mechanisms underlying inflammatory breast cancer. She is studying macrophages, immune cells that ingest debris and defend against disease. Certain special macrophages called tumor-activated macrophages have been found to abet metastatic cancer by suppressing the immune response to tumors and promoting the growth of new blood vessels to them.

Infiltration of these macrophages within a tumor is known to be strongly associated with inflammatory breast cancer. Cytokines, a diverse

group of signaling proteins produced by the immune system, also play a role. Finally, another factor in this cancer is the way the body synthesizes proteins.

Previously, these factors had no known association with each other. "Amanda conceived of a way in which all three of these major factors in the disease might interact, and [she] set up a way to test that in the lab," Dr. Schneider explains. "With great insight, she's right. All three interact in a way that fuels this terrible form of breast cancer," he says. "For the first time, we have an understanding as to the types of cytokines involved with this disease, how they remodel the macrophage and the cancer cell, and how we should be targeting them for inhibition."

Her insights recently helped Amanda secure a fellowship from the Howard Hughes Medical Institute. "I couldn't even talk when I opened the e-mail," she says. The funding from HHMI will give Amanda the freedom she needs to pursue her dream, Dr. Schneider says. "It allows her to have no boundaries to the kind of work that she can do in the lab. It will enable her to do the more expensive experiments and opens doors not just for her present research, but for her future as well."

As far as she has ranged from home, the women of Zimbabwe are never far from Amanda's thoughts—nor is her promise to her mother. "She's never forgotten her family, her country, and why she wants to work this hard," Dr. Schneider says. "Within the next 10 years, 85 percent of the world's cancers will be in countries that have 5 percent of the world's resources. Here, we spend over \$3,000 per person a year on health care. In Nigeria, it's \$65 a year. In South Africa, it's \$300 a year. Amanda understands that and knows that we need to deal with the insidious problem of unrelenting breast cancer in African women."

"The situation in Zimbabwe is precarious right now, so I could not go back," Amanda says. "But at the end of the day, if it takes 10 years or 20 years, I will go home and bring my cancer research there." ● —GINA SHAW

A CONVERSATION WITH
VIRGINIA SADOCK, MD

Addressing Women's Sex Lives

A noted psychiatrist helps women enhance their sex lives and, in the process, debunks many myths.



IN 1980 VIRGINIA SADOCK, MD, clinical professor of psychiatry, founded the NYU Program in Human Sexuality, among the first of its kind at an academic medical center. Under her dynamic leadership, the program has become one of the largest devoted to sexual problems. A clinician and a scholar, Dr. Sadock was the developmental editor of *The Sexual Experience*, one of the first major textbooks on human sexuality, and co-editor of the *Comprehensive Textbook of Psychiatry*. Her collaborator was her husband of more than 40 years, Benjamin Sadock, MD, professor of psychiatry.

Dr. Virginia Sadock has a busy practice that includes individual psychotherapy and couples therapy. Sexual problems are common—the U.S. National Health and Sexual Life Survey found that 43 percent of women and 31 percent of men, ages 18 to 59, reported some sexual dysfunction. Along with treating sexual problems, a routine part of her practice involves debunking myths about female sexuality. One of the most persistent is that women's sex lives end once they enter menopause.

What drives the myth that older women are not sexual?

Most studies involved people under age 60. So we know less about older women's sex lives. This helps perpetuate the idea that sex is all over at age 50 or 60, so women worry about it. Women actually reach their sexual peak later in life. Men reach their physiological peak at age 18 to 19, but women do so at age 39 to 40. With age it takes longer for a woman to become aroused, to become lubricated. Men take longer to get and keep an erection, and we have treatments for that. As a result penetration has become the focus for men, which can be painful for older women. If you are not taking menopausal hormones, which are controversial for some women, the decrease in estrogen causes the mucus membranes of the vagina to atrophy, and intercourse can be uncomfortable. There are vaginal lubricants that help counteract this.

However, the vagina atrophies less if you have a regular sex life and continue to have sex. And while age is going to take its toll, you have to “use it or lose it.” A major problem for many women is lack of a partner. They tend to marry older men and as a result may find themselves alone for many years. But women don’t have to miss out on all sexual gratification. There is always masturbation, which is normal and which I encourage.

Is it true that women’s libidos take a big drop after menopause?

