Focused Effort to Streamline the Drug Development Process

SCI Constructs Pipeline to Deliver New Cancer Drugs

The Stanford Cancer Institute has, as one of its central missions, the objective of discovering new and better treatments for cancer patients. One fundamental area of research is the creation and refinement of chemical compounds that selectively eliminate or inhibit cancer cells.

In just the past few years the SCI has taken several major steps toward increasing the number of new anti-cancer compounds in development and shortening the time it takes to move these agents from the laboratory to the clinic. Through a series of faculty recruitments, internal collaborations, targeted investments and a strategic partnership with an external group, SCI has assembled the pieces of an integrated cancer drug development “pipeline.”

“We now have all the pieces to maintain a seamless pipeline from target identification all the way to the first-in-human trials.”
— Shivanni Kummer, MD, FACP

Simply put, the stages in the pipeline are: research to reveal the causes of cancer development and progression; identification or creation of chemical compounds that interfere with these processes; pre-clinical testing in laboratory settings; animal models to determine the agent’s efficacy and potential toxicity; and early-stage clinical trials in human volunteers to access safety, efficacy and possible side effects.

This is the basic formula for developing new medical treatments, and Stanford has long excelled at the initial step of basic biological research. Biological scientists study the development and behavior of cancer cells and search for clues to the causes and mechanisms of their destructive activity.

Finding a cause—a specific underlying genetic mutation, for example, is a tremendous achievement, but it is just the beginning of the process. Once a cause—often referred to as a “target” in research parlance—is identified and validated, potential interventions are sought. Is there a chemical compound that naturally seeks out the cells with the cancer-causing genetic

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Message from the Director
Pursuing Better Therapies and Better Lives

As our Stanford Cancer Institute community knows, the SCI is made up of hundreds of scientists and physicians dedicated to applying the broad expertise found within Stanford University to reduce the burden of cancer. This edition of SCI News highlights several examples of how our programs reach from the study of cancer in the laboratory to the delivery of comprehensive, compassionate care to our patients.

Our lead story describes the steps we have taken to build the infrastructure necessary to help investigators translate their basic research discoveries into viable drug candidates. Though the process is complex, there are well-established steps involved in the pursuit of new therapies, and Stanford now possesses growing multidisciplinary expertise and the capacity to shepherd new cancer drugs from the lab to the clinic.

With the opening of the new Laboratory for Cell and Gene Medicine (Page 5) we have also added in-house capability to develop cell- and gene-based therapies, an exciting and fast-growing area of study. The facility enables us to make human biological products in large quantities while maintaining exacting quality standards. Similarly, our new Organoid Culture Core (Page 8) provides living cellular models for studying the mechanisms of cancer and the potential effects of new drug treatments.

Advances in diagnosis and treatment are enabling more people to live longer with and after cancer, and SCI is helping patients maintain their highest quality of life through our integrated Cancer Survivorship Program (Page 3). It is my great pleasure to welcome the program's passionate director, Lidia Schapira, MD, to SCI. I hope many of you get to know Lidia as she develops a world-leading program in this important area.

Our story on liver cancer (Page 6) once again demonstrates SCI's leadership in education and outreach, as well as research, in a type of cancer that is increasing and of great concern both to our local communities and internationally.

And finally, we feature a story on the importance and impacts of community philanthropy (Page 11). The examples show that financial support comes in all sizes and methods, and how fundraising efforts often bring together families and communities. We at SCI are most grateful for all the generous support that we receive.

On behalf of all the SCI members and staff, I want to wish everyone in our community a joyous, peaceful and healthy holiday season, and a wonderful New Year. ■

Beverly S. Mitchell, MD
Director

The Stanford Cancer Institute

The Stanford Cancer Institute provides support and coordination for the range of cancer-related activities occurring at Stanford University, Stanford Health Care, the Lucile Packard Children’s Hospital Stanford and the Cancer Prevention Institute of California. Our nearly 400 faculty members belong to more than 30 academic departments in three schools, and represent the wide array of disciplines involved with comprehensive cancer research, treatment, prevention, education and training.

The Institute is a National Cancer Institute-designated Comprehensive Cancer Center, with a scientific agenda combining laboratory research, clinical study, translational programs and population science. The Institute also engages in patient care, community education, clinical trials, as well as support and training for the next generation of cancer physicians and researchers.

