FOCUS

News from Harvard Medical, Dental and Public Health Schools

June 2011

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Jeff Thiebauth

IN PRAISE OF MENTORS, p. 6
Arundhati Ghosh, Vanessa Redditt join in the celebration

Jeff Thiebauth

PHOTO FINISH
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COMMENCEMENT 2011


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'We are at a cusp point in medical generations'

Medical leaders — of today and tomorrow — inspired graduates at the 2011 commencement ceremonies. Here are excerpts of their remarks.

HARVARD MEDICAL SCHOOL

Dean Jeffrey Flier
State of the School address

"One hallmark and legacy of my administration, I hope, will be the building of new and stronger bridges between academe and industry. Neither academe nor industry can do the job alone of moving basic science discoveries out of the lab, into trials and, ultimately, to patients everywhere. Key to realizing this vision will be collaborative, University-wide alliances, including Harvard Immunology, an umbrella organization that will capitalize on Harvard's unrivaled expertise in this arena. The goal is to better understand disease pathogenesis, formulate immune-based assays to support human clinical trials, and improve diagnostics."

Atul Gawande
Commencement address

"We are at a cusp point in medical generations. The doctors of former generations lament what medicine has become. If they could start over, the surveys tell us, they wouldn't choose the profession today. They recall a simpler past without insurance company hassles, government regulations, malpractice litigation, not to mention nurses and doctors bearing tattoos and talking of wanting balance in their lives. These are not the cause of their unease, however. They are symptoms of a deeper condition—which is the reality that medicine's complexity has exceeded our individual capabilities as doctors."

Sawalla Guseh, *student address*

Oh, the places you'll go.
Oh, the patients you'll see.
The conditions you'll cure.
Oh, the doctors you'll be.
Sure! There were MCATs and essays
Cups of coffee and tea
But it took so much more
To get your Harvard degree.
We learned a few things
that first and second year—
like how to talk to patients
and show people we care.
How to do a home visit
way out in nowhere!
How to gather a medical history
from the very first square.
What's your chief complaint?
I ask and you share.
What's that you say?
A hernia repair?
Does it itch? Does it burn?
Does it tingle down there?
That must be hard for you.
Are you feeling despair?
Do you need medical advice?
I better send you elsewhere,
because I'm a medical student;
I'll be a doctor next year.

Anjana Sharma, *student address*

"You've taught us signaling pathways, how to auscultate the heart, and how to discern the crucial difference between sick and not sick. You've taught us trickier, more undefined skills, like how to talk about death, or how to remain professional even when talking about taboo topics ranging from bowel movements to domestic violence. You've modeled for us the kind of doctors we want to become. Thank you for showing us how to touch a patient, both with hands and with words."

FOCUS

HARVARD MEDICAL SCHOOL

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Recent books written or edited by members of the HMS, HSPH and HSDM faculty or staff may be submitted to *Focus* at the address above. Books received by July 15, 2011, will be featured in the next book section.

We invite letters from our readers, which should be brief and include a signature, address and daytime phone number.

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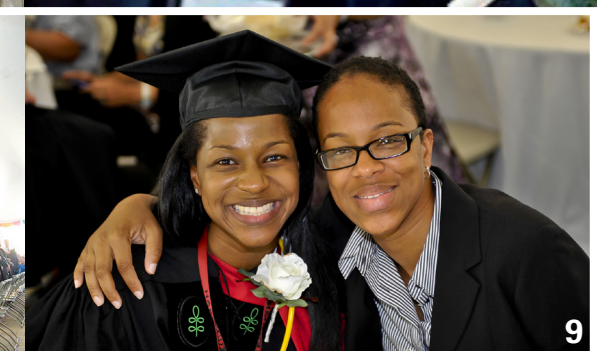
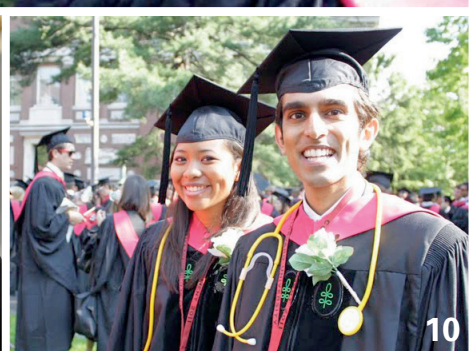
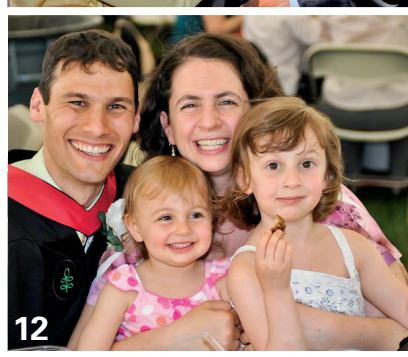
"One of the biggest reasons I was excited to come to HMS was the way in which the school nurtures students' life goals, both within medicine and in other intellectual and personal pursuits." *—Christopher Miller*







HARVARD SCHOOL OF DENTAL MEDICINE

Dean Bruce Donoff
Class Day address

"Communities based on merit and passions are rare, and people who have been part of them never forget them. … I believe you made a wonderful choice in entering a school that does not strive to produce a uniform product, but an exceptional one. Your class's passion for viewing dental medicine as a public good, with a place in public health and global health, is memorable. You have been more involved substantively in community service and public health than any class before you."

