Flies to hitch ride into space for heart study

By Tracie White

Peter H.U. Lee, MD, is reaching for the stars. The Stanford heart surgeon has combined his twin passions — medicine and outer space — in a joint proposal for an experiment on the effects of weightlessness on the hearts of fruit flies. Next December, a cohort of these tiny insects-turned-astronauts are scheduled to blast off from Cape Canaveral Air Force Station aboard a SpaceX Falcon 9 rocket. Their destination: the U.S. National Lab, on the International Space Station, in orbit roughly 240 miles above the Earth. Called a nanoLab for the flight. “We’ll be looking at how well the flies’ hearts squeeze and look after being in space — whether there are more arrhythmias or any changes in gene expression.” Lee and his collaborators at NASA Ames Research Center in Mountain View and the Sanford-Burnham Medical Research Institute in San Diego were one of eight teams to win a research competition in December sponsored by Space Florida. As a result, their experiment gets a free trip aboard the rocket. Lee was working in his cubicle at the Falk Building, in between heart/lung transplantation surgeries, surrounded by his space memorabilia — a photo of himself shaking hands with astronaut Neil Armstrong, a screensaver of the Space Shuttle Endeavour atop a 747 airliner — when he heard about the contest, and came up with the idea for the experiment. “I was looking for something related to heart disease and heart function that could fit in with our twin passions.”

Lucy Shapiro to be awarded National Medal of Science

By Krista Conger

Lucy Shapiro has a date at the White House this week. It’s not clear whether her visit will include a private conversation with President Obama, but, if so, it’s likely our commander in chief will get an earful about the threat antibiotic resistance of emerging infectious diseases. Shapiro, whom colleagues know as a knowledgeable, confident and opinionated researcher who balances impeccable science with twin passions — medicine and outer space — in the field of systems developmental biology, has revolutionized our understanding of bacterial genetic networks and led to the development of desperately needed novel drugs to counter the spread of antibiotic resistance and emerging infectious diseases. She is deeply deserving of this honor.”

On Jan. 30, Shapiro and her husband and colleague, physicist Harley McAdams, PhD, and their grown children will travel to Washington, DC, to accept the award during a three-day whirlwind of events and celebrations. And, although it’s been a month since the announcement, the excitement hasn’t worn off for her. “I’m thrilled,” said Shapiro, PhD, the Virginia and D.K. Ludwig Professor at the Beckman Center for Molecular and Genetic Medicine. “I’ve been getting several e-mails from Washington every day. It’s apparently a very big deal.”

Beta carotene may protect people with genetic risk factor for type-2 diabetes

By Bruce Goldman

School of Medicine investigators have found that for people harboring a genetic predisposition that is prevalent among Americans, beta carotene, which the body can convert into vitamin A, may lower the risk for the most common form of diabetes, while gamma tocopherol, the major form of vitamin E in the American diet, may increase risk for the disease. The scientists used a “big data” approach to hunt down interactions between gene variants previously associated with increased risk for type-2 diabetes and blood levels of substances previously implicated in type-2 diabetes risk. In people carrying a double dose of one such predisposing gene variant, the researchers pinpointed a highly statistically significant inverse association of beta carotene blood levels with type-2 diabetes risk, along with a suspiciously high positive association of gamma tocopherol with risk for the disease.
Karl Blume, who built bone marrow transplantation program, dies

By Krista Conger

Karl Blume, an emeritus professor of medicine at the School of Medicine who started the School's blood and marrow transplantation program and spearheaded its effort to attain cancer center designation, died unexpectedly at his home in Palo Alto on Jan. 9. He was 75.

Blume is remembered as a meticulous and measured researcher who excelled at team building and enjoyed literature and music and avidly supported Stanford athletics.

"A founding father of the Stanford blood and marrow transplantation program, he was an inspiration to those of us who treat patients who have a blood disorder," said Mark Chao, MD, a former Stanford physician and Blume mentee who now heads the Division of Hematology and Cellular Therapy at Duke University.

"This was a great contribution to the world and although I could be strong and demanding — you had to do share your love and help people," said Karl being a real gentleman, very respectful," said Negrin. "He gave us a great sense that our major role is to mentor people and promote their careers. I always told him that I tried to model my own career around this idea. The thing that Karl had was time. I would go to him often and he would sit and listen and hear all the details before giving his advice."

