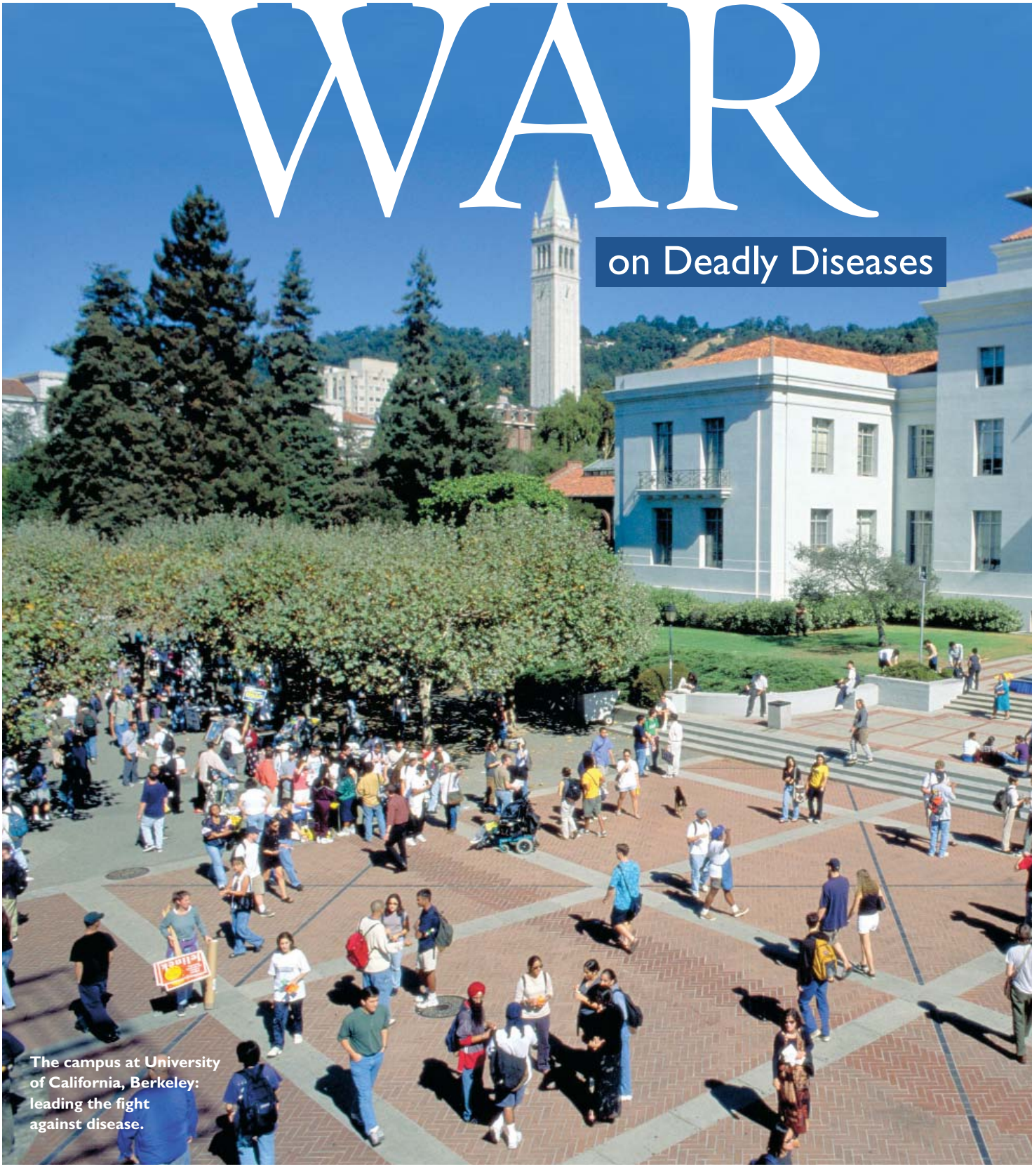
The Li Ka Shing Center at UC Berkeley: a new research facility, a new approach

By Andrea Li

WAR on Deadly Diseases



The campus at University of California, Berkeley: leading the fight against disease.

PHOTOS: COURTESY OF UC BERKELEY

MORE THAN A DECADE AGO, a group of scientists at the University of California, Berkeley, had a vision they named the "health sciences initiative". This was a new approach to scientific research, and involved building the kind of state-of-the-art facilities that would not only ensure the university maintained its position as one of the world's premier teaching and research institutions, but also maximise the economic and social benefits that would flow from their discoveries.

