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DOCTORS AND RESEARCHERS NOW PEER INTO PATIENTS’ GENES TO DETERMINE TREATMENT AND PREDICT PROBLEMS. THE WORLD OF PERSONALIZED MEDICINE IS GROWING FAST AT THE CU MEDICAL SCHOOL AND ACROSS THE WORLD. “IT’S GOING TO EXPLODE,” SAYS DAVID SCHWARTZ, MD, CHAIR OF THE DEPARTMENT OF MEDICINE. “IT WILL HAVE A PROFOUND EFFECT.”

On pages 14-18, CU Medicine Today explores personalized medicine and how the medical school is teaching students about it, in part by raising ethical questions.

Cover photo by Patrick Kelley, photo left by Dan Meyers

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A complete, perhaps long overdue, self examination

In recent months, we took the first tangible steps toward the goal of examining the structure and orientation of the medical school. The question I asked in my State of the School speech last fall was: How would the school look if we could start fresh while keeping intact our substantial strengths in our four missions—education, patient care, research and community? Several experts came to Denver at their own expense to offer thoughts, which made us think even more about this project. Whatever direction we choose, this endeavor will involve a lot of conversations with the faculty, students and staff who make up this medical school, the administration and staff of our partner hospitals and, in fact, the entire medical campus.

Change can be challenging, but certainly we have experienced a lot of it here: the move to the Anschutz Medical Campus and our major curriculum revision are two of the biggest. We are now transforming our clinical enterprise, an undertaking led by our senior associate dean for clinical affairs, Doug Jones, MD, and vice chairs from every clinical department and major center. They are focusing on crucial areas such as hospital readmissions, communication with referring physicians and quick access to outpatient clinics.

Here’s more change: the possibility of a branch campus in Colorado Springs. University of Colorado Hospital’s (UCH) proposal to run Memorial Hospital won the support of the city council there, launching further negotiations. The UCH bid included a major enticement of funding for our medical school to begin a branch campus in Colorado Springs to provide clinical training to third- and fourth-year students. There are hurdles to come, likely including a public vote. If all goes well, training in Colorado Springs could begin in May 2015 for 24 or more students who entered medical school in 2013. And if that works out, we may be able to expand each medical school class to more than 160 students.

And, there’s a big new health system in Colorado with direct impacts on our school. UCH has signed a joint operating agreement with Poudre Valley Health System, creating University of Colorado Health. Bruce Schroffel, president and CEO of the hospital, has been named president of University of Colorado Health and chairman of the board of directors. Rulon Stacey, president and CEO of Poudre Valley, will serve as CEO of the new system. This matters for the medical school because it should help solidify future revenue and expand our reach for clinical trials and rotations for students.

In other news, I want to note the passing of someone known to many of you. John Shobar, MD, who was medical director of University Physicians Inc., died last August. In many ways, the success of this school rests on Dr. Shobar’s skill in maneuvering through bureaucracy to solve problems. He was warm and tough, and is sorely missed. (There is an article about him on page 21).

And, we have a new University of Colorado Denver chancellor. Don Elliman, who was executive director of our stem cell center and member of former Colorado Gov. Bill Ritter’s administration, succeeded Jerry Wartgow. There are details about this inside this magazine and at medschool.icdenver.edu/CUMedToday.

I hope to see many of you from the graduating classes ending in 2 or 7 for the reunions that will be held Memorial Day weekend. Darrell Kirch, MD, ’77, president of the Association of American Medical Colleges, will be the graduation speaker.

With warm regards,

Richard D. Krugman, MD
Dean, School of Medicine
Vice Chancellor for Health Affairs
University of Colorado
Journalists turn to medical school for expertise

Topics include research breakthroughs, overcrowded emergency rooms, palliative care debates. You can read or listen to the full stories at medschool.UCDenver.edu/CUMedToday.

Stephen Daniels, MD, chair of the Department of Pediatrics, was quoted in the Wall Street Journal, Washington Post and other publications discussing government recommendations that all children be tested for high cholesterol before they reach puberty. Daniels, a professor with the medical school and a pediatrician at Children’s Hospital Colorado, chaired the panel that wrote the new guidelines.

Colorado Public Radio interviewed John Moyer, MD, about the tragic loss of his son, Andy, and the remarkable events that followed. The Moyers donated Andy’s organs and over the years have become friends with several of the recipients. Moyer talks in the radio interview about the power of these events, and how he uses that in teaching our students as a clinical faculty member. The radio interview was an expanded version of a story that ran in CU Medicine Today a year ago. You can see that article and listen to the interview online.

Colorado Public Radio (CPR) also featured Marion Downs, distinguished professor emerita and a pioneer in testing children’s hearing. At 97, she gave an energetic and wonderful interview. CPR got the idea after reading about her in the fall issue of CU Medicine Today in an article that began, “Hundreds of thousands of people are living normal, productive lives thanks to Downs’ firm belief and dogged determination that children should be tested for hearing loss at birth so they can begin to learn language early, preventing communication and cognitive problems as adults. Once that was a radical notion. Now nearly all infants in the United States are hearing tested at birth, a policy initiated by Downs, who became CU School of Medicine’s first director of audiology in 1959.”

In an article on exercise and weight loss, The New York Times last November cited the work of University of Colorado medical school researchers. Edward Melanson, PhD, an associate professor in the Division of Endocrinology, found that people who exercised moderately one day did not burn extra calories the next—the “afterburn” effect. The Times also wrote about Andrew Freeman, MD, a medical school assistant professor and National Jewish Health cardiologist who founded a group called Walk With a Doc, which encourages people to get out and “stroll the city with their physicians.”

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In March, The New York Times wrote about a blog entry posted by Daniel Matlock, MD, in which he detailed an incident that had rattled him. Matlock, an assistant professor in the CU medical school and a geriatrician who specializes in palliative care, had been called in to consult when a woman in her 70s arrived at a hospital after a major stroke. She had a notarized advance directive rejecting life support, or artificial nutrition. Another doctor ordered intravenous fluids. Matlock objected. The doctor took Matlock on in language that, Matlock says, evoked Nazi Germany. In an online report, The Times explores the incident under the headline, “Among Doctors, Fierce Reluctance to Let Go.” Colorado Public Radio interviewed Matlock in April.

Frank Accurso, MD, a CU medical school pediatrician who practices at Children’s Hospital Colorado, was honored by the Clinical Research Forum for his work in pioneering a genetically based treatment for cystic fibrosis (CF). The clinical trial Accurso led resulted in federal approval of the new treatment in January. Already, dozens of children are being treated with the drug Kalydeco in Colorado. The clinical trial showed the new treatment helps about 4 percent of CF patients by targeting the genetic mutation. The New England Journal of Medicine published the research results. Accurso hopes as many as 90 percent of CF patients eventually will benefit. He was one of 10 recipients nationally of the Forum’s Clinical Research Achievement Awards, which received widespread news coverage.

Marion Sills, MD, showed that overcrowded emergency departments fail to deliver efficient and adequate pain medication to children suffering long-bone fractures. The story was picked up around the planet and was carried in nearly 8,000 publications and websites. Sills, associate professor of pediatrics at the CU School of Medicine, and her colleagues focused on fractures of kids’ arms and legs because they are common and painful. The study was published in the journal Academic Emergency Medicine.

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Dean Krugman marks a milestone

School of Medicine Dean Richard Krugman, MD, marked his 20th year on the job in March. He’s the longest-serving medical school dean in the country.

It hasn’t been a dull couple of decades. In that time the school has moved to the Anschutz Medical Campus, revamped its curriculum, introduced interprofessional education and, recently begun the process of reviewing how the school itself is organized. One constant over the years, Krugman says, is the struggle many rural and urban areas have to find enough doctors.

At a recent meeting of the school’s Executive Committee, Krugman was surprised with some gag gifts, a book containing photos and letters the dean has written in *CU Medicine Today*, and a crystal paperweight with the words “20 Years of Leadership and Dedication.”

You can see the photos of the dean over the years including the executive committee event by going online to medschool.ucdenver.edu/CUMedicineToday or by scanning the QR code below.

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Secrets of a storage facility

Outside, the building on the east side of the Anschutz Medical Campus is nondescript. Inside, the Preservation and Access Service Center for Colorado Academic Libraries (PASCAL) is stunning.

Shelves of books soar 30 feet high in two vast rooms where the climate is controlled at 55 degrees and 35 percent humidity. Those shelves hold 1.7 million books, maps, film, journals, videos, phonograph records and other materials.

PASCAL started going up in 2001. It houses everything from historical papers to a Danielle Steele novel. It isn’t well-known on the campus but it gets about 100 daily requests for scans or loans and more materials arrive daily, to be filed in its cavernous bays.

To read about and see more photos of PASCAL, go to medschool.ucdenver.edu/CUMedToday/Features.
Just days after the 2008 presidential election, Dr. Shale Wong, a Denver pediatrician and community health advocate, submitted her application for the prestigious Robert Wood Johnson Foundation Health Policy fellowship in Washington. “Maybe,” she remembers thinking, “health care reform is finally going to hit the radar.”

Wong, an associate professor of pediatrics and co-director of the LEADS (Leadership, Education, Advocacy, Development and Scholarship) program at the CU School of Medicine, earned one of 10 coveted spots in the 2009–2010 program. She served in the Office of First Lady Michelle Obama as a health policy advisor for Let’s Move!, the First Lady’s signature initiative to combat childhood obesity.

Now back in Colorado, Wong, a 1997 CU pediatric resident who received her MSPH from CU in 1999, talks about what she learned inside the Beltway, including how policy gets made and how that experience has shaped her vision for better public health and policy on local and national levels.

Q: Why apply for this program? What did you hope to learn?
A: This fellowship has a tradition of providing an immersion experience in health policy in Washington that is unlike any other fellowship. I was most interested in understanding the process of policy development at the federal level and how a physician could impact that process. As a medical educator, I helped develop a curriculum at CU with an opportunity for students to learn advocacy and leadership in their community.

