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Memorial gifts bolster education initiative



“Public education is my passion.” – Endowed lectureship recipient Lori Mackstaller, MD, answers questions from the audience after a presentation.

‘Not Just a Dream’

Long-time support culminates in an endowment gift to advance heart health for women

The Sarver Heart Center has made it a top priority to improve the cardiovascular health of women through research, education and patient care geared specifically to women. The latest advance is the establishment of an endowed lectureship to provide more opportunities for women to learn about what they can do to provide heart-healthy choices to their family while taking charge of their own health. The endowment is officially named the *Bertram H. and Hazel Brach Brodie and the J. Edwin Brach Foundation Endowed Lectureship for Heart Disease in Women*. It was awarded to Lorraine Mackstaller, MD, who is one of the Sarver Heart Center’s most outspoken public advocates of a heart-healthy lifestyle.

“This lectureship gives me the opportunity to go out to the community and educate women about their cardiovascular health,” says Dr. Mackstaller. “It allows me to develop more in-depth programs that focus on certain issues related specifically to women and their families. Take obesity in children, for example: If we can do a better job at getting the word out about this preventable disease, we can diminish, if not prevent it entirely!”

All too often, a woman has her hands full balancing a career and family life and ignores early cardiovascular warning signs, and she doesn’t slow down and take the time to listen to her body. Add to that the fact that heart attacks tend to manifest in a more

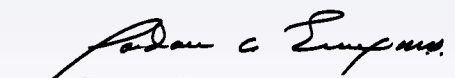
...from the Director



The mission of The University of Arizona is to improve the quality of lives via the academic principles of **research, education and service**. For the clinical faculty of our medical school, **service** is predominantly patient care. I think it speaks for the exceptional quality of our University Medical Center to be ranked number one for the lowest mortality in cardiology among the nearly one hundred university hospitals in the United States. While this issue of our Newsletter contains articles covering some

aspects of all three, if there is an emphasis, it is **education**. Our primary obligation is educating the physicians, researchers and cardiologists of tomorrow. However, we also take seriously our obligation to educate the public. This issue highlights our most recent public education programs in Yuma, Green Valley and Tucson. At our annual "Healthy Heart" program in the Student Union building on campus, a "full house" heard several topics presented by Sarver Heart Center members. At that event, it was my privilege to formally announce that Lorraine Mackstaller, MD, was awarded the Bertram H. and Hazel Brach Brodie and the J. Edwin Brach Foundation Endowed Lectureship for Heart Disease in Women for her dedication to public education, with emphasis on heart disease in women. She is a popular lecturer not only at our formal public outreach programs, such as our annual "Heart of the Matter Luncheon" at Skyline Country Club, but she also is an authority frequently seen on TV and at small group discussions hosted by friends of the Sarver Heart Center. Those interested in any of our events are encouraged to contact Daniel Stolte at (520) 626-4083 or Clint McCall at (520) 626-4146.

This issue also shines a light on the Sarver Heart Center's Investigator Research Awards funded by contributions to the UA Foundation to fund start-up projects at the Sarver Heart Center. In awarding these grants we emphasize translational or "bench-to-bedside" research. These awards are important, as they are one of the few ways scientists investigate unknown or unproven approaches that could lead to national funding and truly transformational research.


GORDON A. EWY, MD
Director, UA Sarver Heart Center

'Not just a Dream'
continued from page 1

subtle and less clear-cut way compared to men, and you can understand why women are more likely to suffer "silent" heart attacks and are less likely to seek treatment as early as their male contemporaries.

After Hazel Brach Brodie's passing, her husband, Bertram Brodie, took over the affairs of the J. Edwin Brach Foundation, which has supported the heart center for many years. The foundation provided research funding to the late Rubin Bressler, MD, professor emeritus and former chief of medicine at the UA College of Medicine.

Dr. Bressler had long been recognized for his dedication and contributions to medical science. As one of the most published members of the Sarver Heart Center, his work is of international renown. However, it was not Dr. Bressler's work as a scientist that piqued the interest of Mr. Bertram Brodie, but the care that

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he had received as his patient. “Mr. Brodie respected Dr. Bressler immensely,” says Sharon King, trustee of the Brach Foundation and a friend of Mr. Brodie. “He was very proud to have been able to make a difference in his [Dr. Bressler’s] work.”

“Mr. Brodie was very proud of directing contributions from the Brach Foundation to the Sarver Heart Center,” Ms. King continues, “he was also very clear with his instructions on the areas the foundation should be supporting.”

After his death, the decision was made to dissolve the Brach Foundation. “We didn’t feel we could continue making grants without Mr. Brodie’s input. But we knew he would have wanted a portion of the proceeds to be appropriated to the Sarver Heart Center.”

It was through a final gift from the J. Edwin Brach Foundation that the trustees memorialized and celebrated Mr. Brodie’s commitment to the Center, his respect for Dr. Rubin Bressler and his affection for his late wife, Hazel Brach Brodie.

