Berg to grads: ‘Aim high and keep learning’

By Julie Greicius

Exploration of the unknown and the thrill of discovery are “exhilarating experiences” for those who dedicate their lives to the professions of science and health, Nobel laureate Paul Berg, PhD, told Stanford School of Medicine graduates on June 16.

“Such experiences are rare, personally rewarding and not always recognized by prominent prizes,” Berg said.

A professor emeritus of biochemistry at Stanford, Berg spoke at the medical school’s 110th diploma ceremony, which was held on campus at Sand Hill Fields beneath the shade of a large white tent. Lloyd Minor, MD, dean of the School of Medicine, fellow faculty members and graduating students — candidates for medical degrees and graduate degrees in the biomedical sciences — were seated behind him on a stage decorated with ferns and cardinal red Stanford Medicine banners.

In the audience, family members, guests and classmates of the students numbered in the hundreds. The weather was mild, with temperatures in the low 70s. A light breeze drifted through the tent.

Berg, 91, the Robert W. and Vivian K. Cahill Professor of Cancer Research, Emeritus, affirmed the “scientific core of medicine,” noting that breakthrough discoveries can be made both in the lab and at the bed-side. “Physicians, by their encounters with and proximity to patients displaying a range of pathologies, are often the first to identify novel and disruptive aspects of human biology,” he said. “Indeed, physicians have initiated some of the most significant discoveries that of human biology,” he said. “Indeed, physicians have initiated some of the most significant discoveries that changed the course of medical thinking and progress.”

“Inspire others by your passion”

But the challenge for those who practice medicine has unique demands, said Berg, who won the Nobel Prize in chemistry in 1980 for creating the first recombinant DNA. It is “not for the faint-hearted, for it will engage every ounce of your powers of patience, understanding and empathy.” He emphasized the indispensable role of investigation, and charged the graduates to “aim high and keep learning, be skeptical of accepted certainty and stay fast in the belief that facts matter.”

In his remarks to the graduates, faculty and guests, Minor also underscored the importance of science, especially in a world with “a growing distrust of science as a source of truth.” Commending an example from Berg’s career — the historic Asilomar conference that Berg convened to work through questions of safety raised by his work in genetic engineering — Minor said, “We must not shy away from the public debate; indeed, it is incumbent on us to begin the conversation.”

Minor encouraged the students to be passionate advocates for science. “As Stanford Medicine graduates, you have a unique understanding of the transformative benefits of discovery,” he said. “So, today, as we send you off to change the world, I’d like to ask you to help me share those life-changing benefits — to be a spokesperson, advocate and defender of science.”

He encouraged graduates to “inspire others by your passion for your work” and “let your enthusiasm and pride be infectious.”

“Imagine the Stanford Medicine classes of 2038 and 2048,” Minor said, “full of today’s youngsters inspired by your example and a world celebrating how the science of tomorrow has overcome the greatest challenges of today.”

Biochemist and Nobel laureate Paul Berg spoke to graduating students at the School of Medicine’s 110th diploma ceremony on June 16.
By Julie Greiceus

The lives of two patients — one a baby, one a retired physician — crossed paths in the most unexpected way in the summer of 2017, when a single organ donor helped save both their lives at once.

Noah Hernandez, born in February 2015, had never met, but both were facing life-threatening health conditions caused by liver disorders. Noah had been born healthy, but at 4 months, he was beginning to look yellowish, a condition associated with jaundice. After being admitted to his local hospital in Sacramento, a CT scan and liver biopsy indicated a problem with his bile ducts that was preventing his liver from draining properly — a condition called biliary atresia. That’s when he was transferred to Lucile Packard Children’s Hospital Stanford.

“With biliary atresia, no one really knows what the cause is,” said Carlos Esquivel, MD, PhD, professor of surgery at the Stanford School of Medicine. Most patients, he said, get a pediatric surgery called a Kasai procedure that attempts to create drainage of the liver. “In some children, it works and they get better; in some children, this procedure fails,” said Esquivel, who is also director of the Liver Transplant Program at Lucile Packard Children’s Hospital Stanford. “Their only chance for survival is liver transplant.

And that was the case with Noah. Noah was placed on the waiting list for a donor liver. His parents, Alyssa and Reynold, understood it could be a long wait, because pediatric livers aren’t often available. “They can’t tell you how long you’ll wait,” Alyssa said. “They preferred to have an infant-sized liver, and felt that Noah was well enough that they could be picky and wait for the perfect liver.”

