

SUMMER/FALL 2009

# EINSTEIN

The Magazine for Alumni and Friends of Albert Einstein College of Medicine of Yeshiva University



## EINSTEIN & INDIA

Working together  
for global health

Inside:  
2009 Commencement/  
50th Reunion Coverage

## WORLDWIDE COMMITMENT

Over the last decade, Albert Einstein College of Medicine has dedicated itself to improving global health. Nowhere is this commitment more evident than in India, home to more than one billion people. Einstein faculty members work with their Indian counterparts in confronting challenges ranging from AIDS to alcoholism. Our cover story, "Einstein & India," shows that global health is truly a two-way street: Knowledge gained in helping less-developed countries can directly benefit America as well.



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# Einstein & India

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PHOTOGRAPHED BY  
Gary Goldenberg



**AH, INDIA!** Within seconds of arrival, the senses are overwhelmed, if not by the heat and humidity, then by the cacophony of car and truck horns, the kaleidoscopic swirl of saris in reds and greens and yellows or the jumble of architectural styles from across the millennia. Once the eyes, nose and ears begin to adjust, it's the contrasts that amaze: the creaky pushcarts that vie for a bit of pavement with gleaming BMWs and the odd cow; the sweet smells of incense that mix with the stench of raw sewage; the cold, hard stares of strangers that morph into warm, wide smiles. And of course, there are people, people everywhere in India, home to one sixth of humanity.



The rate of HIV/AIDS in India soared throughout the 1990s, and the disease cuts across all sectors of Indian society. Pictured below is Einstein faculty member Hillel Cohen, Dr.P.H., teaching an HIV/AIDS workshop in Mumbai.

Over the last decade, the many health challenges facing this outside nation have mobilized scientists half a world away, at Albert Einstein College of Medicine. In keeping with Einstein's mission to improve global health, researchers, clinicians and educators throughout the College of Medicine have launched a wide array of India-centric projects, from basic research into HIV/AIDS, to clinical studies of diabetes, to training programs for public health specialists—just a sampling of which are featured below.

While Albert Einstein College of Medicine may not be a household name in India, officials at the highest levels of its government have taken notice. In June 2008, India's minister for health and family welfare, Dr. Anbumani Ramadoss, paid a visit to the Bronx to learn more about Einstein and its global health ventures. By all accounts, Dr. Ramadoss left Einstein impressed, envisioning even closer ties with the College of Medicine in the years ahead.

### HIV-related dementia

Einstein's collaborations with India began in earnest in 2000, when Vinayaka R. Prasad, Ph.D., professor of microbiology & immunology, received a multimillion-dollar, multiyear grant from the Fogarty International Center for Advanced Study in the Health Sciences, a component of the National Institutes of Health, to establish an AIDS International NIH Training and





“At first, I was extremely skeptical that this low incidence of dementia in southern India was real. One possible explanation was that people with HIV in India die before developing dementia. But the patients under study had been placed on antiretroviral therapy and were still alive.”

— Vinayaka R. Prasad, Ph.D.  
Professor of Microbiology & Immunology

**A paper published last October in the *Journal of Neuroscience* provides the first clear evidence that the major HIV strains in the US and India differ in their ability to cause dementia.**

Research Program (AITRP) at Einstein, one of about two dozen around the US. Using AITRP funds, US researchers help their counterparts in less-developed countries gain expertise in HIV/AIDS research and in public health.

With support from AITRP and the Einstein-Montefiore Center for AIDS Research, Ganjam Kalpana, Ph.D., associate director of AITRP and professor of genetics at Einstein, conducted several workshops for basic scientists and clinical researchers in Bangalore. In another joint effort, Einstein faculty members, including Ellie Schoenbaum, M.D., and Hillel Cohen, Dr.P.H., created a condensed version of Einstein’s Clinical Research Training Program for Indian and Rwandan doctors, which was held in Mumbai (formerly Bombay) in early 2008. AITRP has also hosted more than two dozen Indian scientists who have come to Einstein for advanced training.

Research supported by AITRP is especially rich and varied, involving

studies of HIV-prevention programs, the molecular biology of fungal infections, and attitudes and behaviors regarding antiretroviral medications, to name just a few. Thus far, AITRP research has laid the groundwork for two major NIH grants and led to about 20 peer-reviewed papers jointly authored by scientists from Einstein and India.

