

RUSH RECORD

Winter 2004

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Better radiation therapy treatments for gynecologic cancers

Tissue engineering provides solutions to orthopedic problems

Eating certain foods may help prevent Alzheimer's disease

and more...



TAKING WOMEN TO HEART

With treatment and education, Rush empowers women to beat heart disease

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RUSH RECORD

Winter 2004

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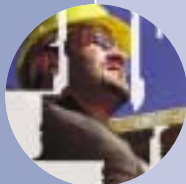
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Taking women TO HEART

by Judy Germany

While out to dinner with her husband one night nearly two years ago, 45-year-old Debra Dunn felt a ripping pain in her chest. She had a decade-long history of unexplained chest pains and other symptoms, such as palpitations, fatigue, chills and fever, but doctors kept telling her nothing was wrong, or that it was stress. Eventually, she was diagnosed with an irregular heart rhythm and developed cardiomyopathy, or weakened heart muscles. But as she sat in the restaurant, her face ashen, feeling the room closing in on her, Dunn began to suspect that the problem was, in fact, far more serious.

“I thought, ‘this could be a heart attack,’” she says. “But it didn’t seem possible. Although the pain was bad, it didn’t knock me out of my seat; I was coherent and able to analyze how I felt.”

Wavering between going home and going to the emergency room, she finally decided to get checked out, just to be safe. “At the ER, they kept asking me if I did drugs, if I had a stressful job, if I had kids, what I was eating when the pain started. They said it could be an anxiety attack or acid reflux.” After spending the night at the hospital and undergoing an echocardiogram and an angiogram, Dunn was sent home with prescriptions for five different medications and instructions to see a cardiologist in three months.

It wasn’t until she came to Rush five months later for a third opinion — after seeing an article in *O* magazine about Oprah Winfrey’s heart evaluation at Rush — that Dunn learned the truth about what happened at the restaurant: She had suffered a massive heart attack, and she was lucky to be alive.

Care for women’s hearts

While Dunn was shocked to discover that she had heart disease, she’s far from alone. More than six million American



Photography by Andrew Campbell

Leading an active lifestyle has helped Debra Dunn bounce back from her heart attack.

women live with heart disease and one in three will die from it — more than all cancers combined. In fact, it’s the leading killer of women, claiming nearly 10 times as many women as breast cancer.

Yet heart disease is commonly misdiagnosed or underdiagnosed in women, as it was in Debra Dunn. “Women’s heart attack symptoms are frequently ignored, overlooked or written off as stress, even by cardiologists,” says Rush cardiologist Annabelle Volgman, MD. As a result, many women don’t know they have heart disease until they have a heart attack or stroke, and that’s often too late.

To help reverse this disturbing trend, in October 2003, Rush opened the Heart Center for Women, the first heart center in Chicago devoted exclusively to women. Led by cardiologists Volgman and Martha Gulati, MD, the center is staffed with a nurse practitioner, a dietitian, a cardiac psychologist and nurses — all of whom are women. They provide comprehensive, compassionate care for women with heart problems and educate women about the risks of heart disease.

They also conduct groundbreaking research, in partnership with the Rush Department of Preventive Medicine, to shed more light on heart disease in women. As their under-

According to the American Heart Association, more than six million American women live with heart disease and one in three will die from it — more than all cancers combined.

standing advances, they will be able to devise the most effective diagnostic, treatment and prevention strategies to help women get and stay heart healthy for life.

A difficult diagnosis

This focus on heart disease in women is a relatively new phenomenon, because up until the 1990s, heart disease was considered to be a “man’s disease.”

“Studies showed 20 years ago that men in their 40s were dying of heart attacks. It took another decade for the same studies to show that women were dying of heart attacks, too — just usually not until after menopause,” Volgman says “Unfortunately, for a long time, doctors were misinformed that women were safe from heart disease.”

As a result, doctors were not routinely trained to diagnose and treat heart disease in women — a problem compounded by the fact that women tend to have different heart attack symptoms than men. “Often, women don’t have the classic symptoms, such as pressure-like chest pain, that men have,” says Rush cardiologist Robert C. Hendel, MD. “They more frequently experience nausea or fatigue, and they may not have chest pain at all.”

Another problem is that in many women who do have chest pain, diagnostic angiograms reveal whistle-clean arteries. That’s because women are far more likely than men to have heart attacks resulting from coronary spasm — a condition in which the artery clenches temporarily, cutting off blood flow to the heart. Volgman says a coronary spasm may have been responsible for Debra Dunn’s heart attack, since her arteries were clear.

Starting in early 2004, Hendel will be leading a multi-million dollar, multi-site project to determine the most effective method for detecting and evaluating heart disease in women. “There’s a controversy as to what testing method is best,” he says. “We want to know which one will give us the most accurate diagnosis and how we can use the test results to make treatment decisions.”

Dunn’s heart attack would have been diagnosed if she’d

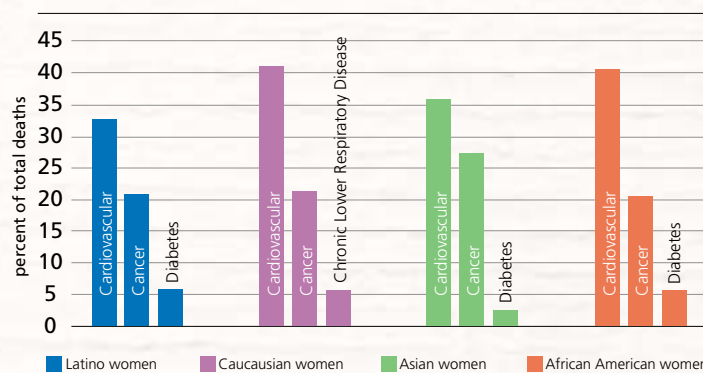
been given a stress test during her emergency room visit. The day of her first appointment at Rush, Volgman sent her for a stress test — and she had a lethal arrhythmia while on the treadmill. “My heart was functioning at 20 percent. I was in shock. But it was also an unbelievable feeling because finally I was validated,” she says. “I was critically ill, and, before coming to Rush, I was being blown off by doctors left and right. It’s frightening.”