Keith Levesque, *student address*

"I imagined Harvard as it is portrayed in Hollywood: brilliant, snooty geniuses in tweed jackets bombarded by endless exotic medical questions from cold and hard-nosed professors. … But to my great amazement I discovered that Harvard, like many things in life, is actually quite different from the Hollywood storyline. At Harvard, we found a community of amazing people from all over the world, with depth and achievements far beyond the classroom. And instead of cold, hard-nosed professors—the ones who revel in student difficulty—we found them to be unbelievably supportive."

HARVARD SCHOOL OF PUBLIC HEALTH

Dean Julio Frenk

"You wanted to devote yourselves to a cause—and to master some area that you believe will better equip you to improve the health of people in Boston or Los Angeles, in Albania or Jordan, Nigeria or Thailand. The process has demanded your all. But for us as your teachers, our goal is not only to help you master your chosen field, but also to help you become leaders who can use that mastery to make transformative improvements in the public's health."

Gro Harlem Brundtland, *UN special envoy, commencement address*

"At Harvard, I learned so much more about the links between humans and nature, our societies, cultures and our environment. … I learned to always look for the close and near as well as the far away, the small as well as the large, through a holistic lens. This holistic approach is public health at its best; it is preventive medicine at its core. It relates to our minds as well as to our bodies, to the links between us as humans, to the communities and the societies we create, to our surroundings and the environment in which we live. Today, it also relates to Planet Earth, as humanity faces fundamental challenges in our relationship with nature."

Lakshmi Nayana Vootakuru, *student address*

"A few years ago I was a medical student in Australia, working with indigenous communities. One of these was a small community of about 200 people that I will never forget, plagued by a spate of suicides—several boys under the age of 18 over a few months. I pondered the circumstances that had allowed this horrific situation to materialize—poverty, substance abuse, historical injustice and community breakdown—all of which had meant that tragedy was far too regular a visitor. What made the situation even more devastating was the desperation that gripped this community as they worried not if, but when the next child would follow suit. At that moment, I understood what it was like to be held hostage by fear."

See more commencement 2011 coverage online at:

HMS: focushms.com/features/2011-commencement-photo-gallery

HSDM: hsdm.harvard.edu/index.php/news/commencement_day_2011

HSPH: hsph.harvard.edu/student-life/commencement

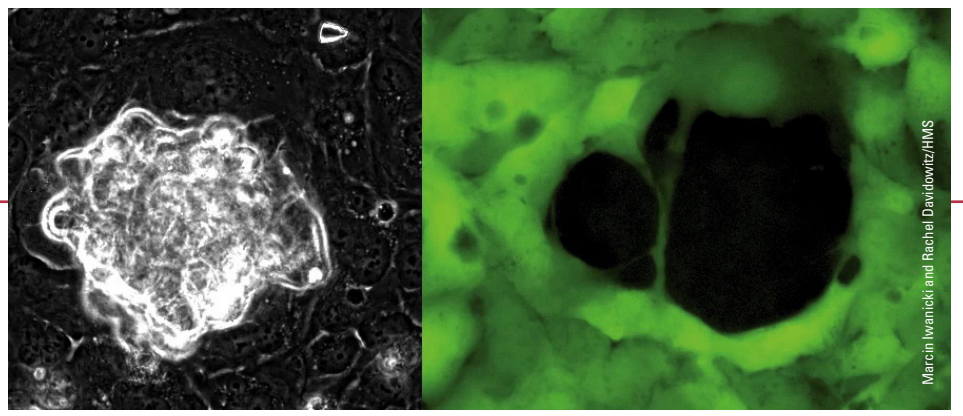
1. **HMS graduate Russell Goodman shares a moment with his father as families regroup for lunch.**
2. **HMS graduate John Berry-Candelario and daughter Xavia**
3. **HMS graduate Pamela Young feels "on top of the world."**
4. **HMS graduates Sonya Trinh and Catherine Choi gather in historical Harvard Yard for the 360th Commencement Day ceremony, 369 years after Harvard's first commencement, in 1642.**
5. **HMS graduate Christopher Miller has no regrets.**
6. **Jubilant HSPH graduates, diplomas in hand**
7. **HMS grad Tafadzwa Muguwe gets a helping hand from girlfriend Tendai.**
8. **HMS grads await their diplomas.**
9. **Ilisten Jones steals a moment with her sister before reuniting with other HMS graduates.**
10. **HMS graduates Christina Ramirez and Chetan Vedvyas don their academic regalia.**
11. **HSDM grad Preetha Thomas receives her hood from Senior Tutor Romesh Nalliah.**
12. **HMS grad Samuel Lewis Zager celebrates with his wife, Tracy, and daughters.**

COVER: Katherine Walker, HMS Class of 2011, gets a hug.

Steve Lipofsky (1, 2, 3, 7, 9, 12); Angela Alberti (4,10); Kent Dayton (6); Suzanne Camarata (8); Steve Gilbert (11)

How Ovarian Cancer Spreads

Cells bore through tissue with brute force



LEFT: Ovarian cancer cells (white) use physical force to push their way through a layer of mesothelial cells (black). RIGHT: Within the mesothelial cells (green), a gaping hole opens up. Watch the video at focushms.com.

A team led by Joan Brugge, the Louise Foote Pfeiffer Professor of Cell Biology at HMS, has cast new light on how ovarian cancer spreads. The cancer cells act like bullies, using sheer brute force rather than a biochemical process to plow their way through tissue and colonize additional organs, according to a report by Brugge and colleagues in the July edition of *Cancer Discovery,* the newest journal of the American Association for Cancer Research.

