Biochemist James Spudich wins Lasker Award

James Spudich's research helps to explain the molecular activity that enables heartbeats, makes muscles contract and powers immune cells.

By Bruce Goldman

Stanford biochemist James Spudich, PhD, has been flying small planes as a hobby since 1975. At his Pacific Ocean vacation home there’s a private runway within walking distance from his cottage. But what’s put him in the pilot seat with respect to his professional career is his consistent ability to develop ever-more-precise ways of measuring molecular movements. Spudich, the Douglass M. and Nola Leishman Professor of Cardiovascular Disease at the School of Medicine, will receive the 2012 Albert Lasker Basic Medical Research Award for his trailblazing investigations of the molecular motors that drive our skeletal muscle contractions and heartbeats, enable our cells to divide, and power patrolling immune cells through our tissues. The prize, sponsored by the New York City-based Albert and Mary Lasker Foundation, carries an honorarium of $250,000, which Spudich will share with two other researchers: biologist Michael Sheetz, PhD, of Columbia University, and cellular and molecular pharmacologist Ronald Vale, PhD, of the University of California-San Francisco.

Over the course of an ascent launched at age 6 when he got his first chemistry set, Spudich found ingenious ways to figure out how cells’ molecular motors work. He eventually took his studies down to the single-molecule level to measure the minute displacements and forces produced by a single molecular motor.

Spudich’s discoveries testify to the synergies of interdisciplinary science — his work has involved various combinations of cell physiology, physics, biochemistry, structural biology and genetics. In the late 1990s, he and then-Stanford physiologist and current U.S. Secretary of Energy Steven Chu, PhD, pitched then-Stanford provost Condoleezza Rice, PhD, with an idea that spawned Bio-X, Stanford’s pioneering interdisciplinary research program that fosters collaborations among scientists from the physical, biological and computer sciences. Spudich served as the program’s first director.

Colleagues hailed Spudich as not only a superb scientist but a terrific person endowed with modesty, leadership, inspirational mentoring and vision. Asked how he felt about the award, he replied, “So many other people at Stanford alone could have received this recognition.”

“Jim’s not only an amazing scientist but an amazing colleague,” said Mark Krasnow, PhD, professor and chair of biochemistry and a Howard Hughes Medical Institute investigator, who is also a member of Bio-X.

“From his earliest discoveries, we’ve all known he was destined for greatness. He’s bridged basic biological science with every other science, not stopping at the edge of his lab or even the edge of his department, but finding collaborators in other parts of the university, in other fields of science, and across the world when necessary.”

Spudich’s methods epitomize hard-core basic research — scrupulous scrutiny of one-celled creatures, painstaking protein purification, measurements of motion and energy conversion at the single-molecule level — but they have practical consequences. Clinical trials, now under way, of several drugs based on Spudich’s hard-won understanding of proteins and RNA molecules that governs when and how genes are expressed.

$288 million effort yields encyclopedia detailing roles of genomic ‘junk DNA’

By Krista Conger

The completion of the human genome sequencing project in 2003 revealed what many scientists already knew to be true: more than 90 percent of the newly sequenced DNA had no known function. In fact, only about 1.5 percent encodes instructions for proteins that do the work of the cell. Now a five-year collaboration of more than 440 scientists in 32 labs around the world has pulled back the curtain on this so-called “junk DNA” to reveal a complex interplay among regulatory regions, proteins and RNA molecules that governs when and how genes are expressed.

“Until now, we had only the nucleotide sequence,” said Stanford genetecist Michael Snyder, PhD, one of the leaders of the mammoth effort, which was funded and coordinated by the National Human Genome Research Institute. “Now we have the beginnings of a regulatory network, or wiring diagram, for a human being. This global overview will help us understand how changes in the genome cause disease, and also to see how an individual’s unique genetic code may affect his or her health in meaningful ways.”

In fact, more than 80 percent of so-called “junk DNA” was found to have some type of biological function.

Lucile Packard Children’s Hospital breaks ground on state-of-the-art expansion

By Ruth Schechter

About 200 hospital employees, volunteers, administrators, planners, business leaders, elected officials and community members wearing bright yellow hardhats gathered under a white tent near the excavation site next to Packard Children’s Hospital on Sept. 6 to celebrate the official groundbreaking of its long-planned expansion.

While “make-ready” activities have been under way for the past year, the groundbreaking marks the formal start of construction. The $1.2 billion project will add $212 million square feet to the approximately 300,000 square-foot existing hospital, streamlining diagnosis and treatment, and catering to the unique health-care needs of children and their families.

“I want to acknowledge the tremendous work that takes place here every single day,” said Packard Children’s president and CEO Christopher Dawes. “It’s the patients, families and staff who inspired us to build this hospital so that we can take care of the most complex needs and provide true family-centered care.”

Scheduled to open in 2016, the new building will optimize the hospital’s services and infrastructure, adding more beds, private rooms, state-of-the-art operating suites, family-friendly...
Early stenting may help some coronary artery disease cases

By Tracie White

For patients with stable coronary artery disease who have at least one narrowed blood vessel that compromises flow to the heart, medical therapy alone leads to a significantly higher risk of hospitalization and the urgent need for a coronary stent when compared with therapeutic stenting, a new study including initial placement of artery-opening stents.