"Karl was thinking about his patients all the time," said Susan Ipaktchian, PhD, assistant professor of medicine. "He was an inspiration to us all. His compassion, steadiness, and work ethic and sense of fairness set the standard for our medical center."

"Karl was thinking about his patients all the time," said Stephanie Beutler, MD, then the chair of internal medicine. "When we were working on campus in the days before the Stanford Medical Center, I was flying to City of Hope to interview for the position of associate medical director for the cancer center. Karl being Karl, he took control of the call to check in, and I'd start telling him about the latest clinical trial results or other aspects of the program we'd discuss, but he'd always take time to ask about the latest Stanford basketball or football results. We would always talk about that Stanford had made to the national finals, we'd be there together. I'd always regret that that never happened."

"Karl had a remarkable way of making us feel good about being part of our team. He had a remarkable way of making each person feel special," said Blume is survived by his wife, Vera; his daughter, Caroline Mitrich; his son, Paul, and his five grandchildren. A memorial service is planned for March 23 at 4 p.m. at the Frances C. Arrillaga Alumni Center. Memorial contributions may be made to the Stanford Cancer Institute. Five medical technology projects earn Spectrum grants

Five medical technology teams from across the university have received a total of $125,000 through the Stanford Spectrum program. The Biodiagnostic Program and Spectrum, the Stanford Center for Clinical and Translational Education and Research, are collaborating on this grant program to improve and advance the training of young interdisciplinary innovators while at the same time accelerating the development of novel medical technologies and diagnostics. These include: Bioengineering, Biosensors, and bioengineering projects are funded by a Clinical and Translational Science Award from the National Institutes of Health, and Stanford institutional and philanthropic funds.

Following are the projects and investigator teams receiving funding:

• A novel device to prevent surgical wound infections: A pilot clinical study — Mark Welton, MD, professor of surgery, and Thomas Krummel, MD, professor and chair of surgery.

• Hepatic neural balancing device for blood sugar control — Paul Wang, MD, professor of cardiovascular medicine, and Jeffrey Cates, PhD, postdoctoral researcher in medicine.

• New protein microarray platform on plasmonic gold substrates — Hongjie Dai, PhD, professor of chemistry.

• High-throughput tools for in-situ vector-based disease surveillance in real-world field settings — Manu Prakash, PhD, assistant professor of bioengineering.

• Development and testing of a prevention device for ventilator-associated pneumonia: The BronchoGuard — Stephen Russel, MD, professor of medicine.
Immune cells engineered in lab to resist infection by HIV, the virus that cause AIDS

By Ruthann Richter

Researchers at the School of Medicine have found a novel way to engineer key cells of the immune system so they remain resistant to infection with HIV, the virus that cause AIDS.

A new study describes the use of a kind of molecular scissors to cut and paste a series of HIV-resistant genes into T cells, specialized immune cells targeted by the AIDS virus. The approach was made in a gene that the virus uses to gain entry into the cell. By inactivating a receptor gene and inserting additional anti-HIV genes, the virus was blocked from entering T cells, thus preventing it from destroying the immune system, said Matthew Porteus, the study’s principal investigator. “We can use this strategy to make cells that are resistant to both major types of HIV.”

He describes the use of engineered CCR5 receptor gene therapy, which could ultimately replace drug treatment, in patients who have to take multiple medications to begin clinical trials within three to five years. The approach is labor-intensive but would be treated with a cocktail of drugs — known as highly active antiretroviral therapy or HAART — which hit the Stanford scientists used a similar approach but with an added twist. They used the same nucleotide to zero in on an unaffected gene, CCR5, instead of the donor’s T cells. They created a break in the sequence and, in a feat of genetic editing, they inserted one, two and all three of the genes and then exposed the T cells to HIV. Though the T cells with the single- and double-gene modifications were somewhat protected against an onslaught of HIV, the triplets were by far the most resistant to infection. These triplet cells had more than 1,200-fold protection against HIV carrying the CCR5 receptor and more than 1,700-fold protection against those with the CXCR4 receptor, the researchers reported. The T cells that hadn’t been altered succumbed to infection with 25 days.

Porteus said he views the work as an important step forward in developing a gene therapy for HIV. “I’m very excited about what’s happened already,” he said. “This is a significant improvement in that first-generation application.”