A lasting legacy

Establishing the endowed lectureship took some discussion, however. “The easy part was making the gift,” says Ms. King. “Deciding on the purpose of the endowment was a little more difficult.”

At that point, Dr. Bressler would again play an important role in

Mr. Brodie’s philanthropic plan,” says Ms. King. “We were glad to have input from Dr. Bressler – he knew Mr. Brodie better than most. While the endowment was to pay tribute to Mr. and Mrs. Brodie, it was equally important that the endowment meet a need of the



*Bertram and Hazel
Brach Brodie*

Sarver Heart Center and be something Mr. Brodie would have valued. I am so pleased with the one we ultimately selected – an endowed faculty lectureship is something Mr. Brodie would have really liked.”

“Heart disease in women remains a top priority for the Sarver Heart Center,” says Director Gordon A. Ewy, MD. “While the Allan and Alfie Norville Endowed Chair provides for research helping us to better understand the nature of heart disease in women, the Bertram H. and Hazel Brach Brodie and the J. Edwin Brach Endowed Lectureship will allow the Sarver Heart Center to provide educational opportunities for all women. Education is the first and most crucial step in preventing the progression of this disease. Mr. Brodie would indeed be proud of what the Center will accomplish – we feel genuinely honored to have been one of his charities of choice,” Dr. Ewy adds. “This endowment will have a profound impact on our community.”

“This lectureship would not have been possible without the culmination of a long-standing

tradition of support through the J. Edwin Brach Foundation,” Dr. Ewy adds.

Lectureship holder Dr. Mackstaller already has concrete plans on how to best use this opportunity. Her passion for educating women and their families about cardiovascular health shines through when she says, “Women are the cornerstone of the family. If we can educate them about heart-healthy diet, exercise, the importance of not smoking and other lifestyle choices, we can change the health history of the people in Arizona and beyond! Of course, it is important to keep in mind that lifestyle changes alone often are not enough, so understanding the importance of appropriate medications is equally important.”

When asked about the biggest challenges that stand in the way of making tangible strides towards a better cardiovascular outlook for women, she points to tough economic times for starters. “If you’re a single mom, it’s hard to find the time to exercise or even just go for a walk. It’s hard to put a heart-healthy meal on the table when the fast food restaurant down the street is so much cheaper and more convenient.”

“Our job as health professionals is to ask the public: ‘How can we best work with *you* to make *your* life healthier?’”

Dr. Mackstaller adds: “It’s not just a dream. Knowledge is power – the power to make a change. And this is what this endowment will allow me to help make possible.” ♥

In memoriam: Rubin Bressler, MD



Rubin Bressler, MD, passed away on May 3, 2009. Dr. Bressler dedicated his life to academic medicine and his family. He served as Department Head for three UA departments, including the Department of Medicine. In addition to his administrative leadership in the College of Medicine, he provided care to numerous patients and published groundbreaking research during his career of more than 37 years at the UA. He had been a

mentor and teacher at the College of Medicine since 1967. In 2007, the Alumni Association of The University of Arizona honored Dr. Bressler with the Professional Achievement Award for Extraordinary Faculty.

Born December 13, 1928, he graduated from the Bronx High School of Science and McGill University in Montreal. He studied medicine at Harvard and Duke. After graduation from medical school, he spent two years as an intern and a junior assistant resident at Yale. He returned to Duke, where he did a residency in internal medicine and a fellowship in biochemistry. Following his fellowship, he joined the Duke faculty, rising to a full professor in three years.

Dr. Bressler moved to Tucson in 1970, shortly after the medical

school was founded at The University of Arizona, where he stayed active in research and clinical fields for many more years. His dedication to science and to the pursuit of knowledge was tireless. He authored more than 300 scientific articles, numerous book chapters and wrote several books. In addition, he served as the editor of several journals. A teacher at heart, he mentored hundreds of students and physicians, many of whom are still in the community.

Throughout his career, Dr. Bressler was interested in the mechanisms by which medications exert their influence on cells, including cells of the immune system, and how these mechanisms relate back to certain heart conditions. Recognizing the importance of research at the cellular level, Dr. Bressler used the resources not to only further his own work but to foster and build a strong cell culture program. Led for many years and expanded by his coworker Joseph Bahl, PhD, this program was the sole source of cell cultures and allowed faculty throughout the Sarver Heart Center and the College of Medicine to pursue basic research using various types of cells as model systems in their research.

Although his career was in science and medicine, his interests were quite varied. He majored in English in college and had a passion for poetry. He enjoyed and collected Native American art, wine, stamps, coins and fine china. With Dr. Bressler's passing the faculty and staff at The University of Arizona will miss a most valued colleague, friend and mentor. ♥

Game - Set - Match: We Can Beat Sudden Cardiac Death!

Congratulations to the Steven M. Gootter Foundation for another successful year of raising awareness and funds to support efforts to prevent sudden cardiac death.

At the recent Gootter Gala Dinner the Foundation presented a check to the Sarver Heart Center for \$376,000. Money raised is being used partly to fund promising and innovative research projects (see "Fitting the Pieces Together," pages 6-7) and to create a \$2 million endowed chair for the prevention of sudden cardiac death.