Those are the findings of a study published online Aug. 28 in the New England Journal of Medicine that was designed to evaluate the benefits of using a diagnostic tool called fractional flow reserve, or FFR, to guide a standardized treatment for fixing a narrowed artery.

“We believe there is a significant proportion of patients who benefit from stenting early on as opposed to receiving only medical therapy,” said William Fearon, MD, associate professor of cardiology at Stanford University and co-principal investigator and senior author of the multi-center international trial called FAME 2. “In this group of patients who have significant ischemia [blood vessel narrowing that compromises flow to the heart muscle] based on assessment with FFR, the need for hospitalization and urgent revascularization is much higher and the benefit of stenting is prescribed. People feel better and do better with FFR-guided placement of coronary stents up front in this setting.”

The study’s principal investigator is Bernard De Bruyne, MD, PhD, of Cardiovascular Center Aalst in Belgium. The trial was halted early, on Jan. 15, because of the high rates of hospitalization and coronary stenting needed in the very ill patients with significant ischemia who received only medical therapy. Some of those patients had suffered subsequent chest pain and heart attacks requiring urgent revascularization, which entails repairing damaged blood vessels with emergency stenting or heart bypass surgery.

Narrowing of the arteries caused by buildup of atherosclerotic plaque is common and accounts for 40 percent of Americans over the age of 60 have one or more narrowings in the coronary arteries but no coronary disease. That trial relied solely on X-rays from coronary angiograms and noninvasive stress tests to determine whether stenting was needed for patients with coronary artery disease. Many can be treated with medical therapy alone, which may include aspirin or other drugs.

The idea for this trial grew out of the landmark COURAGE trial, presented in 2007 at the American College of Cardiology, which showed that stenting would provide any significant benefits over medical therapy for patients with stable coronary disease. That trial relied on only X-rays from coronary angiograms and noninvasive stress tests to determine whether stenting was needed for patients with coronary artery disease. Many can be treated with medical therapy alone, which may include aspirin or other drugs.

The trial was halted early, on Jan. 15, because of the high rates of hospitalization and coronary stenting needed in the very ill patients with significant ischemia who received only medical therapy. Some of those patients had suffered subsequent chest pain and heart attacks requiring urgent revascularization, which entails repairing damaged blood vessels with emergency stenting or heart bypass surgery.

Narrowing of the arteries caused by buildup of atherosclerotic plaque is common and accounts for 40 percent of Americans over the age of 60 have one or more narrowings in the coronary arteries but no coronary disease. That trial relied solely on X-rays from coronary angiograms and noninvasive stress tests to determine whether stenting was needed for patients with coronary artery disease. Many can be treated with medical therapy alone, which may include aspirin or other drugs.

The idea for this trial grew out of the landmark COURAGE trial, presented in 2007 at the American College of Cardiology, which showed that stenting would provide any significant benefits over medical therapy for patients with stable coronary disease. That trial relied on only X-rays from coronary angiograms and noninvasive stress tests to determine whether stenting was needed for patients with coronary artery disease. Many can be treated with medical therapy alone, which may include aspirin or other drugs.

The trial was halted early, on Jan. 15, because of the high rates of hospitalization and coronary stenting needed in the very ill patients with significant ischemia who received only medical therapy. Some of those patients had suffered subsequent chest pain and heart attacks requiring urgent revascularization, which entails repairing damaged blood vessels with emergency stenting or heart bypass surgery.

Narrowing of the arteries caused by buildup of atherosclerotic plaque is common and accounts for 40 percent of Americans over the age of 60 have one or more narrowings in the coronary arteries but no coronary disease. That trial relied solely on X-rays from coronary angiograms and noninvasive stress tests to determine whether stenting was needed for patients with coronary artery disease. Many can be treated with medical therapy alone, which may include aspirin or other drugs.

The idea for this trial grew out of the landmark COURAGE trial, presented in 2007 at the American College of Cardiology, which showed that stenting would provide any significant benefits over medical therapy for patients with stable coronary disease. That trial relied on only X-rays from coronary angiograms and noninvasive stress tests to determine whether stenting was needed for patients with coronary artery disease. Many can be treated with medical therapy alone, which may include aspirin or other drugs.
Cap. Chesley ‘Sully’ Sullenberger on applying lessons of airline safety to health-care practices

Sully Sullenberger is the pilot who landed US Airways Flight 1549 in the Hudson River after a flock of geese struck and disabled the plane’s engines. His Quiet One, as he is affectionately called, saved the lives of all 155 passengers on board. After retiring in 2010, he is now using his expertise to focus on the safety of a different set of people, patients. In a recent interview for the medical school podcast “1:2:1,” Paul Costello, the medical school’s chief communications officer, spoke with Sullenberger about similarities between aviation and medicine and why health-care professionals need to transform the culture of patient safety in this country. His interviews are available online at med.stanford.edu.

1. You and three co-authors wrote an article for The Journal of Patient Safety in March on “avoidable health-care errors” making comparisons with the aviation industry. Can you define the nature of the problem?