Women’s libidos do take a drop after menopause, but it’s not a big drop. Part of it is because of the decline in estrogen but also there’s a drop in the androgenic hormone, testosterone, which is the main driver of libido. We have a testosterone patch, as well as ointments and gels. Studies show that the patch increases desire and sexual frequency, and it is approved in Europe for hysterectomized women with low sexual desire. Some U.S. pharmacies will compound a low concentration testosterone ointment, which, when used under medical supervision, can jump-start things when placed on the thigh or labia. The oral administration of testosterone must be monitored by a physician who will assess the development of side effects.

Have the demands of full-time jobs and parenthood led to more sexual dysfunction or dissatisfaction among women?

Yes and no. The extra demands of a job can interfere with alone time, which every couple needs for emotional as well as physical intimacy. At the same time, women who get gratification from their work, from some financial independence, and from interacting with the non-domestic world often feel a confidence that bodes well for their feelings about sexuality.

What are some of the ways your program helps women with sexual difficulties?

We deal with problems such as anorgasmia, painful sex, or even sex phobias, and we take a behavioral

“Women’s libidos do take a drop after menopause, but it’s not a big drop. Part of it is because of the decline in estrogen but also there’s a drop in the androgenic hormone, testosterone, which is the main driver of libido.”

approach as well as that of individual therapy. Psychiatrists send us a lot of patients. Some may be in marital therapy where a lot of issues get addressed, but sex does not. We don’t ignore analytic theory—that unconscious conflict may be the root of a sexual problem—and we encourage individual therapy; but we give patients behavioral exercises that they can do in the privacy of their own home to try to make sexual activity as little performance-focused as possible and remove as much anxiety as possible. And then we progress to systematic desensitization so that people get comfortable with their sexual selves.

In your opinion, is hypoactive sexual desire disorder (HSDD) a bona fide medical problem among women? An online survey by the Society for Women’s Health Research among 1,300 women ages 30 to 55 found that at least 75 percent reported an occasional lack of desire.

HSDD exists but it may be over-diagnosed. The way you know that it exists is if a partner is unhappy and a woman sees a professional about it. Having sex once every six months is a little hypoactive. There are some people who actually have a sexual aversion. The libido is not hypoactive, but they are turned off by genitalia; it’s akin to a phobia. And there are others who are naturally asexual. Whether or not asexuality is a disorder is controversial. If you are happy with it, fine. But you have

to find someone who is like you or you are going to make your partner unhappy.

Is there a norm for sexual interest? Some women say they hardly ever have sex and are not particularly interested or bothered by this.

The idea that there’s an ideal or normal sex life is also a myth. The prevalence of sexual activity is different from the incidence. I know of one study in which couples who rated themselves happily married sometimes went for periods of eight to 12 weeks without sex. It wasn’t lifelong or continual, but sometimes for a long period they wouldn’t have sex. So you need to know, when does it happen? How often does it occur? It’s a snapshot in time, and you need to take a longer-range view.

What are the secrets to a good sex life in later life—or at any age for that matter?

In the context of an ongoing relationship, sex requires attention and work. The newness is gone, the initial titillation of courtship is gone, and the bedroom door is always open. Sometimes all it takes is a new environment to rev up a sex life. That’s why some people have good sex on vacation when they are away from work and children, away from the same bed. But the real secret is to pay attention, to make time for it. Allow yourself to enjoy whatever you are able to enjoy at a particular time in your life. It’s never too late. ●

—RITA BARON-FAUST

Dean's Honors Day

In Its 10th Year, Ceremony Spotlights Academic Excellence and Benefactors

NOW A DECADE-OLD TRADITION at NYU School of Medicine, Dean's Honors Day was held Wednesday, October 5, 2011, in Farkas Auditorium to commemorate the year's academic honors and achievements by faculty, including appointments to departmental and endowed chairs, promotion to professor, awarding of tenure, and intramural and extramural distinctions.

Dean Robert I. Grossman, MD, led a

distinguished platform party that included Kenneth G. Langone, chairman of the board of trustees; Robert Berne, PhD, executive vice president for health, New York University; and Steven B. Abramson, MD, vice dean for education, faculty and academic affairs, in conferring honors. Among the highest-profile awards are the so-called masters: Master Clinician, Master Educator, and Master Researcher.

Frederick Feit, MD, associate profes-

sor of medicine, was named Master Clinician. Dr. Feit, a 1972 alumnus of the School of Medicine who went on to become a chief resident here, was hailed by Dean Grossman as "the epitome of ... deeply humanistic care." An interventional cardiologist, Dr. Feit was described as a superstar "whose deftness at intricate, life-and-death procedures is a wonder to behold."