Q: Does that emphasis represent a shift for medical students?
A: It does. Our program shifts traditional medical training toward one that both supports students’ interest in community service that they bring coming in and gives them direction as future physicians to practice with civic responsibility.

Q: But if you are already doing that here in Colorado why go to Washington?
A: The only way to learn about federal policy is to be in the middle of it. You can’t do the same thing outside of Washington. Policy is more than passing legislation. Policy is about regulation and implementation. What I really wanted to know was what is the physician’s role, how can I influence policy?

Q: Was it intimidating to go to work at the White House? And I have to ask, what is Michelle Obama like?
A: Yes, it is intimidating. It was also an opportunity. To work on such a significant children’s public health issue, and for this First Lady, was like the stars aligning. She has such an amazing presence. She is knowledgeable but is not intimidating at all. One of the surprising things is how she puts people at ease. She is really genuine. She listens to your ideas and is very thoughtful.

Q: Did you swap mom stories?
A: Sure. She’s the “mom-in-chief.” She understood the long hours it took to be part of her staff and she really cared about the well-being of my kids.

Q: How did the partisan battles in Washington affect what you were trying to do?
A: There is no such thing as a non-partisan issue. The politics in Washington right now don’t make sense. But we were able to stay true to our
goals and much of the policy work we were doing was at the executive level and didn’t require legislative action. It didn’t bother me personally. There is an expectation in policy development that there will always be opposition.

Q: How has being in the midst of such a volatile time in this country changed your view?
A: Coming home I see things differently. I read the newspaper differently. I know how hard people in Washington are trying to work and I think that gets turned around in the way stories are presented in the media.

Q: What is your proudest accomplishment?
A: I got to work on school nutrition policy, development of the new My Plate icon with the Department of Agriculture, and expanding access to affordable foods through financing initiatives and farmers markets. But I guess what I’m most proud of is the work we did to improve healthy environments in child-care settings. Let’s Move Child Care holds promise to truly target prevention and establish healthy habits from the start.

Q: How do you translate those things on a more local level?
A: All of those policies require local implementation. Going forward, I hope to help other health care providers find their voice in the community. We have a responsibility to share knowledge and exchange information with local leaders and policy makers. Improving health requires much more than good clinical care. If we can impact health in schools, workplaces and neighborhoods, it can really make a difference.

Q: What in your personal background has brought you to this point in your career?
A: (Laughs) I tend to enjoy doing things that my advisors tell me I can’t. I was a dance major. I was told dancers can’t be doctors. Combining medicine and policy is a bit untraditional. What I love about medicine is connecting with people and communicating clearly about their health. What I love about policy is an opportunity to refine the messages around health so they can have an impact with the people who make the rules.

Q: Why is it important to get medical students involved in community health?
A: Because doctors need to know where their patients come from. Being involved in the broader community allows us to better understand the environment and the patient’s reality. And it allows us to influence health beyond the clinic. It is a great lesson to learn early on. For me it’s important to keep a foot in both places, in and out of the clinic. That’s why I’m back.

Q: What goals did you come back from Washington with and what are the biggest obstacles to achieving them?
A: I’m hoping to pave a path between Colorado and Washington. With the connections that I made while I was away, and my continued focus on obesity prevention and policy, I hope that Colorado can become a model for national efforts. And I hope I can help to translate and implement some federal policy into local programs. With respect to obesity, the obstacle is not just the parents, or the schools. It’s also special interests and our cultural expectations. Industries are driven by their bottom line, they make money producing stuff we think we want even if it’s not good for us. Not that the bottom line isn’t important. But children are vulnerable and targeting unhealthy products to kids is an unfair game. Society can and should understand that we can make choices that are right by our kids.

Photos by Helen Macfarlane
The year was 1955 and incoming CU Boulder freshman Pat Vigil got his first impression of the campus and his place in it.

“It was a culture shock. Out of 20,000 students there were about five who looked like me,” says Vigil, a long-time Denver community activist. In the ensuing years, Vigil realized that “there was a feeling among Latinos in Denver that the University of Colorado was discriminatory toward us.”

But in 2010, Vigil had a chance to reassess. He became one of dozens of community leaders to guide School of Medicine and other University of Colorado researchers through medically underserved urban and rural communities as part of Colorado Immersion Training (CIT) in Community Engagement through the Colorado Clinical & Translational Sciences Institute. The program began in 2010 with a National Institutes of Health grant modeled on a program in Pittsburgh, where doctors would enter the community for a few days, according to co-directors Jack Westfall, MD, and Linda Zittleman, MPH.

“We took that model and made it more in-depth and long-term,” says Westfall, associate dean of rural health and director of the High Plains Research Network and of Colorado Area Health Education Center (AHEC).

Designed to strengthen Anschutz Medical Campus ties with the community, the program puts researchers into churches, clinics, schools, rec centers and other sites with people who will help steer future research and discover ways to bring breakthroughs to the community.

“It takes about 17 years on average for new clinical discoveries to get into everyday practice,” Zittleman says. “In the meantime communities are suffering from health disparities.”

One reason they believe in community engagement comes from their experience on the eastern plains, where they worked with community members to spread the word on colon cancer prevention through print materials and presentations at local civic clubs.

Westfall recalls being at a health fair when a man said, “This project saved my life.” He’d heard a local man give a talk at the Haxtun Gun Club about his colon screening, and he followed up by asking his doctor about a colonoscopy. It showed he had precancerous polyps.

He told Westfall that without that talk “I wouldn’t have gone and gotten tested.”

Researchers have to put in a month of upfront

Above, community members learn about modern medical technology at the Anschutz Medical Campus. Right, Janine Higgins, PhD, a researcher, explains diet and nutrition to a group of community members in an Academic Immersion day. Photos by Patrick Kelley.
reading, and study is required. Then for one week, partnered with a community guide, they immerse themselves. Of the 44 who have gone through since 2010, almost all said they felt emotionally connected to their new community, Westfall says. Each researcher is provided six months of support through the CCTSI and the local community liaisons, which helps translate ideas into action.

The openness of researchers impressed Vigil. “You could feel the compassion,” says Vigil, who has guided two groups through the Latino community. “Later, all the people at the agencies we took the researchers to said ‘These are really good, really brilliant people.’ ”

“These are the kind of things you’ll remember for the rest of your life.”

By Westfall’s measurement, the program has been “wildly successful”—for both community and researchers.

“Many community members have commented that they didn’t picture the researchers being so passionate. For some of the researchers, it changed the trajectory of their research forever.”

Count Westfall among them.

“It strengthened my commitment. I can’t imagine doing research again without engaging the community.”

CIT includes six community tracks. Two are in rural areas—eastern Colorado and San Luis Valley—and four are in the Denver area for African-Americans, American Indians, Latinos and the Asian and refugee population. There is also an academic immersion program in which community members are invited onto campus for one day to meet with researchers, visit labs and watch medical simulations.

When researcher Linda Overholser, MD, assistant professor in the Division of General Internal Medicine, heard about the immersion program, she was instantly on board. Overholser came from a semi-rural area of Kansas and had already spent some time on the eastern plains working with community groups. Her interest lies in helping rural primary care doctors keep current with care for cancer survivors.

She’d already started two clinics: one for survivors of childhood cancer and another for adult survivors of breast cancer.

“But what I found was that there were several intervention programs directed to patients, but few to primary care doctors,” says Overholser, who is now co-director of the Colorado LIVESTRONG® Survivorship Center of Excellence Network Program.

“At an academic medical center like this one you’d have your medical oncologist, a health oncologist and a nurse coordinator to work on your case. But how can you provide those services in the San Luis Valley to an adult survivor of childhood cancer?”

She has since applied for two new grants to help bring information to San Luis Valley doctors. “You can’t forget the people outside of Denver,” she says.

Nia Mitchell, MD, MPH, assistant professor for internal medicine, started one grant in August and is waiting on word for the next two. She was already interested in obesity in the African-American community and through the immersion program she expanded to senior citizens.

“It was the perfect opportunity because I was interested in doing something with seniors,” says Mitchell, whose grant opened three weight-loss chapters, called Take Off Pounds Sensibly (TOPS), in the community. These groups have charted an average of four pounds lost over 12 weeks.

“It might not sound like that much, but with that age group you expect weight gain, so actually staying stable is a victory.”

Mitchell, who has signed up for the American Indian CIT track this spring, is planning to study the TOPS program in the American Indian population as well.

Community activist Owetta McNeil enjoyed showing researchers around her northeast Denver community so much that she is getting ready to host her third immersion.

“We have so much fun,” she says. She remembers one researcher who, at the end of the immersion week, stood up before the crowd of community members and said, “I want to be black.”

The Rev. Lee Hall of Grace Christian Center in Montbello took the opposite journey—into academic immersion in which he spent a day on campus.

“I think the take back for me was to know that there were people that always were out there working for the common good. They’re always trying to find new ways of helping people. I saw them as people who were not necessarily in it for themselves and who could save people a lot of pain—could save lives.”

For Vigil, the impact is a little more personal.

“I am elated at the changes that have come about since 1955,” he says. “Now I really value my relationship with the University of Colorado so much. It’s a major part of my life.”
“Looks like I’m in the right place”

Fritz Karrer’s tour of duty in Afghanistan

Dr. Frederick “Fritz” Karrer spent three months last year patching up soldiers, children and even enemy fighters at Forward Operating Base Salerno in Khost, Afghanistan. He dodged ornery krait snakes and lumbering two-foot-long lizards, befriended his first patient, a kid called “Hot Rod,” and tested his surgical skills. A professor of surgery with the CU School of Medicine, Karrer decided after the 9/11 terrorist attacks to join the Army Reserve.

Col. Karrer did a stint in Hawaii and another in Iraq, but neither rivaled the medical action he shared with other reserve physicians at Salerno. A Children’s Hospital Colorado pediatric surgeon, Karrer sent home observations in weekly emails, starting in June. Here is an edited account of his experience.