"This is the first time that mechanical force has been implicated in the spread of ovarian cancer," says Brugge, who chairs the Department of Cell Biology. "While this research is still preliminary, we are building a foundation for the development of treatments based on a robust understanding of the disease."

Ovarian cancer accounts for about three percent of all cancers among women in the United States, according to the National Cancer Institute. In 2010, it caused nearly 14,000 deaths.

The ovaries and many other organs, such as the liver, stomach and intestines, are located in the peritoneal cavity, the fluid-filled gap between organs within the abdomen and the abdominal wall. The lining of this cavity, the peritoneum, has a top layer called the mesothelium. After an ovarian tumor develops, clusters of cancer cells are released into the cavity. Each cluster floats around until it encounters the cavity's lining and attaches to it, spreading out and launching an invasion into the mesothelium. Brugge's team determined how ovarian cancer cells get through the mesothelium to colonize organs on the other side.

THREE KEY PLAYERS

When researchers placed ovarian cancer cells and mesothelial cells in a dish, the cancer cells formed a hole in the mesothelial layer, mirroring behavior that would occur in the body as an invasion proceeds. One by one, the team interfered with molecular components of the cancer cells and used time-lapse microscopy to watch the result. If a hole failed to form, the researchers knew they had discovered a critical molecular player in the invasion process.

The team identified three such players—integrin, talin and myosin, all proteins known to play a role in cell movement. Integrin sticks out from the cancer cells and grabs hold of scaffolding surrounding the mesothelium. Myosin, which acts like a motor, pulls on integrin via talin. As a result, the protruding cancer cells gain traction and are able to force mesothelial cells out of the way.

"The cancer cells act like bullies," says first author Marcin Iwanicki, a postdoctoral researcher in Brugge's lab. "Instead of relying on a sophisticated biochemical process to achieve their goal, they simply push mesothelial cells apart."

"Eventually, it might be possible to prevent or reverse the invasion process," says Brugge. "We hope that our work will inform such treatments in the future."

—Joanna Logue

To learn more, students may contact Joan Brugge at Joan_Brugge@hms.harvard.edu.

How Do Bacteria Handle Mixed Signals? With Surprising Simplicity

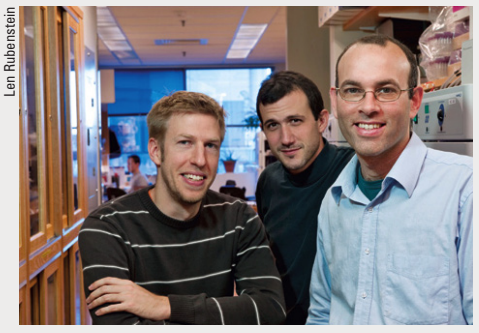
Kishony lab explores cell's response to drug pairs

You say yes, I say no. You say stop and I say go, go, go.

Mixed signals can be confusing, as the Beatles' refrain has it. But when the signals come from antibiotic drug combinations, cells react in surprisingly simple ways, HMS researchers have found. Even when drug pairs affect different genes in a single cell in complex ways, the cell as a whole responds in a manner that's predictable—an insight that could improve drug design.

So-called combination drug therapy is a staple for treating many infectious diseases. Doctors treating tuberculosis, for example, might prescribe one drug to break down the pathogen's protective barriers and a second to deliver the knockout punch. But identifying effective combinations for a particular disease has relied on guesswork—and the excruciatingly slow accumulation of data.

Roy Kishony, professor of systems biology at HMS, and Tobias Bollenbach, a postdoctoral fellow in his lab and now an assistant professor at the Institute of Science and Technology Austria, wondered whether there was a better way to explain —and perhaps predict—why some drugs work better together while other pairings are less powerful or even counterproductive. Using a systems approach, Kishony and Bollenbach investigated how, within a living cell, gene expression responds to drug pairings.



Tobias Bollenbach, left, and Roy Kishony, right (with research fellow Remy Chait), are investigating how bacteria resolve conflicting signals from drug pairs.

"The possibility of predicting how cells respond to multi-drug treatments opens the door to a more rational approach for the design of new drug combinations," Kishony said.

AVERAGE OR PRIORITIZE?

Kishony and Bollenbach measured how the single-celled bacterium *E. coli* responded when subjected to a combination of two drugs. The effect could be either additive, with the drugs' combined inhibitory effect equal to the sum of their individual effects, or antagonistic, in which case the drugs have a weaker effect when combined. In either case, the bacterial cell's response to one of the drugs may prove incompatible with its response to the other.

For example, a specific gene in the cell may be "turned off" by drug A but "turned on" by drug B. So how do cells as a whole respond, the researchers wondered, when A says stop and B says go?

In a study published in the May 20 issue of the journal *Molecular Cell,* Kishony and Bollenbach report that bacterial cells respond in surprisingly simple ways, which can be reasonably predicted by monitoring only a handful of their responses.

When drugs enter a bacterial cell's environment, the researchers found that the response can be broken down to two components: the first, comprising about 70 percent of the cell's response, involves processes resulting from the total inhibition of the cell's growth by the two drugs. In the remaining 30 percent, the cells focus on resolving conflicts that arise when paired antibiotics caused mixed genetic responses. This conflict resolution depends on the nature of the signals sent by particular drug pairs.