He said a potential drawback of the strategy is that the whole nucleosome, as well as the addition of the anti-HIV genes, created multiple layers of protection. Blocking HIV infection through both the CCR5 and CXCR4 receptors is important, Porteus said, as it hasn’t been achieved before by genome editing. To test the T cells’ protective abilities, the researchers created versions in which they inserted one, two and all three of the genes and then exposed the T cells to HIV. Though the T cells with the single- and double-gene modifications were somewhat protected against an onslaught of HIV, the triplets were by far the most resistant to infection. These triplet cells had more than 1,200-fold protection against HIV carrying the CCR5 receptor and more than 1,700-fold protection against those with the CXCR4 receptor, the researchers reported. The T cells that hadn’t been altered succumbed to infection with 25 days. Porteus said he views the work as an important step forward in developing a gene therapy for HIV. “I’m very excited about what’s happened already,” he said. “This is a significant improvement in that first-generation application.”

He said a potential drawback of the strategy is that it could possibly cause a break elsewhere, leading to cancer or other diseases, such as sickle cell anemia, one of his areas of interest. Porteus works with patients in the Pediatric Bone Marrow Transplant service at Packard Children’s.

In addition to Sawyer, he collaborated with Richard Voi, a former Stanford graduate student who is now an MD/PhD candidate at the University of Texas Southwestern Medical Center, and Moira McMahon, PhD, a former postdoctoral scholar who is now at the University of California-San Diego.

The study was supported by a grant from the American Foundation for Children with AIDS and by a Laurie Butte has been named principal investigator for the bioinformatics support contract by the National Institutes of Health and the National Institute of Allergy and Infectious Diseases. The purpose of this contract is to maintain and expand existing repositories for clinical and high-throughput measurements made by NIAID-funded investigators so that these measurements can be reused in new experiments.

The Stanford team’s efforts will be geared toward forming collaborations to drive scientific discoveries using those data and developing tools to enable others to browse and find data in the repositories. Proceeds to the Stanford team’s efforts will be used to support $6.5 million over five years, with a potential $30 million for the entire contract.

The Butte-led team will work in partnership with the Northrop Gruman Corp, to help investigators throughout the country find and re-use data to answer new scientific questions.

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Tony Ricciardi remembers precisely when he quit smoking. It was 1 a.m. on Martin Luther King Jr. Day in 2003. A late night trip to buy cigarettes left him feeling so disgusted by his need for nicotine that it became the last trip he ever made to support behavior he knew was bad for his health.

But he has no idea when his lung cancer began to grow inside him. It might have already been there. In any case, Ricciardi didn’t find out about it until several years later, after he happened to notice a lump on his neck, just above his collarbone. “It felt like a bug bite,” he said, “and it didn’t hurt.” Ricciardi mentioned it to an acquaintance, a retired physician, who recommended he see a doctor. So he did.

The doctor “did some kind of X-ray and then called me in,” Ricciardi remembers. “The diagnosis was advanced lung cancer.” Ricciardi said. The man looked so serious that Ricciardi tried a joke. “Could I buy green bananas?” he asked. The answer was not what Ricciardi expected. That tiny, bug-bite-like growth near his collarbone was actually the tip of a cancerous tumor that had expanded out of his lungs up into his neck. If Ricciardi responded to treatment, he might have a year left. Ricciardi, stunned at the prognosis, talked to another acquaintance, also a doctor, who sent him to see Heather Wakelee, MD, at Stanford Hospital & Clinics. Her focus is lung cancer, and she is the lead medical oncologist of the Stanford Cancer Institute’s Thoracic Oncology group.

Wakelee, an associate professor of oncology at Stanford, ordered more detailed images to be taken of Ricciardi’s chest and then told him what she thought. “She just handled it like I had a runny nose,” Ricciardi said. He liked her, he said, because she said, “We cure people like you all the time.”

Ricciardi did some kind of X-ray and then called me in,” Ricciardi remembers. “The diagnosis was advanced lung cancer.”

Wakelee, who leads the Stanford Cancer Institute’s thoracic oncology group, and Billy Loo Jr., program leader of thoracic radiation oncology, compare images of Ricciardi’s chest before and after his combined treatment with chemotherapy and radiation. Ricciardi is currently free of lung cancer.