Simply put, all of our members and resources are focused on one goal: to reduce the incidence and impact of cancer.

Stanford Cancer Institute News is a quarterly update for members, supporters and friends. On behalf of our members and staff, we thank you for your ongoing support and welcome your feedback and inquiries.

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In Profile
Lidia Schapira, MD

Advances in cancer detection and treatment are enabling many more patients to live longer and fuller lives. And just as cancer treatment is becoming more individualized, every patient living with and beyond cancer requires a unique strategy to maintain the best possible health and quality of life. To meet this growing need the Stanford Cancer Institute has launched a Cancer Survivorship Program that coordinates several existing Stanford services with new research- and patient-focused features.

Cancer survivorship will provide a unique opportunity for research and innovation, as well as for transdisciplinary collaborations that capture the multidisciplined talents of Stanford faculty and staff.

“We are thinking about the transition from cancer treatment back to normal life, or a ‘new normal,’ and it is not the same for everybody,” said Lidia Schapira, MD, the program’s inaugural director. “It is definitely not one size fits all, and that is why we are taking a comprehensive approach.”

“Cancer survivorship will provide a unique opportunity for research and innovation, as well as for transdisciplinary collaborations that capture the multidisciplined talents of Stanford faculty and staff. Improved technology will play a role in the program, facilitating better, easier communication between patient and their care team. Remote monitoring, when appropriate, will reduce travel and cost burdens for many patients. There will also be a longitudinal research component so the program can be critically reviewed and improved.

On each patient’s first visit to Stanford a risk assessment will be done to understand the needs of each patient and family. Physical, emotional, social and other concerns will be addressed by a care team—with a lot of compassion and clinical acumen—stressed Schapira. Patients and their families will be encouraged to be as informed as they want or can be about all aspects of their care. One important part is to give them access to their health information in such ways that it is portable, durable and comes with expert input to help clarify and answer questions.

Schapira joined Stanford on September 1st, having been recruited from Harvard, where she was an Associate Professor of Oncology. She also had a joint appointment at Massachusetts General Hospital, where she conducted clinical care and research with their breast cancer group for 14 years.

“We want to minimize the physical burden of symptoms, to boost their emotional health and help them start to think about the transition out of the cancer world and back into normal life, so that by the time they get there they feel as prepared as possible,” said Schapira.

Cancer survivorship will provide a unique opportunity for research and innovation, as well as for transdisciplinary collaborations that capture the multidisciplined talents of Stanford faculty and staff. Improved technology will play a role in the program, facilitating better, easier communication between patient and their care team. Remote monitoring, when appropriate, will reduce travel and cost burdens for many patients. There will also be a longitudinal research component so the program can be critically reviewed and improved.

“All of us who look after patients need to be engaged in finding ways to help improve their lived experience and that of their informal caregivers. This is part of our professional mission, and the central focus of cancer survivor care and research. The goal of the program is to enhance the physical and emotional wellbeing of cancer patients and their families by advancing the science of cancer care,” said Schapira, a breast cancer oncologist.

Schapira is an Associate Professor of Medicine (Oncology) at the Stanford University Medical Center, the Editor-in-Chief of Cancer.Net, the patient information website of the American Society of Clinical Oncology, and she serves on the Editorial Board of the Journal of Clinical Oncology.

“My inspiration is to assist with transitions—from wellness to illness, and illness to wellness,” said Schapira. “It is the latter part that is now the focus of the program that we are developing together at Stanford.”
Pipeline, continued from page 1

mutation? If not, can one be engineered in the lab? Will that compound also kill the cells, or possibly interrupt their activity so they no longer divide, and thus stop the cancer growth?

The process involves assessing what is currently known about the target of interest, to further assess the target, identify potential strategies for reaching it and then test the efficacy of the strategies.

Just over a year ago, Stanford recruited Sanjay Malhotra, PhD, FRSC, from the National Cancer Institute’s Laboratory of Synthetic Chemistry. He and his team are expert at answering these questions and helping the basic biological scientists translate their insights into reality by engineering new chemical agents that bind to cancer-related targets and disrupt their activity. He and his team use a number of techniques, including “synthetic medicinal chemistry,” which is analogous to crafting chemical keys to fit the specific locks that researchers want to open.