Kishony and Bollenbach found that bacterial cells resolve conflicting signals from drug combinations by either "averaging" or "prioritizing." For a drug pair that is additive, the cell averages the conflicting effects of the two drugs. (For example, when one drug's effect on the regulation of a gene is a four-fold increase and the other's is a two-fold decrease, their combined effect on the cell is a two-fold increase.) But for the antagonistic drug pair, the cell responds only to the stronger drug signal, ignoring the other. Particularly surprising was that, no matter the drug pairing, almost all genes within a bacterial cell were in agreement about which conflict-resolution strategy to use and which signal was strongest.

These findings demonstrate that it is possible to quickly predict bacterial responses to combined drugs, simply by measuring just a few aspects of how a cell responds to individual drugs. Thus the most effective combinations can be more easily determined.

—Atreyee Bhattacharya

To learn more, students may e-mail Roy Kishony at Roy_Kishony@hms.harvard.edu.

Marcin Iwanicki and Rachel Davidowitz/HMS

HSPH Team Helps Vermont Devise Single-Payer Health Law

Blueprint leaves financing details to legislators

In May, Vermont enacted the nation's first single-payer health care law, designed by a Harvard School of Public Health economist and his team to provide health care for all legal residents and curb runaway costs. If Vermont can navigate the political waters and implement the plan, said its chief architect, William Hsiao, the K.T. Li Professor of Economics at HSPH, "it will provide a model for other states, and for the country."

Past attempts to pass a single-payer system have failed, but this time the political stars are aligned. "You must have a plan that is appealing and credible to legislators and the public," said Hsiao, who was approached last year by the Vermont Senate majority leader, Peter Schumlin, who is now governor.

"We know single-payer can work," says Hsiao, who helped design Taiwan's single-payer, universal health coverage system and system reforms for eight other nations. Hsiao also played a leading role in developing the national health insurance plan in the Carter administration, and his development of the resource-based relative value scale, the basis for calculating physician reimbursements under Medicare.

THREE OPTIONS

In August 2010, Hsiao and a team of health system analysts were commissioned by the Vermont legislature to develop options featuring universal coverage, an appealing benefits package and controls on health care costs. They were given six months to design three options:

- A pure government-run, single-payer system that would channel all payments, including Medicaid and Medicare's, through one insurance fund with uniform payment rates;
- Add on a public option that would compete against private insurers in health-insurance exchanges created by the federal Patient Protection and Affordable Care Act, or PPACA;
- A public-private single-payer system, run by the government and by a board of stakeholders.

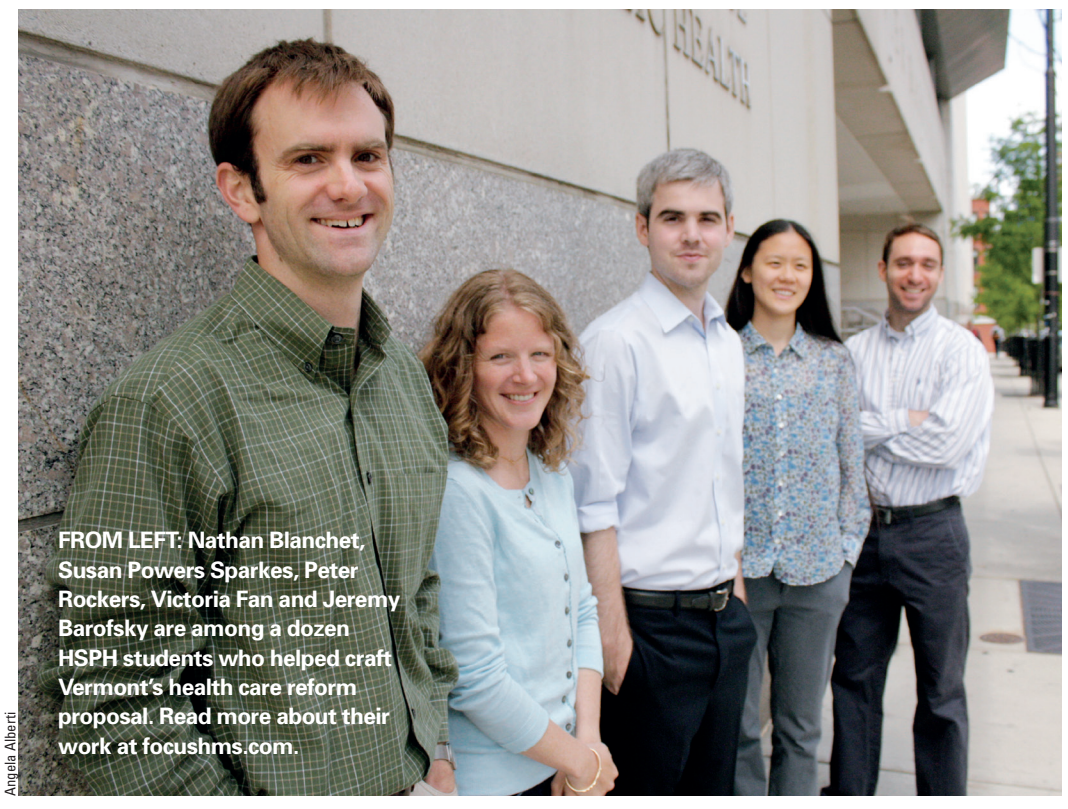
While computer modeling and analyses found all options resulted in savings, the third—the HSPH team's choice—did so most effectively. It will slash annual health expenditures by 25 percent when fully implemented in ten years—with $580 million saved in year one. Part of the savings will be used to cover the uninsured and upgrade coverage for the underinsured. "We purposely designed a system that saves almost twice what might be spent so that we'd have a huge margin for error," said Hsiao.