SULLENBERGER: The nature of the problem is systemic, huge and immediate. As we know from the Institute of Medicine reports and others, medical errors lead to 400,000 deaths a year, which is more than those caused by all cancers, heart disease, and strokes combined. It’s a country with over 300,000 deaths a year that’s not being addressed. That’s 10% of all deaths in the country. That’s the equivalent of 20 large jet airliners crashing every week with no survivors.

If that were to happen in aviation, there would be a nationwide ground stop, a presidential commission, congressional hearings. The National Transportation Safety Board would investigate, search out root causes. No one would fly until we solved the fundamental problem.

I’m trying to bring to this discussion a sense of urgency. I can tell you from my own domain, commercial aviation, we have worked very hard over the last four or five decades to make [it] ultimately an ultra-safe endeavor. In fact, the last passenger fatality on a large U.S. jet airliner was in November 2001, over a decade ago. That’s not quite as safe as aviation, but it is the same level of safety, but as far as the major, large jet, airlines, we have achieved an amazing accomplishment: Littles and small accidents, failures, even fatal ones, but you don’t see the same kind of big accident.

Thankfully, those days are long gone. We’ve achieved much better standardization. We’ve taught captains what to do in the event of a tragedy and have taken steps not to have similar disasters. We have not only seen a decline in the number of fatalities, but we can no longer be a collection of individuals. What many don’t realize about aviation is that at a large airline, you’re working with people all of the time that you’ve never met before.

It’s important that we make introductions, that we learn each other’s name. I think one of the things that we want to create an environment of psychological safety, where there are no stupid questions, where we have an obligation to speak up if we see something not being right, and when we have a feeling that something is wrong, it’s our responsibility for the outcome. It’s not about who’s right, it’s about what’s right. We’re in aviation we’ve created this robust safety structure on which we build. Paradoxically, it’s this predictability, this reliability, this regularization of our processes that becomes the firm basis upon which we can then innovate when we face the unexpected, when we face the crisis.

That’s exactly what we did, my crew and I, on Flight 1549, resulting in this Hudson River landing. It was something that we’d never trained for, it was something we had never envisioned, and we had 208 seconds to solve this life-threatening problem that we had never seen before.

4. How do you think you chart a path that leads to ‘four drastically reducing the number of preventable medical deaths sooner rather than later?’

SULLENBERGER: I think we need to do what we did in aviation. We need to have the public awareness and the sense of urgency to do to what we did in aviation. I think we need to be making a difference. I think there are many who are doing important things right now and have been for a number of years, but it’s not in a system, a fashion. It’s not in every hospital, in every city, in every state. We do have islands of excellence right now, but they are just that. They’re islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them.

5. Why did you choose patient safety as the issue on which you would use your star status? What moved you from aviation to patient safety?

SULLeNBerger: Well, I’m still doing aviation safety advocacy also, but it was just such an obvious analog with such obvious transfer. The need is so great. I’m a new media person and I’ve been doing it for a few years. There are people who have dedicated their whole lives to this concept. If I can help increase that awareness and understanding politically in some way, I think it’s my duty to do so.

One of the biggest surprises for all of us directly involved with the Hudson River flight three-and-a-half years ago, the crew, and me, and especially my first officer Jeff Skiles and me, was that unlike almost every other news story, this story of this Hudson landing did not evolve. It is a story that we would tell every single day. It was something that really touched a lot of people’s lives and made them feel a certain way about and about this event.

Once Jeff and I figured out that was the case, we felt an intense obligation to do as much good as we could in every way that we could. I was fortunate to be a part of this with this, both in terms of aviation safety and in ways that we cared about. This is just a logical follow-on."

Groundbreaking continued from page 1

amendments and the flexible floor space the hospital needs to adapt to new technolo-
gies and to provide more efficient ser-
vices. The expansion will feature not only seven new operating rooms (with state-of-the-art diagnostic MRI and computer-assisted imaging equipment), but also space designed to make work more efficient and a digital dashboard to predict surgery time for better oper-
inatation. The children and families who have come to Packard Children’s over the past 20 years benefit from deep medical ex-
pertise and a family-focused approach to care. The added space also means that the hospital has more than doubled the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them. the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them. the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them. the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them. the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them. the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them. the current square footage.

Although the children’s hospital goes back all the way to 1913, the current facili-
ties were constructed in 1991. Since then technology has changed dramatically, as have the needs of the children who come to Packard Children’s for care.

The new hospital has been designed not only to meet the current needs of the po-
patients but for what we anticipate their needs will be in the future,” added Dawes. “The new hospital will incorporate the very latest diagnostic equipment, new operating and sedation rooms, but also space designed to make work more streamlined and effective, such as centralized meeting rooms, adjacent that they say that they are islands of excellence in a sea of systems failure. We need to make those islands bigger, and we need to have less water between them.
Questions raised about organic foods’ health benefits

By Michelle L. Brandt

You’re in the supermarket eyeing a basket of sweet, juicy plums. You reach for the conventionally grown stone fruit, then decide to spring the extra $1/pound for its organic cousin. You figure you’ve just made the healthier decision by choosing the organic product—but new findings cast some doubt on your thinking.