The scientists then set out to raise the funds needed to construct two new cutting-edge research facilities that would encourage cross-disciplinary collaboration and group together leading scientists from a wide range of disciplines to fight some of the deadliest diseases on the planet.

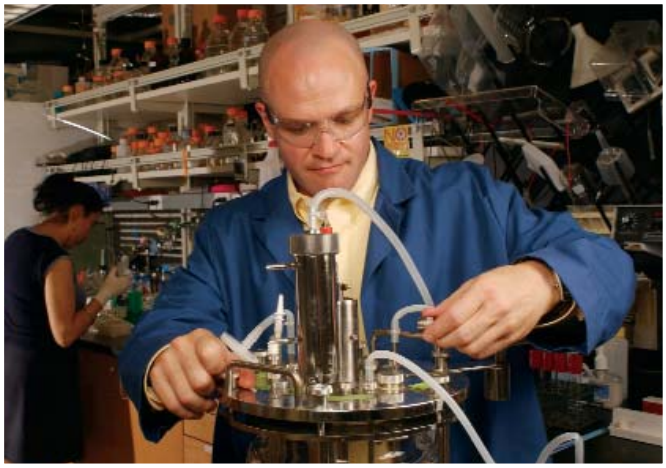
Now, 10 years and three university chancellors later, their dream has almost come to fruition, with one building about to be completed and construction of the second commencing soon, thanks to a generous USD40 million donation from the Li Ka Shing Foundation.

This is the largest-ever international donation in the university's history and is considered to be the "cornerstone" gift to the USD160 million second-phase initiative. The Li Ka Shing Center for Biomedical and Health Sciences is expected to make a huge contribution to the advancement of medical research. The facility will house computer scientists, biologists, physicists, engineers, chemists and mathematicians under one roof and enable a collaborative medical approach towards four key medical issues: stem cell research, infectious diseases including HIV and dengue fever, cancer, and neurosciences including Alzheimer's disease. Several Nobel prize laureates will also work in the centre.

Scheduled for completion in 2009, preliminary designs show the 210,000 gross square foot building will have five storeys and 30-35 research and teaching laboratories, as well as lecture halls and seminar facilities. It will also provide highly specialised facilities for instrumentation and containment areas to handle viruses and stem cell cultures.

"The centre is expected to be a magnet for people from all over the world," said Robert Tjian, professor of biochemistry and molecular biology, also faculty director of the health sciences initiative at UC Berkeley. "We plan to later recruit world-class scientists and feel confident we will attract new talent both nationally and internationally."

So far, UC Berkeley scientists have already made significant progress in using their research to bring science to ordinary people. It is this philosophy behind the health sciences initiative that may have most strongly resonated with Hutchison Whampoa Limited Chairman Li Ka-shing. "The fundamentals of the initiative are almost exactly what Mr Li himself has done in China; by bringing education, medicine, and the modern world to people in rural parts," said Professor Tjian. "Perhaps this is one reason why



Berkeley attracted the tycoon's attention more than any other institution outside China."

UC Berkeley is the kind of place where action follows words. The idea of bringing science to ordinary people is not some lofty goal created by academics in their ivory tower, but a very real way of implementing research done there every day. This can be seen in what the university has done for the prevention of dengue fever, an infectious disease carried by mosquitoes and caused by any of four related dengue viruses.

Scientists at Berkeley recognised that the disease predominately occurs only in small rural villages, where medical access is not easy, so they developed a robust prevention kit that is effective and relatively inexpensive, enabling people to self diagnose for dengue fever when they are out in the field anywhere in the world. It is this type of pioneering prevention measure that scientists hope to see more of in the future.

UC Berkeley is the kind of place where action follows words

Battling against deadly diseases like cancer is another huge challenge but scientists are already heading in the right direction with the development of some less invasive cancer treatments. It is hoped new medical advances will eventually spare patients the brutal side effects associated with cancer treatments like chemotherapy or radiotherapy.

"In the future, we will be able to identify individual tailor-made treatments for different types of cancers once we identify where the cancer is located, and in which gene. We can then gear treatment to that particular area," said Randy Schekman, professor of molecular and cell biology. "This is something we couldn't have dreamed of doing a few years ago."

Meanwhile, research on killer diseases like HIV will focus on the finer points of how the virus works, the virus cycle and how it hides out, said Professor Tjian.