Fluid buildup

Noah soon began experiencing unusually high levels of ascites — an abnormal buildup of fluid in his abdomen. “Normally it’s there in the stomach,” Alyssa said. “But Noah had it only along his Kasa incision. It was so bad that it kept getting bigger and bigger to the point that his entire right side was bulging out. He couldn’t sleep any more, wasn’t comfortable. He would just cry.” Alyssa, who had stayed awake at her son’s side, was sent home to get some sleep on Aug. 23. While she was gone, it was, that even though the sickest patients are placed higher on the organ waiting lists, some patients can be too sick to undergo transplant surgery, making them ineligible for a donor organ. “Dr. Esquivel said they were doing everything in their power to prep Noah to get a liver,” Alyssa said. “That night, at about 9:30, we received the call. A donor match was available — only it was not a pediatric liver, but one from an older teenager.

A doctor with liver cancer

Almost 15 years earlier, in 2003, James Howell, MD, a retired physician in the South Bay, was diagnosed with cirrhosis, an irreversible liver disease. It can be the beginning of other complications and diseases of the liver, including cancer, with which Howell was later diagnosed. “I was just extraordinarily lucky to keep my cancer with only liver involvement,” he said. “Once the tumor in the liver gets large enough, they can treat it by ablation,” he said. “They put a probe into my liver and zapped it. I went through that procedure twice over two years. But the ablation was only buying time. I had two failed illnesses going on at the same time. It was just a weight on my shoulders, just a burden that I felt every day.”

When his cancer came back for the third time, Howell was put on the waiting list for a liver. “I’d been cruising along, all things considered, keeping my ascites under control, strict dieting, staying with my medicines,” he said. “I was getting prepared to go in for another scan of my liver, when all of a sudden I got a call at about 10 o’clock at night.” Howell explained that they described the quality and condition of the liver. “They gave me a little profile of it,” he said. “And it was almost too good to be true. It was like a gift from God and from that family.”

Noah started having trouble breathing. She rushed back to the hospital, where Noah had been transferred to the pediatric intensive care unit and placed on life support. “Those were absolutely the worst days,” Alyssa said. Fearing the worst, she immediately called her husband, and also her pastor, to come right away. Noah was baptized that evening. Because of how sick he was, Noah’s position on the organ waiting list was moved up to the highest urgency, meaning there was a better chance he would get a liver. The paradox of organ transplant, how

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transplant success, rocky recovery

Recovery was rockier for Noah, who stayed in the hospital for two more months. The transplant itself was successful, but the difficulty held her keeping his ascites low before the transplant worsened afterward. “The fluid started going around his lungs, and then into them,” Alyssa said. Noah needed surgery to place, and later replace, a chest tube to drain the fluid, and also needed a respirator to support his breathing.

Alyssa recalled the day that Esquivel stopped by Noah’s bedside and advised taking him off all fluids, because they worsened ascites. Noah was also on diuretics and other medications to balance his fluid retention. “I adjusted his medications,” Esquivel said, “and it worked.” Noah’s ascites were gone within a week.

“Looking back on it, it was a turning point,” Esquivel recalled. “I had absolutely no pain.” Esquivel said. “Noah began looking more and more like a normal child.”

A child who is only a few months old — their blood vessels are tiny.” Andy Bonham, MD, associate professor of surgery, performed the removal of Noah’s liver, and Esquivel did the transplant.

Bonham performed the liver transplant for James Howell.

“I woke up the next day and thought they had not done the transplant,” Howell recalled. “I had absolutely no pain.”

The transplants soon visited Howell to tell him everything had gone well. He made a slow discovery, which he attributed to the constant support of his wife, De- nie, and an around-the-clock team of nurses who were “absolutely incredible,” he said. “They were the most awesome human beings I have ever met.” For his surgeons, and the entire transplant team, he felt equal appreciation. “I can’t say enough about the people who took care of me,” he added. “They were just awesome — skilled, compassionate and caring. It made a huge difference for me, obviously.”

Howell went home just five days after his surgery.

The blood vessels are more of a mis-

A complex procedure

Still, transplanting an adult-sized liver into an infant is a complex procedure. “In adult-sized vessels, because they are adult-sized,” he said. “A child who is only a few months old — their blood vessels are tiny.”
How border separations can traumatize children

In the last several weeks, thousands of migrant children have been separated from their parents at the U.S.-Mexico border and housed in facilities. These separations hurt children’s well-being and can have negative effects on their developing brains, according to Stanford Children’s Health psychiatrist Victor Carrion, MD.