Within six hours of arrival, we got our first patient, an 8-year-old Afghani boy run over by a civilian truck. He had been “treated” at the local hospital. He had an open femur fracture and extensive soft tissue injury of both lower extremities. All they had done was splint his legs and wrap them.

The next day, we had three Afghanistan Nationals brought in after being injured by an IED. One was a 9-year-old boy peppered with shrapnel over his anterior surface. He had been asked to roll a wheelbarrow up to some of the Afghan security forces. The “bad guys” had hidden explosives in the wheelbarrow and when he got close, they detonated it. What’s wrong with these people? After a chest tube and exploratory laparotomy with small bowel repairs/resection and a cholecystectomy for shrapnel perforations, he was evacuated to Bagram [Air Base].

Two days on the job and two serious pediatric trauma patients! Looks like I’m in the right place.
10 JUN 2011

Last week, we lost two Apache helicopter pilots. It’s not clear if they were shot down or had a mechanical failure. Shortly after, we received one of two insurgents that were placing an IED on a local road. Our patient had been seriously wounded. You can imagine the internal ethical/moral conflict among the staff when providing medical care to the “bad guys” right after two of your own have been lost. The Medical Rules of Engagement direct that we provide care without distinction. Priority for treatment is based solely on medical urgency, regardless of whether U.S. or coalition forces, enemy combatants or host-nation civilians. It’s hard, but it’s the right thing to do.

25 JUN 2011

I had an opportunity to see several children in clinic this week. One was an injury caused by an old fashioned washing machine. The little girl got her hand caught in the wringer, which “rolled her in” up to the armpit and then just kept rolling with a resultant traction burn/degloving of the skin under her arm. I plan [a] skin graft next week and our orthopod will put her in a shoulder cast to immobilize her.

Hot Rod is getting better and now motoring around the wards with his pediatric wheelchair and a walker. In this deployment, more than any other, it feels like I am well located to utilize my pediatric surgical training.

4 JUL 2011

We’ve tackled more than 60 cases since we got here, and that doesn’t count the dozens of sedations for dressing changes, washouts and minor procedures. Hot Rod has been here so long he’s gone through puberty but was finally discharged Friday. We had two [patients] from an RPG explosion. Sadly, one was a 2-year-old with multiple fragment wounds, most noncritical, but one had penetrated her skull. We shipped her off for the neurosurgeons [in Bagram] to evaluate. I think she may do alright. Still, seems so senseless!

One of the finds of the week was the Salerno Golf Club. Well, really just a hitting cage. I’m confident my practice drives are more than 250 yards and right down the middle. There are plenty of golf clubs and balls, but the hitting mat is in tatters. My friends at Pinehurst [Country Club] have arranged to send a mat that we can actually hit off of without having to chase it after every shot. That will be schweet!

14 JUL 2011

One of the more unusual [cases] was an Afghan woman. She was 25-year-old, supposedly shot by our friendly forces unintentionally, so-called collateral damage. I guess I wasn’t prepared for how to deal with the whole cultural business. She was reluctant to let us examine her. After putting up privacy screens and [administering] a little vitamin V (Versed), we found an entrance wound in the low left chest, but no exit wound.

The first chest X-ray showed no bullet. Where did it go? We explored her and found that the projectile was free
in the peritoneum, resting on the uterus. She recovered and was transferred to the Khost Hospital. If it wasn’t weird enough to find a large caliber projectile free in her abdomen, in the opinion of several soldiers, this did not come from one of our weapons. While not lucky to get shot, she’s lucky to be alive with that size of a round.

We saw Hot Rod in clinic and his wounds are coming along, still not closed, but he is ambulating without his walker and looks cute as ever.

21 JUL 2011

I am taking a language class in Pashtun, the official language of A’stan. I find the language very difficult. More fascinating has been learning about the Pashtun culture from our teacher, also one of our interpreters. Pashtuns are known for their hospitality, called melmastia. Guests (travelers, neighbors, relatives) are entertained, housed and fed for as long as they want.

1 AUG 2011

Beginning Friday, we began to receive patients in waves. Several from IED attacks and two bunches from [mortars or rockets]. If they come in more than five at a time, it can tax the resources of our little hospital. Command then notifies medical providers and other designers to go to the hospital. Dozens of helpers (docs, vets, PAs, medics, nurses and just regular soldiers) pitch in. Saturday, we had cases lined up and we tackled them two at a time until everyone was taken care of.

Hot Rod returns twice weekly for dressing changes. His wounds are healing and he is ambulatory with only a little cane now.

One of the more unusual cases this week was an Afghan soldier that had a colon resection and colostomy a couple months ago for a GSW [gunshot wound]. He had been doing well, but returned with terrific abdominal pain. We waded through some adhesions only to find what looked like a drain left behind by the previous surgeons. We all jumped back when we realized it was actually a worm that had eroded through the bowel and was writhing around in the upper abdomen. Yick!

8 AUG 2011

This was a crazy week. Starting on the Friday before Ramadan, we started receiving patients in waves. We saw 69 patients over that five-day stretch. It only takes one bad one to chew up a whole day. A soldier came in [with] GSWs to the butt and leg.

We evacuated a belly full of blood and found one of the bullets had [penetrated] the pelvis. The pelvic veins were bleeding too fast to even see where it was bleeding from. We got some control with ligation of the internal iliac artery, but eventually packed [it] and got out. Problem was, he also had a GSW through the leg with a shattered tibia.

He received more than 40 units of blood products, 17 of which were whole blood, something you almost never give in the States. When our blood supply runs low, we call in soldiers for an on-the-spot blood drive and dozens show up. Fortunately, he was in good shape when he was evac’ed about 24 hours later.

15 AUG 2011

I’m on my way back now. [Before I left Khost,] a group of young Afghan males started throwing rocks at U.S. soldiers in the marketplace. Then out of the crowd came a grenade. We received a 10-year-old boy with not a mark on him except for a small puncture wound on his forehead. A tiny fragment passed through the front of his skull and lodged in the back, crossing the midline. He survived about 48 hours, but there was nothing anyone could really do for him. Whether he was a participant or an innocent bystander remains unknown, but regardless, it seems like a senseless waste of a young life.

One of the redeeming aspects of making it to Kuwait is the opportunity to turn in my weapon. My 9mm Beretta pistol has been my constant companion and my ball and chain. You are required to have your weapon with you at all times [except] in the shower. We didn’t have to wear it in the OR, but it had to be locked up nearby. It only weighs 2.6 pounds, but when you add the three magazines with 15 rounds of ammo each, it’s a pain to carry around all day. It’s very uplifting not to have to lug it and to worry about it all the time.
Conflict-of-interest policy tightened and clarified

A committee now reviews all requests

By Dan Meyers

A headline in The Denver Post was a reminder that health care providers, and the schools that teach or employ them, need to remain vigilant about conflict-of-interest issues. The Post declared: “Docs limit drug-firm ties.” The ties refer to payments to doctors from pharmaceutical companies and medical-device manufacturers.

The smaller headline tells another important part of the news: “Payments must pass ethics muster ….”

The story underscores changes that have occurred recently at the University of Colorado School of Medicine. The school has had conflict-of-interest (COI) rules on the books for years. But in 2011 those rules were both tightened and clarified—the “ethics muster.”

The guiding principle is this: faculty cannot accept money to help a company market or promote a product.

The main target of the change was what are called “speakers bureaus.” Companies set these up to pay for speeches by physicians and others. CU now bans such participation.

“We’ve made explicit what always was our intention,” says Steven Lowenstein, MD, an emergency department doctor and associate dean who helped shape the new policy. “Our doctors can’t promote products. Drug companies can’t tell our doctors what to say or require them to use the companies’ slides or other instructional materials. And speaking requests will be reviewed by a new committee. “The committee review is designed to separate truly educational talks and research-related talks, which are permitted, from talks that are about marketing and promotion.”

Lowenstein notes that research collaboration and research-related talks are allowed because they advance the science and practice of health care and benefit patients. For example, a doctor might have a contract with a pharmaceutical company to assist in developing, testing or assuring the safety of a new drug or device.

The issue of payments to physicians has gained prominence because of reporting by the organization ProPublica. In October 2010, they published a report called “Dollars for Docs,” based on pharmaceutical company payment disclosures that recently had become available.

A small number of CU faculty members were among those listed. Faculty members and Dean Richard Krugman began discussing how to tighten and toughen the conflict-of-interest policy.

“The status quo is no longer acceptable,” Krugman has said.

The latest stories were triggered by a second wave of disclosures in September from ProPublica, using data from several more companies (12 total). Payments totaled $760 million nationally since 2009, including those previously reported.

The medical school’s faculty leaders also have agreed to a recommendation from students to extend the conflict-of-interest disclosures to the classroom. That recommendation is contained in a revised teacher-learner agreement, which will encourage teachers to disclose their relevant financial ties and conflicts of interest to students during lectures, seminars and mentored research activities.

Meanwhile, the CU medical school adopted new rules that the Faculty Senate, Executive Committee and individual faculty members had discussed and refined over the previous months. Those rules went into effect June 1.

The main points are:

• Research consulting, continuing medical education talks and compensation from academic, non-profit or professional groups are allowed.
• Speakers’ bureaus and other promotional activities are banned.
• Activities that are “a genuine service to the community and that are solely for educational purposes” are allowed.
• Companies can’t require the use of their presentation materials or require that they approve materials a speaker will use, and talks cannot focus on a single drug, device or product.

Faculty must seek permission to give talks, and an independent committee must review those applications and the contract from the pharmaceutical or medical device company. Here is the scorecard:

Since the policy went into effect in June 2011, 50 requests were submitted for review. Two were exempt. Of the applications reviewed, 29 (58 percent) were approved. And 19 (38 percent) were disapproved.

To read the new conflict-of-interest rules of the School of Medicine and recent reporting on ProPublica disclosures, go to medschool.ucdenver.edu/CUMedToday.
Sniffing out mysteries of the olfactory system

Diego Restrepo's work unites researchers and clinicians

By Lisa Marshall

Ask most people which of their five senses they would give up if they had to and, chances are, they'd relinquish their sense of smell.