Ruth Lehmann, PhD, the Laura and Isaac Perlmutter Professor of Cell Biology, was named Master Researcher. As a Howard Hughes Medical Institute Investigator and member of the National Academy of Sciences, Dr. Lehmann is "an acknowledged trailblazer in...developmental genetics, cell interactions in organ development, and the biology of stem cells," Dean Grossman said. Since joining NYU in 1996, she has risen to director of the Skirball Institute and in 2006 founded the Helen L. and Martin S. Kimmel Center for Stem Cell Biology that now has more than 45 faculty members. Dr. Grossman said that she was "revered as an inspirational leader, who not only sets the highest standards through the exceptional caliber of her own investigations, but...also creates an environment of encouragement, acknowledgment... and excitement!"

The award for Master Educator went to Melvin Rosenfeld, PhD, associate professor of cell biology. Beyond his "personal wizardry in the classroom" over the past 30 years, Dr. Rosenfeld was cited for his leadership in creating C21, the new undergraduate medical education program that went into effect last year. "Maybe," said Dr. Grossman, "we would have stumbled our way to our magnificent new curriculum without Mel's leadership, but it's hard to imagine how." In a process rife with strong opinions and turbulent cross-currents, "Mel is



Medical Center Chair Kenneth G. Langone (third from left) embraced two honorees at Dean's Honors Day, Trustee William Berkley, who received the Valentine Mott Founders Award, and Ruth Lehmann, PhD, who was named Master Researcher. Also shown are platform party members Robert Berne, PhD, left, NYU executive vice president for health; Dean and CEO Robert I. Grossman, MD, far right; and next to him, Stephen B. Abramson, MD vice dean for education, faculty, and academic affairs.



Fred Feit, MD (left), was honored as Master Clinician and Melvin Rosenfeld, MD, as Master Educator, at Dean's Honors Day festivities.

the one who built consensus, and to that consensus, we owe the engaging, effective, far-seeing undergraduate program we're all so proud of today."

In recognition of extraordinary support of the School's academic mission, the 2011 Valentine Mott Founders Award was conferred upon William R. Berkley, member of the NYU Langone Medical Center board of trustees since 2007. Created in 2006, the award is named for one of the fathers of modern surgery and an original member of the School's faculty. Mr. Berkley is founder, board chair, and CEO of W.R. Berkley Corporation, a Fortune 500 property-casualty insurance holding company. A graduate of New York University and

the Harvard Business School, Mr. Berkley is vice chair of the New York University board and chair of the Medical Center's compensation and benefits committee and sits on its finance and operating committees. He has received many awards for his business, civic and philanthropic activities, including an honorary doctor of law degree from Mercy College.

Dr. Grossman described Mr. Berkley as "a person of deep beliefs and staggering commitment...someone with an incisive understanding of what really matters in the world—whether it's the education of disadvantaged young people...the protection of the environment...interfaith dialogue...or healthcare—and who acts to address the needs he sees."

Dr. Schmidt and Colleagues Receive \$7.4 Million NIH Grant for Diabetes Research

The National Heart, Lung, and Blood Institute of the NIH awarded Ann Marie Schmidt, MD, the Dr. Iven Young Professor of Endocrinology and professor of medicine, pathology and pharmacology, Shi Fang Yan, MD, associate professor of pharmacology and medicine, and Ravichandran Ramasamy, PhD, associate professor of medicine and pharmacology, \$7.4 million for research to improve long-term outcomes of cardiovascular disease in people with diabetes.

For the past two decades, Dr. Schmidt has focused her research on the receptors for sugar-modified molecules that collect in the walls of blood vessels in people with diabetes. She has found that the interaction between these molecules (advanced glycation endproducts or AGEs) and their receptors (RAGEs) may provide new targets for preventing or reversing the vascular damage caused by diabetes. Previously, Dr. Schmidt has shown that giving diabetic mice a RAGE inhibitor or genetically deleting the animals' RAGE receptor reduced atherosclerosis and other complications of the disease. Afterward, the animals were healthy, lived an average life span, and reproduced normally.