“The SCI-SRI Biosciences collaboration provides a fully integrated engine for taking ideas to the investigational new drug (IND) stage and beyond,” said Nathan Collins, PhD, executive director of the Pharmaceutical and Chemical Technologies Section in SRI Biosciences. “Our focus is on developing ‘first-in-class’ drugs and delivering improved outcomes for patients.”

The United States Food and Drug Administration’s IND program is the key milestone prior to testing drug candidates in humans. When this approval is granted for a new drug, the process moves back to Stanford’s early phase clinical trials program for preliminary testing in cancer patients.

“Our focus is on developing ‘first-in-class’ drugs and delivering improved outcomes for patients.”
— Nathan Collins, PhD, SRI Biosciences

“We now have all the pieces to maintain a seamless pipeline from target identification all the way to the first-in-human trials,” said Shivanni Kummar, MD, FACP, Professor of Medicine (Oncology) and of Radiology, and the director of SCI’s Phase I Clinical Trials Program.

Phase I trials aim to test a new drug’s safety and to find the best dose with the fewest side effects. The drug will be tested in a small group of patients—usually about 15 to 30—at low doses. Incrementally higher doses are given and patients are closely monitored for efficacy and potential side effects.

Kummar is an experienced innovator in clinical trial design and incorporation of advanced imaging techniques to study drug efficacy. She works closely with Sam Gambhir, MD, PhD, Professor and Chair of Radiology, and SCI’s Cancer Imaging and Early Detection Program Director. Imaging can confirm whether the desired target is present in the patient’s tumor, and if it is present in sufficient density to attract an effective dose of the drug. This will enable physicians to be more selective when matching drugs to tumor types, making treatment more effective and, importantly, reducing the number of patients who take drugs unlikely to help their form of the disease. Moreover, the trials can be smaller because the patients have been selected with more precision, since the researchers know the tumors possess the targets for which the trial drug is designed.

Imaging can also illuminate whether the drug actually gets to the target area, whether it does so in sufficient quantities, and whether it penetrates the tumor cells and then remains for the expected length of time (“the tumor retention time”). Answering these critical questions helps investigators design protocols for combination treatments. For example, two drugs given together may prove toxic and cause side effects in patients, but if given sequentially they may still produce the desired therapeutic effects without the toxicity.

“First-in-human trials need to be designed to tell us whether the drug hits what we’re aiming at, and what is the optimal effective dose amount, rather than the maximum tolerable dose, as has often been the default in most cancer treatments,” said Kummar.

All of SCI’s coordinated efforts—basic science, chemical engineering, pre-clinical testing and early human trials—are aimed at selecting better cancer drug candidates and speeding up the drug development process. If done effectively, it can also mean better treatments for patients and lower costs.
Specialized Laboratory Aids Research by Producing Engineered Cells in Large Volume

New Facility Offers Advanced Cell-based Cancer Therapies

Earlier this year, Stanford Medicine celebrated the grand opening of its new Laboratory for Cell and Gene Medicine (LCGM). The laboratory is devoted to making biological materials—human cells, viruses and antibodies—for use in early-stage human clinical trials, including cancer trials.

Until this facility was realized, Stanford researchers wishing to conduct clinical trials involving cells or viruses had to arrange to have them manufactured off campus, at biotech companies and other sites around the country. The laboratory is Stanford’s first dedicated facility to comply with the Food and Drug Administration’s current ‘good manufacturing practices’—standards used to ensure safety and consistency in medical therapies.

The facility maintains ‘clean rooms’ and all the regulatory clearances necessary to safely manufacture cell-based therapies for use in human patients. The addition of this multifaceted laboratory, and its skilled staff, will create more opportunities for SCI members to translate their therapeutic discoveries into advances in cancer patient care.

A Vast Pipeline

“Stanford has a vast pipeline of potential cell and gene therapies that can now be realized without having to go off-site to make materials for testing,” said laboratory director David DiGiusto, PhD. “We’ve seen an explosion in cell therapy and have built a biologics manufacturing facility to support the translation of cell and gene therapy from the research lab to the clinic.”

