

population, when compared to the general public, reflects a disproportionate level of medical needs, including cardiovascular disease, strokes, diabetes, and cancer. Harvard Street Neighborhood Health Center and the other Men of Color health care programs do aggressive outreach and case management, and offer medical services in all major areas. They are to be commended for their hard work and commitment to the community.

I also commend Brigham and Woman's Hospital, the Massachusetts Department of Public Health, and the numerous businesses and individuals whose hard work and financial contribution make this initiative possible.

CONGRESSIONAL BIOMEDICAL RESEARCH CAUCUS CELEBRATES 50 BRIEFING SESSIONS

HON. GEORGE W. GEKAS

OF PENNSYLVANIA

IN THE HOUSE OF REPRESENTATIVES

Friday, October 4, 1996

Mr. GEKAS. Mr. Speaker, I am pleased to inform my colleagues that since the beginning of the Congressional Biomedical Research Caucus in 1990, until the last briefing of this Congress on September 25, there have been 50 briefing sessions for Members of Congress and their staffs on the latest cutting edge developments in biomedical research.

Over the 6-year period, the Biomedical Research Caucus has developed a working relationship with the five scientific societies: American Society for Cell Biology, American Society for Biochemistry and Molecular Biology, Biophysical Society, Genetics Society of America, American Association of Anatomists and the Association of Anatomy, Cell Biology and Neurobiology Chairpersons, which compose the Joint Steering Committee for Public Policy [JSC]. JSC under the leadership of Dr. Marc Kirschner, chairman of Cell Biology at Harvard Medical School and with the scientific resources of the member societies established a committee, chaired by Nobel Prize winner Dr. Harold Varmus, the current Director of the National Institutes of Health, to develop a biomedical research briefing program for the Congress. I am proud of the quality of the programs and the new opportunities in health care that are presented at the caucus briefings. Since Dr. Varmus assumed his duties at the NIH, we have been fortunate to have Dr. Michael Bishop, University of California, San Francisco, his former colleague and co-prize winner of the Nobel award advise us on appropriate topics and speakers for the caucus briefings. This past year in 1996, Dr. Bishop suggested the caucus learn about issues involving: genetic testing, antibiotic resistance, mad cow disease, and us, how vision wires our brains and the potential for learning, the latest in new drug therapy that may prevent the HIV virus from becoming full blown AIDS and allow individuals to live productive lives, and how H Pylori is involved in ulcers and stomach cancer. We look forward to his suggestions for next year.

This December, 1996, the American Society for Cell Biology at its annual meeting in San Francisco will give its Public Policy Award to Dr. Marc Kirschner, the first research scientist to receive the award. Previous recipients of the Public Policy award have been the Sen-

ator from Iowa [Mr. HARKIN] and the gentleman from Illinois [Mr. PORTER] for their contributions to the field of biomedical research. I think it is fitting that scientific societies begin to recognize and reward the service and contributions that their members make to the public arena on behalf of biomedical research. Dr. Kirschner has served the Congress well in beginning the briefing series and bringing all his colleagues, specifically Dr. Varmus and Dr. Bishop to our attention. Once again, Dr. Kirschner has served the Congress well in securing a replacement for his leadership of the JSC societies, Dr. Eric Lander, Director of the Whitehead Institute Genome Center at MIT. For the last year Dr. Lander, a member of the Genetics Society of America, has succeeded Dr. Kirschner, as chair of the efforts of the five societies of the Joint Steering Committee, which continue to provide us excellent advice and guidance on the latest developments in biomedical research. Over the years the caucus briefing series has developed a reputation for excellence and an audience among the Congress from the Congressional Research Service analysts to professional staff of the health and related Committees of the Congress. Two years ago the caucus hosted a briefing presentation by NASA, which was beginning its biology research on the Space Lab and in attendance was astronaut Shannon Lucid, the current American with the longest flight in space and her replacement in space John Blaha. We are able to bring these issues to the Congress by using the noon hour for briefing meetings because of the contribution of the Federation of American Societies for Experimental Biology, which cooperates with the Joint Steering Committee in this service.