Even when women are properly diagnosed, they often don’t respond as well as men do to treatment. One possible explanation is that women’s heart attack symptoms tend to be less severe than men’s, so they aren’t as likely to rush to the emergency room. Another is that when women are misdiagnosed, the disease advances unchecked, making treat-

ment more challenging when it’s eventually revealed.

“The truth is, we don’t know why women don’t fare as well. It could also be because the procedures and medications used to treat heart attacks were tested and perfected primarily in men,” says Gulati. “We’re just now starting to gather the information that will lead to a better understanding of heart disease in women.”

Women and cardiovascular disease deaths as compared to deaths caused by other diseases



source: American Heart Association Web site

Weighing the risks

Given how many question marks there still are, Volgman and Gulati focus their diagnostic, prevention and treatment efforts on what they do know. “We’re committed to helping our patients every way we can, physically and emotionally,” she says. “We work with them to figure out the best available strategies for preventing or managing the disease.”

At Rush, women diagnosed with heart disease are treated by highly skilled specialists who have access to the latest treatments: drug therapies; pacemakers and defibrillators to regulate the heartbeat; mechanical assist devices to take over the heart’s function in patients with end-stage heart failure; and a full range of surgical and minimally invasive procedures to treat blocked arteries and fix faulty valves. Rush also has one of the region’s top heart transplant teams.

For healthy women trying to prevent heart disease, the first step is to identify their risk factors, which can include



“We’re committed to helping our patients every way we can, physically and emotionally. We work with them to figure out the best available strategies for preventing or managing the disease.”

— Rush cardiologist Annabelle Volgman, MD

poor physical fitness, diabetes, high blood pressure, high cholesterol, stress and age. The biggest risk factor for premenopausal women is a combination of smoking and taking oral contraceptives.

And while obesity is a risk factor in men, it may be the location of fat that matters in women. Rush heart researcher Lynda Powell, PhD, is leading the Women on the Southside Health Project (WISH) to determine whether intra-abdominal fat — the fat that collects around vital organs in the torso — increases women’s risk for heart disease and diabetes.

WISH, which involves 868 African-American and Caucasian women from Chicago’s Beverly and Morgan Park neighborhoods, is also the first study to examine the mediating role stress plays in heart disease and diabetes risk among postmenopausal women.

“We believe that menopause coupled with chronic stress causes an increased buildup of intra-abdominal fat, which in turn increases a woman’s risk of heart disease,” Powell says. “It’s healthier for women to be shaped like pears, with their weight concentrating around their hips; women who are shaped like apples most likely have higher amounts of intra-abdominal fat.”



Debra Dunn, shown here with daughter Nicole, has made heart health a family affair.

Photography by Andrew Campbell

a lipid profile, body mass index and waist measurement, electrocardiogram, history and physical examination by a cardiologist, and interviews with a nutritionist and cardiac psychologist.

At the end of their visits, patients learn whether they are at low or high risk for cardiovascular problems. Low-risk patients receive valuable information on how to maintain a healthy lifestyle to prevent heart disease down the road. For those patients at high risk, lifestyle modifications and medications may be necessary.

The best time to go for risk assessment is just before the onset of menopause, which usually happens between the ages of 45 and 50. “That’s when the path first begins to diverge — and women will either go down the road to heart disease or go down a path toward good heart health,” Powell says. “If we can catch women then and treat them preventively, we can keep many from ever getting heart disease.”

Healthy for life

Because prevention is so important, Debra Dunn is now dedicated to educating women as a spokesperson for the American Heart Association. “We need to get the word out there so women know the dangers,” she says. “It helps when they see me. I don’t look like someone they’d think

Knowing the score

To pinpoint their personal risks, each patient at the Heart Center for Women undergoes a comprehensive assessment:

would have heart disease, and it really hits home that it could happen to them.”

Continued on page 12

Healthy bodies, healthy hearts

While there is no miracle cure for heart disease, there are plenty of things women can do to prevent it. But the most significant way for women to reduce their risk of cardiovascular problems is also the simplest: be active.

Research now suggests that lack of physical fitness predicts death in women more strongly than it does in men. Rush cardiologist Martha Gulati, MD, recently led a groundbreaking study called

the St. James Women Take Heart Project that showed that, all other factors aside, even a slight increase in a woman’s physical fitness lowers her risk of death from heart disease.

Being physically fit doesn’t have to mean going to the gym for hours every day. The recommended amount of physical activity for staying heart healthy is 30 minutes, 5 to 6 times a week, or a cumulative 150 to 180 minutes per week.

“Physical activity is the best medicine for preventing heart

disease,” says Lynne T. Braun, PhD, RN, CNP, nurse practitioner for the Heart Center for Women.

“Medications can each address only one risk factor, so sometimes you end up taking several different medications at a time. Physical activity alone can reduce every modifiable risk factor you have, from lowering your blood pressure and cholesterol to helping you lose weight. You don’t need a lot of activity, but you need to be consistent.”



A Creative Approach

Through advances in research and treatment, Rush demonstrates the art of cancer care.

by Sean Carr

Janet Wells knows how to put her time to creative use. There's the art to admire in her Roselle, Ill., home, some of it compliments of her artist daughter. There are the theater subscriptions. Every now and then, there's even a little harp practice.

Then there are the books. Hundreds of them, filling the shelves in her bedroom and den. Not quite to overflowing — at least not since she gave more than 1,000 away to the Chicago Public Schools and the local library branch — but certainly to capacity. She tackles one every month or so with her early-morning book group. The rest she takes at her own pace. And these days, she's also writing one of her own.