While all three options would streamline administrative functions, curb fraud, abuse and waste, and introduce a no-fault medical malpractice system, the third offers a twist on the traditional government-run, single-payer concept: governance by an independent board of stakeholders, the Green Mountain Care Board. This plan also calls for the competitive bidding of contracts for administering claims, imparting this modest role to private insurance companies.

The board will hash out benefit packages and payment rates by joining at one table those who must pay—workers, employers, and the state—with those who receive, namely hospitals, physicians, pharmaceutical companies and the public. "We want to let them negotiate directly, without state government in the middle," said Hsiao. "This is what I have proposed to many governments, and it has worked. It takes politics out of the picture."

Three months after submitting their report on February 17, 2011, Hsiao's team saw crucial elements of their plan pass in both legislative chambers. About three months later, Governor Shumlin signed the plan into law.

Continued on page 8



Angela Alberti

FROM LEFT: Nathan Blanchet, Susan Powers Sparkes, Peter Rockers, Victoria Fan and Jeremy Barofsky are among a dozen HSPH students who helped craft Vermont's health care reform proposal. Read more about their work at focushms.com.

Paper Chase

RECENT PUBLICATIONS FROM HMS RESEARCHERS

The index below is a selection of new studies and review articles by researchers from across the HMS community. It represents a small sample of the research at focushms.com.

GLUTAMATE INDUCES DE NOVO GROWTH OF FUNCTIONAL SPINES IN DEVELOPING CORTEX

Kwon HB, Sabatini BL. Howard Hughes Medical Institute, Department of Neurobiology, Harvard Medical School

Mature cortical pyramidal neurons receive excitatory inputs onto small protrusions emanating from their dendrites, called spines. Spines undergo activity-dependent remodeling, stabilization and pruning during development, and similar structural changes can be triggered by learning and changes in sensory experiences. However, the biochemical triggers and mechanisms of de novo spine formation in the developing brain and the functional significance of new spines to neuronal connectivity are largely unknown. Here the authors develop an approach to induce and monitor de novo spine formation in real time using combined two-photon laser-scanning microscopy and two-photon laser uncaging of glutamate. *Nature.* 2011 Jun 2;474(7349):100-4.

AUTOANTIGEN DISCOVERY WITH A SYNTHETIC HUMAN PEPTIDOME

Larman HB, Zhao Z, Laserson U, Li MZ, Ciccia A, Gakidis MA, Church GM, Kesari S, Leproust EM, Solimini NL, Elledge SJ. Harvard-MIT Division of Health Sciences and Technology. Department of Materials Science and Engineering, Massachusetts Institute of Technology. Department of Genetics, HMS, and Division of Genetics, Howard Hughes Medical Institute, Brigham and Women's Hospital.

Immune responses targeting self-proteins (autoantigens) can lead to a variety of autoimmune diseases. Identification of these antigens is important for both diagnostic and therapeutic reasons. However, current approaches to characterize autoantigens have, in most cases, met only with limited success. Here the authors present a synthetic representation of the complete human proteome, the T7 peptidome phage display library (T7-Pep), and demonstrate its application to autoantigen discovery. *Nature Biotechnology.* 2011 May 22;29(6):535-41.

INITIATION OF PROXIMAL-DISTAL PATTERNING IN THE VERTEBRATE LIMB BY SIGNALS AND GROWTH

Cooper KL, Hu JK, ten Berge D, Fernandez-Teran M, Ros MA, Tabin CJ. Department of Genetics, Harvard Medical School

Two broad classes of models have been proposed to explain the patterning of the proximal-distal axis of the vertebrate limb (from the shoulder to the digit tips). Differentiating between them, the authors demonstrate that early limb mesenchyme in the chick is initially maintained in a state capable of generating all limb segments through exposure to a combination of proximal and distal signals. As the limb bud grows, the proximal limb is established through continued exposure to flank-derived signal(s), whereas the developmental program determining the medial and distal segments is initiated in domains that grow beyond proximal influence. In addition, the system we have developed, combining in vitro and in vivo culture, opens the door to a new level of analysis of patterning mechanisms in the limb. *Science.* 2011 May 27;332(6033):1083-6.

In Praise of Mentors

To faculty role models goes "the best accolade"

"A rare combination of humility, brilliance and warmth" is how HMS student Vanessa Redditt described Arundhati Ghosh, one of 15 honored June 7 during the 15th annual Mentoring Awards ceremonies at HMS.

Ghosh, an instructor in surgery at Cambridge Health Alliance, is "an inspiring role model for me and countless other students," Redditt said. "She doctors with compassion and great expertise, she teaches with enthusiasm, and she is dedicated to fostering student's development."

Redditt was among the many mentees who paid warm tribute to faculty who have helped shape their lives and careers. Nearly 150 guests honored the mentors who are widely esteemed for guiding, nurturing and supporting rising junior faculty in the basic sciences and clinical medicine.

The very best accolade any mentor can receive "is the recognition of the role he or she has played in the academic and career development of their trainees and peers," said HMS Dean for Diversity and Community Partnership, Joan Reede, whose office has hosted the awards since 1995.

Nominations were invited from the faculty, officers, fellows and students. A committee with representation from HMS and its affiliates reviewed 275 nominations and chose the 15 for recognition in one of three categories.

—Angela Alberti

Young Mentor Award winners

■ **Nabeel Bardeesy,** assistant professor of medicine, Massachusetts General Hospital ■ **Charles Dimitroff**, assistant professor of dermatology, Brigham and Women's Hospital ■ **Arundhati Ghosh**, instructor in surgery, Cambridge Health Alliance ■ **Elena Losina**, associate professor of orthopedic surgery, Brigham and Women's Hospital ■ **Emily Oken**, associate professor of ambulatory care and prevention, HMS.