On June 20, President Trump signed an executive order to end his administration’s policy of separating families at the border. Still, the effects for children who have already been taken from their parents will last long after border separations are discontinued, Carrion said. Furthermore, the order doesn’t address what will become of the roughly 2,300 children who have already been separated from their parents, nor does it guarantee that children arriving now won’t be detained for long periods with their families as they await court proceedings.

“Among kids who experience community violence as well as their age, the duration of this traumatic experience and the amount (or lack) of support they get during this experience,” Carrion said. “Their long-term effect of border separations will depend on the subjective experience of the child. If you’re a very young child being removed from your parents, it may feel like nothing more horrible can happen. Overall, I would summarize that any individual child will develop psychological problems after this are in the range of 40-90 percent.”

1 From your perspective as an expert in childhood trauma, what are the problems with separating members of migrant families at the border?

CARRION: There are many; it’s hard to know where to start. Any time there is separation that is not planned by the family, it’s perceived by the child as a traumatic event. For children younger than 7 or 8, separation from parents is even worse than the concept of death. At young ages, children see death as something that can be reversible and is not universal, that may not happen to their family.

So the worst thing that can happen to a young child is being taken away from their parents or caretakers. As a child gets older, separation from their family could be the second-worst thing. At moments of high stress, children need even more of the support, care and the feeling of safety and security that they get from their parents. When you take their parents away, all those feelings are taken away: safety, security, confidence, coping skills.

If this happens in an environment that children are not familiar with, it’s even more traumatizing, and in a situation where they perceive threats, still more traumatizing. We have good reason to believe that what migrant children are experiencing at the border — where they are not in their usual environment — is one of the most traumatic experiences possible.

I’m also very concerned about what we call the allostatic load, a term for cumulative stress. We are all responding to all of our experiences in life, not only the most recent. Many of these children may already have a history of trauma. When you add a new trauma of this magnitude to their backpack, they may buckle under its weight.

2 What does the latest brain science tell us about how children’s development is affected by trauma?

CARRION: There is a popular misconception about re- silience in which people think children will overcome things simply because they are children. But nothing in the scientific literature supports this. In fact, what our research shows is the opposite: Having a young, vulnerable brain that is still developing puts you at a disadvantage when something traumatic occurs. The hormones secreted in response to stress alter brain structure and brain function.

When we are under stress, we secrete a hormone called cortisol. When a stressor persists for a long period, high cortisol can become toxic to developing brain cells. It particularly affects cells with more glucocorticoid receptors. The areas of the brain that are strongly affected include the prefrontal cortex, the limbic system and the frontal-limbic connections that attach emotional to cognitive life. These brain regions are where you store memories, where memories get retrieved. We believe brain changes in response to high cortisol are responsible for the anxiety, depression and post-traumatic stress disorder that we see in survivors of abuse and trauma. We also know that the genetic makeup of an individual, the expression of their genes, can be altered by the experience of stress. Stress can increase the methylation of some genes, causing the genes to behave differently, and not in a positive way.

3 You’ve written that “harmful measures that cause prolonged, intense fear in the absence of known caretakers are experienced by children as terror.” Can you elaborate on that?

CARRION: I want to make sure people understand what traumatic stress is. I think a good way to describe it is as terror. If you are causing harm for prolonged periods to vulnerable individuals, and they are experiencing intense fear, that is terror.

4 What determines how children taken from their parents will fare in the long run?

CARRION: Several factors are important. One is the support system these children have available to them. Right now they don’t have any. Our authorities are supposed to be trying to connect children with family members here in the U.S., but it’s hard to know if those efforts are adequate.

I’m especially concerned about kids who don’t have families here. For example, what are they going to be detained? Their long-term response depends on their allostatic load, as well as their age, the duration of this traumatic experience and the amount (or lack) of support they get during this experience.

And although the practice of family separations is being stopped by an executive order, I am worried about the ability of the system to reunite thousands of families who are already apart. The trauma won’t end until all children are returned to their parents.

The resources needed to process what transpired may not be available to many of these families in need. We now have an obligation to repair the children’s experience of fear and vulnerability.

5 Among children who experience trauma, how many develop PTSD or other similar problems? Can you estimate what proportion of kids separated from their families at the border might be affected in the long run?

CARRION: Among kids that experience community violence as well as their age, the duration of this traumatic experience and the amount (or lack) of support they get during this experience, 5 percent.

The long-term effect of border separations will depend on the subjective experience of the child. If you’re a very young child being removed from your parents, it may feel like nothing more horrible can happen. Overall, I would summarize that any individual child will develop psychological problems after this are in the range of 40-90 percent.