Diego Restrepo isn't so sure. “People tend to think this sense is not really important, but it is,” says Restrepo, PhD, a professor of cell and developmental biology at the CU School of Medicine. “When you lose it, it can make a big difference in your life. And by better understanding this sense, we can learn a lot about other neurological systems.”

For the past 25 years, the Colombian-born biophysicist has been examining olfactory tissue from everything from catfish to rodents to humans in hopes of revealing the complex mechanism behind this oft-under-appreciated sense.

That work serves as a foundation for an array of potential applications: developing new treatments for anosmia (lack of sense of smell) and spinal cord injuries; using easily accessible olfactory sensory neurons as a window into other neurological problems; even developing better systems for sniffing out bombs or detecting cancer.

As co-director of the CU medical school’s new Center for NeuroScience, Restrepo says his mission is to bring scientists and physicians together, bridging the gap between basic research and clinical applications in hopes of improving the lives of those suffering neurological problems.

In a sense, he’s been doing that his whole career. “I was drawn to [the olfactory] field because it is one where, first, you have to look deep into the mechanism to see how things actually work—and it is not a trivial mechanism,” says Restrepo, who spent a decade at the Monell Chemical Sense Center in Philadelphia before coming to CU in 1997. “It’s interesting from the basic science and the clinical side, and I love both.”

Mammals perceive smell when a molecule binds to one of 10 million to 20 million highly specialized olfactory receptors in the upper nasal passage, each encoded to perceive a certain subset of odors. The signal is then sent to the brain via one of many fragile axons nestled in a thin, bony plate called the cribriform. When those axons reach the olfactory bulb in the brain, they converge on one of 2,000 distinct relay stations called glomeruli, each also believed to encode for a subset of odors.

Ultimately, the complex pattern enables us to distinguish between the sweet aroma of grandma’s cookies and, say, poisonous gas.

In the past two decades, interest in and understanding of this once-enigmatic system has increased considerably, with the 2004 Nobel Prize in Physiology going to Columbia University researchers Richard Axel and Linda Buck, of the Fred Hutchinson Cancer Research Center in Seattle, for their work to unravel it. “It is something the military is very interested in,” Restrepo says, noting that work is under way at other institutions on an “electronic...”
nose" to sniff out explosives, land mines and hazardous materials. Scientists also have discovered that human tumors cause a change in body odor, detectable by either trained animal sensors or chemical techniques.

Unlike other sensory neurons, buried deep inside the eye or ear, olfactory sensory neurons are easily accessible for research.

"You can look in someone's nose, take a pinch of that tissue and they are not going to care," says Vijay Ramakrishnan, MD, an assistant professor in the CU medical school's Department of Otolaryngology. "You can't biopsy someone's retina or somewhere in their hearing mechanism and have it be of no functional consequence."

As the only primary neurons in direct contact with the environment, olfactory neurons are constantly being damaged and regenerating themselves. How that happens is of great interest to researchers of neurodegenerative disease.

Restrepo is credited with expediting that research.

"He is the one who really pioneered a lot of the human biopsy studies, actually looking at human tissue as opposed to animal models," says Beverly Cowart, PhD, director of the chemosensory clinical research program at Monell.

Studies show that loss of the sense of smell can be an early, cardinal sign for numerous neurological problems, from Alzheimer's to Parkinson's to multiple sclerosis to depression.

By examining the olfactory cells of patients with those diseases, and comparing them with healthy controls, Restrepo hopes to better understand the physiological underpinnings of those diseases and how to treat them.

For instance, researchers recently discovered that calcium signaling between cells was altered in olfactory receptor neurons of people with bipolar disorder. "That could guide therapy toward treatments which change the way calcium is regulated in the cells," Restrepo says.

Studies show that more than 3 million adults suffer from impaired taste and smell, often caused by head trauma that shears those delicate axons linking the nose to the brain, as well as by upper respiratory infections, nasal polyps or genetic disorders. In addition, about half of seniors age 65 to 80 suffer age-related loss of smell.

This is no trivial loss, says Ramakrishnan.

Our sense of smell heavily influences our sense of taste, he says, and if that goes, people may be disinterested in food, lose weight and get depressed. Smell also can alert people to danger—smoke, for example, or spoiled food. And smell is entwined with our memories.

"It reminds you of people, and places that give you a good feeling. When you lose it, your experience of that memory is also diminished," Ramakrishnan says. Some people regain their sense of smell over time, but for those who don't, there now are no medical solutions.

Ramakrishnan and Restrepo ultimately hope to help change that via a new collaborative research project looking at unique "olfactory ensheathing cells," found only in the nasal cavity. The specialized cells are believed to be responsible for helping axons between the nose and the brain swiftly regenerate after injury. By spying on them as they do that, and establishing what the problem is when they don't, researchers hope to develop treatments for restoring not only the olfactory sense but also other senses.

"Say you have a head injury or some trauma and you lose your sense of smell," Ramakrishnan says. "I take a biopsy of your cells from inside your nose, take them to the lab and turn on various parts of them, and inject them back into your nose to facilitate resprouting of those olfactory nerves."

Researchers around the country have begun similar experiments in spinal cord injury patients, using olfactory ensheathing cells to try to repair damaged nerve tissue. The problem: It works in some people but not in others.

"The question is why," Restrepo says. "There is very little understanding about how these cells really work in the nose and our task is to better understand that."

You have to look deep into the mechanism to see how things actually work—and it is not a trivial mechanism.
The patient required higher than expected doses of the drug warfarin to prevent clotting. Matt Taylor, MD, was concerned: Was the unusual dose caused by genetic factors or by the temporary use of another medication that was interacting with the warfarin?

If the patient went off the other medication, and if that other drug was the issue, her warfarin dose could be too high, potentially causing bleeding complications.

Taylor, an associate professor at the CU School of Medicine and director of the Adult Medical Genetics Program, used genetic testing to figure it out. He looked for DNA sequence differences in two genes that can guide dosing—CYP2C9 and VKORC1. The results argued against her genetic makeup causing the high warfarin dose. The patient now knew that when she went off the other drug she likely would need to reduce her warfarin.

It's just one example of the growing realm of personalized medicine. From cancer to pulmonary fibrosis, cardiology to clotting, a person's genes often can predict disease, confirm a diagnosis or guide treatment.
Genetic fingerprints can guide diagnosis and treatment
By Dan Meyers

“Personalized medicine is not new but it is accelerating,” says David Schwartz, MD, chair of the Department of Medicine at the CU medical school. “It may take a while but it’s going to explode and represents one of our next opportunities. It will have a profound effect in terms of clinical trials and treatments. The care of some of our most complex patients will be decided by their molecular attributes.”

Schwartz and others caution that while personalized medicine means medical advances it also raises new ethical questions that will have to be carefully addressed.

The school of medicine and CU are moving into personalized medicine in a number of ways, both institutional and individual. A new center is planned to help support research; researchers are exploring personalized medicine; it’s being used for treatment and it’s part of the students’ curriculum.

One institutional step involves biomedical informatics—the ability to collect lots of clinical and biological data and crunch it.

Dr. Richard Krugman, dean of the medical school and vice chancellor of health affairs for the University of Colorado Denver, says that expanding biomedical informatics capability is a crucial step to competing in the research environment of the future.

Continued on page 17
Genetic test spares a patient thyroid surgery

Information came at a crucial moment

By Michele Conklin

As if fighting one form of cancer were not enough, Emilia Johnson-Tabakoff was suddenly facing the possibility that she had two types of the disease.

And to find out if the suspicious “lump” in her thyroid was cancer would typically require surgery that would postpone crucial treatment for the ovarian cancer that had previously been diagnosed, in October of 2010.

But she had an alternative to surgery. The way forward rested with 167 genes. One hundred sixty-seven out of 22,000 genes would tell whether Johnson-Tabakoff’s thyroid nodule was harmless, and chemotherapy to treat her ovarian cancer could begin.

Half of all Americans will develop a lump on their thyroid by the time they are 60 years old. In the majority of cases, a simple tissue sample obtained with a needle will rule out cancer. But in about 30 percent of patients, that sample will be inconclusive. Until a year ago, those patients likely would have needed surgery to make the decisive call.

The surgery itself is not generally considered risky. But Johnson-Tabakoff’s case was tricky. Her ovarian cancer was an aggressive threat, so the sooner she started chemotherapy the better. Yet if she needed the surgery, the chemo would have to wait because the cancer-fighting drugs would increase her risk of bleeding during surgery.

“My opinion was just, ‘Cut the damn thing out,’” says Johnson-Tabakoff, a spirited 61-year-old who divides her time between Denver and running a cattle-breeding ranch in Illinois. “But if they did that, I couldn’t start the chemotherapy.”

Johnson-Tabakoff’s husband, a professor at the CU School of Medicine, thought there was another option. Boris Tabakoff had read about a genomic screen that, without surgery, could determine whether the nodule was benign.

Developed by Veracyte, Inc., the Afirma Thyroid FNA Analysis measures the expression of genes that distinguish whether the thyroid tissue is malignant or benign. Now commercially available, the screen was still being researched when Johnson-Tabakoff was diagnosed. CU had one of two lead national research sites. The CU effort was led by Bryan Haugen, MD, head of the Division of Endocrinology, Metabolism and Diabetes.

The test results, delivered in December 2010, revealed that Johnson-Tabakoff did not have thyroid cancer. No surgery needed. Chemotherapy to treat her ovarian cancer began soon after. Before too long, she felt strong enough to head back to Illinois to tend her cows.

“It really gave me peace of mind,” Johnson-Tabakoff says of the test. Although her ovarian cancer returned in early January 2012, now she can focus solely on that fight.

“It’s fascinating what’s being developed,” adds Johnson-Tabakoff, who was trained as a clinical pharmacist. “A lot of these tests can save money and anxiety, but we need to figure out a way to use them in a manner that is a benefit rather than overused and abused.”