These therapies include, among many others, immune system cells engineered to target cancers, purified blood stem cells to treat cancer and various genetic diseases, and viruses equipped to replace faulty genes with healthy, functional copies in an attempt to treat conditions as diverse as multiple cancer types to sickle cell anemia and a blistering skin disorder known as epidermolysis bullosa.

“We will ensure each patient receives the right product at the right dose and at the right time.”

— David DiGiusto, PhD.

“The LCGM expands our capacity more than twofold and will help researchers and clinicians test potential therapies safely and more rapidly,” said DiGiusto.

“Stanford has long been a leader in developing novel cell-based therapies, and it is exciting to have a centralized resource that can support a wide variety of cancer-related projects,” said Beverly S. Mitchell, MD, director of the Stanford Cancer Institute.

The 25,000-square-foot lab is funded by the School of Medicine, Stanford Health Care and Stanford Children’s Health, and has been completely remodeled to include clean rooms with airlocks, poured floors without cracks that could harbor bacteria, and easily sanitized surfaces. It includes separate areas for cell processing and for the development of viral vectors designed to infiltrate human cells.

Current good manufacturing practices require a high degree of sterility, strict chain-of-custody protocol and practices to ensure consistency in products. One focus of the facility will be the generation of banks of induced pluripotent stem cells and other specialized tissues, such as heart muscle cells, derived from stem cells. These cells can be used to test the effects of drugs in a “clinical trial in a dish” or potentially even used to repair tissues injured by disease or trauma.

In addition to manufacturing biological products, the laboratory will also serve as a kind of pharmacy to dispense cellular therapies that were made in other facilities compliant with current good manufacturing practices. These therapies will be for Stanford patients, as well as for patients at collaborating institutions.

“We will ensure each patient receives the right product at the right dose and at the right time,” said DiGiusto.

Plans are also in place to support collaborations among researchers from Stanford and elsewhere. DiGiusto and his colleagues are working to be licensed by the state of California as a biological manufacturer so that materials made in the laboratory can be shipped across state lines. They will also file a facility master file with the FDA so that non-Stanford collaborators can receive approval to use the laboratory.

In the end, the lab’s activities will be driven by the needs of the Stanford community, including cancer-related projects led by SCI members.
Incidence of most types of cancer is declining in the US due to advances in prevention, detection and treatment. However, the rate of liver cancer has been increasing nationally for the last 30 years. Worldwide, the burden of liver cancer is significant: each year approximately 800,000 people die of liver cancer, and roughly half of those fatalities occur in China.

Most liver cancer deaths are the result of chronic hepatitis infection, which is also a staggering global scourge. Worldwide, there are nearly 400 million people with chronic hepatitis—approximately 250 million with hepatitis B and an estimated 140 million with hepatitis C—most of which occurs in East Asian countries. Left untreated, the hepatitis infection leads to liver fibrosis, cirrhosis and very often, liver cancer.

For decades, Stanford Cancer Institute members have been leaders in liver cancer research and in efforts both domestically and internationally to educate government institutions, at-risk communities and the general public about the impacts and opportunities related to liver cancer.

Samuel So, MD, is the founder and executive director of the Asian Liver Center at Stanford (ALCS), and is recognized worldwide for his expertise in chronic hepatitis B and primary liver cancer prevention, research, treatment and health policy.

“I founded the Center because of the lack of awareness about this preventable and treatable chronic infection which is a major cause of liver cancer,” said So, who is also the Lui Hac Minh Professor and Professor of Surgery. “What we try to do is address gaps: gaps in education, gaps in prevention and gaps in treatment, both locally and around the world.”

ALCS will be celebrating its 20th anniversary in the summer of 2017, and it has a long list of accomplishments to honor. For example, through the research and cost-effectiveness data derived by So and colleagues in a pilot vaccination project in a rural Chinese province, the Chinese government has adopted policies to both vaccinate all newborn children against the hepatitis B infection and provide so-called “catch-up vaccinations” for children and adults who acquired the virus prior to the national vaccination policy.

Research shows that in the coming years the rate of liver cancer among African Americans, Hispanics and Caucasians will surpass that of Asian Americans.