We look forward to working with Dr. Lander, who was recently featured in a New York Times profile of a scientist at work, "Love Of Numbers Leads To Chromosome 17". Dr. Lander is an amiable adviser who brings the unique perspective of a mathematician to the work of genetics and biology. I commend the attached article about Dr. Lander for your reading and inspiration:

[From the New York Times, Sept. 10, 1996]

LOVE OF NUMBERS LEADS TO CHROMOSOME 17

(By Philip J. Hiltz)

CAMBRIDGE, MASS.—In the career of Dr. Eric Steven Lander, as in the new branch of biology known as genomics, the life of numbers and the numbers in life have come together.

Dr. Lander, director of the Whitehead Institute/M.I.T. Genome Center here, is a leader in constructing a complete catalogue of the human DNA code or genome. But he did not arrive at this position in the traditional way—for example with a degree in biology. Only when past 30 did this curly haired and energetic figure first crack a book in biology.

Rather, he grew up in the thrall of numbers. As a high school mathematics whiz, he was on the United States high school team that came in a close second to the Soviet team in the world mathematics Olympiad in 1974. He later trained as a pure mathematician at Princeton University. Only then did he fall in love with biology, as he spent hours talking with his brother, Arthur, a neurologist.

Biology itself has also been undergoing change in recent years. The old style of academic biology is now admitting a brash new branch of inquiry, one that is information-heavy, computer-driven and closely allied to business. And for Dr. Lander, that has been

perfect. When he emerged from his personal transformation, there he was, at the leading edge of molecular biology.

He established his credentials in biology by tackling subjects that could only be approached by someone with a strong background in mathematics, like how to analyze statistically whether a disease may be caused by one or many genes, and how to ferret out the different contributing genes.

In August, a team led by Dr. Lander found a gene that contributes to type 2 diabetes, a disease caused by many genes, each with many variants. Dr. Lander's strategy began with the calculation that elusive genes are easier to identify in isolated populations, where people are descended from only a few founders and have not accumulated the many genetic variations of more cosmopolitan groups. He searched for the diabetes gene among a group of people in the Bothnia region of western Finland where few outsiders have migrated in the last 1,000 years.

When biologists began to consider the task of making a complete catalogue of the entire three billion letters in the human body's DNA code, Dr. Lander's work made him a natural candidate to lead one of the several teams of DNA sequencers.

Craig Venter, head of the Institute for Genetics Research, a private concern in Rockville, Md., a competitor of Dr. Lander in the race to sequence genomes, said: "In sequencing whole genomes the breakthrough has been mathematics, applied math and new algorithms. These are the kind of things Eric is good at."

At the Whitehead Institute/M.I.T. Genome Center, Dr. Lander's group has produced the first genetic maps of the human and mouse genomes, a necessary step toward working out the complete DNA sequence. His laboratory is one of several that are financed by the National Center for Human Genome Research in Bethesda, Md. The consortium of laboratories had planned to complete the full DNA sequence of the human genome by the year 2005 at a cost of \$3 billion, but is already two years ahead of schedule and below budget. The project has already identified many genes of medical interest and prompted investments by several companies.

Dr. Lander, 39, was born and raised in Brooklyn in a family of lawyers. As student at Stuyvesant High School in Manhattan, he was sent one summer to participate in an elite mathematics program, where the students decided that 17 was the most interesting of all numbers. They formed a 17 club and made up a T-shirt emblazoned with amazing facts about the number 17. Dr. Lander can still quote examples: "Many multisided figures are stable when set down any one of their sides, for example, a pyramid. But did you know that a 17-sided figure is the only one that is stable on one side only?"

Recently, the number 17 has sneaked back into his life. The Whitehead genome center has chosen human chromosome No. 17 as the one it will sequence as its contribution to the Human Genome Project.

"Someone suggested I had picked chromosome 17 because of my fascination with that number," Dr. Lander said. "That's not really true, but I am thinking of taking the old T-shirt out of the closet. I still have it."

As Dr. Lander followed his instincts, his career took some sharp turns, from pure mathematics at Princeton and Oxford, to managerial economics at the Harvard Business School. Then, while teaching mathematically oriented business classes by day, at night he crossed the Charles River to hang out in biology laboratories.