One such paper, published last October in the *Journal of Neuroscience*, provides the first clear evidence that the major HIV strains in the US and India differ in their ability to cause dementia, a finding with important implications for therapy.

This paper’s genesis can be traced to 2001, when Dr. Prasad traveled to India to work with Udaykumar Ranga, Ph.D., a scientist at the Jawaharlal Nehru Centre for Advanced Scientific Research in Bangalore. Comparing notes, the two were stunned to learn that in southern India, only a small percentage of people with HIV develop dementia—about one-tenth the rate in the US. Together, the researchers set out to determine why.

“At first, I was extremely skeptical that this low incidence of dementia in southern India was real,” says Dr. Prasad, who hails from Bangalore, India’s Silicon Valley. “One possible explanation was that people with HIV in India die before developing dementia. But the patients under study had been placed on antiretroviral therapy and



In 2008, India’s minister for health and family welfare, Dr. Anbumani Ramadoss, visited Einstein to learn more about its global health ventures. Dr. Ramadoss is pictured at left with Allen M. Spiegel, M.D., the Marilyn and Stanley M. Katz Dean.

were still alive. Another possibility was that the patients weren’t properly diagnosed. But the study was kosher by our standards.”

This left two plausible explanations: that Americans and Indians differ genetically, affecting their response to HIV; or that the dominant subtypes of HIV in each country differ genetically, affecting the way the virus interacts with the immune system. “I’m a virologist and Dr. Ranga is an immunologist, so we decided to look into the viral genetics,” says Dr. Prasad.

After HIV enters the body, it quickly gains access to the brain by stealthily hitching a ride inside immune cells known as macrophages. These HIV-infected macrophages release their HIV cargo once they cross the blood-brain



“Global health is no longer just the First World helping the Third World.”

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Professor of Medicine and of Pathology

barrier. Then a crucially important protein called Tat, on the surface of HIV, lures additional HIV-infected macrophages into the brain and triggers production of chemicals known as chemokines that attract even more infected macrophages.

Dr. Ranga suspected that there might be differences between the Tat protein in the Indian HIV subtype, known as clade C, and in the Western subtype, clade B—which proved to be the case. Dr. Prasad and colleagues then discovered that the Tat protein in the two clades differs by a single amino acid at a key position on the virus.

The next question was whether this single change in Tat’s amino acid sequence could explain the contrasting neurotoxicities exhibited by the two HIV subtypes. To find out, the researchers injected clade B or clade C viruses into a special strain of immunodeficient mice. After six days—enough time for the viruses to cause neurological damage in these animals—the mice were put into a complex water maze that challenged their short-term memory as well as their working memory (which temporarily stores and manages the information needed to carry out complex cognitive tasks, such as learning, reasoning and comprehension). “It’s like having to remember where you parked your car at work if you have no assigned space, which requires you to update your memory every day,” says Dr. Prasad.

In the end, mice infected with clade C performed much better in the maze than those infected with clade B, confirming that Tat does play a significant role in the development of HIV-related dementia. According to Dr. Prasad, therapies capable of disabling the Tat protein might protect against dementia in people infected with HIV.

The need for such drugs has grown more acute in recent years, thanks to anti-retroviral therapies that allow people to live longer lives but don’t fully eradicate HIV from the brain or the rest of the body. In 1996, a 20-year-old newly diagnosed with HIV could expect to live another 36 years, according to a recent study in the *Lancet*. Today, that same person could expect to live another 49 years. But the low levels of remaining virus can cause significant brain damage, with estimates suggesting that up to half of the people infected with HIV will develop neurologic complications.

More papers from Einstein’s AITRP can be expected in the years ahead. In 2006, Einstein’s funding for AITRP was renewed for another five years, and its geographic scope was expanded to include Bangladesh and Rwanda.

**Global health: A two-way street**  
AITRP will surely benefit India, but America will gain as well. “Global health is no longer just the First World helping the Third World,” says Sanjeev Gupta, M.D., professor of medicine and of



pathology and a native of Jaipur, India’s “Pink City,” so named for its brightly colored sandstone palaces and homes.