By Sara Wykes

Late-stage cancer patient gets a new lease on life

Patrick v. On der Grebe

Every day for three months, Tony Ricciardi came to Stanford Hospital for an aggressive treatment that combined chemotherapy with radiation, an approach that studies have shown improves outcomes. Ricciardi formed strong bonds with his medical oncologist, Heather Wakelee.

The radiation Ricciardi received was delivered by technology that has advanced so rapidly that the physician in charge of Ricciardi’s care, Billy Loo Jr., MD, PhD, has learned a completely new set of skills from those he acquired during his radiation oncology residency training at Stanford. “The change of pace has been really impressive,” said Loo, Stanford’s program leader in thoracic radiation oncology and an expert in image-guided focused radiation therapy. “The main changes have been in the way we can focus the radiation from many different directions. We can focus so precisely that we minimize the spillover radiation to healthy surrounding organs.”

Keeping the radiation contained just to cancerous areas means fewer side effects; in the past, many patients who received radiation to the chest experienced such damage to the esophagus that they could not swallow without difficulty and needed temporary feeding tubes. “Since implementing focused radiation techniques for lung cancer at Stanford, I’ve never had to place a feeding tube in a patient,” Loo said. “That’s a dramatic change from the past.”

The newer radiation machines can also deliver more radiation in a shorter period of time, which reduces the number of dosage sessions. But that intensity of dose makes it all the more important that the target is hit accurately. “In the lungs we’re aiming at moving targets,” said Loo, an assistant professor of radiation oncology at Stanford. “That’s a technical challenge. We have to be able to see how the tumors are moving — and advances in imaging technology allow us to do that. We can make three-dimensional moving pictures so we can adjust the radiation beams to turn on only at a certain portion of the breathing cycle, and we can track tumors as they move.”

In the past, Ricciardi might have received just radiation or just chemotherapy, by treating him with both at the same time, he became someone who represents “the best outcomes we’ve seen to date,” Loo said.

Even in the short time since Ricciardi’s treatment was completed, new advances have become available. If he arrived at Stanford now, his cancer cells would be analyzed with greater molecular detail and typed for their response to chemotherapies designed to attack certain gene mutations or cellular growth factors. “We now know that almost every tumor is going to have one of these specific molecular changes,” Wakelee said, “and as we get smarter, and add more knowledge, we’re able to define that in more and more patients.”

Ricciardi is still rather amazed at his survival, now four years since completing radiation and chemotherapy. “The echo of that guy’s voice still rings in my ears,” he said. “I haven’t done any victory dances, but I did get a reprieve for however long that might be — and it’s given me so much.”
Diabetes

Continued from page 1

disease.

Type-2 diabetes affects about 15 percent of the world’s population, and the numbers are increasing,” said Arul Butte, MD, PhD, associate professor of systems medicine in pediatrics. “Government health authorities estimate that one-third of all children in the United States since the year 2000 will get this disease at some point in their lives, possibly knocking decades off their life expectancies.”

Butte is the senior author of the new study, published online Jan. 22 in Human Genetics. The first author, Chirag Patel, PhD, is a former graduate student in Butte’s lab and now a postdoctoral scholar at the Stanford Prevention Research Center.

The findings point the way to further experiments that could determine whether beta carotene and gamma tocopherol are, respectively, protective and harmful to themselves, or merely “markers” whose blood levels dovetail with the presence or absence of some other substance, process or defect that is a true causal factor.

Moreover, the fact that both beta carotene and gamma tocopherol interact with the same gene variant to influence diabetes risk, albeit in opposite directions, dovetail with the presence or absence of some other environmental substances, including both beta carotene, found in carrots, sweet potatoes, kale and other leafy vegetables, and gamma tocopherol, which is relatively abundant in vegetable fats such as soybean, corn and canola oils and margarine.

Butte and his associates designed an approach analogous to the GWAS: the EWAS, or environment-wide association study. Unlike the genome, which is huge but finite (about 3 billion chemical units long), the environment contains an infinite number of substances, from dietary micronutrients to synthetic pollutants, to which a person might be exposed over a lifetime. But increasing numbers of exposures are being cataloged by investigators — including, for example, scientists at the federal Centers for Disease Control and Prevention who conduct massive environmental screenings to collect data that can guide public-health policy decisions. This ongoing endeavor, called the National Health and Nutrition Examination Survey, involves a detailed analysis of substances in blood drawn from thousands of volunteers along with their heights, weights, blood pressures, fasting blood-glucose levels and other indicators of their medical status.