In 2012 the ALCS established a satellite center in China—the Stanford Asian Liver Center at Peking University—which expands Stanford’s teaching and research opportunities in China. Through the center at Peking University, Stanford faculty and students are able to tap into a wealth of resources, allowing them to pursue fieldwork and internships in various subject areas. As just one example, So’s team produced an on-line in-language training course to educate Chinese healthcare workers about the realities of hepatitis infection and the importance of screening and treatment.

So is now working with research collaborators, international health organizations and government agencies to enact similar policies in Mongolia, Vietnam and Indonesia—sharing their online course, as well as other outreach, education and policy efforts.

As he works to influence foreign government policies, So, who is a native of Hong Kong, wears a variety of hats: that of a scientist, physician, economist and diplomat.

“You have to do everything you can to affect policy change,” said So. “We bring data and evidence-based recommendations, and through years of effort we have gained the trust of these international organizations. We have shown that we can advance the agenda much more effectively by working together.”

Closer to Home
So and the ALCS have also been quite active in the ten Bay Area counties that make up the Stanford Cancer Institute’s “catchment area,” the geographical locations in which most of Stanford’s cancer patients live. As these counties contain high percentages of Asian Americans and recent Asian immigrants, who are at increased risk of chronic hepatitis infection and therefore liver cancer, the ALCS conducts numerous education, awareness raising and hepatitis screening activities. In 2000 So launched the Jade Ribbon Campaign as ALCS’ signature, and tremendously effective, community outreach and education program.

“We took a page from HHIV and their incredibly successful red ribbon awareness campaign,” said So.

More recently, So has initiated a corporate outreach program to high-tech companies across Silicon Valley. He and his colleagues administer thousands of blood tests to employees of Google, Facebook, Cisco and many other local companies to determine whether they carry the hepatitis B or C virus.

Other SCI members are collaborating with So to incorporate data gathering, patient follow-up and long-term surveillance into the successful education and screening efforts.

“It’s a tremendous amount of work, and resource-intensive, but it is important because it can tell us about those programs’ impact on access to treatment, adherence
to treatment, treatment outcomes and mortality rates,” said Ann Hsing, PhD, MPH, a cancer epidemiologist and co-director of SCI’s Population Sciences Program.

“Unlike many forms of cancer, liver cancer is largely preventable, but we are not doing all we can to prevent it.”
— Ann Hsing, MD

Most of this outreach is directed at Asian Americans, particularly those over 30 years of age. Now and historically, Asian Americans have the highest rate of liver cancer in the US due to higher incidence of exposure to hepatitis viruses, but research shows that in the coming years the rate of liver cancer among African Americans, Hispanics and Caucasians will surpass that of Asian Americans (see graphs below).

This trend is the result of both increased screening and treatment for liver disease within the Asian American community—like the work of the ALCS—and a rise in Hepatitis C infection in other populations. Hepatitis C doesn’t account for all the increase, and it is hypothesized that the obesity epidemic among US populations of all ethnicities is to blame. Obesity raises the risks for metabolic diseases, like diabetes, and for a condition called “fatty liver,” which also increases the chances of developing liver fibrosis, cirrhosis and liver cancer.

“We think that obesity and inflammation may be driving this trend,” said Hsing. “While we continue to collect the data, we encourage people to lose a little weight and get a little more exercise in order to improve the liver health, and overall health.”

So, Hsing and their colleagues are actively seeking support to continue the research in the area of obesity and metabolic disease risk, and maintain the outreach efforts to at-risk communities in the Bay Area and throughout California.

“Unlike many forms of cancer, liver cancer is largely preventable, but we are not doing all we can to prevent it,” said Hsing. “That is why I am so passionate about my work. If we work harder, we can save hundreds of lives each year, right here in our backyard.”

Hsing said that there are approximately 850 liver cancer deaths each year in the SCI catchment area.

Early detection is important for all cancers, but it is vitally important to those patients with diseases of high mortality, such as liver cancer. Hsing is working with other SCI members to translate exciting new “liquid biopsy” technology to the detection and treatment of liver cancer. Liquid biopsy refers to a technique developed by SCI members Maximilian Diehn, MD, PhD, and Ash Alizadeh, MD, PhD, that analyzes blood samples so precisely that DNA fragments from a malignant tumor can be detected and used not just to diagnose disease but to monitor its progression and response to treatment.