“There isn’t much difference between organic and conventionally grown foods, if you’re an adult and making a decision solely on your health,” said Dena Bravata, MD, MS, the senior author of a paper comparing the vitamin content of organic and non-organic foods, published in the Sept. 4 issue of Annals of Internal Medicine.

A team led by Bravata, a senior affiliate with Stanford's Center for Health Policy, and Crystal Smith-Spangler, MD, MS, an instructor in the Stanford School of Medicine’s Division of General Medicine and Infectious Disease and a physician-investigator at VA Palo Alto Health Care System, did the most comprehensive meta-analysis to date of existing studies comparing organic and conventional foods. They did not find any compelling evidence that organic foods are more nutritious or carry fewer health risks than conventional alternatives, though consumption of organic foods can reduce the risk of pesticide exposure. (For responses in the media to the study, please see the adjacent story.)

The popularity of organic products, which are generally grown without synthetic pesticides or fertilizers or routinely use synthetic antibiotics or growth hormones, is skyrocketing in the United States. Between 1997 and 2011, U.S. sales of organic foods increased from $3.6 billion to $24.4 billion, and many consumers are willing to pay a premium for these products. Organic foods are often twice as expensive as their conventionally grown counterparts.

Although there is a common perception—perhaps based on price alone—that organic foods are better for you than non-organic ones, it remains an open question as to the health benefits or drawbacks of any of the Stanford study stemmed from Bravata’s patients asking her again and again about the benefits of organic foods. She didn’t know how to advise them.

So Bravata, who is also chief medical officer at the health-care transparency company Castlight Health, did a literature search, uncovering what she called a “confusing body of studies, including some that were not very rigorous, appearing in trade publications.” There wasn’t a comprehensive synthesis of the evidence that included both benefits and harms, she said.

“This was a ripe area in which to do a systematic review,” said first author Smith-Spangler, who jumped on board to conduct the meta-analysis with Bravata and other Stanford colleagues.

For their study, the researchers sifted through thousands of papers and identified 237 of the most relevant to analyze. For their study, the researchers sifted through thousands of papers and identified 237 of the most relevant to analyze. For their study, the researchers sifted through thousands of papers and identified 237 of the most relevant to analyze. For their study, the researchers sifted through thousands of papers and identified 237 of the most relevant to analyze.

In discussing limitations of their work, the researchers noted the heterogeneity of the studies they reviewed due to differences in testing methods; physical factors affecting the food, such as weather and soil type; and genetic variation among organic farming methods. With regard to the latter, there may be specific organic practices (for example, the way that maize is grown) that people can use to make their own decisions based on their level of concern about pesticides, their budget and other considerations.

She also said that people should aim for healthier diets overall. She emphasized the importance of eating of fruits and vegetables, “however they are grown,” noting that most Americans don’t consume the recommended amount.

As for what the findings mean for consumers, the researchers said their aim is to educate people, not to discourage them from making organic purchases. “If you base your health effects on such studies, there is little evidence that organic foods is the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

“The study in Annals of Internal Medicine did note that the lack of evidence of organic foods’ health benefits [see adjacent story] prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.

“We pay more for organic or free-range products because we believe it’s the right thing to do. We want to support the farmers and growers who treat their animals, their crops and mother nature’s land with respect and dignity. And even though organic and free-range have become part of Big Food, we believe that it’s a better way of doing things,” The Bad Deal.

Together, the researchers noted, this has prompted a wave of commentary in the media and blogosphere that was both critical and laudatory. Here’s a sampling.
You already know it's hard to balance your checkbook while simultaneously reflecting on your past. Now, investigators at the School of Medicine — having done the equivalent of wire-tapping a hard-to-reach region of the brain — tell us how this impasse arises.

The researchers that grouped nerve cells in a structure called the posterior medial cortex, or PMC, are strongly activated during a recall task such as trying to remember whether you had coffee yesterday, but just as strongly suppressed when you're engaged in solving a math problem.

The PMC, situated roughly where the brain's two hemispheres meet, is of great interest to neuroscientists because of its central role in introspective activities. "This brain region is famously well-connected with many other regions that are important for higher cognitive functions," said Josef Parvizi, MD, PhD, associate professor of neurology and neurological sciences and director of Stanford's Human Intracranial Cognitive Electrophysiology Program. "But it's very hard to reach; it's so deep in the brain that the most commonly used electrophysiological methods can't access it."

In a study published online Sept. 3 in Proceedings of the National Academy of Sciences, Parvizi and his Stanford colleagues found a way to directly and sensitively record the output from this ordinarily anatomically inaccessible site in human subjects. By doing so, the researchers learned that particular clusters of nerve cells in the PMC that are most active when you are recalling details of your own past are strongly suppressed when you are performing mathematical calculations. Parvizi is the study's principal author. The study's co-authors, respectively, are postdoctoral scholars Brett Foster, PhD, and Mohammad Dastjerdi, PhD.

Much of our understanding of what roles different parts of the brain play has been obtained by techniques such as functional magnetic resonance imaging, which measures the amount of blood flowing through various parts of the brain. Such studies are required to know, like functional magnetic resonance imaging, which measures the amount of blood flowing through various brain regions as a proxy for activity in those regions. But changes in blood flow are relatively slow, making fMRI a poor method for testing in on-the-high-frequency electrical bursts (approximately 200 times per second) that best reflect nerve-cell firing.