The work of Einstein’s William Jacobs, Ph.D., professor of microbiology & immunology and of genetics, is a perfect example. For years, he has been trying to perfect a rapid and inexpensive way to diagnose tuberculosis (TB). The test is based on a bacteriophage (a virus that infects bacteria) specific to the TB bacterium. In brief, the test involves



taking a sample of the patient's sputum and adding a specially engineered phage that glows in the dark in the presence of TB. Dr. Jacobs' assay worked well in the lab, but tests in the real world found that the phage caused patients' cells to burst, or lyse—which ruined the test. What was needed was a phage that infects TB bacteria without lysing it.

"When we started AITRP, we discovered a TB research center in India that has collected hundreds of phages," adds



**A single Indian medical center might see as many as 50 to 100 liver-failure patients in a single year, due to the sheer size of the population and the high prevalence of toxins and infectious agents that cause liver failure.**

Dr. Prasad. "They knew how to isolate them and whether they were lytic or nonlytic and which ones were specific to TB. AITRP brought the Einstein and India groups together, and by the end of eight visits to India by three graduate students, one post-doc, and one professor, they had identified and built a phage that would do exactly what Dr. Jacobs was hoping it would do."

Dr. Gupta's own research also exemplifies global health's two-way street. Using gene-transfer and cell-transplantation technologies, he and his colleagues are trying to transform liver cells and stem cells into replacement therapies for a variety of diseases,

including liver failure, diabetes and hemophilia. These therapies have shown great promise when tried on laboratory animals.

How quickly Dr. Gupta's team can move to clinical trials may well depend on India's health-care system. For example, in the US, even a large teaching hospital may see only a handful of patients with liver failure in a given year. "If we wanted to do a study with, say, 20 or 30 patients, we might have to wait years, or involve ten or more centers around the country, which is very logistically complex and time consuming," says Dr. Gupta.

By contrast, a single Indian medical center might see as many as 50 to 100 liver-failure patients in a single year, due to the sheer size of the population and the high prevalence of toxins and infectious agents that cause liver failure. Would India's health-care system be up to the task of conducting a sophisticated clinical trial? According to Dr. Gupta, who regularly collaborates with scientists in India, the answer is an emphatic yes.

"Many health-care facilities in India are on par with what we have over here in the US," he says. "One Indian



“Keralans went from a predominantly vegetarian diet, perfected over the centuries, to a high-fat diet. And they started exercising less.”

— Joe Verghese, M.D., M.S.  
Associate Professor of Neurology  
Louis and Gertrude Feil Faculty Scholar

mainly to money sent home by Keralans working abroad. “Lifestyles changed,” says Joe Verghese, M.D., associate professor of neurology, who was born and raised in Kerala. “Keralans went from a predominantly vegetarian diet, perfected over the centuries, to a high-fat diet. And they started exercising less.”

The changes took their toll, often in the form of heart attacks, heart failure, hypertension and diabetes. Dementia has also become relatively common—although exactly how common is not known.

“Nobody has done a true prevalence study of dementia here,” says Dr. Verghese, who remains closely tied to the area, personally and professionally. “Among people in India, dementia is still considered a natural consequence of aging, rather than a disease process. In fact, most Indian languages contain no word for dementia. The family structure has provided a kind of security blanket for people with this problem.”

But as India modernizes and the population ages, this security blanket may fray or disintegrate. “Because India has about a billion people, even just a small percentage with dementia translates into a huge number,” says Dr. Verghese. An estimated three percent of India’s seniors—some six to seven million people, or more than in the US—already



institution we are working with does 100 living-donor liver transplants a year—more than any medical center in the US. So they possess the technical know-how and facilities to manage people with complex disorders, which bodes well for collaborative efforts.”

### The risks of “Westernization”

India has caught up to the West in many other ways, for better and for worse. Today, the country is grappling with long-standing Third World scourges such as TB and malaria while also confronting a rise in diabetes, hypertension and other chronic ailments associated with modern lifestyles and longer life spans.