New building to open at Stanford Medicine Outpatient Center

By Grace Hammerstrom

On July 9, the Stanford Medicine Outpatient Center in Redwood City will open a new three-story medical building, broadening the range of Stanford Medicine expertise available at the location.

Pavilion D will be home to the spine, tumor, and foot and ankle centers; the digestive health and pelvic health centers; and an endoscopy suite. The building will open July 9.

A rendering of Pavilion D, which will be home to the spine, tumor, and foot and ankle centers; the digestive health and pelvic health centers; and an endoscopy suite. The building will open July 9.

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Graduates continued from page 1

Graduate Oprah Kornfeld, who earned a PhD in chemical and systems biology, spoke candidly, and at times humorously, about the value of learning how to fail. His first notable failure, he said, came in a middle school spelling bee after recently immigrating to the United States. An ambitious scientist, he added, must learn to fail well. “The living systems we study are complex and unpredictable, our hypotheses are daring,” Kornfeld said. Rebounding from disappointment is a skill the best scientists must hone. “Dean Minor, the individuals sitting behind me are some of the best failers I know.”

Solidarity with her classmates and embracing the novel experiences of medicine were the themes of remarks delivered by graduating medical student Charlotte Rajasingh, who will stay on at Stanford as a resident in general surgery. “I hope that by remembering the complex feelings of novelty we became so familiar with as medical students we will be better caregivers for our patients, better team members for our family, friends and classmates. Mariko Bennett had conducted her research in the lab of the late Ben Barres, MD, PhD, on the function of microglia, “the resident immune cells of the brain,” as she called them. “It’s been a tough few years and, with Ben dying this year, it sometimes felt really hard to think about moving on,” she said. “But we did.” Bennett and her husband will be moving to Pennsylvania, where she’ll begin her residency in pediatric neurology on June 21 at the Children’s Hospital of Philadelphia. She’ll also continue her research.

Mark Freeman, who earned a master’s degree in community health and prevention research, celebrated with his family and best friend, Alexander Ekweume. “I’m so happy for him. And I’m motivated by him to work harder, since I’m trying to get into med school myself,” Ekweume said. “We’re going to eat, and then tonight’s shenanigans are gonna happen.”

The Teasley family had arrived June 15 from Inglewood, California, to celebrate the graduation of Eric Teasley, who earned an MD. “I feel overwhelmed. I don’t even know. Fantastic,” said Teasley, who also earned a master’s degree and has been working on a PhD in bioengineering. “I feel very loved today. It’s been a long road.”

Teasley was encircled by his parents, Sireric and Janice Teasley, his brother Myles, cousin and godmother Margaret Pasley, and family friends Aaron Greenspan, Kevin and Susan Atkins, and Joyce Boykin, MD. Their next stop was a dinner at Pampas in Palo Alto.

The breeze picked up, and the tent slowly cleared. Graduates left in cars or on foot, heading to celebrations and then into the next phase of their lives.
Karl Deisseroth wins Kyoto Prize for advanced technology

By Bruce Goldman

Karl Deisseroth, MD, PhD, a Stanford University professor of bioengineering and of psychiatry and behavioral sciences and a Howard Hughes Medical Institute investigator, will receive the 2018 Kyoto Prize for advanced technology.

Deisseroth will be honored for pioneering optogenetics and the optogenetics-enabled “development of causal systems neuroscience,” the award citation notes, referring to the science of establishing causal relationships between nerve-circuit activity and behavior, rather than merely observing correlations between them.

Deisseroth is the youngest recipient of the prize ever.

Of his research, he said, “This technology has been a long time in the making and has undergone a lot of development and improvement from the outstanding students, postdoctoral fellows and staff members in the lab. Meanwhile, we and others around the world are continuing to achieve new discoveries and insights with optogenetics.”

Deisseroth’s lab developed the basic components of optogenetics between 2004 and 2009. Between 2008 and 2018, his lab elucidated the inner-workings of opsins, allowing them to develop variations of these molecules and enabling more-richly diverse, precise and verifiable exploration of neural circuits. Today, thousands of laboratories around the world routinely employ Deisseroth’s methodology and opsins to identify the brain circuitry responsible for specific behaviors, both healthy and maladaptive. Their findings have given rise to thousands of publications in peer-reviewed journals.

Deisseroth’s previous honors include the Harvey Prize and Fresenius Research Prize in 2017; and the Dickson Prize in Medicine, the Lure Prize in Biomedical Sciences and the Breakthrough Prize in Life Science in 2015. He is a member of the National Academy of Sciences, the National Academy of Medicine, the Stanford Neurosciences Institute and the National Academy of Engineering.