Moreover, fMRI typically requires pooling images from multiple subjects to build up an active brain composite image. Each person's brain physiognomy is somewhat different, so the blending blurs the observable anatomical coordinates of a region of interest.

Nonetheless, fMRI imaging has shown that the PMC is quite active in introspective processes such as autobiographical memory processing ("I am科技大学 today") or dreaming, and less so in external sensory processing ("How far away is that pedestrian?"). "Whenever you pay attention to the outside world, its activity decreases," said Parvizi.

To learn what specific parts of this region are doing during, say, recall versus arithmetic requires more individualized anatomical resolution than an fMRI provides. Otherwise, Parvizi said, "if some nerve-cell populations become less active and others more active, it all washes out, and you see no net change."

For this study, the Stanford scientists employed a high-sensitivity technique to demonstrate that introspective and externally focused cognitive tasks directly interfere with one another, because they impose opposite requirements on the same brain circuitry.

The researchers took advantage of a procedure performed on patients who were being evaluated for brain surgery at the Stanford Epilepsy Monitoring Unit, associated with Stanford University Medical Center. These patients were unresponsive to drug therapy and, as a result, suffered continuing seizures. The procedure involves temporarily removing small sections of a patient's skull, placing a thin plastic film containing electrodes onto the surface of the brain near the suspected point of origin of that patient's seizure (the location is unique to each patient), and then monitoring electrical activity in that region for five to seven days — all of it spent in a hospital bed. Once the epilepsy team identifies the point of origin of any seizures that occurred during that time, surgeons can precisely excise a small piece of tissue at that position, effectively breaking the vicious cycle of brain-wave amplification that is a seizure.

Implanting these electrode packets doesn't mean piercing the brain or individual cells within it. "Each electrode picks up activity from about a half-million nerve cells," Parvizi said, "It's like looking at the ceiling of a big room, filled with a lot of people talking, with multiple microphones. We're listening to the buzz in the room, not individual conversations. Each microphone picks up the buzz from a different bunch of partners. Some conversations are more exciting and talking more loudly than others."

The experimenters found eight patients whose seizures were believed to be originating somewhere near the brain's midline and who, therefore, had electrode packets placed in the crevasse dividing the hemispheres. (The brain's two hemispheres are spaced far enough apart to slip an electrode packet between them without incurring damage.)

The researchers got permission from these eight patients to bring in laptop computers and put the volunteers through a battery of simple tasks requiring modest intellectual effort. "It can be boring to lie in bed waiting for a day to pass or a seizure to come," said Foster. "Our studies helped them pass the time." The sessions lasted about an hour.

On the laptop would appear a series of true/false statements falling into one of four categories. Three categories were self-referring, albeit with varying degrees of specificity. Most specific was so-called "auto-biographical episodic memory," an example of which might be: "I drank coffee yesterday." The next category of statements was more generic: "I eat a lot of fruit." The most abstract category, "self-judgment," comprised sentences along the lines of: "I am honest." A fourth category differed from the first three in that it consisted of arithmetical equations such as: 67 + 6 = 73. Evaluating such a statement's truth required no introspection but, instead, an outward, more sensory orientation.

For each item, patients were instructed to press "1" if a statement was true, "2" if it was false. Significant portions of the PMC that were "tapped" by electrodes became activated during self-episodic memory processing, confirming the PMC's strong role in recall of one's past experiences. Interestingly, true/false statements involving less specifically narrative recall — such as, "I eat a lot of fruit" — induced relatively little activity. "Self-judgment" statements — such as, "I am attractive" — elicited none at all. Moreover, whether a volunteer judged a statement to be true or false didn't affect the PMC's firing rate, the time of occurrence or location or duration of electrical activity in activated PMC circuits.

"This confirms the hypothesis that for leukemias, all of the early mutation events occur in blood-forming stem cells, but it opens the possibility that the same will be true for other cancers, and perhaps all cancers. The progression to the cancer might occur in the normal stem cells of any particular tissue, and the cancer would only emerge as the full set of mutations accumulate."

The leukemia research was supported in part by the National Institutes of Health and the Howard Hughes Medical Institute, the National Institutes of Health, the Ellison Medical Foundation, the Ludwig Foundation, the Lucille P. Markey Charitable Trust, the National Science Foundation, the Burroughs Wellcome Fund and the New York Stem Cell Foundation.

Christopher Vaughan is the communications manager for the Stanford Institute for Stem Cell Biology and Regenerative Medicine.
making it possible for myosin or similar proteins to ferry cargos of various mate-
rials from one part of a cell to another. In this case, each myosin molecule is free to
move along actin filaments that are fixed in place, like a truck moving along a road.
A cell, far from being just a bag of randomly floating chemicals, is in many
respects as complicated as a major city. In order to function properly, said Spu-
dich, each cell type — nerve, liver, skin and so forth — has its own “city plan” (its cytoskeleton) to help molecular mo-
tors move the right substances along its actin or similar thoroughfares so those
substances get to the right place at the right time. In a muscle, actin filaments
are mostly aligned, so mass movements of myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.
By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

in this case, each myosin molecule is free to
move along actin filaments that are
fixed in place, like a truck moving along a road.
A cell, far from being just a bag of randomly floating chemicals, is in many
respects as complicated as a major city. In order to function properly, said Spu-
dich, each cell type — nerve, liver, skin and so forth — has its own “city plan” (its cytoskeleton) to help molecular mo-
tors move the right substances along its actin or similar thoroughfares so those
substances get to the right place at the right time. In a muscle, actin filaments
are mostly aligned, so mass movements of myosin molecules along them cause
an entire tissue to contract.