India’s smallest state, Kerala, is at the forefront of this troublesome trend. The standard of living in this verdant sliver of land on India’s southwestern coast began rising in the 1970s, thanks

“Among people in India, dementia is still considered a natural consequence of aging, rather than a disease process. In fact, most Indian languages contain no word for dementia.”

India has more people with diabetes than any other country. In 2008, Meredith Hawkins, M.D. (center), professor of medicine at Einstein and a specialist in diabetes, spent three weeks in India to set up research and education partnerships with the staff of Christian Medical College in Vellore. CMC has special expertise in treating diabetes in poor areas and has also teamed up with Einstein researchers to create diabetes prevention-and-care programs in Uganda, where the incidence of diabetes is on the rise.



An estimated three percent of India's seniors—some six to seven million people, or more than in the U.S.—already suffer from dementia. This number may well double over the next two decades, both in India and the rest of the developing world.

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Dr. Verghese decided it was time to learn more about dementia in India, starting with his home state. Thus was born the Kerala-Einstein Study, a two-year project funded by the National Institute on Aging and aimed at strengthening dementia-related research and identifying risk factors for cognitive decline in Kerala.

Dr. Verghese's first challenge was administrative in nature. "Since it's difficult to do this research from afar, we wanted to build an infrastructure that allows local investigators to set up their own studies and develop a research network across Kerala and, in the long term, across India," he says.

Another challenge was assessing cognitive decline in a manner free of bias against people who cannot read or write. Compared to the rest of India, literacy rates are relatively high in Kerala, but many people would still have trouble with standard memory impairment tests, which rely on printed words. "It gets even more complicated if we want to expand this research across the country, since India has about 18 official languages and a hundred dialects," says Dr. Verghese. His solution: develop a test based on pictures and on



spoken rather than written words.

With his new test now in hand, Dr. Verghese and colleagues will look for factors that put Keralans at risk for dementia. A top suspect is cardiovascular disease, which has risen in tandem with dementia in this region of India. "While cardiovascular disease and dementia often coexist," says Dr. Verghese, "we don't know whether the relationship between them is coincidental or causal. Establishing causal links between cardiovascular disease and cognition will be the first step towards developing effective preventive strategies."

The researchers will also look at such risk factors as low education levels and lack of participation in leisure activities—factors that Einstein studies have

linked with cognitive decline.

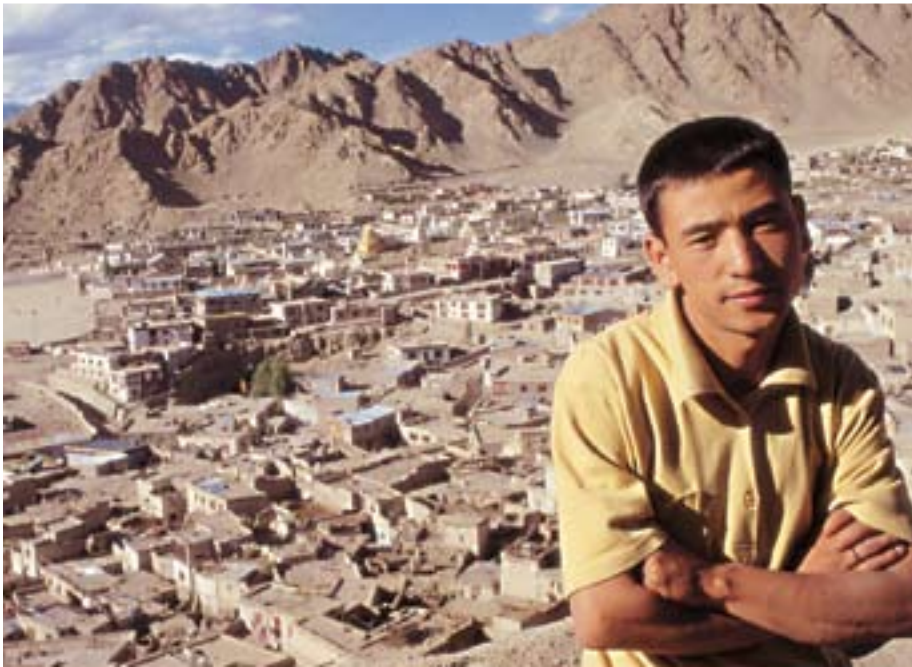
The next phase of the study will establish whether these risk factors can predict the onset of cognitive decline and dementia. To find out, some 2,000 patients will be tested at a new dementia clinic that the team has established at Sri Chitra Tirunal Institute in the Kerala city of Thiruvananthapuram.