A study published in November in the Journal of Clinical Endocrinology & Metabolism found that the thyroid genomic analysis could do just that. It’s estimated that this genetic screening could reduce thyroid surgeries by 74 percent, sparing 50,000 surgeries in the U.S. every year and saving $600 million.

All thanks to 167 genes.

A genetic test ruled out one disease, allowing Emelia Johnson-Tabakoff to focus on another and return to the animals at a ranch in Illinois.
Personalized medicine, continued

“To do that, we will create two units,” Krugman says, “an academic division in the Department of Medicine and a center that will support the collection and analysis of the vast amounts of data that are the foundation of personalized medicine.”

The center will be housed in the Office of the Vice Chancellor for Health Affairs.

Already, personalized medicine is blossoming at CU:

• Last January, the FDA approved a treatment for cystic fibrosis pioneered by Dr. Frank Accurso, a pediatrics professor with the University of Colorado School of Medicine. In the past, doctors only could treat the complications caused by CF. A decade ago, scientists learned that a defect in the protein CFTR causes cystic fibrosis. Accurso led the clinical trial that showed the new treatment, using the drug Kalydeco, helps about 4 percent of CF patients by targeting the mutation. He hopes as many as 90 percent will eventually benefit.

• In the past, about a third of patients with a suspicious thyroid nodule couldn’t be sure from tissue analysis whether they had cancer. In those cases, patients often had their thyroid removed, just to be sure. Research led by CU’s Bryan Haugen, MD, head of the endocrinology division, helped show that a test of 167 genes could make the call on cancer and spare many patients the cost, risk and discomfort of surgery. (See story on facing page).

• Ross Camidge, MD, director of the Thoracic Oncology Clinical Program at University of Colorado Cancer Center and an associate professor of the medical school, is helping a subset of lung cancer patients with a mutation called anaplastic lymphoma kinase (ALK). ALK is a strong indicator that the drug crizotanib will, for a time at least, shrink or stabilize tumors in 90 percent of patients. In general, personalized medicine has had a large impact in the cancer field. “One-size-fits-all treatments are yesterday’s paradigm,” Camidge says. “This is personalized medicine.”

• Researchers led by a team from National Jewish Health peered into the genes of 82 families with a history of pulmonary fibrosis. They found a common variation near the MUC5B gene, associated with mucus formation, that greatly increases the risk of pulmonary fibrosis in individuals, regardless of family history of the disease. The risk variant of MUC5B results in excess lung mucus; mucus is a benefit to the lungs unless there’s too much of it. This discovery gives science a new, genetic target for research aimed at finding a cure for the now-fatal disease. Schwartz, the Department of Medicine chair, was senior author of the paper on the findings.

• Karl Lewis, MD, helped demonstrate that for the half of metastatic melanoma patients with the genetic BRAF V600 mutation, there was significant benefit from the drug Vemurafenib. With the drug, survival more than doubled from about 6 months to 15.9 months. Lewis, an investigator at the University of Colorado Cancer Center and associate professor at the University of Colorado School of Medicine, notes that until a year and a half ago, no effective drug existed for metastatic melanoma — the most dangerous form of skin cancer. The BRAF V600 mutation signals a cell to grow without bounds. Vemurafenib is a BRAF inhibitor. For metastatic melanoma patients with a BRAF mutation “This represents a new standard of care,” says Lewis, one of the authors of a Vemurafenib study published in February in the New England Journal of Medicine.

Future doctors grapple with personalized medicine as part of their medical school training. In CU’s interprofessional ethics course, for example, students wrestle with tricky ethical questions arising from genetic testing. Personalized medicine is covered in lectures about cancer.

And Taylor, the doctor who tested for warfarin-related genetic variations, gives a lecture to medical students about pharmacogenetics: using genetic variations to guide drug therapy. Taylor tells his students that researchers have estimated that adverse drug reactions (which include more than genetically driven problems) are the fourth to sixth ranked cause of death in the United States.

This striking conclusion motivates researchers and doctors to move away from “one-size-fits-all” prescribing, Taylor says, to find ways of tailoring treatments to avoid adverse events and maximize health.

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Personalized medicine, continued

Personalized medicine is an interesting term. Much of medicine, after all, is “personal.”

But nine years after completion of the Human Genome Project, health care is entering a transformative realm by using “an individual’s genetic profile to guide decisions,” in the words of the National Human Genome Research Institute.

Personalized medicine is seeping into our culture. It has gained a “nearly cult-like following” in popular media, Steve Nissen, with the Cleveland Clinic, recently wrote in the Journal of the American Medical Association. His essay called for “the same scrutiny required of all therapeutic advances—careful evaluation through well-designed randomized clinical trials.”

Several companies now will analyze a person’s genes for a fee of a few hundred dollars. The topic has even hit television comedy. In the show 30 Rock, one character asks a quack physician, “When they check my DNA, will it tell what diseases I might get, or help me to remember my ATM pin code?”

The TV doctor’s answer: “Absolutely. Science is whatever we want it to be.”

It’s a joke, of course, but also a reminder that personalized medicine, while promising (and in some cases delivering) advances, won’t be “whatever we want it to be.” Genes aren’t everything. Environment and other factors can play big roles in what happens to a person. Some people are genetically predisposed to heart problems. But diet and environment can make a huge difference.

There are other questions as well—ethical issues, being discussed in CU classrooms and across the country, about privacy of information and the implications of widespread testing.

What would result if all fetuses were tested for a range of genetic traits that inevitably would find harbingers of medical trouble? Imagine when that knowledge collides with the abortion debate. What if routine, broad genetic analysis began to unearth paternity surprises? What policies should guide a future society that can find and fix problematic genes or even enhance average ones?

Meanwhile, the research continues and is likely to grow at the school of medicine. Schwartz says the goal is to apply that research to help patients.

“The biggest problem is not developing the knowledge but understanding how these new insights about disease can be used to fundamentally improve the way we practice medicine and enhance the outcome for our patients,” he says. “While we are years if not a decade from being there, the opportunity is right there, tangible, in front of us.”

Sorting things out
Gene sequencers getting cheaper, faster

Mark Johnston, PhD, gazes fondly at the big blue and white box standing next to a sign that reads, “Top Secret. Keep Out.”

“That machine changes the world,” says Johnston, chair of the Department of Biochemistry and Molecular Genetics at the CU medical school. “It makes genome sequencing incredibly cheap.”

What cost nearly $10,000 per million DNA bases in 1991 plunged to a penny last year, according to the National Human Genome Research Institute.

With about 6 million differences in DNA sequence between individuals (out of a human genome of 3 billion base pairs), there is a lot of sorting to be done.

The genome analyzer that’s part of Johnston’s lab takes only a few days to determine a genome sequence and find its characteristics and variations.

It takes purified pieces of DNA, copies them on a microscopic “lawn” of adapters, and dyes them with the four DNA nucleotides, producing a four-color Milky Way of dots that then are analyzed and compared to other samples.

“It’s almost a daily tool in research now,” analyzing everything from yeast to snakes to humans, Johnston says.

Here’s how fast science is moving now. The sequencer Johnston uses was delivered in February, 2009. It now is obsolete and will be replaced, Johnston says.

“My vision,” he says, “is in five years to see everybody here using this kind of DNA sequencing instrument in their research. It will permeate the university.”
Alive, alone
By Sara Parke

In her time in a neonatal intensive care unit, medical student Sara Parke encountered a premature infant with congenital abnormalities. The girl’s young mother requested that the baby be resuscitated, then abandoned her to the care of the state. Parke, who describes herself as “intrigued by the ways in which creative projects can help with healing and prevent physician burnout,” captured her reaction in a poem. The title is a reference to Emily Dickinson’s “I Have a Bird in Spring,” the last line a nod to Dickinson’s poem “Hope.” Parke, a second-year medical student, is from Littleton, Colo. She received a BA in human biology from Stanford University and studied bioethics on a Fulbright Scholarship.

Bird in Spring

Amanda,
I whisper her name

From Latin:
one worthy of love

She hears me.
Two babyblues flicker
open / shut / open

Alive. Alone
(I feel the weight of it)

Whose face will interpret mine?
Whose eye will hold me light and near?
Whose mouth will taste my honeyed tear?

Don’t worry, baby —

Out here, we are all alone.

• • •

The vernix of an early labor
lingers on translucent skin

skiff of ice, scarlet grooves

Behind a blue mask
[nitrile-embrace]
tender coos
fall like snow flakes

warm and safe

Hope is a thing with feathers.

Encouraging arts

The University of Colorado School of Medicine and other healthcare programs on the Anschutz Medical Campus encourage artistic expression as well as traditional medical education. One example is The Human Touch, an annual anthology of poetry, prose, photography and graphic art issued under the auspices of the Arts and Humanities in Healthcare Program from the Center for Bioethics and Humanities.

Released every spring, the soft-cover edition allows artists and authors to discuss health and illness from a Medical Humanities perspective. Contributors come from the Anschutz Medical Campus community.

The Human Touch was founded by Henry N. Claman, MD, from the Division of Allergy and Clinical Immunology, and is mainly created by medical students.

It is distributed free by the AMC bookstore in Building 500. Or read The Human Touch online at medschool.ucdenver.edu/HumanTouch.
Students create and run popular course in medical Spanish

“Tiene picazon?” (Do you have itching?) and other key questions

By Tonia Twichell

In one classroom, Team Los Gatos and Team Los Pesca-dos are waging a battle of Jeopardy over the word for finger in Spanish.

Across the hall, a more linguistically advanced group of students is taking sexual histories from mentors, asking questions like “Tiene picazon?” (Do you have itching?)

Once a week for one semester, 50 first- and second-year medical students gather to learn medical Spanish through SABES, the student-led elective that began in 2006 when three medical students decided to help future doctors gain a better knowledge of the language spoken by so many Coloradans.

“They realized that a lot of students weren’t able to communicate effectively,” says Claire Ojima, a SABES student leader who is finishing her second year.