He had begun to see that beneath the surface of the two very different disciplines of mathematics and biology there lay some

links of possible importance. Biology, however chaotic it might appear, had regions that he felt would yield to the firepower of mathematical methods. His first few papers exploring mathematical approaches to biology were sufficiently remarkable that he won a MacArthur Fellowship, the so-called "genius" award. "That grant was crucial for me," he said. "I was struggling to establish myself at the interface of math and molecular biology. Why should anyone take me seriously? The MacArthur gave me that essential credibility."

The \$250,000 grant helped finance travel to the far-flung and isolated human populations where he knew gene-hunting would be easier.

Dr. Lander soon started to make an impact in molecular biology, creating the mathematical tools to tease out a major gene in asthma, and a "modifier" gene that can suppress colon cancer. But eventually he tired of hunting down genes in the genetic jungle, one by one. "That time is over," he said. He is now laying plans for the next era in biology, in which he foresees that the entire set of human genes and their functions will be available on one CD-ROM disk, so there will be no more Stanley-and-Livingston searching.

"Now, suddenly, biology is finite," he said.

"The genome project is wholly analogous to the creation of the periodic table in chemistry," Dr. Lander said. Just as Mendeleev's arrangement of the chemical elements in the periodic table made coherent a previously unrelated mass of data, so Dr. Lander believes that the tens of thousands of genes in present-day organisms will all turn out to be made from combinations of a much smaller number of simpler genetic modules or elements, the primordial genes, so to speak. He theorizes that these modules helped carry on life in the most primitive cells living on the planet three billion years ago. The basic functions of the life carried out by the first genes must all have been formed very early in evolution, Dr. Lander surmises. Most present-day genes are variations on these few original themes, he said.

"The point is that the 100,000 human genes shouldn't be thought of as 100,000 completely different genes," Dr. Lander said. "They should be thought of as maybe a couple hundred families that carry on essentially all of life."

Making such a periodic table for families of genes will define a new direction for biology, in Dr. Lander's view. The completed table would mark the end of structural genomics, the analysis of the structure of genes. "When you get the last base of the genome, driven in like the golden spike in the transcontinental railroad, we'll maybe have a big ceremony," he said. "But when it's done, it's done."

Then comes what Dr. Lander calls functional genomics, or making practical use of the table. For example, Dr. Lander says, biologists may learn to read human DNA so effectively that laboratories will quickly be able to tell patients all the important variations they have in their entire gene set, or genome. Further, it should be possible to tell which of those genes are turned off or on at a given moment, thus getting a picture of whether the cells of the body are up to snuff.

"So here's the manifesto for the era of functional genomics," Dr. Lander said.

"One. At the DNA level we want the ability to re-sequence an entire genome—anybody's genome—in a regular medical setting, to find all the variations. Because you and I differ in one-tenth of 1 percent of our bases, and that accounts for our differences.

"Most genes will have two, three or four major variants. If you have 100,000 genes, that means there will only be about 300,000 major variants. It's a finite number. We can

then take that list, and then correlate all the different variations with health outcomes. You could take the Framingham Heart Study and find the rate of each disease associated with each of the 300,000 variants of genes."

That would allow each person to get a full list of what disease they are most at risk for, based on their inheritance.

With a mix of hope and skepticism, he said: "In principle, that would allow us to have personalized health care and personal health care strategies. In practice, of course, whether we do that will depend on what we as a society want to pay for, and how much we can protect our privacy, and so on."

"Two," he said, holding up fingers to signal the next item on his manifesto. "We want to be able to monitor gene expression." Finding out which of an individual's genes are active at any time would help indicate a body's response to drugs, dieting, exercise and other factors.

"All this is not so crazy as it sounds," Dr. Lander said. "Less crazy, in fact, than the genome project itself. There are already genetic 'chips' that can make these things possible."

He was referring to one of his favorite new technologies, which has put human genes on microchips. Genes in a blood sample can be matched against the standard ones on the chip to see if there are any important abnormalities.

So far, one company making "gene chips," Affymetric Inc. of Santa Clara, Calif., has succeeded in putting all the genes of H.I.V., the virus that causes AIDS, on a chip for such comparison. The company has plans to put 30 to 40 human genes on one chip, and "in principle at least," said Robert Lipschutz of Affymetric, "we should be able to put all human genes on a chip."

Dr. Lander has a piece of that company, as well as a major financial interest in Millennium, a company that intends to make use of the data from the genome project to design diagnostics and treatments of disease.