Information from the Kerala-Einstein study will help the Indian government better predict its future health needs and may help the US as well. "I think studying diseases there will give us some insights into problems that immigrant populations face over here," adds Dr. Verghese. "Moving from a developing country to a developed country completely changes your lifestyle, as well as your risk for disease."



“With all the HIV cases occurring in India, I wanted to return and do something for the community there.”

— Rosy Chhabra, Psy.D.  
Assistant Professor of Pediatrics



### STEPS in the right direction

When it comes to topics like sexually transmitted diseases and substance abuse, the last person teenagers want to listen to is a know-it-all adult. They're much more likely to pay attention to their peers or near-peers such as college students—the philosophy behind the School-based Teen Education Program (STEP), which trains undergraduates to tell Indian adolescents about the dangers of HIV and alcohol abuse.

STEP is the brainchild of Rosy Chhabra, Psy.D., assistant professor of pediatrics at Einstein, who comes from Simla, a town in India's mountainous north. Many Westerners know this area for its cool, lush green hill stations established by the British in the 1800s.

“With all the HIV cases occurring in

India, I wanted to return and do something for the community there,” says the researcher, an expert in grassroots HIV-prevention efforts.

Everything fell into place for Dr. Chhabra during a 2000 conference in India, where she met people working with teens to prevent drug abuse, but not HIV. “They had the interest and the drive but lacked the expertise,” she says. “We proposed a joint project, and the result was STEP.”

STEP began as a pilot project in Mumbai combining Western know-how and Eastern sensibility. “Teenagers are teenagers no matter where they live, but there are some big social and cultural differences,” Dr. Chhabra explains. For example, STEP's trainers couldn't talk about dating, which is frowned upon by

parents in cosmopolitan Mumbai, but they could discuss intercourse. Go figure. “It helped that I was born in India and brought up there, so I understand a lot of this,” she adds.

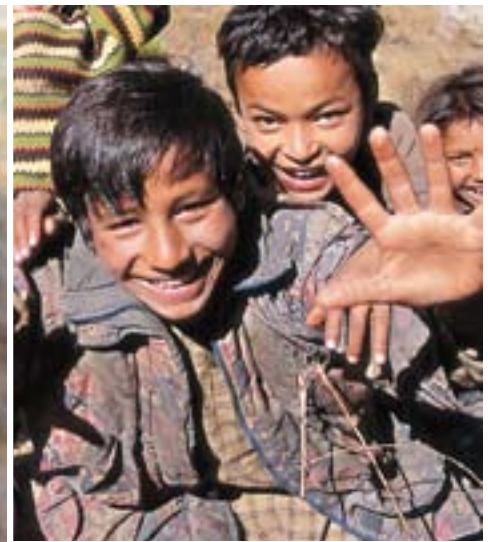
Dr. Chhabra also understood the importance of involving parents, teachers and school administrators every step of the way—especially in a program targeting youngsters with potentially controversial material. “I'm not sure the program would have been as successful if it had been done after school or in a community center,” she says. “As it turned out, not a single parent refused to let their children participate.”

In educating teens about HIV/AIDS, Dr. Chhabra hopes to reduce the disease's stigma, which often prevents people from getting tested and treated. “So many are already symptomatic by the time they get to the doctor,” says the researcher. “I want people to think about prevention rather than treatment. That can change the whole scope of the disease.”

Funded by the World AIDS Foundation, STEP has reached some 2,000 eighth-graders in 25 schools. For the vast majority, STEP was the first HIV-prevention program they'd ever attended.

Dr. Chhabra calls the results “amazing.” Questionnaires given before and after STEP training sessions showed that STEP helped educate students about HIV/AIDS and make them more accepting of people with HIV/AIDS and less likely to be swayed by peers to engage in risky behaviors. “The communities and the schools were very happy, because they felt the students gained some skills they could carry on,” she adds.