“If we can use a simple blood test to determine whether people have developing liver cancer, it will be a major breakthrough for our field,” said Hsing, who is also a professor of medicine. ■
Tiny Organ Models Provide Powerful Research Tool
SCI Establishes New ‘Organoid’ Tissue Resource

One of the Stanford Cancer Institute’s missions is to create a world-class research environment that enables scientists to do their best work. SCI supports and maintains a number of specialized laboratories that offer members access to advanced equipment and technical expertise to assist their research projects. These core facilities offer services like genomic screening, biostatistical analysis and molecular imaging.

SCI has recently added a new core lab that provides investigators with a powerful research tool: tiny three-dimensional clusters of living human cells that model a variety of organs and tissues, and serve as customizable platforms for studying genetics, cancer progression and response to therapy. The lab is called the Organoid Culture Core—the cell clusters are referred to as “organoids”—and it serves as the central hub for generating and distributing human organoid cultures for novel cancer research projects.

“These cultures are like mini-organs,” said Calvin J. Kuo, MD, PhD, who directs the core. “They completely recapitulate all the different cell types with exquisite precision.”

Organoids were developed about a decade ago as a way to grow intestinal tissue in the lab. For decades scientists throughout the world had tried and failed to culture intestinal cells through standard culture methods: spreading a thin layer of identical cells on the bottom of a petri dish and adding chemical nourishment (or media). Then a young Japanese scientist named Akiifumi Ootani experimented with suspending small chunks of mouse intestinal tissue in media. The chunks grew into spheres and maintained the diverse cell structure of normal intestines.

“Many tissues that would not grow in regular culture can be grown in the three dimensional organoid structure,” said Kuo. “It may be that it more accurately reflects what happens in real life.”

The core lab also creates organoids that are cancerous, grown from tumor tissue, something else that was very difficult with traditional culture methods. And since every patient’s tumor is unique, organoid technology will enable physicians to sample a tumor, grow replicas of it in the lab and then test therapeutics on them to determine which will be most effective.

“Our ultimate goal is to grow a patient biopsy and then to test the effects of therapeutics in real time,” said Kuo. “We have extensive plans, and a huge effort, in this area.”

Kuo learned about Ootani’s work and arranged a meeting during which he convinced Ootani to join his lab at Stanford. Together they refined their techniques and cultured human intestine tissue and many others, including stomach, small intestine, liver and lung.

Organoids can also help identify new cancer-causing genetic mutations. There are long lists of potential cancer-causing alterations that need functional validation. The standard method to test whether a genetic mutation causes cancer is to insert it into the genomes of cell lines (colonies of identical cells used for testing) that are...
certain to already possess hundreds or thousands of other mutations in them. Such “background noise” makes it harder to assess the impact of the mutation of interest. Organoids can provide healthy human tissue with background of zero mutations, thereby greatly increasing the sensitivity for accessing whether the mutation causes cancer or not. Kuo’s lab has done just that, inserting known cancer-causing mutations and turning healthy tissue malignant.

“We are able to engineer cancer from the ground up,” said Kuo. Altering just two or four genes can change normal cells into cancer.”

And this goes beyond cancer. Researchers can derive organoid models from other diseased tissue, including cardiovascular, gastro-intestinal, pulmonary conditions. Kuo stressed that there are numerous emerging uses for infectious disease, stem cell biology, regenerative medicine and congenital diseases.

“It is an enabling technology with very diverse applications,” said Kuo. “We want to encourage other investigators at Stanford to take advantage of this core to study cancer and all kinds of diseases.”

To date Kuo’s lab has provided more than 140 samples to many Stanford investigators, and with SCI’s support for the Organoid Culture Core many more researchers studying cancer, and other conditions, will be able to access this tiny but powerful research tool.

Kuo is the Maureen Lyles D’Ambrogio Professor and co-director of SCI’s Cancer Biology Program. He earned his MD/PhD at Stanford in 1994, then left to do his internship and residency at Brigham and Women’s Hospital in Boston. He went on to become an oncology fellow at the Dana Farber Cancer Institute, before returning to Stanford in 2001 to start his own lab.