A. Clifford Barger Excellence in Mentoring Award winners

■ **Carlos Camargo, Jr.**, associate professor of medicine, Mass General ■ **Catherine Gordon**, associate professor of pediatrics, Children's Hospital Boston ■ **Douglas Kiel**, professor of medicine, Beth Israel Deaconess Medical Center ■ **Karen Kuhlthau**, associate professor of pediatrics, Mass General ■ **Valerie Pronio-Stelluto**, assistant professor of medicine, Mount Auburn Hospital ■ **Brian Snyder**, associate professor of orthopedic surgery, Children's.

William Silen Lifetime Achievement in Mentoring Award winners

■ **Thomas Brady,** Laurence Lamson Robbins Professor of Radiology, Mass General ■ **Richard Grand**, professor of pediatrics, Children's ■ **Stephen Harrison**, Giovanni Armenise-Harvard Professor of Basic Biomedical Science, HMS ■ **Dennis Selkoe**, Vincent and Stella Coates Professor of Neurologic Diseases, Brigham and Women's.

Jeff Thiebauth

FRONT ROW: Elena Losina, Catherine Gordon, Arundhati Ghosh, Nabeel Bardeesy, Jeffrey Flier, Valerie Pronio-Stelluto, Joan Reede. MIDDLE: Brian Snyder, Douglas Kiel, Karen Kuhlthau, Dennis Selkoe, Emily Oken, Richard Grand. BACK: Charles Dimitroff, Thomas Brady, Carlos Camargo. NOT PICTURED: Stephen Harrison

Dynamic Duos

Reflections on the rewards of mentorship

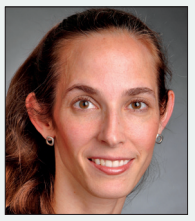
Focus invited a student and faculty member to share how their relationship has shaped their lives and work. For more stories from students and mentors, please visit **focushms.com.**

As the Student Gains Insight …

Kimberly Stegmaier, a pediatric oncologist and principle investigator at the Dana-Farber Cancer Institute, opened her lab to me during the year between my third and fourth year. I was likely more of a resource burden than a help in the beginning, but she decided to invest herself in nurturing my scientific curiosity nonetheless.

I grew tremendously over the year, meeting with her weekly and learning how to develop and test hypotheses between our meetings. Slowly, as she taught me how to think for myself, how to trouble-shoot and how to write an original research article, I became increasingly confident and excited about the discovery process. Most important, she gave me the courage to envision myself as a physician-scientist. This was an invaluable gift."

—Julia Carnevale
Class of 2011



… So Too Does Her Mentor

"As I observe the startling contrasts between my two young children, I am increasingly convinced of the power of nature in the nature-versus-nurture debate. However, in the tortuous path of one's academic career, I am more than certain that nurture plays a heavy hand. The critical influence of the mentor cannot be overestimated.

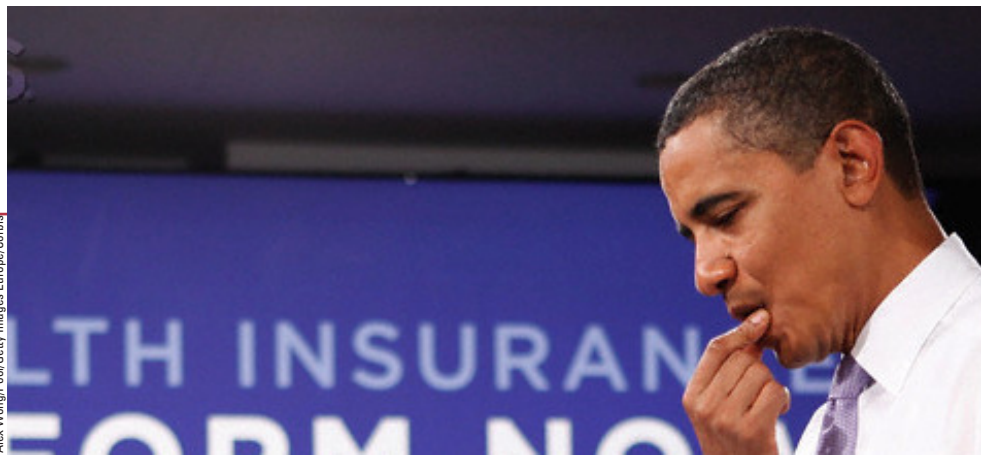
I have been fortunate to have been guided by two brilliant mentors, Gary Gilliland and Todd Golub, both whom I first met during my transformative experience as a Howard Hughes Medical Institute medical student fellow. Without them, I would not be where I am today. Their passion for research is contagious, their dedication to trainees superlative. To this day, they remain my primary mentors.

'See one, do one, teach one' is a familiar phrase to those in the medical field. This is a career of a lifetime of learning and observing, of executing on a set of finely tuned skills, and of teaching the next generation. I now also have that pleasure of playing the role of mentor. Students such as Julia Carnevale are treasures. They reignite the fire for learning with their curiosity and rescue us from endless grants and manuscripts. They remind us of the heart of the matter: improving the lives of others through medical research. There is a joy in participating in the developmental process of the student, nurturing their gifts and helping them decipher their own heart in this life's path. There is also a great sense of shared accomplishment in the victories. As Julia completed a presentation of her work, I thought, "Wow!" I was so proud of what she had completed in just one year, of how much she had grown as a scientist, and of what a phenomenal individual she is."