In 2010, Patel, Butte and their colleagues published the results of a so-called “GWAS,” in which they combed large public databases to compare people with or without high blood-glucose levels — a defining marker of type-2 diabetes — in pursuit of differences between the two groups’ exposures to myriad environmental substances. The analysis fingered five substances, including both beta carotene, found in carrots and many other vegetables, and gamma tocopherol, which is relatively abundant in vegetable fats such as soybean, corn and canola oils and margarine.

The Stanford investigators learned that the NHANES contained data on numerous individuals’ environmental exposures and, for many of the same individuals, their genomic compositions. This enabled the researchers to perform a novel study pairing each of the 18 type-2-diabetes-implicated gene variants with each of the five suspect environmental substances to see how, for individuals carry a particular gene variant, different blood levels of a given substance correlated with those individuals’ blood-glucose levels.

None of the genetic factors studied in isolation had shown a particularly impressive impact on type-2 diabetes risk. But when they were paired off one by one with the environmental factors, a couple of statistically robust results jumped out. First, for those carrying two copies of the variant in SLC30A4, higher beta-carotene levels correlated with lower blood-glucose levels.

This vitamin was already known as being ‘good’ with respect to type-2 diabetes, so it was no surprise that we saw it, too,” said Butte. “But it was reassuring, as it suggested we were doing things right, and interesting to find it paired with SLC30A4.”

The second finding was at once novel and disconcerting. High blood levels of gamma tocopherol appeared to be associated with increased risk for the disease. The Butte lab is now gearing up to perform studies in which purified beta carotene and gamma tocopherol will be fed to lab mice. This may show whether those substances themselves are critical to preventing or accelerating the onset of type-2 diabetes. It also may throw light on precisely how these substances affect the production or performance of the protein for which the implicated gene codes.

“We can’t say, based on just this study, that ‘vitamin E is bad for you,’” said Patel. He noted that blood levels of alpha tocopherol — another form of vitamin E that predominates in most supplements — showed no deleterious interaction with the predisposing gene variant in the new study.

But maybe it can’t hurt to eat a few more carrots. Other co-authors were John Ioannidis, MD, PhD, professor of medicine and of health research and policy, and former staff bioinformatician Rong Chen, PhD, and research associate Keichi Kodama, MD, PhD.

The Lucile Packard Foundation for Children’s Health, National Library of Medicine, National Institute of General Medical Sciences and other National Institutes of Health agencies funded the study.

The medical school’s Department of Peditiatrics also supported the work.

Gamma tocopherol, a major form of vitamin E in the American diet, is relatively abundant in vegetable fats such as soybean and corn oil, whereas beta carotene is abundant in vegetables such as carrots, kale and sweet potatoes.
President John Hennessy spoke at the recent summit on health-research policy at Stanford.

Safely reducing health-care costs focuses on summit at Stanford

By Kris Newby

As nearly 200 experts from across the country assembled at Stanford University to discuss health-research policy, the buzz was about the central role of health-care spending in the continuing federal budget battle.

"It's not a question of finding a solution," said university President John Hennessy, as he kicked off the national brainstorming event on Jan. 16, co-hosted by Stanford's Clinical Excellence Research Center and the White House Office of Science and Technology Policy. He called on participants to "think outside the box" and to guide the White House in developing science and technology policy changes to improve health-care and its affordability.

Recommendations will be published in a month's time in four white papers.

"American prosperity now depends on attaining better health with less spending," said Arnold Milstein, MD, the Stanford professor of medicine who organized the event in collaboration with Thomas Kahil, the deputy director for policy analysis at the White House Office of Science and Technology Policy.

Milstein directs the Stanford Clinical Excellence Research Center, which organizes small teams of post doctoral scholars from medicine, engineering and management science to design and test health-care delivery innovations that improve both health-care affordability and quality.

"We need to reverse some of the years of excess of the past decade," Milstein said. "As a health-care advisor to Fortune 100 companies, three White House administrators, and as chair of the American Board of Medical Economics, I have seen the effects of a health-care system that is broken." With President Obama's administration gearing up to tackle the challenge of ending the excess of the past decade, "it is time to think outside the box," he said.