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**Home-made Clips Highlight Research as Part of Annual “Jimmy V Week”**

**SCI Members’ Videos Run on ESPN Sports Network**

Two SCI members were highlighted in short self-made videos on the ESPN sports television channel during its annual “Jimmy V Week,” November 30 to December 9. Ash Alizadeh, MD, PhD, earned a 2016 V Scholar Plus Award for his project “Direct Quantitation of Circulating Cell-Free DNA by Sequencing.” Michelle Monje Deisseroth, MD, PhD, received a 2015 Translational Award for her work titled, “Targeting neuronal activity-regulated cancer cell growth.” The two were featured along with other current V Foundation grantees. Both of their awards span multiple years.

The V Foundation, a non-profit funding cancer research was established to memorialized popular and inspirational college basketball coach Jim Valvano (nicknamed “Jimmy V”) who died of cancer in 1993.
$3 Million Award Supports Work on Cancer-related Genes and Proteins

Nusse Wins Prestigious Breakthrough Prize for His Cancer Research

SCI member Roeland Nusse, PhD, was recently awarded a prestigious Breakthrough Prize in the category of life sciences. Nusse, a Virginia and Daniel K. Ludwig Professor in Cancer Research, co-director of SCI’s Cancer Stem Cells Program and chair of Developmental Biology, received the $3 million grant for his work on the Wnt family of genes.

Wnt is a class of specialized genes, and their resulting proteins, that influence billions of cells in the human embryo as they organize themselves into the body’s functioning organs. Nusse was cited for showing how the Wnt genes control the pace of stem cell division and the regulation of tissue growth in adults, and how their malfunctioning can lead to cancer.

“The Breakthrough Prizes are a sign of the times,” Nusse said. “Together with the recently announced Chan Zuckerberg Initiative, they show how the wealth of Silicon Valley is now making an impact not just in the field of computer science, but also in biomedical fields. This is very exciting.”

Nusse was one of 12 scientists—physicists, biologists and mathematicians—to receive 2017 Breakthrough Prizes, which are financially much larger than the Nobel Prizes. The prizes were started five years ago, co-funded by Sergey Brin of Google, Anne Wojcicki of 23andMe, Facebook CEO Mark Zuckerberg and his wife Dr. Priscilla Chan, and entrepreneur Yuri Milner and his wife Julia.

The Stanford – VA Facility Will be First Hadron Therapy Center in the US

Next-generation Radiation Treatment Coming to Stanford

On October 17, Stanford Medicine and the Veterans Affairs Palo Alto Health Care System (VAPAHCS) announced that they are collaborating to create the first hadron therapy center in the United States. Hadron therapy is a form of particle beam treatment that focuses streams of high-density particles, such as carbon, on cancer tumors in order to damage the DNA structure of individual cells. Due to their heavier mass, carbon particles are 1.5 to 3 times more effective than standard radiation therapy.

“But charged particle beams, one can concentrate the high radiation dose to the area of the tumor with very little collateral dose to the adjacent normal tissues,” said Quynh-Thu Le, PhD, Chair of the Stanford Radiation Oncology Department and co-director of SCI’s Radiation Biology program.

The proposed project results from the combined and sustained efforts of the Stanford Cancer Institute, Stanford Health Care and SLAC National Accelerator Laboratory (originally named Stanford Linear Accelerator Center). Although discussions are still in progress, the center is planned for the Palo Alto Veterans Administration Hospital campus.

It is likely that the center will require 60 to 70 thousand square feet of space and contain three treatment rooms. One would be a proton room to treat children. A second room will house a hadron therapy machine, and the use for the third is still open for discussion.

The nationwide Cancer Moonshot initiative, chaired by Vice President Joe Biden, invited the new hadron therapy center to be included as one of its potential projects.

“Stanford worked with Varian Associates to develop the first linear accelerator for medical use in 1968,” said Sridhar Seshadri, Stanford Medicine’s Vice President of Cancer Services. “Today, Varian Medical Systems has installed several thousand linear accelerators in the U.S. and worldwide to treat cancer patients. It took a bet like this, almost 50 years ago, for radiation therapy linear accelerators to be brought to the our country and the world. We look forward to being one of the first in the US to develop the use of heavy particles to treat cancer patients.”
Examples of the Power of People Coming Together
Community Support for Cancer Research

Cancer is an intensely personal disease. Every patient’s life is affected differently, and has an impact on those who know and care for them.