In addition to the Gala Dinner, the Foundation also holds the Gootter Grand Slam tennis tournament and pro exhibition. This annual event has drawn Tucson's top players and featured matches between tennis legends Mats Wilander and Jimmy Arias. In four short years, the Gootter Grand Slam has become one of the largest tennis events in Arizona!

In 2005 Steven M. Gootter's life tragically was cut



Tennis champ Jimmy Arias helps Max, 7-year old son of the late Steven M. Gootter, prepare for a forehand return at the 2009 Gootter Grand Slam tennis tournament.

short by sudden cardiac arrest. In the wake of his death his family and friends created the Steven M. Gootter Foundation. Over the past four years the Gootter Foundation has contributed more than \$1 million dollars to the Sarver Heart Center to fund research and the endowment.

"The Gootter Foundation's commitment to conquering sudden cardiac death aligns seamlessly with ours," says Dr. Ewy. "We are attacking this problem on several fronts: from our world-class research in ARVD (the most common cause of sudden death in younger individuals in some countries) to new approaches in Cardiocerebral

Resuscitation to save those suffering a cardiac arrest." He adds, "We are also working to identify individuals at risk through basic (genetic, microscopic, physiologic and anatomic) research and clinical (electrophysiology and imaging) programs. We are indeed fortunate to have the energy and enthusiasm and partnership of the Gootter Foundation – together we will succeed." ♥



The Gootter Family with former world No. 1 tennis player Mats Wilander and Jimmy Arias.

Frank Marcus, MD, and Kathy Gear, RN, receive Johns Hopkins Award

Frank Marcus, MD, professor emeritus at the UA College of Medicine and founding member of the College of Medicine section of cardiology, and research nurse Kathy Gear, RN, received the prestigious Johns Hopkins Award of Excellence in ARVD during the 10th Annual ARVD Family Seminar in Baltimore in May.

ARVD stands for Arrhythmogenic Right Ventricular Dysplasia, a familial heart condition in which parts of the heart muscle become infiltrated by fatty tissue, leading to disturbances in the electrical conductivity and resulting in an abnormal heart rhythm. ARVD is a serious condition in that often its first and only manifestation is sudden death.

A world-renowned authority on ARVD, Dr. Marcus regularly is called upon to share his expertise on this disease, which affects about one in 2,000 individuals. Most recently, he was asked to comment on a study published in the *New England Journal of Medicine*, in which researchers presented a promising new biopsy test, which, if commercially developed, will help in diagnosing the rare genetic disorder in its early stages. The test allows doctors to visualize a tell-tale reduction in plakoglobin, a protein that “glues” heart muscle cells together.

“I have been following this work carefully and am most enthusiastic about the possibility of making an accurate diagnosis in this disease, which has been very difficult to diagnose with certainty using conventional methods,” says Dr. Marcus.

A principal investigator of a now concluded, seven-year study on ARVD that included 18 centers in the United States and in Canada, Dr. Marcus has teamed up with the researchers who authored the study to pursue funding for a joint effort to study the molecular, genetic and other aspects of this disease.

“If the results of this new test can be confirmed in a larger series of patients in the early stages of the disease, it would be a significant medical advance. One could speculate that the abnormal findings described in this study may be present in family members who have the genetic defect but have minimal or no symptoms. Therefore, in addition to diagnosing patients, the test could also help their relatives who are asymptomatic but concerned about whether they

might have the disease.” In addition to receiving the Johns Hopkins award, Dr. Marcus recently was recognized with the “ECAS Outstanding Support Award” by the European Cardiac Arrhythmia Society. ♥



Kathy Gear, RN was recognized “for her dedication and devotion to patients and families with ARVD.” Frank Marcus, MD, received the award for his “pioneering research and lifelong commitment to patients with ARVD.”