Students are responsible for teaching the classes and taking care of logistics for the elective, including creating the textbook, which was recently accepted by the peer-reviewed AAMC’s MedEdPortal, meaning other universities can now use it as well.

There are four levels of classes: sub-zero (for those with no Spanish background), beginner, intermediate and advanced. Each year there is a waiting list, though student leaders are considering offering more classes.

SABES, in addition to coming from the verb “to know,” stands for Spanish Acquisition Begets Enhanced Service. Advisor Steven Lowenstein, an emergency medicine MD who has been involved with SABES since its inception, says that is exactly why he learned Spanish as an adult.

“Many of my patients are Spanish speaking only,” he says. “At some point it occurred to me that I was not doing the best I could do for them, that in order to take better care of my patients, I needed to learn the language.”

“Now I can spend more time in the examining room with these patients. It strengthens my relationship so I can provide better emergency care.”

SABES’ most basic goal for students is to enable them to engage in rudimentary conversational Spanish so they can at least introduce themselves and explain that they cannot speak much Spanish, says Ojima, who learned most of her Spanish in Paraguay health clinics while working in the Peace Corps before medical school.

SABES student leader John Prucha, tells fellow students, “Even if you aren’t comfortable, speak as best as you can.”

“It shows patients that you are trying to communicate. Little things like that can help create better patient and doctor relationships,” Prucha says.

SABES doesn’t just teach language.

While shadowing doctors in rural Mexico before he entered medical school, Prucha discovered the cultural divide was greater than what learning Spanish nouns and vowels could bridge.

“I realized that you can’t use your metaphors from a TV show or a sport. You might have to refer to agriculture,” because many of the patients are farmers, who don’t have access to American media, says Prucha, who is also finishing his second year.

So leaders often ask mentors, many of whom are doctors, to hold cultural talks to educate students on beliefs and customs.

“It’s to help them understand things like curanderos (folk healers) and mal de ojo (the evil eye),” Prucha says.

For students interested in continuing their Spanish education past the second year, the university also offers a fourth-year class called SABES II through the company Common Ground.

“It’s as close to an immersion experience as possible,” Lowenstein says. Students complete classroom work and also follow preceptors who work in community clinics.

SABES student leaders are also planning to reach out to Aurora high school students to act as mentors for medical students. If all goes well, the mentorship could become a pipeline program to bring local students into medical school.

“They could feel good about helping medical students learn Spanish,” Lowenstein says, “and then—maybe—they start thinking about becoming a doctor, too.”
John Sbarbaro’s chess game
A serial optimist’s legacy of fearless change
By Dan Meyers

To understand John Sbarbaro’s gift, picture this scene from 1954 at the National Boulevard Bank in Chicago.

The bank is closed for the day. In the basement, Sbarbaro, an 18-year-old teller, is hanging out with the three ladies of the cleaning crew. Their mops and pails are set to the side. One stands with him in a dance position. They start to move—slow-quick-quick, slow-quick-quick. The young teller is learning to polka from the women who mop the floors.

“I can still see him,” says Marlene Sbarbaro, then 16, an assistant bank bookkeeper who, despite his dancing limitations, seven years later married Sbarbaro. “I thought it was so cute. You could see, everybody was his friend.”

Dr. Sbarbaro passed away on Aug. 30, 2011, at age 75. He was a professor of medicine and medical director of University Physicians Inc. (UPI).

He left his mark in many places. His main achievement at the CU School of Medicine was helping move it from a focus on research and teaching in the early 1990s to what is now “a significant and powerful clinical practice, which is critical to the support of the research and education missions,” says Dean Richard Krugman, MD.

“He had a clear effect on how the medical school looks and runs today,” Krugman says. “John was a masterful operations person.”

There was a complexity to Dr. Sbarbaro that made him difficult to pigeonhole—dedicated to helping people, friendly, never aloof, he was skilled at maneuvering through bureaucracy and, sometimes, just plain tough.

Dr. Sbarbaro grew up in Chicago, often working in his father’s funeral business. Early on it was clear what he was going to become.

“When he was a little boy his mother said, ‘Johnny, when you grow up you’re going to be a doctor.’ He wanted to make his mommy happy,” Marlene Sbarbaro says with a laugh. “How many children do that?”

He went to the Johns Hopkins medical school, then entered the Public Health Service, which sent him to Denver, and in 1965 began what would be a two-decade career (with a year out to attend the Harvard School of Public Health) at what was then Denver General Hospital.

A recent history of the hospital recounts how, when Dr. Sbarbaro was there, Denver General was tangling with competition from private ambulance companies. The hospital assembled a tape recording of people complaining about the competition’s poor service. Dr. Sbarbaro met with the companies and explained that his hospital would handle the 911 calls in Denver or reporters would get to listen to the tape. The ambulance companies ceded the turf.

Dr. Sbarbaro was vice president for medical affairs at St. Anthony Hospital Systems from 1986–1989. A respected pulmonologist with key contributions to care and treatment of tuberculosis, his long relationship with the School of Medicine began in 1969. After he became UPI medical director in 1992, Krugman sometimes used him as a problem solver. If two department heads were quarreling, the dean sent in Dr. Sbarbaro.

“He was fearless,” Krugman says. “He believed the best way to manage change was to create a crisis. He would go around and toss little verbal Molotov cocktails. Then when he got everybody calmed down, he generally was able to get people to the position he wanted them in anyway.”

Liz Kissick, a friend and colleague at UPI, recalls Sbarbaro saying that life was a chess game, and if someone else was about to win “you kick the table, all the pieces fall, and you set the board again.”

Yet he was no cynic. “A serial optimist,” Kissick, UPI’s director of health plan development, calls him.

“He would stop by my desk and just chat,” Tom Frost, an administrative assistant in the medical school, recalls. “He acknowledged you and he engaged you. He was a shining light who came through the room. He elevated everyone around him.”

Dr. Sbarbaro became the person who reviewed treatment decisions for the health plan run by UPI. He’d approve a procedure—or not—depending on the medical evidence. It was a standard Dr. Sbarbaro applied to the end of his own life. Despite urging of physicians and family, he rejected further treatments he felt wouldn’t have changed the outcome.

In his 40 days in a hospice facility, people lined up to see him. The man they saw was unchanged—still upbeat, determined, clear-minded.

What the visitors did not see were the quiet, private moments after visiting hours. Alone with his family, his daughter Anne recalls, he would turn to them and say, “I didn’t know all those people liked me.”
You could say that Dr. Jamie Feinstein’s literary career started like so many others: with a rejection. But for Feinstein, it was rejection times 50.

He had persuaded about a third of his 150 classmates at University of Pennsylvania to write essays for second-year medical students, coaching them on how to survive their upcoming third year—a project similar to CU School of Medicine’s Letters to a Third Year. The third year is tough, as students enter clinical settings fulltime. He thought the essays would be helpful for dealing with dying patients, arrogant doctors, unexpected kindness, beginner mistakes.

However, “It was not exactly met with open arms” by the administration, Feinstein says. “I think they were worried that we were going to be writing down horror stories to second-years who shouldn’t have that perspective yet,” recalls Feinstein, who is a fellow in Academic General Pediatrics working with patients with complex chronic conditions at Children’s Hospital Colorado.

What came out of that rejection was Short White Coat, self-published through iUniverse Inc. It contains his essays on the third-year experience, which he hopes will help overwhelmed students realize they are not alone. Most of the few thousand book sales have been to medical schools.

“I did it to keep sane without a doubt; it was my outlet,” says Feinstein, 32, who is working on a master’s of public health degree in biostatistics. “I even bound my own books. My mom has an entire shelf of my books,” Feinstein recalls. And as a medical student he realized that writing worked best for him when it came to expressing his emotions.

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“I did it to keep sane without a doubt; it was my outlet,” says Feinstein, 32, who is working on a master’s of public health degree in biostatistics. “There is no one to talk to once you’re in the midst of a clinical year. You are separated from your friends. You’re seeing a lot of things, and sometimes people didn’t want to talk about them. That’s when I picked up writing with a fury.”

Doctors he met could be compassionate and wise or rude and dismissive. Patients were often frustrated and short-tempered, but could also be counted on to guide a new doctor or make him laugh when things were tense.

There was a convict who taught him how to draw blood, gently coaching him to hold the needle at the right angle and anchor the vein.

“I’ll make you a deal,” the convict proposed. “I’ll teach you how to draw blood in exchange for a Snicker’s bar.” Feinstein readily accepted.

And there was a doctor he followed who had taken care of multiple generations of families as a sole practitioner.

“I went from a very big shiny cold hospital in my first couple weeks to a doctor who was still making house calls,” Feinstein says. “He was just a humble guy who did his work. What impressed me was the interaction between him and his patients.”

Two of that doctor’s patients, a couple named Jack and Hannah, spurred his first short story: Bag of Humility.

“Dr. Freedman knelt in front of Hannah on the raggedy carpet,” Feinstein recalls. As he opened his black leather bag to take out his stethoscope, an overwhelming sadness enveloped me. The strong woman sat wilted in her chair. She had a painfully empty stare ….

After checking on Hannah, Freedman struggled to convey the news of her approaching death. He made meandering attempts only to have Jack shift the conversation. Finally, Jack took over.

Feinstein says “Jack placed his thick hand on Dr. Freedman’s shoulder. ‘You’ll come to the funeral?’ Dr. Freedman nodded and I could see his body physically relax ….”

Feinstein remembers writing a lot as a child. “I even bound my own books. My mom has an entire shelf of my books,” Feinstein recalls. And as a medical student he realized that writing worked best for him when it came to expressing his emotions.

“I don’t consider myself a very good speaker; I’m better at writing. At least, I like to believe I write a heck of a lot better.”

The book he is working on now concerns a sensitive topic: making medical errors as a young doctor and how educators deal with them. “Making mistakes is part of training,” he says. “Putting some of this stuff down [in writing] has been tough.”