In the past, she's tried her hand at playwriting and fiction. But right now she's working from real life — 12 real lives, to be exact.

Over the past three years, Wells has interviewed a dozen women, asking them to share their experiences of living with ovarian cancer — from the food they're eating to stay healthy, to the things they find to

laugh at, to their spiritual lives.

"My topic is how to live with ovarian cancer. And the people who know how to do that best are the people who are living with it," Wells says.

She should know. She's one of them. And she's not alone in thinking that a little creativity — a little art — is just what is needed in the fight against ovarian and other gynecologic cancers. At Rush, where Wells is receiving treatment, Jacob Rotmensch, MD, director of the Section of Gynecologic Oncology, and his colleagues are pursuing a new radiation therapy that could offer new hope for ovarian cancer patients.

Getting scary news

Ovarian cancer has the highest mortality of any gynecologic cancer. It usually isn't caught until it has reached an advanced stage, when it has already spread beyond the ovaries and the pelvic region, into the abdomen. It's hard to diagnose any sooner because there is no standard screening test (like the Pap smear

that detects cervical cancer), and ovarian cancer's early symptoms — bloating, nausea, frequent urination and backaches are just a few of the vague complaints — are often brushed aside.

But back in the fall of 2000, Wells knew something was wrong and kept after her doctor. The doctor ordered a CAT scan and the results weren't good: "She called me immediately," Wells remembers. "She wanted me in for surgery as soon as possible."

Surgery, the first line of treatment for ovarian cancer, accomplishes two things. First, it lets the doctor confirm how much cancer there is and how far it has spread. Second, that same procedure allows the doctor to remove as much cancer as possible, as well as all of the organs and tissue to which it has spread, including the ovaries, the uterus, the fallopian tubes, nearby lymph glands and, many times, part of the intestine. Following surgery, chemotherapy is used to kill any remaining cancer cells.

A more complete treatment

After two surgeries and two rounds of chemotherapy, Wells was apparently cancer-free. But 14 months after her last treatment, the cancer returned.

“Sixty percent of ovarian cancer patients have what is called a partial response to therapy,” Rotmensch says. “Thirty percent have a complete response, though even that doesn’t mean they’re cured.”

That’s because even after surgery and chemotherapy, microscopic deposits of cancer remain, waiting to grow again. Thus far, those deposits have resisted even the various radiation therapies that have been attempted. But over the last several years, Rotmensch — uniquely comfortable in and conversant with the worlds of both medicine and nuclear physics — has been developing and refining radioactive isotopes of the element Bismuth as a treatment for these microscopic killers.

Bismuth 212 and 213, the isotopes Rotmensch is currently investigating, have several attractive properties. First, they penetrate only a few cell layers deep, so they leave healthy tissue relatively unharmed. Second, the cells they do come into contact with — namely, the cancer cells — receive a punishing, knock-out dose of energy. Third, in delivering that energy, Bismuth decays into a harmless amount of lead within 10 hours. In laboratory and living tissue tests, Bismuth clears up all traces of ovarian cancer. With these results in hand, Rotmensch is now seeking approval to begin clinical trials with patients, in which Bismuth 212 or 213 will be delivered to ovarian cancer cells via a liquid solution.

The next steps

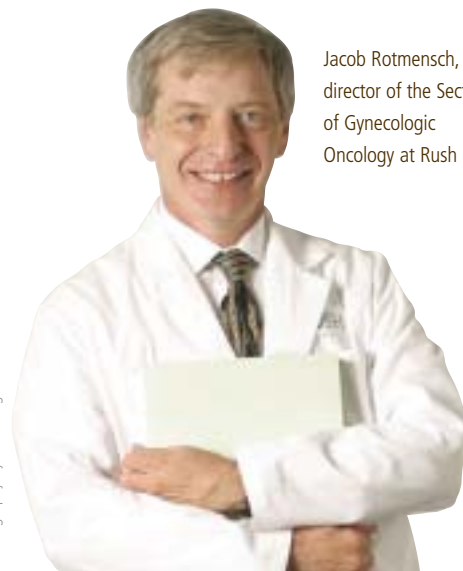
While Rotmensch is excited that his Bismuth studies could ultimately lead to a more effective treatment for ovarian cancer, his broad focus concerning this deadliest of gynecologic cancers remains the same: “The major thing is that we need to

understand what causes ovarian cancer,” he says. “That’s how we’re going to stop it. And a lot of work still needs to be done.”

Janet Wells, hard at work on her book (and, occasionally, her harp playing), has an idea about how to move that work to the next level.

“I think we need to take the breast cancer movement as a role model,” she says. “They’ve done so much to call attention to the disease and to raise money for research. We haven’t figured out how to get that kind of attention for ovarian cancer. But we will.”•

Photography by Mark Segal



Jacob Rotmensch, MD, director of the Section of Gynecologic Oncology at Rush

IMRT: Creative control

Another form of radiation therapy, funded by the Regenstein Foundation, is already helping some gynecologic cancer patients. Called intensity modulated radiation therapy, or IMRT, it has proven successful in sparing patients with head and neck, prostate, lung and other cancers from many of the worst side effects of traditional radiation therapy. Rush’s Jacob Rotmensch, MD, has pioneered its use in the treatment of endometrial and cervical cancer.

Both of these cancers can be detected in their earliest stages, when they are easiest to treat. But if the cancer has spread beyond the cervix or the uterus, surgery may be necessary, along with chemotherapy. And when these cancers are at advanced stages, or if there is a high risk of the cancer returning after treatment, doctors generally elect to use external beam radiation therapy.

With computer imaging, radiation oncologists can get a very precise picture of cancerous tissue in the pelvis. But traditional radiation therapy, with its thick beams, can only approximate that picture. It’s like trying to color in a detailed, jagged outline using a fat-tipped marker. There’s going to be some coloring outside the lines. In radiation therapy, that means some healthy tissue is going to be irradiated.