Cardiology at UMC ranked top in the nation for low mortality

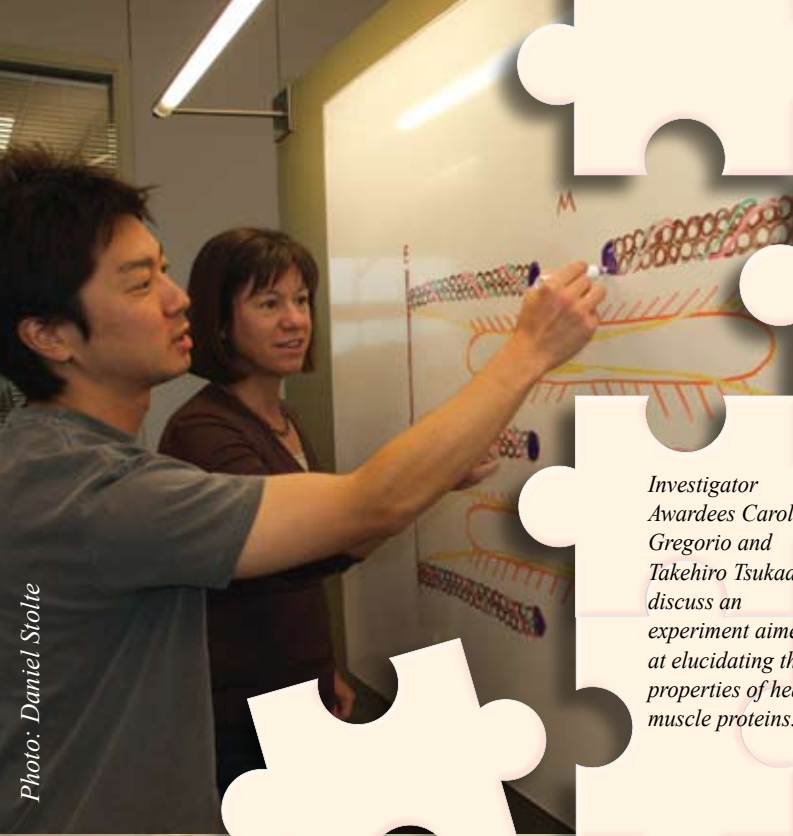
Cardiology at University Medical Center was ranked number one in the nation for low patient mortality in a report by the University HealthSystems Consortium. The most recent report comprises the time from July 2007 to June 2008. For each of the 98 university hospitals in the United States the consortium evaluates the ratios of expected mortality based on the severity of the disease and the actual mortality at that particular hospital and lists the top 10 hospitals by name. In the overall ranking, which takes into account other parameters such as safety, timeliness, efficiency and patient-centeredness, UMC ranked number five in the nation. ♥

Fitting the Pieces Together

Advancing cardiovascular research through donor

The Investigator Awards provide our scientists with critical seed funding to give them a competitive edge to leverage national research grants. Even though they don't all fit together, complement each other in the formation of new knowledge. Together they form a bigger picture – that of new therapeutic approaches for the patients of tomorrow.

Photo: Daniel Stolte



Investigator Awardees Carol Gregorio and Takehiro Tsukada discuss an experiment aimed at elucidating the properties of heart muscle proteins.

Steven M. Gootter Investigator Award #1

Established in memory of Steven M. Gootter to find new ways of preventing sudden cardiac arrest

Mission: Investigate how the signaling molecule TGF-Beta is involved in aortic aneurysms.

Investigator: Mohamad Azhar, PhD, research assistant professor in the Department of Cell Biology and Anatomy at the UA College of Science and BIO5 Institute

Goal: Help develop better therapeutic approaches to aneurysm prevention and repair. ♥



Steven M. Gootter Investigator Award #2

Mission: Understand the mechanisms governing heart muscle formation and how mutations affect this process.

Investigator: Carol Gregorio, PhD, director of the Sarver Heart Center's Molecular Cardiovascular Research Program

Goal: Thanks to results obtained through the Gootter funding, the group was awarded a \$150,000 grant from the American Heart Association to identify the effects by which known mutations put people at risk for sudden cardiac death. ♥



Photo: Daniel Stolte



Brad Davidson and his model organism, the sea squirt Ciona. Despite their lowly looks, these marine creatures could be the key to saving the lives of children born with heart defects and discovering ways to repair hearts after a heart attack.

Steven M. Gootter Investigator Award #3

Mission: Elucidate how the brain might play a role in the risk of sudden cardiac death.

Investigator: Richard D. Lane, MD, PhD, professor of psychiatry, psychology and neuroscience

Goal: Obtain images of the brain and the heart to study the interaction between the two organs in cardiac arrhythmias. ♥

Photo: Darci Slaten



Whenever he gets a break from his busy clinic, Scott Klewer studies chicken embryos and uses molecular genetics to characterize mutations that prevent heart valves from forming properly.

Walter and Vinnie Hinz Endowed Investigator Award

Paying tribute to retired UA Professor Walter Hinz, whose contributions were given in honor of his wife Alvina and his friend Peg Barrett, this award supports promising initiatives of cardiovascular therapies.

Mission: Create a new tool to modify stem cells for genetic experiments aimed at finding ways to replace or regenerate damaged heart tissues.



or-funded investigator awards

ng to bolster innovative ideas with research data and give them
the individual projects pursue different lines of research, they
edge about cardiovascular mechanisms, and combine into a
tomorrow.

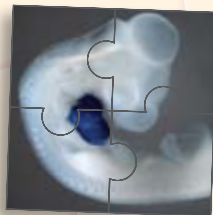
Investigator: Takehiro Tsukada, PhD, postdoctoral fellow in the Department of Cell Biology and Anatomy

Goal: Promote the development of clinical transplantation therapies and tools to study specific questions related to heart development in ways that were previously impossible. ♥

William J. “Billy” Gieszl Endowed Investigator Award

Established in memory of William Gieszl to advance diagnosis and treatment of congenital heart defects

Mission: Study the processes by which heart valves form during embryonic development and the molecules that govern this process.