In 1982, he and co-prize winner Sheehy performed an experiment that
combined disciplines ranging from mi-
te biochemistry to biophysics. It was known
that the inward-facing surface of the membrane surrounding cells of a plant
called N. glutinum was needed with actin fil-
aments that are all oriented in the same
direction. The researchers cut open these cells and splayed them on a surface
to expose those filaments. They then added myosin-coated 1-micron plastic beads.
This allowed Spudich and Sheetz to ob-
serv unidirectional movement of the beads along the filaments. While sci-
entists had theorized about this coordi-
nated movement, it had never before been
documented.

To show for the first time that pure act-
in could move by itself, Spudich and his
team studied myosin movement at physiologically relevant speeds, Spudich and one of his
two co-prizewinners, Philip Pizzo, MD, of New York University, had introduced to the field of biological con-
tact processes.

Sheetz performed an experiment that
failed. But he had arranged to send myosin
coated with 1-micron plastic beads
across my cells for hours on end, and so forth — has its own “city plan” (its cytoskeleton) to help molecular mo-
tors move the right substances along its actin or similar thoroughfares so those
substances get to the right place at the right time. In a muscle, actin filaments
are mostly aligned, so mass movements of myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.

myosin molecules along them cause
an entire tissue to contract. Spudich was born at the tail end of the Great Depression in Bend, Ill., a
coal-mining town. His early fascination with chemistry — at the age of 6 he ac-
tquired his first in a series of progressively more advanced chemistry sets — fore-
shadowed his scientific ambition. Recogn-
ing this, his parents cleared the pantry of their modest home to create a labora-
tory space for his pursuits.

By his teen years, Spudich’s prowess had progressed to the point where he
excelled in chemistry, biology and math at a small school called Aumich, he recollected with some amuse-
ment. In 1960, as a sophomore majoring in chemistry at the University of Illinois
at Chicago, Spudich met his wife, Annamma. In the early 1960s in a physiology
course at the Marine Biology Lab in Woods Hole, Mass., when she was a graduate student. Spudich is an avid pilot and regularly flies a Trindrad plane to his vacation home in Sea Ranch, Calif.
What's your big idea? Youth's offer answers

As part of the Clinical Anatomy Research Scholars program at Stanford, 15 high school students and under-graduates came to campus this summer to conduct re-search alongside professors in a variety of fields, including medicine, surgical simulation, robots and biomedical visu-alization. The end result was a digital encyclopedia that offers a realistic learning experience to students from around the entire world.

The study of anatomy is an essential component of medical education that is most commonly presented to stu-dents through cadaveric dissection and anatomical textbook study.

Cadaver dissection is an extremely effective method of teaching anatomy because of the spatial learning that is involved, allowing physicians to form a mental picture of the body. However, cadaver dissection is very hard to get.

"Until now, everyone has just been looking under the proverbial lapploom to find the causes of disease," Snyder, a se-nior member of the ENCODE Consor-tium and chair of genetics at the School of Medicine, said of the focus on well-studied protein-coding regions. "But 85 percent of variants identified through genome-wide association studies, or GWAS, lie outside these regions. Now we can locate a region of interest in the genome to find, among other things, whether it contains proteins or regulatory RNA molecules.

"ENCODE researchers mapped more than 1.6 million proteins onto the genome. In the process, they dis-covered that more than 80 percent of so-called 'junk DNA' is functional — serving as binding sites for proteins or regulatory RNA molecules. "ENCODE scientists incorporated more than 1,600 individual experiments in 147 cell types. Their results paint a picture of the genome that, rather than ex-isting as a static sequence of nucleotides, is instead as complex and as busy as our nation's largest airports. Casual observers will need navigational tools, and landing, but a closer inspection reveals the planes' activities are dependent on myriad other factors. Flight controllers, to ticketing agents, that keep things running smoothly.

ENCODE researchers mapped more than 30,000 possible proteins encoded by GWAS, lie outside these regions. Now studied protein-coding regions. "But 85 percent of variants, but it will also significantly advance the ability of researchers and clinicians to study the genetic under-pinings of complex diseases. Earlier this year, Snyder made headlines with a study in which he used his whole-genome sequence and many other bio-logically important factors, including diabetes, that he would develop type-2 diabetes.

The completion of the project, known as the Encyclopedia of DNA En-vironments, or ENCODE, was announced Sept. 5 with the simultaneous publi-cation of 30 papers in three journals: Nature, Genome Biology and Genome Research. Six review articles also appear in the Journal of Biological Chemistry, as well as other affiliated papers in Science, Cell and other journals.