But writing is part of his life, and he misses it when he doesn’t do it. “I’ve always written to make sense of what I am going through.”

Writing served as an outlet for Jamie Feinstein, MD, when he was in medical school. Now a fellow at Children's Hospital Colorado, he's still at the keyboard, working on a second book. Photo by Patrick Kelley.
OZZIE’S ODYSSEY
A “beautiful focus” takes a CU graduate far

By Dan Meyers

Stanford’s kickoff return man inhales the roar of 80,000 spectators. Then the kicker’s foot drives forward and Ozzie Grenardo’s world goes silent, reduced solely to the sight of a football flying toward him. Number 22 catches it and looks upfield at the melee of players. He starts to run. “It’s a beautiful focus,” Grenardo says. “I’m a terrible artist, but what I did in football was as artistic as I could get. It’s about instinct and flow.” At one point in 1991, Grenardo led the nation in kickoff return yards and set two Stanford records that endure today. He figured he could turn pro.

Twenty years later, Oswaldo Grenardo, MD, emerges from a clinic exam room in rural Rocky Ford, Colo. He shakes his head and smiles.

“I don’t know you,” a patient has just told him. “But if Doug trusts you, I do.”

Doug is Douglas Miller, the longtime nurse practitioner at the Rocky Ford Family Health Center. Grenardo is medical director here and at a clinic in neighboring Ordway, 50 miles east of Pueblo. Iced tea at the ready, hip-hop on the radio, fueled by fast food, he drives the five-hour round trip from Denver to the Eastern Plains once every two weeks.

His route takes him past plain farm houses and a convenience store where nine pots of morning coffee are brewing.

“He’s easy to talk with,” Miller says. “He’s not the big-city doc. He’s just the doc.”

The clinics, where few patients are insured, further Grenardo’s longstanding commitment to primary care and outreach. In medical school, he was one of five students nationally to win a Pisacano Scholars award for commitment to family medicine.

“I love working with these people,” says Grenardo, 38, who grew up in Colorado Springs and graduated from CU School of Medicine in 1995. “I’m building relationships with the communities and I love the health care providers.”

Grenardo grew up in modest circumstances. His mother, a white woman from Poland, and father, a black man from Guyana, “instilled in me that there are people who didn’t have the same opportunities we did. We should give back.”

Football first, he figured, then a meaningful job. He went to Stanford on a full scholarship and found that “beautiful focus.”

And then he lost it.

Sports came too easily to Grenardo. After a super first year, when he set those return records, Grenardo coasted. His coach benched him. The pro career he dreamed of was out of reach.

“It was the best lesson I could have learned, losing the dream of playing in the NFL,” Grenardo says.

Chastened, Grenardo went on to get an MBA in health administration from the University of Colorado Denver. He worked in health care for six years but kept thinking that he could contribute more as a doctor. He studied more and got into CU’s medical school.

Today, along with his rural route, Grenardo runs a family practice in the Denver suburb of Parker, heads community outreach for the medical school’s admissions office and is a volunteer CU medical faculty member.

The admissions team in two years has about tripled diversity in the first-year classes. When Grenardo talks to students, he tells them the football story—how he had it, blew it, then rescued himself with hard work.

“I’m honest with them,” he says.

* * *

Ozzie Grenardo sits in a Rocky Ford exam room opposite one person, a woman struggling with depression. Oblivious to the rumble of a nearby coal train, he asks her questions, gently eliciting her story. They talk like old friends. The patient leaves with a plan. She’s smiling.

Could anything fully replace the jolt Grenardo felt from excelling on the field while the crowd roared? Maybe not. But in that exam room, Grenardo again blocks out the noise. He uses skill, plus some instinct and flow. As he did in the glory days, he focuses, beautifully, on the most important thing.
May 23–26, 2012
Honoring the graduates of the class years ending in 2s and 7s.
The Office of Alumni Relations is planning an exciting week of activities. For more information or to register, call us at 303-724-2518, e-mail us at healthalumni@ucdenver.edu or check our website, www.ucdenver.edu/somalumni.

**WEDNESDAY, MAY 23**
5:00 pm
Welcome BBQ on the Quad, Anschutz Medical Campus, Boettcher Commons, $25 per person

**THURSDAY, MAY 24**
8:00–10:30 am
All-Class Breakfast and Dean’s State of the School Address, Anschutz Medical Campus, Research Complex 2, Room 2100, $15 per person

11:00 am
Lunch and Tour of the Anschutz Medical Campus, Anschutz Medical Campus, meet in front of Building 500, $10 per person

4:30 pm
Honors Convocation, History Colorado Center, no charge

5:30 pm
Silver & Gold Banquet, History Colorado Center, $75 per person (no charge for Class of 1962 members; spouses $75)

**FRIDAY, MAY 25**
8:45–10:00 am
Class of 1962 Continental Breakfast
(Class of 1962 members only) Anschutz Medical Campus, Education 2 North.

10:30 am–12:30 pm
Convocation Ceremony, Hooding and Oath Ceremony, Anschutz Medical Campus, Education Quad.

12:30–2:30 pm
1883 Society Luncheon, Anschutz Medical Campus, Research Complex 2, Room 2100, $10 per person

2:00 pm
Denver Museum of Nature & Science, $10 per person

**FRIDAY, MAY 25**
CLASS ACTIVITIES

Class of 1947 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 1952 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 1962 — 5:30 pm
Dinner at University Club, $55 per person

Class of 1967 — 10:00 am
Golf Tournament, Murphy Creek Golf Course, $80 per person

Class of 1967 — 6:00 pm
Dinner at Denver Country Club, $80 per person

Class of 1972 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 1977 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 1982 — 5:00 pm
Dinner at Nu Sigma Nu Green Roof, $55 per person

Class of 2002 — 6:00 pm
Dinner at Lola, $55 per person

**SATURDAY, MAY 26**
CLASS ACTIVITIES

Class of 1957 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 1982 — 5:00 pm
Dinner at Dan Bessesen’s Home, $55 per person

Class of 1987 — 10:00 am
Denver Zoo Class Outing, $11 per person

Class of 1987 — 5:00 pm
Dinner at Nu Sigma Nu Green Roof, $55 per person

Class of 1992 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 1997 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Class of 2002
Spring Ski at Arapahoe Basin, details to come

Class of 2007 — 5:00 pm
Dinner at Fogo De Chao, $55 per person

Register Now
Go to www.ucdenver.edu/somreunion to register online or call 303-724-2518 for more information.

Parking and Directions
Directions and parking information for each event will be provided to registrants using the email address provided to the Office of Alumni Relations.

Guests should arrange for their own transportation to and from events.

2012 Medical Alumni Association Awards

Silver and Gold Award – Nathaniel Stinson, MD, PhD, ’81

Distinguished Service Award – Rudolph deLuise, MD, ’57,

Distinguished Achievement Award – Gerald Rainer, MD, MS, ’59
More incentive for continuing education

A number of trends continue to make the quality of physician training at all levels even more important than ever.

In 2012, it almost seems that we practice medicine in a large auditorium, where all sorts of interested and semi-interested parties watch and exercise their own agendas on what they think is “good medicine.” More and more layers of reporting, supervision, evaluation and compliance can easily divert attention from the patient.

Famous personalities seem to love proclaiming the latest fad or miracle; TV docs routinely make their pronouncements about “what your doctor must do.” The Internet, also known as talk radio on a screen, contains some valuable material, but along with it come shams and craziness. Even the venerable Reader’s Digest over time has been transformed into a long series of health tips and checklists. Many of us have felt the deep and routine intrusion into the doctor-patient relationship that can come from a clerk in Cleveland, a bureaucrat in Baltimore or a checklist in Chicago.

I only know a little bit about cars; I expect my mechanic to be the expert. I only know a little bit about the financial world; I expect my advisor to be the expert. I only know a little bit about construction; I expect my contractor to be the expert. As delightful as it is to have well-informed, highly participating patients, they have every reason to require of us the highest level of expertise in the application of medicine to their situation. Especially in an environment filled with all these other voices, sources and agendas, we owe it to our patients to provide well-informed, confident, expert care.

An environment of continuing learning can be reawakened all around us—in renewed dedication and attention at CME events, in private study of our medical literature and cases, and in our active discussions with colleagues and others who are involved in the care of patients.

We are all the widespread presence of the University of Colorado School of Medicine in our individual settings. We ARE willing to accept the responsibility and privilege of being uniquely qualified to figure out what is best for our patients. I hope that the continuing growth and success of our institution is reflected not only in the magnificent facilities we occupy, but also in our daily growth as clinicians and servants.

Thank you for your ongoing support and involvement,

Gary Grasmick, MD

MEDICAL ALUMNI ASSOCIATION

Membership Structure for 2012-2013

Membership in the Medical Alumni Association is based on donations to any School of Medicine funds. The level of giving has a corresponding membership benefits as described below. For a full list of giving opportunities, please visit our website at medschool.ucdenver.edu/alumnimembership. The tiered levels and their associated benefits are:

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<thead>
<tr>
<th>Membership Type</th>
<th>Donation Level</th>
<th>Membership Benefit</th>
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<tbody>
<tr>
<td>Medical Student</td>
<td>$0 (students only)</td>
<td>Membership benefits packet distributed at orientation and invitations to participate in alumni sponsored student events and programs</td>
</tr>
<tr>
<td>White Coat Member</td>
<td>$0–$99</td>
<td>CU Medicine Today</td>
</tr>
<tr>
<td>Stethoscope Society</td>
<td>$100–$249</td>
<td>Above, plus a AMC Tour Cocktail Reception (CAPE &amp; Visible Human Lab)</td>
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<tr>
<td>Century Club</td>
<td>$250–$499</td>
<td>Above, plus 2 tickets to the Century Club cocktail reception</td>
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<tr>
<td>Faculty Circle</td>
<td>$500–$999</td>
<td>Above, plus a CU Football Game Event</td>
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<tr>
<td>Dean’s Circle</td>
<td>$1000+</td>
<td>Above, plus Dean’s Scholars Dinner, and 2 tickets to the Silver &amp; Gold Banquet</td>
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Sponsor a student’s stethoscope

Sponsor tomorrow’s physicians by donating a stethoscope to a matriculating medical student. Students will receive their stethoscope at the White Coat Ceremony in August along with a notification of the alumnus who donated the stethoscope. Donate your stethoscope today at medschool.ucdenver.edu/stethoscope.
Medical school serves as one of the attractions at AAMC annual meeting

At the 2011 Association of American Medical Colleges annual meeting, held Nov. 4–9 in Denver, many School of Medicine faculty members participated in presentations, and the school offered tours of the Anschutz Medical Campus. Visitors arrived by bus at the campus in Aurora, where they were treated to breakfast and then whisked away to see the campus sights.