DR. BLASER ELECTED TO INSTITUTE OF MEDICINE



MARTIN J. BLASER, MD, the Frederick H. King Professor of Internal Medicine, chair of the Department of Medicine, and professor of microbiology, was recently elected to the Institute of Medicine. Dr. Blaser, a distinguished microbiologist and infectious disease specialist, is well known for his work with *Helicobacter pylori*, the bacterium causing ulcers. His most recent pioneering work explores the relationship between the microbiome, the trillions of bacteria inhabiting our bodies, and human health. Election to the IOM is considered one of the highest accolades for outstanding professional achievement and commitment to service in the fields of medicine and health.

Dr. Edwin R. Guzman Joins NYU Langone Medical Center

LATE FOR HIS FIRST morning appointment, Edwin R. Guzman, MD, hustles into his private office, coffee and muffin in hand. Catching his breath, he explains that he was called to see a young woman, nearly eight months pregnant, suffering from renal failure and preeclampsia, a condition in which blood pressure shoots up and protein accumulates in the urine. Systemic lupus erythematosus, an autoimmune disease, had triggered both events. Other physicians had stabilized the mother, but they were worried about the

and a growing number of them arrive after high-risk pregnancies that demand the skills of many specialists—cardiologists, nephrologists, neurologists, anesthesiologists, neonatologists. “My job is to lead the orchestra and make sure everyone is playing properly,” Dr. Guzman says.

High-risk pregnancies are on the rise, due in large part to escalating obesity among women. Excessive pounds can lead to a variety of complications, including diabetes, miscarriage, emergency C-section, and fetal abnormalities. At the

same time, medicine has made huge strides in developing skills and technologies that permit physicians to help troubled fetuses.

Dr. Guzman will complement NYU’s first-rate roster of obstetric and pediatric specialists in diagnosing high-risk cases and coordinating treatment. He developed a stellar reputation for building a sophisticated and responsive maternal-fetal division at Saint Peter’s University Hospital in New Jersey, says David Keefe, MD,

chair of obstetrics and gynecology, who recruited Dr. Guzman. “Doctors need to have the best possible judgment,” Dr. Keefe says. “Dr. Guzman has been doing this for 30 years and has deep experience in caring for complicated pregnancies.”

Dr. Guzman, 58, did not set out to be a physician. His parents, natives of Puerto Rico, came to the United States before he was born. His mother toiled as a seam-

stress and his father as an auto mechanic. “I have a strong work ethic that I got from them,” Dr. Guzman says.

As a youth at Rutgers University, Dr. Guzman had planned to become a microbiologist; with encouragement in his senior year from an organization that supported minority students he applied instead to medical school. While doing a rotation in obstetrics and gynecology during his third year at New York Medical College, he witnessed a live birth that was a revelation: He had found his specialty. “It was a beautiful combination of primary care, medicine, and surgery,” he recalls. “And it was happy. It was birth, it was health.”

Later, while an attending physician at Coney Island Hospital in Brooklyn, he became fascinated with ultrasound. “I was completely engrossed by the technology.”

After 18 years at Saint Peter’s, Dr. Guzman is enjoying the academic environment at NYU Langone, where he enthusiastically takes on challenges. Using ultrasound as a guide, he recently performed a rare procedure: threading a needle into the umbilical cord vein to transfuse blood into a fetus that had become anemic after the mother got a viral infection. He has also demonstrated all-but-forgotten techniques, for example, using forceps to help deliver a baby that had stopped traveling down the birth canal. “I learned a lot of things usually not done today from old-time obstetricians,” he says.

For all the exciting cases he treats, it remains the miracle of babies that truly awes Dr. Guzman. He picks up a photo sent by a former patient and gazes at the pink, plump infant. “Sometimes I don’t think it’s fair to have such a responsibility, life or death,” says Dr. Guzman, himself the father of four. “When they come through, it’s humbling.”●

—SUZANNE SATALINE



Dr. Edwin Guzman

fetus, questioning whether they should schedule an immediate cesarean section. Using ultrasound, Dr. Guzman determined that the fetus was fine but should be delivered soon.

It is just the kind of obstetrical emergency that fascinates Dr. Guzman, new director of the Maternal-Fetal Medicine Program. Nearly 4,500 babies are delivered each year at NYU’s Tisch Hospital,

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the world...

One patient at a time. When you include a bequest in your will to NYU Langone Medical Center you help us deliver outstanding health care to the many patients and families who rely upon us to improve their lives. Superb physicians, an award-winning nursing staff and internationally ranked scientists make the difference.

Join our community, and create your legacy today.

To learn more about making your planned gift to NYU Langone, please contact Marilyn Van Houten at 212.404.3653 or marilyn.vanhouten@nyumc.org.



John Abbott



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