Investigator: Ray Runyan, PhD, professor in the Department of Cell Biology and Anatomy

Goal: Devise ways to influence heart valve formation and find therapies to address some of those heart conditions. ♥

Stephen Michael Schneider Investigator Award

Named in honor of their son who passed away at a young age in 1960, Mr. and Mrs. Frederick Schneider created this award to advance research in the area of pediatric cardiology.

Mission: Define genetic mutations associated with valve and aortic malformations (collaboration with Dr. Runyan)

Investigator: Scott Klewer, MD, professor of pediatrics

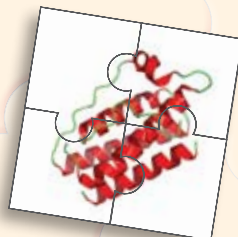
Goal: Establish a comprehensive “bench-to-bedside” program that ultimately might lead to gene tests that could help determine who is at risk from heart malformations. ♥

The John T. and Janet K. Billington Investigator Award

Given in memory of her late husband John, Mrs. Billington’s generosity seeks to advance technology in cardiovascular research and care.

Mission: Study the effect of leptin, a hormone released by body fat, on the heart connective tissue, to better understand the connection between obesity and heart disease.

Investigator: Sherma Zibadi, PhD, MD, graduate research assistant in the UA College of Public Health



Goal: Test if the hormone could potentially be used to treat heart disease. ♥

The Philip and Bobbie Hanft Endowed Investigator Award

Established by the late Philip Hanft and his wife, this award specifically supports scientists who are early in their careers. **Mission:** Investigate the role of red blood cells in clotting.

Investigator: Zoe Cohen, PhD, lecturer in the Department of Physiology

Goal: Find better ways to prevent clotting and thus help prevent heart attacks and stroke. ♥

Leo and Kathy Corbet Investigator Award

Made possible through a gift from former Arizona Senator and heart transplant recipient Leo Corbet and his wife, this award is focused on heart failure research.

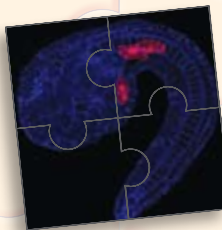
Mission: Evaluate new technologies to monitor artery disease in transplanted organs.

Investigator: Hannah Zimmerman, MD, resident in the Department of Surgery

Goal: Develop tests that would help predict a patient’s risk of developing artery disease and determine a proper treatment regimen while sparing the patient repeated invasive procedures. ♥

Mark and Emma Schiffman Endowed Investigator Award #1

This endowment, created through a generous estate gift, supports promising basic science research at the Sarver Heart Center.



Mission: Study the role of the heart-forming GATA gene in sea squirts, whose hearts are much simpler than human hearts, but use very similar genes and molecules to form the organ.

Investigator: Brad Davidson, PhD, assistant professor in the Molecular and Cellular Biology Department

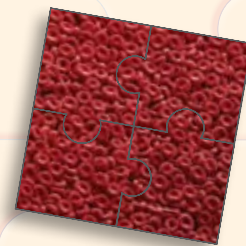
Goal: Provide new and otherwise impossible insights into the basis of human congenital disorders. ♥

Mark and Emma Schiffman Endowed Investigator Award #2

Mission: Analyze inflammatory factors that could be responsible for the worse outcomes experienced by female heart surgery patients compared to their male counterparts.

Investigator: Pei Tsau, MD, assistant professor of clinical surgery

Goal: Develop new and better therapeutics for better outcomes in women after heart surgery. ♥



‘G’ is for ‘Genes’ - or: ‘Pick Your Parents Carefully!’

The more scientists and physicians find out about the physiological and molecular mechanisms underlying heart disease, the more they realize that the emerging picture is a lot more complex than previously thought. “We’ve known all along that cardiovascular disease is the result of an interplay between genes and lifestyle,” says Sarver Heart Center Director Gordon A. Ewy, MD, “but it is becoming ever more clear that while lifestyle changes are important they can only do so much.”

Still not enough?

Yoga in the morning, a heart-healthy cereal and fruit breakfast, garden salad for lunch, bicycling to work, a lean dinner and stretching exercises at night – while a daily routine like this might look intimidatingly healthful to many people, it may still not be enough to steer clear of cardiovascular disease. Dr. Ewy: “Our genes play a big role in determining the impact of a certain lifestyle on our bodies. Also, genetic factors have more time to play out as we get older.”

In the old days, coronary artery disease was seen mostly as a plumbing problem. Much like a roofer clears pipes of obstructions, cardiologists focused on opening blockages in the coronary arteries. Problem fixed, or so they thought.

Scientific advances over the past years have shown it is not that simple.

Just as individuals are different from each other, so are their hearts, their arteries and their blockages. Atherosclerotic plaques, like arteries and hearts and individuals, are the products of many factors, including genetic makeup and age.