IMRT, with its thinner beams, can trace the jags and curves of the target more precisely. In addition, the strength of the beams can be raised or lowered depending on how close they are to the center of the target or to an edge bordering on normal tissue, so that the latter receives a much milder dose — or none at all. It’s like the difference between having your living room lights on a simple on-off switch or controlling them with a dimmer: IMRT gives doctors more control.

“Before IMRT, we couldn’t treat irregularly shaped structures,” says Katherine Griem, MD, acting co-chair of the Department of Radiation Oncology. “Now the radiation beam sculpts around the tumor, carving it out of the normal tissue.”

Although it is still investigational, so far the results look good: IMRT appears to kill cervical and endometrial cancer cells as effectively as traditional therapy, but with far less healthy tissue receiving heavy radiation, which means fewer — and less severe — side effects. In initial studies of IMRT, Rotmensch saw that many of the most common side effects, such as nausea, diarrhea and painful or frequent urination, remained mild and went away quickly. No patients experienced side effects so bad that treatment had to be halted — a common problem with traditional radiation therapy.

FOOD

by Jill Waite Goldberg

Rush research finds that eating certain foods may help prevent Alzheimer's disease.

For decades, moms have expounded on the power of food — carrots improve vision, spinach strengthens muscles, bread crust curls the straightest of hair. As we now know, much of what Mom told us was a ploy to get us to eat the things we hated most. But today we have science to back up at least some of those claims.

In the past 20 years, researchers have produced a body of evidence closely linking diet with health. Although sometimes conflicting — and often confusing — it has become abundantly clear: Food matters. And although you're powerless in determining your height or the color of your eyes, you can control what you eat.

In fact, it is the control factor that initially attracted Rush researcher Martha Clare Morris, ScD, to investigating the connection between food and the mind, specifically Alzheimer's disease. "I've always been very interested in research that is directed at ways people can manage their own lives to prevent a disease rather than focusing on what therapies they can use once they have it," Morris says. Her studies, which are part of a more expansive research program at the Rush Institute for Healthy Aging, zero in on what foods — and what substances within those foods — appear to protect against the dementia associated with Alzheimer's disease.

By surveying approximately 6,000 people initially unaf-

fected by Alzheimer's disease on Chicago's South Side, Morris, her colleague, Rush researcher Denis A. Evans, MD, and their team gathered a mountain-high pile of data about dietary habits. They then regularly evaluated a subgroup for signs of Alzheimer's disease.

Their findings? Enough to make you think twice about what you eat today.

First, they found that foods rich in vitamin E — oil-based salad dressings, fortified cereals, green leafy vegetables, cantaloupe, seeds and nuts — were associated with a reduced risk of developing Alzheimer's disease.

They also found that people eating fish at least once a week were 60 percent less likely to develop Alzheimer's disease than those who rarely or never ate fish. The key ingredient, the Rush team believes, is the n-3 polyunsaturated fatty acids in fish.

From these data, the team made an association between high intakes of saturated and trans-unsaturated fats and Alzheimer's disease. That means it's better to limit fatty meats, full-fat dairy products like butter and milk and vegetable shortening, which is often found in crackers and cookies.

But why these foods? What do they do that could prevent or cause Alzheimer's disease? Although the exact cause (or causes) of Alzheimer's is unknown, research indicates that oxidation of the brain over time does cause

F O R T H O U G H T



According to a recent article in the *Archives of Neurology*, authored by Rush researcher Denis Evans, MD, and his colleagues, the number of people with Alzheimer's disease will continue to increase unless new discoveries are made to prevent the illness. The investigators found that in 2000 there were an estimated 4.5 million people with Alzheimer's disease in the United States. By 2050, they estimate that number will nearly triple to approximately 13.2 million. "These estimates suggest that prevalence of Alzheimer's disease in U.S. population will substantially increase as older age groups increase in size," the authors wrote. "The large public health challenge is to make these projections obsolete and irrelevant by discovering routes to the prevention of the illness through better understanding of its underlying biology and by the discovery of modifiable risk factors."

Fortunately, researchers like Evans, Martha Clare Morris, ScD, and Robert Wilson, PhD — all of whom work at the Rush Institute for Healthy Aging — have taken on that challenge and are looking at factors, such as diet and mental activity, that may protect against this devastating disease.

mental deterioration. Vitamin E, as an antioxidant, may combat that process. The n-3 fatty acids found in fish share chemical similarities to substances found in the brain's gray matter. These substances help transmit signals to the brain, allowing for learning and memory storage. As for the "bad" fats, these culprits are associated with high cholesterol, and high cholesterol has been shown to be bad for both the heart and the brain.

Although swearing off Keebler snacks and Jimmy Dean sausages forever and embracing a life of tuna salads isn't necessarily a bad thing, Morris cautions that it's still too soon to tell if diet is the key to preventing Alzheimer's disease.

"This kind of research is still in its infancy," Morris says. "There may be — and probably are — other factors in play." In fact, in another study, Rush researcher Robert Wilson, PhD, Evans and Morris found that performing mind-stimulating activities, such as crossword puzzles, may also protect against Alzheimer's disease. In addition, Wilson and his colleagues recently identified a relationship between distress and Alzheimer's disease.

Morris's findings are enough, however, to encourage her — and many others — to skip the bacon bits and sprinkle their salads with sunflower seeds instead. •



Photography by Andrew Campbell

Martha Clare Morris, ScD, shows off some of the foods — those rich in vitamin E, such as oil-based dressings, apples, fortified cereals, green leafy vegetables, cantaloupe, seeds and nuts — that may help to prevent Alzheimer's disease.