The late Leonard Herzenberg, PhD, a long-time professor of genetics at Stanford, received the Kyoto Prize in 2006. Several other recipients, including molecular biologists Sydney Brenner, PhD, magnetic-resonance-imaging pioneer Paul Lauterbur, PhD, and stem-cell researcher Shinya Yamanaka, MD, PhD, have gone on to win the Nobel Prize.

Karl Deisseroth will receive the prize for pioneering and advancing a technology for studying brain circuits.

Optogenetics allows scientists to manipulate the activity of nerve cells in an animal’s brain. Genes encoding light-sensitive proteins, called opsins, are inserted into specific nerve cells. Then a pulse of laser light, delivered through a hair-thin optical fiber implanted in the brain, can turn the cells’ signaling activity on or off. By observing how the animal behaves when the signaling is either active or inactive, scientists can deduce the cells’ function. The tool has helped researchers to better understand brain disorders such as schizophrenia, depression and Parkinson’s disease.

“A brilliant and innovative investigator, Karl has created a revolutionary technology that has broadened our understanding of brain disorders and may one day yield treatments to the millions with these disorders,” said Lloyd Minor, MD, dean of the Stanford School of Medicine. “His receipt of the Kyoto Prize is inordinately well-deserved and the product of his unmatched scientific vision.”

The Kyoto Prize has been awarded annually since 1985 by the Inamori Foundation, a Japanese charitable organization, in three separate categories: advanced technology, basic sciences, and arts and philosophy. The prizes, which consist of a diploma, a 20-karat gold medal and a gift of 100 million yen (about $913,000), will be awarded at a ceremony in Kyoto, Japan, on Nov. 10.

A delegation from the foundation visited Deisseroth at Stanford to inform him that he would be receiving the award. “I can’t wait! I didn’t do such math or engage in abstract thought for the rest of that day,” Deisseroth said. Deisseroth, who also holds the D.H. Chen Professorship, is the youngest recipient of the prize ever.
A grant of $5 million was awarded to Stanford University to create a center focused on developing tools to help patients determine whether their irregular heartbeat, make what are often difficult decisions about their treatment plans.

Stanford was one of six universities awarded a total of $28 million by the American Heart Association to build collaborative research centers focused on improving outcomes for patients with this condition, which increases the risk of stroke.

An estimated 6.1 million or more Americans were living with atrial fibrillation as of 2010, making it the most common heart rhythm abnormality in the United States. That number is expected to rise to 12.1 million by 2030, according to the American Heart Association.

Patients must often decide whether to take physician-recommended anticoagulant drugs regularly to help prevent stroke. The decision is complicated by the different advantages and disadvantages of the many blood-clot-preventing drugs that are available. Each drug's bleeding profile is a possible side effect of these medications.

"We recognize decision-making is a major problem for these patients," said Paul Wang, MD, professor of cardiovascular medicine and director of the Stanford Cardiac Arrhythmia Service. "Anticoagulants don't make you feel better. Patients make a choice between an increased risk of bleeding or preventing a stroke. We are trying to help patients make a choice they won't regret."

With funding from the award, the Stanford center will develop a smart- phone app, along with other decision-making tools, to help patients better understand their choices. The center will also conduct comparative effectiveness studies to determine the safety and feasibility of these new tools.

The center will be led by Wang and Randall Stafford, MD, PhD, professor of medicine and director of the Stanford Center for the Integration of Prevention, Treatment, and Practices.

Paul Wang

Flu continued from page 1

sentially acts as a proxy for the presence of a special type of immune cell that may be a key to stamping out nascent flu infection. Put simply: the more of this cell type found in a person's blood, the lower their flu susceptibility. The research even hints at new avenues for pursuing a broadly applicable flu vaccine. A paper describing the work was published online June 14 in Genome Medicine. Khatri is the senior author. Graduate student Erika Bongen is the lead author.

At the start of their study, Khatri and his group ran gene expression analyses that sifted through the collection of human genes, looking for a sign that one might be particularly important for fighting off the flu. But the sheer number of genes in a small number of samples overcame any potential signal, so Khatri turned to a different approach that repurposed immune cell data collected from more than 150 studies that monitored gene expression in the immune cells of more than 6,000 samples.

"The idea was, instead of looking at 20,000 variables [or genes], let's bring it down to 20 — let's only look at 20 immune cell types and see if any of them shows a consistent pattern in regard to H1N1 or H3N2 flu infection, and then we'll look at genes that are related to that cell type only," Khatri said. "And that turned out to be the answer."