"The number of heavy-hitters at the conference was impressive, but the key was the range of backgrounds from health-related fields — academics, government and the private sector," said Mark Halpern, MD, professor of health services research and of medicine at Stanford. "While there is no single silver bullet for our inefficient health-care system, this event suggested a number of ideas that could synergize such that the whole will be greater than the sum of the parts."
the 10-by-10-by-10-centimeter cube that they provide for the experiment to sit in,” Lee said.

The 40-year-old Stanford clinical instructor in cardiodiac surgery has supplemented his extensive education with skills that could come in handy if he ever traveled into space himself: He has taken courses in space medicine and Russian — to communicate with cosmonauts aboard the space station — and earned a pilot’s license.

As a graduate student at Brown University, he was principal investigator for an experiment that sent muscle tissue on a space shuttle mission to study muscle atrophy.

About 10 years ago, he joined a Mars simulation team for a month-long expedition to an Arctic island that roughly approximates the Martian environment. And somewhere along the way he conducted CPR experiments on the aphly dubbed “vomit comet,” a redundant gravity aircraft designed for training astronauts and conducting research.

With this bounty of experience, he had the confidence to start looking online for possible collaborators who could provide the skill sets necessary to conduct a heart experiment on fruit flies in space. He found researchers at NASA who had experience sending fruit fly experiments into space and, at Sanford-Burnham, others who had conducted heart experiments on fruit flies. Lee contacted both, and they brought in to the idea. Together they wrote up a proposal and won some room on the rocket for their fruit flies. Since then, they’ve also applied for a NASA grant to continue research on the effects of space on the Drosophila heart.

“Drosophila (fruit flies) work really well for space flight experiments,” said Sharmila Bhattacharya, the principal investigator of the Biomodel Performance Lab at the NASA Ames Research Center. “You don’t get a whole lot of ‘space’ for space experiments. You can’t send very heavy or big things up. When you do science in space, you make do with as little resources as possible.”

It’s generally known that space flight causes multiple physiological changes in humans — in particular, muscle atrophy — but every system in the body is generally affected in a negative way, Lee said. Little is known about the effects on the heart.

Among astronauts, “there appears to be a higher rate of irregular heart rhythms, some decrease in the size or mass of the heart and a little bit of decrease in heart function after long space flights,” Lee said. “It’s not life threatening, but not a lot is known. Fruit fly research is beneficial because they have a lot of the same basic genes and molecular signal transduction mechanisms as humans.”

Not surprisingly, Lee’s childhood dream was to become an astronaut, and he’s never quite let go of that dream.

“I applied last year to be an astronaut,” he said, with a sheepish grin, adding that he was one of 6,100 applicants to the space medicine astronaut program. “I should have applied sooner, but I just became a U.S. citizen two years ago.”

In any case, Lee has been busy. In addition to his surgical training, he’s finishing up a PhD in pathology and has completed two master’s degrees — one in space studies at the International Space University in France, the other in public health at Harvard. He loves his earth-bound work as a surgeon, but he hasn’t totally abandoned the hope of someday being a surgeon in space. Asked if he would like to accompany the fruit flies into space, he flashed a big smile.

“Oh my gosh, yes, I want to go with,” he said.

Delizonna talked with writer Lia Steakley about how we can develop the proper skill set for achieving happiness.

Stanford students Delizonna Frisoli and Lee Winter, an aficionado of outer space, applied last year to be an astronaut. Above, he joined a Mars simulation team about a decade ago for an expedition to an Arctic island that roughly approximates the Martian environment.

DeLizonna talked with writer Lia Steakley about how we can develop the proper skill set for achieving happiness.

Nearly a month into the new year, many of us are reviewing our list of resolutions to see how well we’re sticking with them. One common resolution is to find ways of being happier. Clinical psychologist Laura DeLizonna, PhD, is teaching a four-course series for the Stanford Continuing Studies program that focuses on building the fundamental internal skills for happiness and success. She believes that sustainable happiness is a cause, not merely a consequence, of success.

DeLizonna talked with writer Lia Steinbly about how we can develop the proper skill set for achieving happiness.

What is sustainable happiness?

DeLizonna: Sustainable happiness is having a global and profound sense that life is meaningful, joyful, vibrant and satisfying. This type of happiness is more lasting and less prone to disappointment than temporary, pleasant emotions that help us find our way back to what’s positive and possible.