How people respond to the cancer journey, and those who travel it, proves to be as unique as the individuals themselves. Below are two stories of how the heartbreak of cancer motivated people to unite in a common cause. Two extended families that each worked to translate their devastating loss into positive and enduring legacies.

Phil Mumma was a dynamic guy. His family and friends remember him as energetic, talented and funny, and he had a passion for fast-pitch softball. A gifted coach and organizer, he founded an elite girls’ fast-pitch softball traveling team called Sorcerer (sorcererssoftball.org). Ultimately, Mumma coached Sorcerer teams to three national championships, and through his teams and his individual coaching academy, he helped hundreds of young women earn athletic scholarships to colleges throughout the nation, including Stanford.

In 2013, Mumma passed away from esophageal cancer. It was a devastating blow to the community that he was so instrumental in helping grow, but they came together to remember Mumma as he surely would have wanted: with a softball tournament to raise funds for esophageal cancer research.

“He was very private about his illness. It was only three weeks before he passed away that he finally revealed that he was terminal,” said Bill Schroll, Mumma’s close friend of ten years and the current president of the Sorcerer organization. “A lot of people who would have liked to honor him did not get a chance, so we hope our tournament gave them that opportunity.”

Schroll recruited Chris Kappmeyer, another softball coach and tournament organizer, to help with the logistics of what turned into a massive undertaking. Over one weekend, 156 teams played games on 30 fields in seven different complexes, in four Northern California counties.

Schroll had personally experienced the quality of care delivered by Stanford Medicine, and suggested the tournament benefit esophageal cancer research at Stanford. Kappmeyer, who had also experienced cancer among close family members, agreed.

“I am grateful for the chance to honor Phil and support cancer research through the sport that we all love,” said Kappmeyer, the founder of 1st to 3rd Softball (1stto3rd.com).

“Phil did a remarkable job raising the level of Northern California softball and providing a platform for girls to achieve a college education. That is a phenomenal legacy.”

The donated funds will help support an upcoming clinical trial of a novel immunotherapy treatment for esophageal and stomach cancer. Schroll and Kappmeyer are planning for the next tournament, which they intend to make an annual event.

The next example is that of a man named ‘Kevin,’ the Western name he chose over 40 years ago when he moved from Vietnam to San Jose with his family, or “gia dinh,” in his native tongue. He pursued his version of the American Dream: starting his own business, creating a community of friends within his church and supporting his growing family.

In 2012, Kevin was diagnosed with stage-three lung cancer. He turned to SCI, knowing its reputation for pioneering research and extraordinary patient care.

During his four years of treatment, Kevin became part of the Stanford family. Sadly, he ultimately lost his life, but based on the extension and improved quality of life he received from his care, Kevin’s gia dinh from around the world pledged their commitment to his legacy by donating to the SCI to help other cancer patients.

The generosity of Kevin’s friends and family ensure that SCI’s physicians and scientists have the resources to further discovery research and clinical testing of new therapies that will lead to advances in treatment and care. They created another legacy of reducing the cancer burden.

These are but two of countless examples of how heartbreak turns into action and provides support and comfort for others challenged by cancer. Individual lives are rooted in family and community, and when lives are impacted or lost due to cancer, families and communities have the chance to respond. SCI members are intimately involved and motivated by these experiences, and they are profoundly grateful for the support of the Stanford cancer community.
Annual Fundraiser Provides Support for Women’s Cancer Center

Under One Umbrella Raises $1.2 Million

The annual Under One Umbrella fundraising event was held December 5th, and raised $1.2 million to benefit programs at the Stanford Women’s Cancer Center.

The event featured a performance by Grammy and Oscar award winning performer Darlene Love, as well as the debut of a short film, “Survivors—Lives Reimagined,” that tells the stories of five women treated for breast, ovarian and cervical cancer at the Stanford Women’s Cancer Center.

Over 300 guests attended, including cancer survivors and leaders from Stanford Health Care and School of Medicine. The gala was organized by Chair Debbie Rachleff and the dedicated steering committee comprised of active leaders in the Stanford cancer community (see photo).