—Kimberly Stegmaier
Assistant Professor of Pediatrics
Dana-Farber Cancer Institute

In the City of Angels, Health Reform Takes Wing

Incentives sharpen an LA clinic's focus on outcomes



Alex Wong/Pool/Getty Images Europe/Corbis

Courtesy of Ellen Rothman

"While health care reform still feels precarious, I am deeply inspired by the changes that the Obama administration has set in motion."

—Ellen Rothman

At my South Los Angeles community clinic, we have been recruiting for a newly created position to develop a more robust disease-management program. If, under health care reform, we will be paid for the quality of care we provide and not just for the volume of services, it makes sense to invest more resources in monitoring our outcomes.

A recent applicant let me know that she had already received several similar offers from other community clinics in the Los Angeles area. "I guess I have been lucky that so many clinics are looking to fill similar positions," she told me.

In fact, her "luck" is actually hard evidence of how successful the health care reform movement has been. The Obama administration has not only invested in the health care industry but also drafted the incentives carefully to make sure that those dollars are invested in information technology, in enhanced communication within the broader health care network, and in enriching services at individual clinics that are focused on keeping the sickest people healthier.

The first infusion of money, which came in the form of a stimulus package as part of the American Recovery and Reinvestment Act, created opportunities to invest in health information technology and to give up the paper chart in favor of an electronic medical record. Meaningful use incentives followed, providing funding for clinics that can demonstrate that they are using their new IT systems to gather data on the effectiveness of clinical care rendered; to generate electronic prescriptions, aided by automated safety measures; to allow patients access to an on-line medical record; and to promote the secure transmission of health information from the primary care provider to consulting physicians. A more recent national initiative supports the Patient-Centered Medical Home, a model of health care delivery that promotes the coordination of care for patients with complex health needs who must access multiple specialty-care providers. A new certification process enables clinics to demonstrate that they meet the standards of this model.

In November 2010, California concluded negotiations with the federal government to enact a Medicaid waiver called "Bridge To Reform." Many states participate in the waiver system, which allows them to modify Medicaid regulations in order to gain flexibility in meeting the needs of specific populations. The nearly $10 billion waiver has positioned California as a pioneer by making expanding access to health care a top priority, with specific provisions for safety net communities, enhanced coordination of medical care, and pilot programs to reform the health care delivery system.

Six months ago, I found myself at a preliminary meeting to develop an accountable care organization, or ACO, in South LA. At the time, I had only a loose understanding of what such an undertaking might entail. Our first several meetings were spent clarifying basic principles. The ACO is intended to function as an integrated health care network that includes hospitals and primary and specialty care. The organization determines a reimbursement strategy based on the quality of services provided rather than the sheer quantity. The network's members work together to gain efficiencies and reduce costs, and they share in the savings achieved; moreover, they shoulder the risk of financial losses. Just how much risk is yet to be determined.

As this organization has picked up steam, an astonishingly representative group of health care providers in South LA has come to the table: financial specialists, clinicians, CEOs, lawyers and community organizers. Members draw from two major hospitals, several local community health centers, the LA County Department of Health Services, and a labor union, in addition to several independent physicians who represent the larger community. I remain awed by this chance to contribute to the conversation. How often does an opportunity like this present itself in the career of a physician?

While health care reform still feels precarious, I am deeply inspired by the changes that the Obama administration has set in motion. The plan is clear and specific. It has created momentum at all levels of the health care system, from hospitals to clinics. The agenda has been set. The future, full of promise, remains to be seen.

—Ellen Rothman

Ellen Rothman, HMS '98, practices at a community health center in Los Angeles. The opinions expressed in this column are not necessarily those of Harvard Medical School, its affiliated institutions or Harvard University.

Nurturing the Physician-Scholar

With dawn of Scholars in Medicine, HMS faculty prepares to kindle students' passion for discovery

Next fall, Harvard Medical School will launch a major new component of medical education reform: the Scholars in Medicine Program. Starting with the entering class of 2011, every medical student will be required to undertake a scholarly project. According to Gordon Strewler, the program's director, projects will run the gamut of inquiry, from molecular biology to health care policy and the history of medicine.

The goal is to hone critical thinking and foster curiosity among students while equipping them with the tools for discovery. "Students will not only master knowledge, but also help create it—in the form of a written work, perhaps even a publication," said Strewler, professor of medicine at Beth Israel Deaconess Medical Center and master of the Cannon Society, one of five medical student societies at HMS.

First-year medical and dental students will identify a mentor and an idea for a summer scholarly project by December and submit a proposal in January. While this effort may evolve into a definitive scholarly project, one that will occupy from four months to a year, students will have the option of pursuing a different project later on, perhaps related to a joint degree.

Details on the Scholars in Medicine Program, and the role of the mentor will soon be announced by HMS Dean Jeffrey Flier, said Strewler. Strewler, a member of the Class of 1971, says his career was shaped by two beloved mentors, John T. Potts, Jr., and Norman Hollenberg, with whom he studied in his fourth year. "Both taught me how to think about science, and John in particular has been a lifelong career mentor."

"Faculty and students alike can reap tremendous rewards from the bonds that form while working together," Strewler said. "Were it not for my own mentors, I might never have studied endocrinology or found myself as Master of an HMS Society."