A natural fit

Tissue engineering gives patients biological solutions to orthopedic problems

by Judy Germany

Forty-year-old construction worker Mark James suffers from severe, chronic pain in his lower back. He has trouble sitting and bending. He's tried a variety of painkilling medications and physical therapy, but the pain persists. The problem: degeneration of his intervertebral discs, cushions made of cartilage that separate the bony vertebrae and act as shock absorbers for the spine. He considers undergoing a surgical procedure called spinal fusion, which would alleviate the pain but restrict his mobility. Fortunately, there is an alternative. An orthopedic surgeon at Rush injects growth factors into the damaged disc to stimulate the cells to create new tissue. Eventually, the discs are restored to a healthy state, the pain retreats and Mark gets his life back.

The truth is Mark James doesn't exist, nor does this treatment; currently there is no miracle cure for intervertebral disc degeneration. But "tissue engineering" — in which damaged cartilage and bone are repaired or replaced using biological approaches — may some day make fictional scenarios such as the one above a reality.

In fact, orthopedic surgeons at Rush are already fixing small bone and cartilage defects by implanting either human donor tissue or the patient's own tissue taken from other parts of the body. Now they are exploring the use of growth factors to boost the body's own regenerative capabilities, as well as methods for using a person's own cells to grow healthy new tissue. "These innovative approaches would benefit a great many patients," says Dale R. Sumner, PhD, chairman of the Department of Anatomy and Cell Biology at Rush.

Thanks to ongoing research at Rush, the future of orthopedic care will likely include all-natural solutions for intervertebral disc degeneration, and for advanced cartilage damage caused by osteoarthritis or injury. Patients would then be able to walk into their doctor's office and walk out with new discs and joints that are as healthy and function as well as the real thing — because they are the real thing.

Creating cartilage

The ultimate goal of tissue engineering in orthopedics is to create hip and knee joints made entirely of human tissue, grown in labs from patients'

own cells. Bioengineered joints would be better for patients because, for all their benefits, artificial joints are made out of materials — metal, plastic or ceramics — not naturally found in the human body. And that makes them susceptible to loosening and failure.

"Since it is such a complex process, however, recreating a joint in a lab setting may never be possible — and even if it is, it will take decades to perfect," Sumner says. For now, artificial implants are the best alternative for patients with joints ravaged by osteoarthritis, and researchers at Rush are studying the use of tissue engineering techniques to strengthen implant fixation. For instance, coating implants with growth factor will spur bone regrowth, which will make the new joints more secure and long-lasting.

Stromal cells — a specific type of bone marrow cell — are being looked at as a potential mechanism for delivering the growth factor. Stromal cells are like tiny cell factories: Because they contain genes with regenerative capabilities, they keep churning out growth factors well after implantation. This, in turn, would generate new-

bone growth for a longer time after surgery, improving fixation and long-term function.

Influencing cellular pathways

Eventually, stromal cells may also enable researchers to create a plentiful supply of new cartilage and bone. These bioengineered tissues could help doctors repair a broader range of defects.

Orthopedic surgeons are already using a technique called autologous chondrocyte implantation to treat small defects in the articular cartilage of the knee before the damage progresses to the point where the patient needs knee replacement surgery. Cartilage tissue is harvested from the patient's own knee and used as a "starter" to grow millions of new cells. These cells are then implanted into the damaged part of the knee, where they continue to multiply and integrate with surrounding cartilage.

Autologous chondrocyte implantation is a highly effective way to repair relatively small defects. Now researchers are searching for ways to generate larger batches of cells.

Stromal cells have the potential to differentiate — to go down different cellular pathways and become other types of cells. "When a person sustains an injury, such as a fracture, complex sequences of signals are sent to these cells, influencing them to form bone cells, cartilage cells or other types of cells, depending on what is needed to heal the injury," says Sumner.

Sumner and Amarjit Viridi, PhD, are attempting to recreate, outside the body, the process by which stromal cells differentiate into bone cells for use in bioengineered tissues.

"To optimize the process, we seek to understand what the cells are doing at any given time, how they react to manipulation, and which genes are being expressed and which are being turned off," Sumner says. "We're also assessing how regenerated bone tissue looks and functions. Ensuring that tissue created in the lab does, in fact, function as well as real tissue is one of the challenges of tissue engineering."

Preserving joints

Another team of researchers at Rush, led by Eugene Thonar, PhD, and Koichi Masuda, MD, is attempting to form biological tissue substitutes that can be used therapeutically to restore normal function to injured articular cartilage, delaying the need for joint replacement surgery.

Masuda developed a method of taking cells from cartilage and growing them in a two-step process in a laboratory culture dish. Studies are now under way to optimize growing conditions — by adding growth factors, for example — to produce new cartilage tissue that will integrate with existing tissue and promote long-term survival.

A variation of this technique is being used in efforts to bioengineer cartilage that, for the first time, mimics the diverse structural and functional roles articular cartilage plays within joints. "This new approach will enable orthopedic surgeons to implant fully formed, durable cartilage — as opposed to cartilage cells — which will lead to shorter recovery times and better results for patients," Masuda says.

Back to the basics

Giving patients better results is also the goal of Howard An, MD, an orthopedic surgeon at Rush, who believes that tissue engineering will ultimately play a crucial role in treating many of the millions of people who suffer from intervertebral disc degeneration.

Degeneration occurs both as a result of physical activity — such as repeatedly lifting heavy objects — and as a normal part of the aging process. In fact, it's one of the leading causes of low back pain.

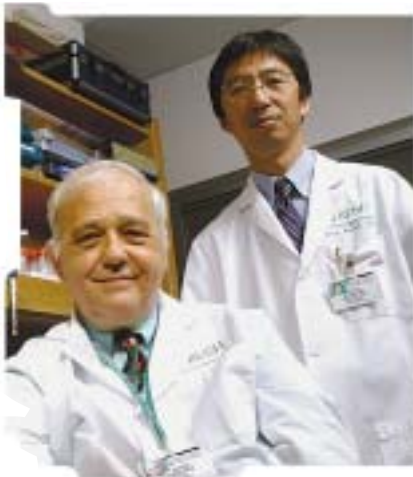
Currently, most patients with persistent low back pain are treated conservatively, with physical therapy and medications. "These methods aren't very effective, however," An says. "They can't correct the underlying problem or prevent further deterioration."