Atherosclerosis, the progressive narrowing of arteries caused by deposits in the arterial wall (plaques), is the main concern in coronary heart disease. When a plaque ruptures, it can trigger a clotting reaction that shuts down blood flow through that artery and causes a myocardial infarction (heart attack). However, research has revealed that the average person ruptures about a hundred plaques for every one that causes a heart attack. Contrary to earlier wisdom, it is not always the

large, conspicuous blockages that pose the greatest risk of a heart attack, but the smaller ones that cause no significant narrowing of the arteries. Less stable than their larger kin, those small plaques tend to be more prone to rupturing.

All plaques, it turns out, are not created equal. Most likely, genes play a considerable role in determining the characteristics of a plaque and how the body deals with it. These insights have led to a shift in the way doctors approach heart disease. Rather than solely homing in on and removing or bypassing the large, most obvious blockages, cardiologists also focus on stabilizing the smaller “soft” plaques and preventing them from rupturing by aggressively treating risk factors such as high LDL cholesterol, low HDL cholesterol, abnormal forms of LDL cholesterol and inflammation in addition to high blood pressure, diabetes and other risk factors.

A low HDL (high-density lipoprotein or “healthy cholesterol”) count is a common lipid abnormality in patients with coronary artery disease. One in four Americans has low HDL. Low HDL is associated with an increased cardiovascular risk and is especially common in people of South Asian descent and people with diabetes. Exercise, alcohol in moderation, certain oils and whole grain products are thought to increase HDL cholesterol, albeit to a limited extent. “Raising HDL cholesterol has become the ‘new frontier’ in the treatment of dyslipidemia,” says Dr. Ewy. “Clearly new medications are needed.”

Genes, cholesterol and a conundrum

In the late 1970s, in a small village nestled in the shore of Lake Garda in Northern Italy, researchers from the University of Milan happened upon a mystery that marked the beginning of a new understanding of heart disease based on genetics.

A blood sample taken from a village resident showed an unusually low HDL count while his triglycerides were soaring. From a cardiologist’s perspective, this constellation is very bad news. Yet, this middle-aged

individual had no signs of cardiovascular disease and his parents had enjoyed longevity.

By analyzing blood samples from other village residents and scrutinizing church records, the scientists traced back the conundrum over several centuries to the patient's ancestors who had given rise to a line of individuals with a mutation in the gene that makes the protein portion of the HDL molecule. By some unknown mechanism, the researchers reasoned, this single mutation, called *apo A-1 Milano*, protects its bearers against heart and vascular disease, enabling them to enjoy long, healthy lives even in

the face of unhealthy lifestyles.

Intrigued by these findings, researchers manufactured an artificial version of the *apo A-1* gene, administered the construct to rabbits and fed them a diet high in cholesterol. Interestingly, but not quite unexpected, the genetically engineered *apo A-1* gene reduced plaque build-up in the animals'

arteries. More recently, investigators took the promising results a step further and administered apo A-1 Milano protein to coronary-artery disease patients in a smallscale clinical trial. After five weeks they found significant and measurable shrinkage in coronary artery plaques, a result that encouraged further investigation of this approach.

Cholesterol, while regarded as one of the main culprits in atherosclerosis, is an essential molecule of life: It serves as a "brick" in the building of cell membranes, helps digest foods as a major constituent of bile