In particular, Snyder and his Stanford colleagues published a number of papers detailing how modifications to DNA or its packaging proteins affect gene expression and how a diverse variety of organisms use their DNA molecules to modify gene expression. "It's an encyclopedia of information that will help researchers in an untold number of areas. Researchers can now locate a region of interest in the genome to find, among other things, whether it contains proteins or regulatory RNA molecules. "ENCODE scientists incorporated more than 1,600 individual experiments in 147 cell types. Their results paint a picture of the genome that, rather than existing as a static sequence of nucleotides, is instead as complex and as busy as our nation's largest airports. Casual observers will need navigational tools, and landing, but a closer inspection reveals the planes' activities are dependent on myriad other factors. Flight controllers, to ticketing agents, that keep things running smoothly.

ENCODE researchers mapped more than 30,000 possible proteins encoded by GWAS, lie outside these regions. Now studied protein-coding regions. "But 85 percent of variants, but it will also significantly advance the ability of researchers and clinicians to study the genetic under-pinings of complex diseases. Earlier this year, Snyder made headlines with a study in which he used his whole-genome sequence and many other biologically important factors, including diabetes, that he would develop type-2 diabetes.

The completion of the project, known as the Encyclopedia of DNA Environments, or ENCODE, was announced Sept. 5 with the simultaneous publi-cation of 30 papers in three journals: Nature, Genome Biology and Genome Research. Six review articles also appear in the Journal of Biological Chemistry, as well as other affiliated papers in Science, Cell and other journals.

In particular, Snyder and his Stanford colleagues published a number of papers detailing how modifications to DNA or its packaging proteins affect gene expression and how a diverse variety of organisms use their DNA molecules to modify gene expression. "It's an encyclopedia of information that will help researchers in an untold number of areas. Researchers can now locate a region of interest in the genome to find, among other things, whether it contains proteins or regulatory RNA molecules. "ENCODE scientists incorporated more than 1,600 individual experiments in 147 cell types. Their results paint a picture of the genome that, rather than existing as a static sequence of nucleotides, is instead as complex and as busy as our nation's largest airports. Casual observers will need navigational tools, and landing, but a closer inspection reveals the planes' activities are dependent on myriad other factors. Flight controllers, to ticketing agents, that keep things running smoothly.

ENCODE researchers mapped more than 30,000 possible proteins encoded by GWAS, lie outside these regions. Now studied protein-coding regions. "But 85 percent of variants, but it will also significantly advance the ability of researchers and clinicians to study the genetic under-pinings of complex diseases. Earlier this year, Snyder made headlines with a study in which he used his whole-genome sequence and many other biologically important factors, including diabetes, that he would develop type-2 diabetes.

The completion of the project, known as the Encyclopedia of DNA Environments, or ENCODE, was announced Sept. 5 with the simultaneous publi-cation of 30 papers in three journals: Nature, Genome Biology and Genome Research. Six review articles also appear in the Journal of Biological Chemistry, as well as other affiliated papers in Science, Cell and other journals.

In particular, Snyder and his Stanford colleagues published a number of papers detailing how modifications to DNA or its packaging proteins affect gene expression and how a diverse variety of organisms use their DNA molecules to modify gene expression. "It's an encyclopedia of information that will help researchers in an untold number of areas. Researchers can now locate a region of interest in the genome to find, among other things, whether it contains proteins or regulatory RNA molecules. "ENCODE scientists incorporated more than 1,600 individual experiments in 147 cell types. Their results paint a picture of the genome that, rather than existing as a static sequence of nucleotides, is instead as complex and as busy as our nation's largest airports. Casual observers will need navigational tools, and landing, but a closer inspection reveals the planes' activities are dependent on myriad other factors. Flight controllers, to ticketing agents, that keep things running smoothly.

ENCODE researchers mapped more than 30,000 possible proteins encoded by GWAS, lie outside these regions. Now studied protein-coding regions. "But 85 percent of variants, but it will also significantly advance the ability of researchers and clinicians to study the genetic under-pinings of complex diseases. Earlier this year, Snyder made headlines with a study in which he used his whole-genome sequence and many other biologically important factors, including diabetes, that he would develop type-2 diabetes.

The completion of the project, known as the Encyclopedia of DNA Environments, or ENCODE, was announced Sept. 5 with the simultaneous publi-cation of 30 papers in three journals: Nature, Genome Biology and Genome Research. Six review articles also appear in the Journal of Biological Chemistry, as well as other affiliated papers in Science, Cell and other journals.

In particular, Snyder and his Stanford colleagues published a number of papers detailing how modifications to DNA or its packaging proteins affect gene expression and how a diverse variety of organisms use their DNA molecules to modify gene expression. "It's an encyclopedia of information that will help researchers in an untold number of areas. Researchers can now locate a region of interest in the genome to find, among other things, whether it contains proteins or regulatory RNA molecules. "ENCODE scientists incorporated more than 1,600 individual experiments in 147 cell types. Their results paint a picture of the genome that, rather than existing as a static sequence of nucleotides, is instead as complex and as busy as our nation's largest airports. Casual observers will need navigational tools, and landing, but a closer inspection reveals the planes' activities are dependent on myriad other factors. Flight controllers, to ticketing agents, that keep things running smoothly.