Patients who don't respond at all to conventional treatments may undergo spinal fusion, in which the vertebrae in the lower spine are fused together. This restricts movement, thus easing back pain. But the disadvantage is that fusing

some vertebra places added strain on other parts of the spine.

Through a multimillion dollar study funded by the National Institutes of Health, An and his colleagues at Rush are exploring alternative approaches to repair or slow down disc deterioration. Rather than fusing the spine or implanting a prosthetic disc made out of plastic or metal, they hope to regenerate the tissue and revitalize a disc that has deteriorated — either by injecting a growth factor into the disk to stimulate the cells to create new tissue, or by removing disc cells from the body and using them to grow new tissue in the lab, then implanting that tissue into the patient.

An cautions that tissue engineering approaches probably won't work for patients whose discs have deteriorated completely — leaving bone to rub against bone — because there aren't



Photography by Bill Richert

Rush Researchers Eugene Thonar, PhD (left), and Koichi Masuda, MD

any cells left with which to generate new tissue.

Still, tissue engineering promises to help a great many patients avoid invasive surgery, heal faster and get permanent relief from their low back pain. "What's so exciting is that we will be addressing the underlying problem rather than just the symptoms," An says. "If we can repair or reverse the damage and restore the disc tissue to a healthier state, patients will no longer have to endure chronic pain, long-term disability and countless hours in the doctor's office." •



Photography by Mark Segal

Thirty years of excellence in epilepsy care

This year, the Rush Epilepsy Center celebrates its 30th anniversary — 30 years of helping patients become seizure free. The center, the first of its kind in Chicago, was founded by epilepsy pioneer Frank Morrell, MD, who directed the center for 25 years until his death in 1997.

Current director Michael C. Smith, MD, is carrying on Morrell's legacy of providing the very best in epilepsy care, research and education. "The greatest strengths of the Rush Epilepsy Center are our experience as a comprehensive epilepsy center and our commitment to our patients and their families," Smith says.

Today, the Rush Epilepsy Center is one of the foremost epilepsy centers in the country, offering a diverse range of treatment options, from innova-

tive surgeries to the latest medications, imaging and monitoring. At the heart of the center is its nationally renowned staff of epileptologists, neurosurgeons, nurse practitioners, nurses, neuropsychologists, physiologists, educators and social workers.

And the future keeps getting brighter. To meet growing demands, the center recently expanded its epilepsy monitoring unit — which has served as a national model — to 11 beds and installed brand new, state-of-the-art equipment. Rush also continues to offer patients the latest advances in diagnosis and treatment, such as SISCOM, a revolutionary imaging technique that enables doctors to precisely locate the source of epileptic seizures in even the most complex cases.

For more information, call (312) 942-5939.

The importance of men's health

Nobody likes going to the doctor. But men tend to schedule annual doctor's visits less frequently than women — and it may affect their health down the road, says Steven Rothschild, MD, a family medicine physician at Rush.

"Unlike women, many men don't have a pressing reason to regularly see a doctor until later in life," he said "Often that means problems aren't caught early, when they're most treatable."

That's why Rothschild and colleague Laurence Levine, MD, a urologist at Rush, are reaching out to men and helping them become aware of the importance of maintaining their health. Recently, the two hosted a non-alcoholic men's health happy hour, where men ranging in

age from 28 to 72 gathered after work to talk about the health issues that affect men.

Rothschild and Levine used the opportunity to stress the importance of exercise and eating well to preventing weight gain and hypertension, which can lead to more serious problems — from heart disease to diabetes, and even erectile dysfunction. They also discussed prostate health and the warning signs for cancer.

"The men who attended found the discussion very valuable," says Rothschild. "It was the first time many of them had spoken about their health in an engaging, meaningful way."

To schedule a men's health happy hour for your organization or group, contact Suzanne Smith at (312) 942-7164.



Rush study shows no link between menopause and cognitive decline

For years, women have complained of forgetfulness during menopause, and many worried that it was a sign they were beginning to experience cognitive decline or dementia. But a recent study lead by Peter M. Meyer, PhD, a Rush researcher, may put those fears to rest. The study, the first to track women's memories through annual interviews during menopause, was published in the September 23 edition of the journal *Neurology*.

Meyer tracked 800 menopausal women between the ages of 42 and 52 for five years and gave them several memory tests. The results were surprising: Women who were going through menopause did not show substantial signs of early cognitive decline. "Hormonal changes that occur during menopause could cause their verbal processing skills to change, but not necessarily get worse, as many believe," he says.

To the contrary, Meyer found that women who were going through menopause actually did slightly better on these tests over time.

Most memory loss experienced by menopausal women, Meyer says, may be the result of stress, noting that similar complaints are common in middle-aged men and women who find themselves in stressful situations.



No doze: Studies look at serious sleep disorder

It's normal to have trouble falling asleep once in a while. But people who are routinely unable to doze off when they want to may be suffering from a serious sleep disorder called delayed sleep phase syndrome (DSPS).

Unlike traditional sleep-onset insomnia, people who suffer from DSPS are able to sleep for a full eight hours but are unable to fall asleep until several hours after their desired time. DSPS sufferers may sleep through alarm clocks and be late for jobs or school in the morning, or they may be too sleepy during the day to be productive. The disorder, which usually affects teens and people in their 20s and 30s,

puts people at risk for poor performance, mood disturbances and motor vehicle accidents.

Now researchers at Rush are taking a close look at DSPS, one of six known disorders that affect the body's internal 24-hour clock. The National Institute of Mental Health is funding two studies directed by James K. Wyatt, PhD, laboratory director of the Sleep Disorders Center at Rush.