Using a computational approach developed in his lab, Khatri and his team parsed the identity and proportion of cells present in participants of two studies — one conducted at Harvard University, the other at Duke University — comprising a total of 52 individuals who volunteered to sniff up live influenza in the name of science. The researchers were looking only at types of immune cells present in each individual just before they were infected with the flu.

"We found that a type of immune cell called a natural killer cell was consistently low at baseline in individuals who got infected," Bongen said. Those who had a higher proportion of natural killer cells had better immune defenses and fought off illness.

"So we asked, 'What are the genes that represent natural killer cells? And there turned out to be this one gene, KLRD1, that seemed to be a good target,'" Bongen said.

"To our biomarker, it shows susceptibility to influenza."

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as the uterus, ovary and cervix, binds to the hormone and sends signals that keep pregnant women from going into labor too soon. Changes in the progesterone receptor near the end of pregnancy help trigger labor. Changes in the receptor could potentially help prevent preterm birth, a leading cause of neonatal death.

Other Stanford co-authors of the study were Paul Wang, MD, PhD, professor of medicine and director of the Stanford Child Health Research Institute; Cynthia Ko, MD, PhD, professor of medicine; and Randall Stafford, MD, PhD, professor of medicine.

Khatri is a member of Stanford Bio-X and the Stanford Child Health Research Institute. The study was supported by the National Institutes of Health, the Donald E. and Delia B. Baxter Foundation, the Henry Gustav Floros Trust, and a gift from Elizabeth F. Alder and the Bill and Melinda Gates Foundation.

Stanford’s departments of Medicine and of Biomedical Data Science also supported the work.

Planned center aims to improve outcomes for patients with heart disorder

Flu continued from page 1

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“‘To our biomarker, it shows susceptibility to influenza.’"
In the past 10 years, the percentage of women who use intrauterine devices in the United States has grown from less than 1 per- cent to nearly 20 percent. But at the international level, those figures are much lower. Paul Blumenthal, MD, MPH, professor of obstetrics and gynecology at the School of Medicine, focuses on family planning in developing countries, many of which do not have broad access to long-acting contraception. Blumenthal's latest paper, published in collaboration with Population Services International, describes the imple- mentation of a new device used to insert IUDs in women immediately after they give birth, and he hopes it will help health care professionals in developing countries provide broader access to long-acting contraceptives.

The idea behind Blumenthal's postpartum IUD inserter, he said, is to simplify and streamline the process of providing women with birth control. In a clinical trial with 500 participants, health care providers in India used either Blumenthal's IUD inserter or the traditional forceps method to place the con-traceptive, comparing their efficacy, ease and safety. A paper detailing the clinical trial was published online May 8 in Contraception.

Blumenthal is the senior author.

Blumenthal’s goal is to bring simple, affordable contraception to the masses — par-ticularly in developing countries. Establishing the inserter's legitimacy in this trial, Blum- enthal said, is a step in that direction. Recently, he spoke with science writer Hanae Armitage about the details of this work, she drives himself and how he hopes to see it pan out on an international scale.

1 What motivated you to create this device?
Why opt to support IUD usage as opposed to a dif- ferent contraceptive technology?

**BLUMENTHAL:** IUDs are an excellent method of contraception, and that’s increasingly recog-nized by both providers and patients around the world. They’re extremely effec-tive. They’re a “forgettable” form of contra-ception — that is, they’re inserted and they don’t need tending to or replacement for somewhere between five and 12 years, which also makes them very cost-effective.

In a postpartum setting, there are actu-ally a lot of serendipities that make it an optimal time for IUD insertion. Since the woman has just delivered her baby, both she and her provider are already in the same place at the same time; no one has to make a special trip to have the IUD placed. Anesthesia is not needed, and women who want an IUD for contraception, the number of in-dividuals who have an IUD one year after delivering a baby are higher if the woman gets the IUD postpartum, rather than if they want to have it inserted later.

So, we thought if we can make this convenient, simple and intuitive, then maybe we could reduce bar-riers to provision and thus help women access to providing postpartum IUDs. Furthermore, in some developing countries, the special forces often recom-mended to insert IUDs right after birth can be hard to come by. With the dedicated inserter, the IUD is al-ready packaged in the instrument, and it’s just a “grab-and-go” process.