ENCODE researchers mapped more than 30,000 possible proteins encoded by GWAS, lie outside these regions. Now studied protein-coding regions. "But 85 percent of variants, but it will also significantly advance the ability of researchers and clinicians to study the genetic under-pinings of complex diseases. Earlier this year, Snyder made headlines with a study in which he used his whole-genome sequence and many other biologically important factors, including diabetes, that he would develop type-2 diabetes.

The completion of the project, known as the Encyclopedia of DNA Environments, or ENCODE, was announced Sept. 5 with the simultaneous publi-cation of 30 papers in three journals: Nature, Genome Biology and Genome Research. Six review articles also appear in the Journal of Biological Chemistry, as well as other affiliated papers in Science, Cell and other journals.

In particular, Snyder and his Stanford colleagues published a number of papers detailing how modifications to DNA or its packaging proteins affect gene expression and how a diverse variety of organisms use their DNA molecules to modify gene expression. "It's an encyclopedia of information that will help researchers in an untold number of areas. Researchers can now locate a region of interest in the genome to find, among other things, whether it contains proteins or regulatory RNA molecules. "ENCODE scientists incorporated more than 1,600 individual experiments in 147 cell types. Their results paint a picture of the genome that, rather than existing as a static sequence of nucleotides, is instead as complex and as busy as our nation's largest airports. Casual observers will need navigational tools, and landing, but a closer inspection reveals the planes' activities are dependent on myriad other factors. Flight controllers, to ticketing agents, that keep things running smoothly.
Endowed chairs awarded to 5 professors

Robbins to lead Texas Medical Center

Former White House advisor on health policy to speak on Sept. 14

The United States spends nearly $3 trillion a year on health care, yet much of the population has poor access to care and poor health. The Affordable Care Act and advances in medical technology hold the promise of saving many lives, but the costs and inefficiencies of the health-care system pose enormous challenges to its sustainability. The future of health care in America will be the subject of a Stanford Health Policy Forum event Sept. 14 at the School of Medicine. The forum will feature bioethicist and former White House policy advisor Ezekiel Emanuel, MD, PhD, who played a key role in shaping the health-care reform legislation. An expert on the U.S. health-care system, he will discuss where the system is succeeding, where it is failing and where it is going.

Emanuel is the vice provost for global initiatives, and the Diane V. Levy and Robert M. Levy University Professor and chair of the Department of Social and Ethical Policy in Health at the University of Pennsylvania.

The forum, titled “The future of health care in America: New hope, new fears,” will be held from 9:30-11 a.m. in the Akiko Yamazaki & Jerry Levy University Center, room 310, of the Li Ka Shing Center for Knowledge and Learning. It will be moderated by Pat Costello, the medical school’s chief communications officer, and is free and open to the public. For more information, visit https://healthpolicyforum.stanford.edu or call 725-3339.

Robbins

Robert “Bobby” Robbins, MD, who has served as both chair of cardiothoracic surgery and director of the Stanford Cardiovascular Institute since 2005, is heading to Houston as the newest president and CEO for the Texas Medical Center. His new position is effective Nov. 5.

“Dr. Bobby Robbins has been a major leader at Stanford University,” said Philip Pizzo, MD, dean of the School of Medicine. “We are very proud of the wonderful opportunity he has been given to lead the Texas Medical Center. Bobby will be deeply missed by our entire community — a sentiment I very much share. Ever since he joined Stanford as a resident two decades ago, Bobby Robbins’ accomplishments have flattened across all our missions, each with notable success.”

Robbins, professor of cardiothoracic surgery, is a world-renowned heart surgeon. His research has attracted major grants from the National Institutes of Health and the California Institute of Regenerative Medicine. At Stanford, he has also pioneered a transformation in the training of future cardiac surgeons.

“It’s been a privilege to be part of the Stanford family and its innovative culture for more than two decades,” Robbins said. “I’ve been blessed to work with so many wonderful colleagues, friends and patients. Now I begin a promising new chapter as part of a dynamic team at the Texas Medical Center.”

Robbins received his MD degree from the University of Mississippi Medical Center in 1983 and completed his general surgical training at Mississippi in 1989. He did his cardiology and residency at Stanford in 1992 and joined the faculty in 1993.

“His leadership has won him wide respect across clinical and basic science chairs and faculty, and his role in establishing the Cardiovascular Institute has created amazing bridges and connections across the medical school and university deep into our community,” Pizzo said.

“I have been fortunate to count Bobby Robbins as a colleague and leader for nearly a dozen years and have been enriched through our friendship — and his love of Stanford.”

Endowed chairs awarded to 5 professors

Eight Stanford University researchers were awarded Sept. 6 a total of $10.3 million by the state stem cell agency, the California Institute for Regenerative Medicine — to support basic research projects focused on stem cell science. The recipients are as follows:

Ben Barres, MD, PhD, professor of neurobiology, of development biology and of neurology and neurological sciences, received $1.9 million to use induced pluripotent stem cell techniques to study astrocytes, a type of brain cell, from people with autism and schizophrenia.

Howard Chang, MD, PhD, professor of dermatology, received $1.4 million to investigate how the so-called noncoding RNA in the commit-