One study will look at the sleep hormone melatonin; the other will monitor sleepers' activity during days and evenings. The goal is to find the biological, psychological and lifestyle factors that cause DSPS.

For more information, call (312) 563-4292.

Creating a better bypass graft

For cardiac surgeons performing coronary artery bypass graft surgery, one of the chief concerns is graft failure — abnormal thickening of the wall of the grafted artery, which can cause blockage.

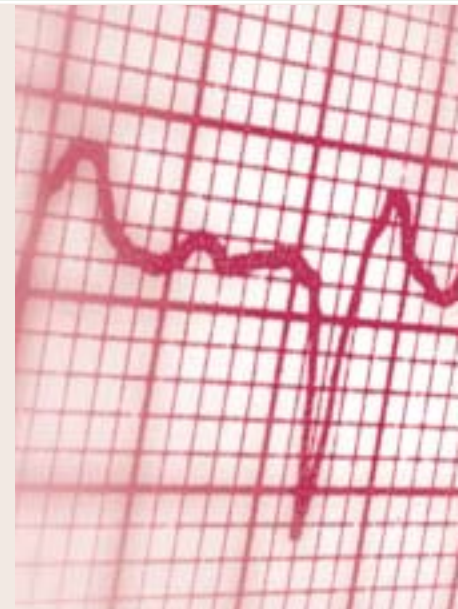
Currently, there is no proven way to prevent grafts from failing. But cardiac surgeons at Rush and 100 other medical centers nationwide are hoping to change that. They are evaluating a new technique that they hope can make grafts last longer: soaking the veins.

During bypass surgery, a vein is removed from the leg, surgically implanted — or grafted — onto the aorta and connected to the coronary artery to reroute blood around a blockage. Complications occur when a gene creates

abnormal cells, causing blockages in the grafted vein, or when the vein becomes narrowed due to a buildup of plaque. About 30 to 50 percent of the grafts fail or become blocked.

But by soaking the veins in a special solution called E2F Decoy for 10 minutes before implanting them, surgeons can suppress the problematic gene, allowing the vein to better adapt, grow thicker walls and maintain blood flow. The technique doesn't change the actual surgery.

"This treatment may allow us, for the first time, to extend the life of vein grafts used in coronary bypass operations," said Marshall Goldin, MD, a cardiac surgeon at Rush and principal investigator of this research.



Moms-to-be: Just say no for kids' sakes

The illegal narcotic ecstasy has been proven to have adverse affects on those who use it. Now, new research by a neuroscientist at Rush shows that mothers who take the drug during pregnancy may be putting their unborn child at risk for brain damage. The study was funded in part by the National Institute on Drug Abuse and was published in the September issue of the journal *Neurotoxicity and Teratology*.

Rush researcher Jack W. Lipton, PhD, demonstrated that when rats were exposed to ecstasy in the fetal stage, the drug caused an explosion — a 502 percent increase — in the development of dopamine neurons in a part of the brain that is important in planning, impulse control and attention. An overactive dopamine system is thought to be associated with schizophrenia and other similar mental disorders.

The effects of abnormal brain development were noticeable. For instance, when researchers put several rats in a new environment, the ecstasy-exposed rats spent considerably more time exploring than their healthy peers, a sign that the drug may have caused learning deficiencies or hyperactivity. The study also suggests that women who take ecstasy in the earliest phases of their pregnancy may alter the brain chemistry of their children, potentially causing learning or behavioral disorders.



Appointments

Administration

Thomas A. Deutsch, MD, chairman of the Department of Ophthalmology, has been named senior vice president and the Henry P. Russe, MD, Dean of Rush Medical College. A 1979 graduate of Rush Medical College, Deutsch is the first alumnus to serve as dean since the school's charter was reactivated in 1971. Deutsch has also served as associate dean for graduate medical education and since February 2002, as acting dean of Rush Medical College.

Clare Giuffrida, PhD, has been appointed chair of the Department of Occupational Therapy. Giuffrida, who has more than 30 years of experience in occupational therapy as a clinician, researcher, educator and administrator, comes to Rush from the University of Florida, where she was assistant professor of occupational therapy.

Christine L. Malcolm has been named senior vice president of strategic planning, marketing and

program development. Malcolm came to Rush last year as vice president of strategic and program development and has been the driving force in crafting a strategic plan to guide the Medical Center's decision-making over the next several years.

Diane M. McKeever has been named senior vice president of philanthropy. McKeever, who previously was vice president, has been with Rush's development office for 20-plus years. She is also secretary of the Rush Board of Trustees. She is now charged with planning a major capital campaign to meet the needs of the strategic plan.

New Trustees

Seven new trustees have been elected to the Board of Trustees of Rush University Medical Center.

Margaret Faut-Callahan, CRNA, DNSc, FAAN, is professor and chair of adult health nursing in the Rush University College of Nursing and president of the Nurses Alumni Association. She is also program director for the nurse anesthe-

sia program. **Jorge O. Galante, MD, DMSc**, is Grainger Director of the Rush Arthritis and Orthopedics Institute and was the chairman of the Department of Orthopedic Surgery from 1972 to 1993.

Catherine "Kit" Grotelueschen, MD, is a board-certified internist practicing in Lombard, Ill., and a 1980 graduate of Rush Medical College. She is president of the Alumni Association of Rush Medical College. **Jay L. Henderson** is managing partner of the Chicago office of PricewaterhouseCoopers LLP. **Marcie Mervis** is an attorney and president of the Carylton Foundation, the philanthropic arm of maintenance contractor the Carylton Corporation. **Frank Techar** is president and CEO of Harris Trust & Savings Bank, one of the largest community bank networks in Illinois. **Richard L. Wambold** is chairman and CEO of Pactiv Corporation, a worldwide provider of advanced packaging solutions based in Lake Forest, Ill.