—Karin Kiewra

An Exemplary Commitment

Awards salute outstanding teachers

They work tirelessly to help students understand the science of life. They bring future doctors together with patients to mold tomorrow's discerning, empathetic physicians. They are mentors during students' years at HMS, and sometimes for a lifetime. Fourteen Harvard faculty members were recognized last month. See story at **focushms.com.** —*Valerie Wencis*

Jeff Thiebauth

Barbara Cockrill, left, assistant professor of medicine at Brigham and Women's Hospital, mentored medical student Sophia McKinley.

The annual teaching awards were presented under the auspices of the HMS Program in Medical Education.

The Donald O'Hara, PhD, Faculty Prize for Excellence in Teaching
BARBARA COCKRILL
HMS assistant professor of medicine
Brigham and Women's Hospital

MATTHEW FROSCH
HMS associate professor of pathology
Massachusetts General Hospital

The Charles McCabe, MD, Faculty Prize for Excellence in Teaching
CARLOS FERNANDEZ-DEL CASTILLO
HMS professor of surgery, Mass General

ANNE FABINY
HMS assistant professor of medicine
Cambridge Health Alliance

Special Faculty Prizes for Sustained Excellence in Teaching
ROBERT GOISMAN,
HMS associate professor of psychiatry
Mass Medical Health Center

MANUEL GUILLERMO HERRERA-ACENA
HMS lecturer in medicine
Brigham and Women's

S. Robert Stone Award at Beth Israel Deaconess Medical Center
JOHN MITCHELL
HMS assistant professor of anaesthesia

Leo A. Blacklow Award at Mount Auburn Hospital
BARBRA BLAIR
HMS instructor in medicine

Bernard Lown Teaching Award at Brigham and Women's Hospital
SARA RUSSELL, HMS instructor in surgery

Robert Masland Teaching Award at Children's Hospital Boston
CRAIG LILLEHEI
HMS assistant professor of surgery

Cynthia N. Kettyle Teaching Award at Massachusetts General Hospital
EUGENE BERESIN
HMS professor of psychiatry

Association of American Medical Colleges Humanism in Medicine Award
DAVID HIRSCH
HMS instructor in medicine
Cambridge Health Alliance

Harvard Medical School Center for Primary Care Excellence in Teaching Award
BARBARA GOTTLIEB
HMS associate professor of medicine
Brigham and Women's

L. James Wiczai Jr. Award for Leadership, Excellence and Innovation in Medicine
JILL SPRINGER
Coordinator and administrator for Patient Doctor I and III courses and Principal Clinical Experience for second and third-year HMS students at Brigham and Women's

Health Reform

Continued from page 5

"Vermont gave us complete freedom to propose what we thought was best," said Hsiao. His co-authors were MIT economist Jonathan Gruber, whose model predicts the impact of key health-market interventions, and Steven Kappel, who has spent 30 years shaping health policy for Vermont. Hsiao also engaged more than a dozen HSPH graduate students.

A FIRST STEP

Vermont's new law is merely a first step. It incorporates the board and other fundamental ingredients recommended by Hsiao's team but leaves the task of figuring out how to finance the plan to legislators, who must first obtain waivers in order to diverge from certain rules set by Medicaid, Medicare and the PPACA. The HSPH team's proposal, a payroll tax, will be contentious, Hsiao concedes.

"Vermont gave us complete freedom to propose what we thought was best."
—William Hsiao

Might state-based, single-payer health care be a solution for the United States? Hsiao addressed this question in a Perspectives essay in the March 31 issue of the *New England Journal of Medicine.* Reform must embrace some components of a single-payer plan, he said, since that is the only way to both fund universal coverage and reduce health care costs.

"Employers, workers and the government all say they can't afford escalating health care costs," Hsiao said. "That's why I'm optimistic that national reforms will come within the next five years."

—*Ellen Barlow*

To learn more, students may contact William Hsiao at hsiao@hsph.harvard.edu.

FOCUS ONLINE

Notable

American Medical Association Foundation Leadership Award to **Alexander Bagley**

▲ Joseph B. Martin Dean's Leadership Award for the Advancement of Women Faculty to **David Bor** ■ Dreifuss-Penry Epilepsy Award to **Bernard Chang** ■ Margaret L. Kripke Legend Award for Promotion of Women in Cancer Medicine and Cancer Science to **Edward Benz Jr.** ■ National Academy of Sciences inducted **George Church** ■ Gates Foundation Grand Challenges Exploration Grants to **Aviva Presser Aiden, Ionita Ghiran, Pierre Striehl and Daniel Kavanagh** ■ Marian W. Fischman Award to **Bertha Madras** ■ Depression and Bipolar Support Alliance Klerman Awards to **Roy Perlis and Mark Bauer** ■ Lifetime Achievement Award from the Massachusetts Psychiatric Society to **Alvin Poussaint** ■ Distinguished Humanitarian Awards from the B'nai Zion Foundation to **Peter Rosen and Richard Wolfe** ■ Burroughs Wellcome Career Awards for Medical Scientists to **Joshua Schulman, Duane Wesemann and Douglas Won** ■ Alfred Newton Richards Award from the International Society of Nephrology to **Terry Strom**

▲ YMCA Academy of Women Achievers Award to **Nancy Tarbell**

▲ Arthur C. Cope Scholar Award from the American Chemical Society to **Suzanne Walker** ■ Centers for Medicare and Medicaid Services electronic health records award to **Beth Israel Deaconess Medical Center** ■ Top ranking from *U.S. News & World Report* annual "best hospitals" issue to **Children's Hospital Boston**