2 Why did you decide to conduct this study in India and how did the health care providers react to your new device?

**BLUMENTHAL:** India has one of the most well-devel- oped programs for postpartum IUDs. For example, in obstetrics and gynecology, physicians are required to learn how to insert IUDs postpartum because the In-ternational Planned Parenthood Federation and the community of OB-GYNs in India feel that it’s an important part of provision of con-traception. So, we thought, “OK, if you’re getting the baby out of the woman, then why wouldn’t you have something specifically designed to do it?” One analogy we often use is, if you’re going to press something, you don’t smash it with a hammer, you want to use a garlic press. It’s the same idea here: We want to make it precise, and we want to simplify the process.

When we introduced the inserter, in gen-eral the feedback was very positive. Most women who used the inserter and have since wanted an IUD for one year after delivering a baby. They’ve also noted it was easy to use. Now, also, they said that it was easy to use the traditional forceps — but that doesn’t take away from the cuteness of the technology. This study is a win for broad dissemination of the tool in India. And now, it’s even been approved by the Drug Controller General of India for broad public and private use.

3 With the Drug Controller General of India’s approval and for commercial use, how will you scale up the pro-cess in India, and do you plan to bring this option to women in other developing countries as well?

**BLUMENTHAL:** We’re working with a third-party company called Pregna International. They’re based in India, and they manufacture IUDs used in programs worldwide. Now with commercial approval, Pregna can market this inserter to the public and private sector in India and reach millions of women. At the same time, other nongovernmental organizations that are working in the family planning area can also rec-ommend this to their clients in India, and that will likely enhance the public-sector programs as well. Cur-rently, the IUD inserter is under review by the United Nations Family Planning Assistance Program, and we hope that this publication will serve to help the UNFPA in its deliberation. Hopefully, that will allow for prequalification of the device, so that it can be used in UNFPA publicly-funded programs that reach other developing countries in sub-Saharan Africa and Asia.

4 Do you have plans to integrate the device into developed countries like the United States, too?

**BLUMENTHAL:** We don’t have plans at present, spe-ciﬁcally because Pregna doesn’t market its IUDs in the U.S. For a company like Pregna, it’s likely too costly to have their device approved by the Food and Drug Administration, which requires a signiﬁcant amount of capital to achieve. However, I’m sure that Pregna would be open to working with a U.S. company or any other company to adapt the technology of this relatively sim-ple inserter to IUDs that are very similar.

5 Are you working on other projects that likewise em-power contraceptive options?

**BLUMENTHAL:** We’re always working on these kinds of projects. One of our family planning fellows is looking at a unique combination of an emergency contraceptive option and another available drug in the U.S. to see if it’s possible to make an “on-demand” contraception. So for example, if a woman has intercourse infrequently, she may not feel like she needs to take a pill every day, or might not need to have an IUD, but she may want to have a contraception method she can use when she wants. So, theoretically, a woman could take this pill once during the course of a cycle, at any time during the cycle, and that would effectively act as contraception. Our tagline here could really be “simplicity and precision.” We want to empower women with options, access and the ability to choose what’s right for their lives and body, at the exact time that they want it.

Operating rooms of the future

**By Grace Hammerstrom**

Both hospitals on the expanding Stanford Medicine campus have reinvented their surgical suites to support the tech-niques of today and the innovations of the future.

In the main building of Lucile Pack-ard Children’s Hospital Stanford, the new surgical and imaging suites open- ing at the end of June will complete the Treatment Center. At the new Stanford Hospital, which opens late 2019, the entire second floor will be devoted to surgery.

“Traditional operating rooms are giv-ing way to interventional platforms that can support new surgical techniques and technologies,” said George Tingwald, MD, director of medical planning at the new Stanford Hospital. Tingwald, who is both a surgeon and an architect, brings a unique perspective to planning major surgical suite projects. One of our family planning fellows is looking at a unique combination of an emergency contraceptive option and another available drug in the U.S. to see if it’s possible to make an “on-demand” contraception. So for example, if a woman has intercourse infrequently, she may not feel like she needs to take a pill every day, or might not need to have an IUD, but she may want to have a contraception method she can use when she wants. So, theoretically, a woman could take this pill once during the course of a cycle, at any time during the cycle, and that would effectively act as contraception. Our tagline here could really be “simplicity and precision.” We want to empower women with options, access and the ability to choose what’s right for their lives and body, at the exact time that they want it.

Doctors at both hospitals are en-thusiastic about the upgraded facilities and what they will mean for patient care outcomes.

“Ultimately, the capabilities of these surgical and interventional radiology suites will translate to patients receiving less radiation exposure, and spending less time under anesthesia and less time in the hospital overall,” said pediatric gen-eral surgeon Dennis Lund, MD, interim CEO and chief medical officer for Stan-ford Health Care.