Name change ushers in new era for Rush

You don't change your name on a whim, especially when that name helps tell your story. The Rush name has a story that spans nearly 170 years and three great institutions. In October, Rush began a new chapter as Rush University Medical Center, elevating its visibility as an academic medical center and highlighting the advanced treatments and innovative technologies that only a university-based medical center can bring to patients.

Heart Story continued from page 3

Two years after her near-fatal heart attack, she is thriving thanks to the treatment she received at Rush: medications to strengthen her heart, ablation therapy to correct the electrical problem that caused her abnormal rhythm, and a pacemaker-defibrillator. Miraculously, her heart is pumping at full efficiency again, the palpitations are gone and she no longer feels exhausted and run down all the time.

The realtor and mother of three has reclaimed her life — and she hopes that by sharing her story, she can empower other women do the same. "As women, we're so busy juggling careers and families and running everything that we often don't pay enough attention to our own health. We need to realize that if we don't take care of ourselves, we won't be around to take care of anyone else," she says. "I have heart disease, but I'm doing everything possible to ensure that I'll be around for a long time."

And the women's heart team at Rush is doing everything possible to ensure that by the time Dunn's 12-year-old daughter, Nicole, is an adult, she won't have to worry about heart disease.

For more information or to make an appointment at the Rush Heart Center for Women, please call (312) 942-6242. •

IT'S HOW MEDICINE SHOULD BE



Faculty nurses such as Carmen Cleary, RN, spend about half of their work week in on-site clinics, providing medical care for the homeless.

Rush nurses help homeless turn lives around

by Patrick F. Kelly

The Rush mission of helping people extends well beyond the Medical Center's walls and out into the community. One of the many ways Rush and its employees are making a difference in Chicago is through the community nursing program, in which Rush nurse practitioners provide health care at several area homeless shelters and outreach organizations.

The homeless population is very vulnerable to a wide array of medical problems, and Rush nurse practitioners are there to help.

Faculty nurses such as Carmen Cleary, RN, spend about half of their work week in on-site clinics, providing medical care for the homeless. They perform basic eyesight screenings, screen for infectious diseases and help people identify and manage chronic conditions, such as diabetes and high blood pressure.

At the Chicago Christian Industrial League, where Cleary works, good health is a key component to

effective job training. "No job training can be effective if a person can't see past 10 feet or is sick because of an infectious disease," says Cleary. "That's why we work with these groups."

And thanks to a community nursing class offered through the Rush University College of Nursing, nursing students can get involved in the program and gain valuable insights on homelessness. "Some of our students have never worked with an underprivileged population," says Marilyn E. O'Rourke, RN, MSN, program coordinator for community nursing. "For those students, it's a real eye-opener.

"Most people have preconceptions about homeless people: that they don't work, or are lazy," she adds. "But in reality, so many different kinds of people are homeless. I've seen people who are students, lawyers, nurses or other professionals. It can happen to anyone who loses their income, doesn't have any family or support network and has nowhere else to go."•

Having FAITH

A four-year, \$20,000 grant awarded to Rush Medical College by the Association of American Medical Colleges will expand Rush University's role in serving the homeless. The grant will help Rush medical students improve clinic operations through better health equipment, education and administration at Franciscan Homeless Shelter Clinic, a homeless shelter that serves up to 215 men and 35 women each night on Chicago's West Side.

Under the Franciscan's Advanced Initiative to Healthcare (FAITH) project, each patient is assigned to a care team comprising a first- or second-year medical student and a third- or fourth-year medical student. Together, the two students complete the initial interview and perform the physical examination, then present the information to an attending physician. With guidance from their attending, the students come up with an individualized treatment plan for each patient. The attending physician, a licensed MD, provides the patients with any necessary medications.

The Franciscan Homeless Shelter Clinic is a part of the Rush Community Service Initiatives Program (RCSIP), which serves as a model for academic medical centers as it strives to train future health care personnel in community health, social and behavioral medicine, and primary care. Rush's FAITH project was one of eight United States medical schools to receive the grant.

RUSH Calendar of Community Wellness Events

For more information, please visit our Web site at www.rush.edu.

January

NBC 5 Health and Fitness Expo

Saturday and Sunday, January 24 and 25, 2004

Sat 10 a.m.-5 p.m., Sun 10 a.m.-4 p.m.

Festival Hall B, Navy Pier, Chicago

Rush forums Saturday

- 12-12:30 p.m. Christopher De Wald, MD – “Scoliosis: What to Look for and the Latest in Treatment”
- 12:30-1 p.m. Sheila Dugan, MD, and Harel Deutsch, MD – “Oh My Aching Back ... A Review of Treatment Alternatives”
- 3-3:30 p.m. Demetrius Lopes, MD, and Michael Sloan, MD – “Stroke: Symptoms, Signs and the Latest in Prevention and Treatment”
- 3:30-4 p.m. Marc Brand, MD – “Colon Cancer: Are You at Risk or Are You in Control?”

Rush forums Sunday

- 12-12:30 p.m. Jeff Mjaanes, MD – “Healthy Kids, Active Kids, Happy Kids”
- 12:30-1 p.m. Lynne Braun, PhD, RN, CNP, Preventive Cardiology/Rush Heart Center for Women – “What to Do When the Pressure Is Up? Keeping Your Blood Pressure Under Control!”
- 3-3:30 p.m. Rajshri Shah, MD, Primary Care – “The Skinny on Fad Diets”
- 3:30-4 p.m. Kathy Weber, MD – “Common Injuries and How to Avoid Them in Women”

While at the expo, visit the Rush booth for:

- Bone density (heel-scan) screenings provided by Midwest Orthopaedics and the Rush Osteoporosis Treatment Center
- Blood pressure and blood glucose screenings provided by the Rush Department of Preventive Medicine
- And more ...

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