With funding from the National Institute on Alcohol Abuse and Alcoholism, Dr. Chhabra launched a second phase of the program, STEP II, which adds a new emphasis on



**Funded by the World AIDS Foundation, STEP has reached some 2,000 eighth-graders in 25 schools. For the vast majority, STEP was the first HIV-prevention program they'd ever attended.**

preventing the alcohol abuse that often leads to risky sexual behavior. STEP's second incarnation has reached 8,000 teens in two Indian states.

"The data from STEP II are still being analyzed, but so far it seems to be working very well," says Dr. Chhabra. "The strength of the program lies in its simplicity. We teach the life skills that youth really need, like dealing with peer pressure."

STEP III, which has just been funded by the MAC AIDS Fund, a private philanthropy, will bring Dr. Chhabra's intervention to her home state of Himachal Pradesh, a rural, mountainous region where the population is largely unprepared for HIV/AIDS. "They are simple, sweet people," she says, "so we need to reach them and educate them before they are affected by the epidemic." Punjab, a state in northwest India, will also be included in STEP III.

Dr. Chhabra has no illusions about the hurdles ahead. "There are more than 300 million people in India under 30," she notes. "But for every person we touch, we make a difference."



“Our goal was to combine structured education, learning gained by doing and the research enterprise.”

— Sonia Suchday, Ph.D.

Associate Clinical Professor of Epidemiology & Population Health; Co-Director, Institute of Public Health Sciences, Ferkauf Graduate School of Psychology



Students at Xavier High School in Mumbai with Elesheva Levine (center), a medical student at Einstein.

### The next generation of global health specialists

“I don’t think anything can sufficiently prepare you for India,” says Elesheva Levine, a third-year medical student at Einstein. She visited Mumbai last summer as part of a pilot training program in global health research offered by the Institute of Public Health Sciences (IPHS), which is jointly sponsored by Einstein and the Ferkauf Graduate School of Psychology. “The first thing that hits you is the humidity. And then the crowds and the poverty.”



But Ms. Levine, a native of Woodmere, Long Island, isn’t complaining. Actually, she can’t praise highly enough the six-week program, split evenly between lectures in the Bronx and a mix of seminars and hands-on research at St. Xavier College in Mumbai, one of India’s most progressive educational institutions. “The lectures here at Einstein were a good preview of global health research,” she says. “But doing it firsthand in India was a lot more powerful.” And that was the intended effect.

“Our goal was to combine structured education, learning gained by doing, and the research enterprise,” says the program’s principal investigator, Sonia Suchday, Ph.D., associate clinical professor of epidemiology & population health and co-director of IPHS. “Teaching each in isolation doesn’t make sense. You can teach students wonderful skills, but those skills are lost unless you give them a place to try them out.”

While in Mumbai, Ms. Levine and her 13 classmates worked on a project involving metabolic syndrome: a cluster of conditions, including abdominal obesity and insulin resistance, that increase one’s risk of developing heart disease and diabetes—two lifestyle-related diseases approaching epidemic proportions in India. Ms. Levine and her colleagues helped Dr. Suchday collect data on biological, psychological and behavioral markers for metabolic syndrome among rural and urban youth in India, paralleling studies that Dr. Suchday has done in

the US. Dr. Suchday hopes to find ways to predict people’s risk for heart disease and diabetes and develop strategies for preventing those problems.

Several students in the global health research program were struck by the different teaching styles in the two countries. “In the West, we tend to be very fact-based in teaching and communicating,” explains Dr. Suchday, a native of Mumbai. “In India, there’s an equal emphasis on research and on learning through personal experience. The students noticed that when one teacher lectured about the epidemiology of cancer, she also talked about her own battle with the disease and how her strong spiritual beliefs influenced her health. One of our students, who knew a lot about the psychosocial aspects of cancer, said to me, ‘I never really understood this until I heard it there.’”

### Endless lessons

There are endless lessons to be learned in India, as Einstein students and faculty are finding out for themselves. A work of fiction—*Midnight’s Children*, Salman Rushdie’s epic tale of the founding of modern India—best sums up this sentiment. Speaking for all Indians, Saleem Sinai, the novel’s protagonist, exclaims: “To understand me, you’ll have to swallow a world.” **E**