One stop was at the Center for Advancing Professional Excellence, or CAPE, where then-director Gwyn Barley explained the high-tech system by which students are monitored as they treat mannequins and “standardized” patients. Future doctors, nurses and other health care professionals are trained at CAPE.

AAMC guests also saw the Visible Human, where amazing 3D photography illustrates the body in a unique way, and visited the restored hospital room where, in 1955, former President Dwight Eisenhower was treated for a heart attack.

Pediatric and fetal surgeon Crombleholme named surgeon-in-chief at Children’s

Timothy M. Crombleholme, MD, FACS, FAAP, was named The Ponzio Family Chair for the surgeon-in-chief at Children’s Hospital Colorado and professor of surgery in the Department of Surgery at the University of Colorado School of Medicine. He will serve as vice chair of pediatric surgical programs and director of the new Center for Children’s Surgery.

Crombleholme came from Cincinnati Children’s Hospital Medical Center, where he founded a highly respected fetal care program. Active in clinical and laboratory research, he was the 2011 president of the International Fetal and Surgery Society and co-authored the leading textbook, *Fetology: Diagnosis and Management of the Fetal Patient*.

Clinical investigations include an NIH-funded multicenter trial to determine the best treatment for twin-twin transfusion syndrome and to research new techniques for open fetal surgery and fetoscopic surgery. His laboratory research includes NIH-funded studies of gene therapy in tissue repair, fetal gene therapy and the role of the fetal fibroblast in fetal wound healing.
Neuroscience center combines expertise to put discoveries into practice

The medical school welcomed the new Center for NeuroScience (CNS) last fall. The center is a collection of more than 100 doctors and researchers from a wide array of disciplines working to help translate theoretical science into therapies, treatments and cures for neurological disorders.

“This is an opportunity to do great translational research with a clinical endpoint,” says John Sladek, PhD, director for outreach and development at CNS and professor of neurology, pediatrics and neuroscience. “We will take it from the bench to the bedside. Our goal is to bring together all of the research being done all over this campus.”

The center directors are Diego Restrepo, PhD, a professor of cell and developmental biology, and Ken Tyler, MD, chair of the Department of Neurology. The center was launched with a keynote address from Story Landis, PhD, director of the National Institute of Neurological Disorders and Stroke.

To learn more, go to medschool.ucdenver.edu/CUMedToday/peaks

CU medical school’s Mini Med School Part 2 debuts

The School of Medicine has launched a sequel to the popular CU Mini Med School, which has taught more than 18,000 people the basic science of medicine. Founded in 1989 by J. John Cohen, MDCM, PhD, a CU medical school professor of immunology and medicine, the Mini Med School concept has spread nationally and internationally. Now there’s Mini Med School Part 2: The Clinical Years. This pilot program began in January and met on Wednesday evenings for 8 weeks. It covered the doctor-patient relationship; heart disease and risk modification; childhood development; pneumonia and smoking; trauma and injury prevention; diabetes and obesity; and pregnancy and delivery. Dennis Boyle, MD, of Rheumatology and Stephen Wolf, MD, of Emergency Medicine, both on the medical school faculty, led the first Mini Med School Part 2, and plan to continue it and expand its reach next year. As always, a large group of enthusiastic medical student volunteers welcomed and engaged with the audience.

To learn more about CU Mini Med School, go to medschool.ucdenver.edu/MiniMed.

Above, Dr. Gerald Zarleno teaches the 600 attendees about labor and delivery as a simulation manikin performs the steps. A videographer is capturing the action to project on the big screen. Photo by Helen Macfarlane
Why are you studying beer instead of curing cancer?” As a basic scientist, I’ve been asked questions of that ilk many times. But never had the question been put that starkly. It was posed by someone who was helping publicize a recent discovery made in my laboratory. With collaborators in Argentina and Portugal, we discovered the genetic roots of the yeast that is used to brew lager beer.

Our discovery attracted interest because of where we found lager yeast’s ancestor – in Patagonia. That was unexpected, because lager brewing was invented on the other side of the world. Bavarian monks discovered in the 15th century that brewing beer in the cold (“lagering”) gives it a satisfyingly crisp, clean taste. But lager brewing works best with yeasts that are adapted to the cold. Sometime in the 16th century those monks stumbled across such a yeast—the forefather of today’s lager-brewing yeasts.

While the origin of the yeast that has been used for at least 6,000 years to brew ales has long been known, the provenance of lager yeast remained a mystery. Our discovery of its ancestor in Patagonia suggests that an early visitor to that part of the world (perhaps Magellan?) unwittingly brought it back to Europe, where it fell into a vat of wort and flourished, establishing the lager brewing industry.

Why were we studying beer? Well, we weren’t (more on that later). But why study anything?

Basic researchers will tell you that we just want to understand how things work, to discover how things happened, to learn why things are the way they are. We’re curious about nature, and don’t fret much about practical applications. But some of the most useful scientific discoveries are born out of curiosity about esoteric questions. Two stories illustrate this.

In 1960 Werner Arber set out to investigate how radiation alters DNA (surely a subject of potential practical interest during the Cold War). He chose for his experimental organism the common gut bacterium E. coli.

While experimenting with viruses that infect bacteria, he observed that viruses grown on bacteria of one lineage were unable to infect a different lineage of the same species. The virus was “restricted.” That was unexpected.

Curious, Arber took a brief research detour, which became his main road. After a 10-year journey, he discovered that bacteria possess enzymes that cut and render harmless the incoming viral DNA. That discovery earned Arber a share of the 1978 Nobel Prize in Physiology or Medicine. Those “restriction enzymes” spawned the multibillion-dollar biotechnology industry and revolutionized genetics research, launching a 40-year era of discovery that brought personalized medicine to our doorstep.

My second story goes back to yeasts. In the mid-1970s, Tom Petes, a researcher in David Botstein’s laboratory at MIT, exploited Arber’s “restriction enzymes” to determine which yeast chromosome harbors the genes for components of the cellular protein synthesis machinery. Petes knew that this was not going to make national (or even local) news. He was simply curious, (and also doing his bit to complete the gene map of yeast, a widely used experimental organism).

While presenting Petes’ results to a group of geneticists, it dawned on Botstein that the same approach could be used to determine the chromosomal location of human genes. That epiphany led to the first identification of human disease genes, and provided the intellectual framework for mapping the human genome that is the foundation of personalized medicine.

Why are bacterial viruses restricted to a particular family of bacteria? Where do ribosomal genes map? These are questions of no apparent practical interest. Arber, Botstein and Petes were basic scientists simply satisfying their curiosity about nature. In doing so, they changed the world.

So, why were my co-workers and I studying beer? As I mentioned, we weren’t.

We were gathering material for an intended study of the evolution of gene control when we came upon a detour that piqued our curiosity. Will discovering the origin of lager yeast change the world? Unlikely. Will it lead to a practical application? You never know. But our curiosity is sated (for now).

Mark Johnston is a professor and chair of the Department of Biochemistry and Molecular Genetics at the University of Colorado School of Medicine and co-author of the book “Genetic Twists of Fate.” Please submit essays for future editions to Dan.Meyers@ucdenver.edu.
You now can keep up with the goings-on at CU School of Medicine on our new Facebook page, found at www.facebook.com/CUMedicine. To stay connected and help the school boost its online visibility, be sure to click “like” at the top of the page.

What’s in it for you? News, for one thing. You’ll see posts about the possibility of a new branch campus in Colorado Springs and the shortage of primary care physicians in Colorado. There’s information on the University of Denver’s interest in starting a medical school and how applications to the CU medical school are increasing at far above the national average. You’ll find links to articles about CU research breakthroughs in Down syndrome and breast cancer.

And there are lighter features, such as one about the student singing group, the Arrhythmias. Curious about the Anschutz Medical Campus? You can find photos that document its recent changes and growth.

There are other ways to keep up on the medical school if Facebook isn’t your thing. Go to medschool.UCDenver.edu/CUMedToday to find links to items such as:

• Dean Richard Krugman’s latest State of the School speech, in which he calls for a review of how the medical school is organized
• The new school Facts and Figures book, with lots of data and other information; it outlines changes in undergraduate and graduate medical education and the school’s finances, among many other things
• The growing collection of videos about research, activities and people at the medical school

And as always, we welcome your comments, story ideas and other suggestions about our Facebook page or any aspect of this magazine.

Dan Meyers
Director of Communications
dan.meyers@ucdenver.edu
You already know that students at the CU School of Medicine benefit greatly from scholarships. But did you know that, in addition to getting that help, the students are giving it? This year, they created and fundraised for the Student Organized Scholarship (SOS) fund. In March, four students were given an SOS scholarship. Their peers nominated the winners using words such as exemplary, fostering class spirit, innovator, altruism, committed to mentoring, collaborative. And students raised every dime. The medical school’s students, faculty and staff are grateful for the support of alumni and others. The SOS fund is a reminder of the quality you invest in when you support the University of Colorado School of Medicine.

For more information go to ucdenver.edu/alumni.

CU Medical students Ryan Roth (‘14) and Kamleah Shaban (‘12), right, and David Joung (‘12) and Vadim (Eddie) Tsvankin (‘13), received scholarships that the students themselves created and raised money for.