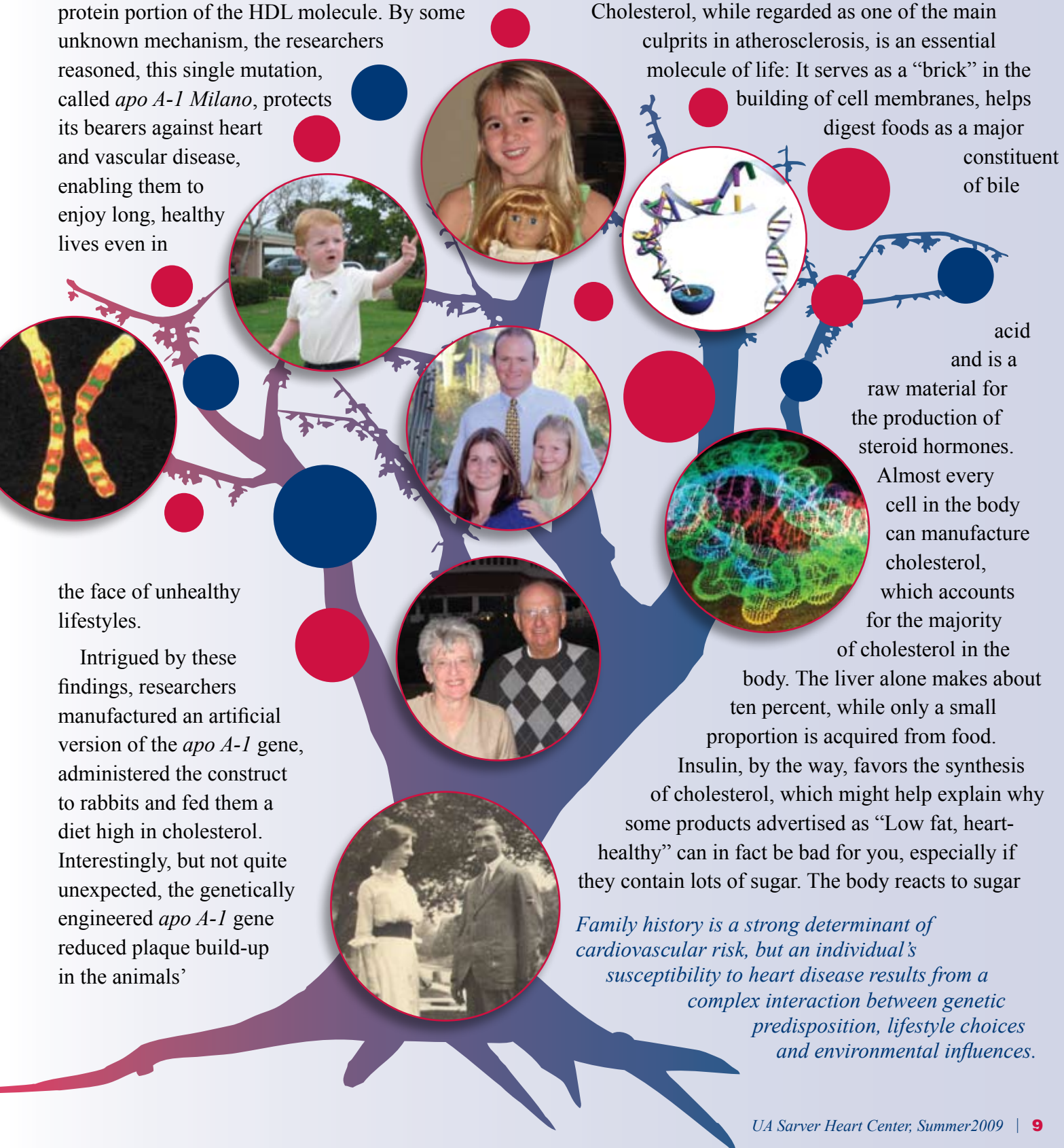
acid and is a raw material for the production of steroid hormones.

Almost every cell in the body can manufacture cholesterol, which accounts for the majority of cholesterol in the

body. The liver alone makes about ten percent, while only a small proportion is acquired from food.

Insulin, by the way, favors the synthesis of cholesterol, which might help explain why some products advertised as "Low fat, heart-healthy" can in fact be bad for you, especially if they contain lots of sugar. The body reacts to sugar

Family history is a strong determinant of cardiovascular risk, but an individual's susceptibility to heart disease results from a complex interaction between genetic predisposition, lifestyle choices and environmental influences.



intake by releasing insulin, which in turn cranks up cholesterol synthesis. Diabetes, which is characterized by either absence of insulin (Type I) or impaired response to the sugar-quenching hormone (Type II) is a genetic disease to a large extent. With enormous implications: While cardiovascular disease accounts for 38 percent of the overall mortality in the general U.S. population, it accounts for nearly two-thirds of deaths in diabetics.

High levels of LDL (Low-density lipoprotein or “lousy cholesterol”) increase the risk for coronary artery disease, and genes appear to have a lot of say in terms of what can be done to curb the risk. Rare, certain genetic conditions known as familial hypercholesterolemia offer a glimpse into the molecular mechanisms at work in our cells, which are in turn determined to a large part by our genes. In some forms of hereditary hypercholesterolemia, the affected individuals have extremely high levels of LDL cholesterol and start to suffer from severe atherosclerosis during childhood or as young adults. This condition is caused by a genetic alteration in the LDL receptor, which normally covers the surface of liver cells in great numbers and catches LDL particles from the bloodstream. The mutation renders the receptor non-functional. As a result, cholesterol is not cleared from the blood in these patients and accumulates to dangerously high levels.

“Genes strongly influence how a person metabolizes cholesterol,” Dr. Ewy says, “but sometimes environmental factors such as lifestyle decide to which degree these genes are active. For that reason, genes are major determinants in the risk for coronary artery disease.”

Current treatment options

Genes, gender and lifestyle all interact in determining the risk for heart disease. Women and men seem to react differently to environmental factors such as alcohol consumption, exercise and stress.

High blood pressure, another major risk factor for heart attack, stroke and kidney failure, is determined to a large extent by heredity. In the United States, high blood pressure occurs more frequently among African Americans than among white or Asian Americans. The greatest risks

are increasing age and decreasing kidney function. In a large percentage of people with primary hypertension, i.e. high blood pressure with no discernable cause, genetic abnormalities lead to alterations in kidney structure and function or in the structure of the arteries. As a result, their arterial walls become stiff, posing a higher-than-normal resistance to blood flow and raising blood pressure.