**Advanced capabilities**

The new pediatric surgical center adds six surgical suites and four interventional radiology labs, giving the children’s hos-pital the most advanced surgical, inter-ventional and hybrid technologies available anywhere. It will nearly double Packard Children’s capacity for pediatric area procedures, helping alleviate scheduling delays.

“The new suites bring an unprec-edented collection of integration of proce-durales and procedural bandwidth for Packard Children’s,” Lund said. “And it’s always come with a great ‘I want to do that’ footprint, which will optimize the ef-ficiency of our care services in a whole new way.” The Treatment Center also in-cludes a state-of-the-art imaging center, which opened in December.

Before the new children’s hospital opened, interventional radiology, nu-clear medicine and surgical services were in different parts of the hospital campus. Now a patient can check into the Treat-ment Center and go from service to ser-vice within one area.

**Integrated functions**

The three acres of surgical floor space in the new Stanford Hospital will in-clude 20 operating rooms and eight in-terventional/radiology rooms with fixed image-guidance. These surgical suites will be grouped together with imaging technology that includes two MRI scan-ners, one CT scanner and one interven-tional MRI scanner.

At 800 to 1,000 square feet each, the new ORs are more than double the size of those in the existing hospital. Over-head booms hoist lights, monitors and fixed equipment off the floors, freeing up space for use during surgery.

“The new ORs will have the most ad-vanced technology, making surgery more precise and safer,” said Mary Hawn, MD, MPH, professor and chair of sur-gery. “We will have the ability to route in images See OPERATING ROOMS, page 8
Barbara Hill, Melchor Madrigal mark 45 years on med school staff

By Kimber Price

When it comes to years of service to the School of Medicine, two people stand out. Barbara Hill and Melchor Madrigal marked their 45-year work anniversaries at the school last year. Both were recognized May 24 at the Cardinal at Work Celebrating Staff Careers event, which honored major career anniversaries of employees across the university.

“I think it’s wonderful to see two employees so dedicated to Stanford Medicine,” said Lloyd Minor, MD, dean of the School of Medicine. “Their work is integral to the university’s mission, and they are an inspiration to all of us.”

Hill was 18 years old when she was hired as a glass washer in the Department of Developmental Biology. But she didn’t stay in that position long, she said. The faculty noticed that she was interested in learning new things, so she transitioned to lab work and continuously learned new techniques. Now a laboratory technician working with Drosophila, she said the best part of her career has been training students and working with the faculty. “We’ve always had a good connection,” she said.

“The new procedures are very good for both the patients and staff,” said Mike Renzi, the department’s director of finance. “It’s a great improvement.”

Maria Borrelli

people

María Borrelli, MBBS, MSc, a postdoctoral scholar in plastic and reconstructive surgery, received a $50,000 grant from The Plastic Surgery Foundation. The grant supports research that translates research findings into clinically relevant advancements or treatments that are likely to improve care soon. She will work to identify the human cutaneous fibroblast to support a faculty member whose academic focus is in the biomedical sciences. Berg, a member of the medical school faculty since 1959, was awarded the Nobel Prize in chemistry in 1980.

Bevery Mitchell

Two faculty members at the School of Medicine have been appointed to endowed positions.

Mark Krasnow, MD, PhD, professor of biochemistry, was appointed the Paul and Mildred Berg Professor, effective April 10. He is the executive director of the Wall Center for Pulmonary Vascular Disease and a Howard Hughes Medical Institute investigator. His research focuses on understanding lung development, stem cells and disease, including breathing and speaking.

The professorship was established with a gift from Paul Berg, PhD, the Robert W. and Vivian K. Cahill Professor of Cancer Research, Emeritus, and his wife, Mildred, and includes a contribution from an anonymous donor. The professorship is intended to support a faculty member whose academic focus is in the biomedical sciences. Berg, a member of the medical school faculty since 1959, was awarded the Nobel Prize in chemistry in 1980.

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The surgical floor has a convenient, centralized area for registration and family waiting, and a combination of pre- and postoperative area for patients.

Hybrid rooms merge the latest imaging, radiology and surgery platforms into adjacent surgical suites, where multistage procedures can now be performed at one scheduled time and location.

For example, when a patient is having a brain tumor removed in one of the semi-private suites, surgeons can take in-suite interventional MRI images to confirm that they removed all of the tumor before closing the surgical site. Previously, surgeons had to complete the surgery before they knew the outcome, which could mean the patient had to undergo additional surgeries. In addition, cardiac hybrid suites combine an OR with a catheterization lab, so care teams can perform a minimally invasive catheter procedure in conjunction with open-heart surgery.