If there is a danger sighted ahead in the "new biology," some critics suggest, it is that businesses may be too close to science, and may even sometimes be in the driver's seat. Scientific judgments may too often yield under pressure from business needs.

Dr. Lander, an avid businessman, takes these problems more seriously than most people in science, said Dr. Francis Collins, director of the Federal genome project. Dr. Collins credits Dr. Lander with leading the way to help solve at least one of the problems—that of hoarding data to gain business advantages.

The Whitehead genome center, at Dr. Lander's direction, puts out on the Internet all the data it produces on DNA markers and sequences, which are freely available to anyone who wants to copy the material.

At first the M.I.T. laboratory's data were posted every few months, and soon they will be disseminated almost daily, Dr. Lander said. "This work is paid for with public money and it's got to be made public as fast as we can," he said. "That means breaking with tradition and getting it out there long before it can be published in scientific journals."

The effect he says, is highly stimulating for biologists. "We get 50,000 to 100,000 hits on our database per week. People need this data."

The Federal genome project office has begun to follow his lead, and those receiving grants must now make their data available at least every six months.

The task over the next few years for those leading molecular biology will be to get biologists away from their traditional tools—pipettes, gels and flasks—and into analyzing gene function with computers.

"In the next one to three years, we have to figure out how to get humans out of the loop," he said. "Then we can really get to work thinking about biology and what's going on in life."

REMARKS OF KIKA DE LA GARZA
AT THE CONGRESSIONAL HIS-
PANIC CAUCUS INSTITUTE'S 19TH
ANNUAL GALA

HON. BILL RICHARDSON

OF NEW MEXICO

IN THE HOUSE OF REPRESENTATIVES

Friday, October 4, 1996

Mr. RICHARDSON. Mr. Speaker, on Monday, September 30, 1996, the gentleman from Texas, Mr. DE LA GARZA, addressed the House for the last time. I would like to include for the RECORD Mr. DE LA GARZA's remarks at the Congressional Hispanic Caucus Institute's 19th Annual Gala.

PARTIAL TRANSCRIPT OF CONGRESSMAN KIKA DE LA GARZA'S REMARKS AT THE CONGRESSIONAL HISPANIC CAUCUS INSTITUTE'S 19TH ANNUAL GALA, WEDNESDAY, SEPTEMBER 25, 1996

This is a great night for me, of course for the tribute, but more important for who we are, and what we do, and what we celebrate here, beyond me. The odyssey began a thousand years ago, in a little corner of Europe called the Iberian peninsula. And then, some 500 years ago, it crossed a vast ocean to a new world. Those galleons were manned by Spaniards, Hispanics. And then they came and explored the coast of the Carolinas, Newfoundland, what we now know as North and South America and began settlements. So the odyssey continued—Spanish, Mexican and Texan, and Confederate and U.S. and we never moved from the same ranch.

. . . people out of the United States, how not to educate children because their parents might be illegal or . . . that to me was a sad occasion that a child, you know, the Master said, "Suffer the children to come unto me." He didn't say if they were Palestinians or Nazarianians, he said, "the children, come unto me." And here we're saying, "No, you're not going to teach this child. You're going to throw him out on the street. We don't care if he's educated because his parents are illegal or because he's illegal. That's not right. That's not what America is all about. (Applause) Thank you. (Applause)

Some of us have been more fortunate than others. I have been more fortunate. But I come to you saying that, to those who receive much, have more to repay, and this is something that we have to look at, and that's been my thrust all along. That we have a . . . When they said life, liberty, and the pursuit of happiness, that's what it means, having a youngster be educated, have a youngster the ability to help himself. If no one else will help them, at least he'll help himself. And I had, throughout my life, the best educators, teachers, since my very first nun, Sister Mary Teresita, and my very first scout master, and following that my first high school coach. We followed them, and we were able to achieve. And my friends, I stand here tonight as part of that odyssey that began long time ago, thank to those who have touched my life along the way. Family, my wife, my kids. I regret that my kids could not be here. One, Mike, is out in the middle of the Mediterranean, the task force with the Enterprise, Lieutenant Commander Mike de la Garza. We're very proud of him. Our daughter Angela works for Jay Morwin (??) in Austin with the Gulf of Mexico initiative. And our heart surgeon George, we're