Until scientists figure out exactly how genes and environmental factors interact in determining cardiovascular risks and relevant gene tests have been developed, lifestyle changes and medications remain a cornerstone in maintaining heart health and lowering risk factors. “Exercising regularly, not smoking, eating a diet rich in fish, nuts, fruits and vegetables, alcohol in moderation and minimizing stress are keys,” Dr. Ewy points out. “However, even a perfect lifestyle usually is not enough to prevent cardiovascular disease if a person has a genetic disadvantage. That is why medications are frequently needed to decrease risk.”

Genetics also play a role in how an individual responds to drugs. ACE inhibitors, for example, a commonly used group of medications for heart failure, have been shown to have less of an effect in African-American men. Similarly, when prescribing cholesterol-lowering statins, doctors have to keep in mind that patients of Asian descent metabolize the drug more slowly than Caucasians and require lower doses. These are only two examples of innumerable differences in drug response that go back to a person’s genetic make-up.

One possible outcome of future research lies in the field of “personalized medicine,” which aims at tailoring drugs and treatments to a patient’s individual genetic makeup. The individual gene profile could determine which patients need more aggressive treatment than others or which ones would benefit from exercise or other lifestyle changes.

“As for now,” Dr. Ewy says, “the old saying holds true: A good family history is a poor man’s gene test. But unfortunately this does not always tell the whole story. This is why we have to monitor blood pressure, blood cholesterol and all the other known risk factors to optimally prevent cardiovascular disease.” Tongue in cheek, he adds, “For a healthy existence, pick your parents very carefully!” ♥

A Cabaret Singer at Heart

Memorial gifts bolster education initiative

In January 2008, Vice Admiral C. Thor Hanson (Ret) lost his battle against congestive heart failure just shy of his 80th birthday. He left behind his wife of more than 51 years, Charlotte Edens Hanson and their five children. Mr. Hanson had enjoyed a long and very successful career in the Navy, rising to the rank of vice admiral. After his retirement in 1982, he served as a military consultant for CNN before becoming president and CEO of the National Multiple Sclerosis Society in New York City.

Admiral Hanson was born in Texas, but raised in Tucson, Ariz. He excelled in school and had a natural musical talent. He was one of the first members of the Tucson Arizona Boys Chorus and while in high school played saxophone and clarinet at the old Bluemoon Ballroom in Tucson. Admiral Hanson remained proud of this association and continued his musical ambitions throughout his military tenure and beyond. “What he held dear was the ability to serve his country, to give to it many different ways,” says Mrs. Hanson, “but if he could have chosen another career, he would have been a cabaret singer.”

“Thor and I shared a wonderful friendship on top of our professional relationship,” says Lori Mackstaller, MD, who was Admiral Hanson’s physician for a long time and came to know him as a patient and friend. “I always called him General and



C. Thor Hanson and his wife, Charlotte.



he would laugh and tease me, pointing out how little I knew about the military – ‘it’s ‘General’ in the Army, but in the Navy, it’s ‘Admiral!’

With a smirk, she adds, “It was actually a lot of fun to give orders to an admiral – medical orders. He would listen and take them but Charlotte really was in charge of his health. She kept meticulous records about his medications, when they should be given, how much and so forth.”

Soon after Admiral Hanson had become a patient of Dr. Mackstaller’s, Mrs. Hanson found herself in need of an internist as well. “Thor insisted I make an appointment to see Lori,” recalls Mrs. Hanson. “He told me that he was quite impressed with Lori and that she was very bright and

articulate – a terrific doctor all around. After visiting Lori, I, too, was very impressed and am glad to remain in her care.”

After Admiral Hanson passed away, Mrs. Hanson and her family made a decision. “I knew immediately that I wanted to have tributes and memorials in Thor’s name be directed to the Sarver Heart Center,” says Mrs. Hanson.

“Dr. Gordon Ewy and Dr. Lori Mackstaller had done a marvelous job caring for Thor.” Over the next few months, gifts from across the country began to come in – each one a testament of the impact that Admiral Hanson had made in his lifetime.

“It was touching to read the notes and cards that arrived with gifts in memory of Thor,” says Dr. Ewy. “Through the Hanson family’s thoughtful request, the Center will be able to supplement Lori’s work in community outreach. (See cover story). These contributions help propel our work towards a future free of heart disease and stroke. We offer our sincerest thanks to the Hanson family and those that remembered Thor in this special way.”

Dr. Mackstaller says, “I honor both of them and I am glad that Charlotte remains in my life as a friend first and a patient second. Thor was very special and we all miss him.” ♥

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Public education about cardiovascular health remains one of the Sarver Heart Center's top priorities. The establishment of an endowed lectureship for heart disease in women will expand our efforts in creating a healthier Arizona (see cover story). Top right: Student volunteers offer diabetes and blood pressure screenings during the Sarver Heart Center's Healthy Heart Conference.



Bottom: An expert panel of Sarver Heart Center physicians and researchers answers questions from the audience at the 2009 Healthy Heart Conference.

Top left: Thanks to the generosity of the Yuma Friends of the Arizona Health Sciences Center, Sarver Heart Center physicians can fly to Yuma once a year at no cost to hold a public seminar on heart disease, risk prevention and treatment options.

Photos: D. Stolte