How have recent discoveries in the fields of neuroscience and psychology changed our understanding of the causes of happiness?

DeLizonna: We now know that there is a genetic set point when it comes to happiness. Most agree it accounts for about 50 percent of one’s happiness level. No matter one’s set point, however, happiness can be increased.

A major breakthrough in positive psychology is the discovery that our perceptions and interpretations of circumstances influence our happiness more than the circumstances themselves. Therefore, we create our experiences. The seeds of happiness can be cultivated by building our ability to intentionally and skillfully create our experiences. As with any skill set, this ability can be improved through repeated and deliberate practice.

Neuroplasticity studies show that our brains are much more malleable than previously understood. Donald Hebb famously posited in 1949 that “neurons that fire together wire together.” We are constantly forming new associations, and we observe this in the brain when neurons form interconnections based on simultaneous firing over a period of time. Over 60 years later, we are only beginning to understand the astounding potential we have to sculpt our neural circuitry.

What are some examples of science-based methods to increase happiness?

DeLizonna: Research shows that the simple process of writing down or discussing the positive events that happen each day can provide a significant happiness boost. In these studies, people who recorded three good things that happened each day for one week had higher levels of happiness and lower levels of depression.

It is thought that this technique trains the mind to scan for what is right, not wrong, in life. When clients I work with use this technique, they typically describe several benefits, including getting more out of positive situations, appreciating events, and noticing the good even on difficult days.

Try “the three Ws” yourself. Ask yourself, “What went well today?” And, “What was my role in creating this?”

Another key practice is savoring. Savoring is pausing to notice, consider, feel and expand the positive circumstances and experiences that occur. Savor by pausing to relish, to soak in pleasant events as they occur. This turns up the volume on fleeting positive events transforming them into more enduring positive experiences.

These are two powerful techniques because they build habits that reliably create positive emotions, are quick and simple, and require only a shift in focus to no external change is required.

How do emotional and social intelligence relate to the process of enhancing sustainable happiness?

DeLizonna: Emotional and social intelligence are the core competencies underlying happiness. Moment by moment we create sustainable happiness with our thoughts, words, actions and deeds. The key to sustainable happiness is being able to choose responses that are conducive to happiness. This ability emerges from a larger skill set of emotional and social intelligence, which enable us to monitor and manage our own and others’ emotional states and actions. High levels of emotional and social intelligence equip and empower us to create possibility and positivity.

The last course in the series looks at applying positive psychology research findings in the workplace. How do the tools used to build sustainable happiness in our personal lives differ from the techniques used in the workplace?

DeLizonna: The general skill sets are the same across contexts, whether it be work, family or intimate relationships. The techniques and applications are modified, however, to target the challenges and objectives of the workplace. In my programs, techniques are developed to create upward spirals of positivity. In the workplace, this often requires tools that build optimism and resiliency, collaboration and teamwork, energy management and leveraging individual and team core strengths.
Online tool helps researchers create a plan for managing their data

Stanford researchers, including those at the School of Medicine, now have access to a new tool to help them create a plan for managing their data.

Stanford University Libraries is collaborating in an open-source effort with the California Digital Library, which has developed the Data Management Planning Tool. Anyone with a SUNet ID can access a Stanford-specific version of the tool.

In recent years, major funding agencies, such as the National Science Foundation and the National Institutes of Health, have begun demanding more than a published study to describe research results. They are asking for transparency, preservation and open access to the mountains of raw data that make up a study.

Funders are requiring researchers not only to preserve their data, but to explain in the proposal how they’re going to make it accessible. It’s a whole new component of the proposal process.

“It can be a daunting task to develop an overall plan for data management for a research group, especially groups that generate large volumes or many different types of data,” said Amy Hodge, science data librarian for Stanford Libraries.

By using the DMP Tool, researchers are better able to develop data-management plans that fit their needs and better promote the sharing and reuse of their research data with colleagues at Stanford and beyond. The tool gathers together in one place much of the information a researcher needs to create, edit, export and share a brief data management plan.

Wider dissemination of research data could also help researchers avoid repeating experiments simply because they could not access data from previous experiments performed by other groups.

For information about the DMP Tool, visit http://dataplan.stanford.edu.