Further funding for the project is likely to come from the California Institute for Regenerative Medicine which awards grants for stem cell research to California research institutions and industry. "We hope to leverage our collaborative research agenda and the construction of the centre to request matching funds from the California Institute for Regenerative Medicine directed for stem cell research at Berkeley. Mr Li's leadership gift is critical to our opportunity to leverage these funds," said Professor Tjian.

Global health problems and disease security are two of the most pressing problems facing the world today. "There is no doubt infectious diseases are a global problem," said Professor Tjian. "We now end up looking at the world as a whole and think about how everything is really interrelated. Take SARS for example. Within 24 hours it could go from China to San Francisco, so it essentially becomes everyone's problem."

The global nature of world medicine also has a human face at UC Berkeley. The Department of Molecular and Cell Biology has one of the university's largest undergraduate populations, attracting several hundred undergraduates each year, many from Asia.

"The undergraduate numbers began increasing in the 1990s, partly as people began realising how important and lucrative the biotech industry had become, and also the difference they could make to the world through research," said Professor Tjian.

Whatever the future holds, there is no doubt the world will need many more of these passionate doctors and scientists in the future if the war against global diseases is to be won.

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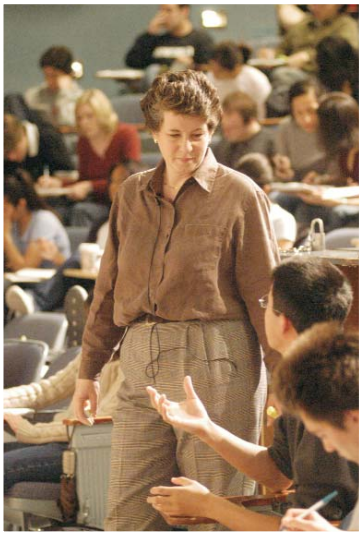
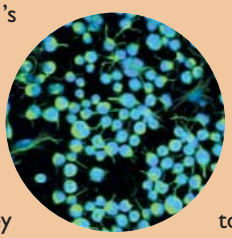


From far left: **The university's landmark bell tower; Jay Keasling, who is developing a cheap new anti-malaria drug; faculty director Professor Robert Tjian; a research programme at the Henry Wheeler Brain Research Center that will be housed at the new Li Ka Shing Center; students attending a lecture; Governor of California Arnold Schwarzenegger thanks Mr Li for his generous donation to UC Berkeley.**

Stem Cell Research

WHAT DO THE ACTOR Christopher Reeve, President Ronald Reagan and former world heavyweight boxing champion Muhammad Ali have in common? The answer is their medical conditions.

Reeve suffered spinal cord injuries after a riding accident that left him paralysed; President Reagan's Alzheimer's disease left him unable to recognise family members in his final years; Ali is battling Parkinson's disease, a progressive neurological condition. All could have benefited in some form from human stem cell research.



Scientists believe stem cell research holds the key to unlocking countless medical mysteries. They are hopeful it will one day help find new treatments or even cures for some of the deadliest diseases, including cancer, heart disease, cystic fibrosis, multiple sclerosis, HIV/AIDS, and even help severe burn victims.

Stem cells have the ability to generate healthy new cells, tissue and even organs that can replace diseased or dysfunctional cells. This provides an alternative and renewable source for specialised cells in the event that donors cannot be found for a particular organ or specific tissue. Researchers are currently investigating the use of adult, fetal and embryonic stem cells as a resource for various specialised cell types which range from nerve cells to muscle, skin and even blood cells, to treat a host of diseases.

For example, in Parkinson's disease, stem cells may be used to form a special kind of nerve cell that secretes dopamine. Transplanted into a patient, these cells will work to rewire the brain and restore function, thus curing patients of the disease.

"Stem cell biology is incipient. Real solutions and therapies can only be effectively explored once the basic biology of stem cells is understood," said Robert Tjian, professor of biochemistry and molecular biology, also faculty director of the health sciences initiative at UC Berkeley. "One of the major challenges facing stem cell research is to understand the molecular and underpinnings of stem cell differentiation and developmental biology, areas of research in which UC Berkeley is premier."

Looking ahead, there is no doubt stem cell research at UC Berkeley will benefit from the inter-disciplinary approach brought on by the health sciences initiative, while the physical infrastructure of the Li Ka Shing Center will provide research facilities of the highest standard.

By leveraging on the university's excellence in molecular and cell biology, genetics, genomics, neuroscience, chemistry, biophysics, bioengineering, computational biology and even advanced imaging techniques, UC Berkeley scientists hope to contribute to discoveries that could mean the difference between life and death for patients.