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Neurosciences Building to Take Scientific Research to the Next Level

An architectural rendering of the neurosciences building to be constructed at UCSF Mission Bay.

By Lisa Cisneros and Robin Hindery

UCSF is moving forward with plans to construct a neurosciences building at Mission Bay where the world's top clinical and basic-science researchers will collaborate to prevent, treat and cure pervasive neurologic diseases and disorders such as Alzheimer's, stroke and epilepsy.

UC Regents today voted to proceed with the funding and financing plan for the five-story, 237,000-square-foot building. Construction of the building — to be the sixth research building at Mission Bay — is expected to begin in March 2010 and be completed in 2012.
Read the news release.

The total project cost of the neurosciences building is $200 million. Since the initial project approval in February 2009, UCSF was able to work with the developer in reducing the total project cost by about $16 million, in large part because of the current construction market conditions.

The Regents also approved $37 million to fund the drafting of preliminary plans, working drawings and basic site infrastructure to support the neuroscience building and three adjacent blocks of real estate at Mission Bay for future UCSF research buildings.

The decision to go ahead with the project despite the serious economic challenges facing the University reflects the need for UCSF to advance its mission, said UCSF Chancellor Sue Desmond-Hellmann, MD, MPH.

"This building offers an unprecedented opportunity to bring under one roof some of the world's top scientists studying complex neurological diseases, allowing them to share their expertise, strategize and collaborate in a way they cannot when spread out on different campuses and in different buildings," Desmond-Hellmann says. "This approach will accelerate research discoveries and drive them toward patient care.

"As such, this building exemplifies UCSF's commitment to discovery, education and

patient care," she says. "It is imperative that we maintain our strategic vision and continue our leadership role in tackling the world's devastating diseases."

The building, to be located on the north side of Koret Quad, will house about 100 principal investigators and more than 500 additional researchers and staff working in clinical and research programs of the UCSF Department of Neurology, the Institute for Neurodegenerative Diseases (IND), and the W.M. Keck Foundation Center for Integrative Neuroscience. The first floor will be occupied by clinicians and clinical researchers of the UCSF Memory and Aging Center, which is part of the Department of Neurology.

Using a New Development Model

Importantly, the neurosciences building will be developed using a novel cost-effective public/private delivery model that was approved by the Regents in November 2007. Under this development model, which is similar to others used at UC Berkeley and elsewhere in the UC system, the neurosciences building will be built and owned by a private developer providing an alternative delivery structure for UC projects.

UCSF, which owns the land, will ground lease the land to the developer and enter into a space lease for the building for a period of between 32 to 40 years, depending on bond market conditions.

Lease costs will be paid by a combination of indirect costs from research grants, campus funds and philanthropy. UCSF plans to raise $95 million through philanthropy over the next five years. At the end of the lease period, ownership of the building, paid in full, will revert to UCSF. No state funds will be used to support the lease.

UCSF also plans to assess the potential to raise another $55 million over the same period to provide critical neuroscience program support, including funds for recruitment.

"This is a really exciting model that will bring the neuroscience community together in the epicenter of our molecular and cellular science effort at Mission Bay," said Stephen Hauser, MD, chair of the Department of Neurology at UCSF. "It will also bring together all of the elements that are needed for truly translational science —from very basic science to bedside science to drug development."

Fostering Collaborations

"This building culminates a 10-year dream," says Nobel laureate Stanley B. Prusiner, MD, director of the IND. "It will bring together some of the best scientists in the world to work on these very prevalent diseases of the brain. The opportunity for major progress is tremendous."

The research space provided by the building and the adjacent Arthur and Toni Rembe Rock Hall neuroscience building will constitute "more than 400,000 square feet dedicated to studying these extremely complex, challenging diseases," Prusiner says. "UCSF Mission Bay will be one of the biggest neuroscience complexes in the world."

Collaborations with colleagues across the thriving biomedical campus at Mission Bay will be strengthened with this new building as will UCSF's ability to recruit and cultivate the next generation of neuroscience investigators.

Representing a milestone in the evolution of UCSF's world-class neurosciences program, the building will bring under one roof clinicians treating patients with neurological conditions, clinician-researchers carrying out brain imaging and drug studies in patients, scientists studying the molecular and cellular basis of diseases, and scientists investigating how the brain normally functions.

"The goal of this building, and the success bar against which we'll be judged, is to cure some of these terrible neurologic diseases," Hauser said. "And by 'cure,' we might mean different things. For someone with one of these problems, cure might mean stopping the disease in its tracks. It could also mean repairing damage that has already been done or preventing the problem from happening altogether."

Achieving that ambitious goal will require teamwork, not only among the building's occupants but throughout the University and beyond.

"We truly want to be a building without walls," Hauser added. "And we will be open to all forms of collaboration, including partnerships with Silicon Valley, the biotechnology industry and the pharmaceutical industry."

Welcoming New Talent
Space provided by the neurosciences building will enable UCSF to recruit a dozen additional investigators who are experts in neurodegenerative diseases, drug discovery and drug synthesis.

Opening the door to new talent—particularly at the IND, which focuses on uncovering the causes of and cures for neurodegenerative disorders, including rare "prion diseases" such as Creutzfeldt-Jakob Disease (CJD) in humans and "mad cow" disease in cattle—is long over due, Prusiner says.

Prusiner won the Nobel Prize in Physiology or Medicine in 1997 for his discovery of prions, a class of disease-causing proteins. The discovery has informed research into the role of misprocessed proteins in more common brain diseases, including Alzheimer's disease and Parkinson's disease.

"In 43 years, there hasn't been one effective treatment introduced for any neurodegenerative disease," Prusiner says. "That's pretty bad."

Using private philanthropic donations, Prusiner plans to recruit about a dozen new investigators from around the world, many of whom will devote most of their time to formulating compounds that can be converted into drugs.

"It takes a lot of smart people to conquer these diseases," Prusiner says. "In the new building, the IND will grow to a point where it can be really effective in mobilizing people…and getting them more excited about tackling these horrible diseases."

Honing in on Alzheimer's
In the new building, the IND will focus increasingly on developing drugs for Alzheimer's disease, which affects roughly 4 million people in the United States, Prusiner says.

Unlike prion diseases, which afflict animals as well as humans, Alzheimer's is a uniquely human disease, and it has therefore been difficult for scientists to produce a high-quality model of Alzheimer's for drug-research purposes, Prusiner says.

In his own lab, Prusiner has made significant strides in developing therapies to treat CJD. That acquired knowledge will help inform the IND's efforts to combat Alzheimer's, he said.

"When you try to develop a drug, you have to have cell models of some sort in order to screen hundreds of thousands of compounds and start to zero in on the one that will work," he says. "We've had some success with prion diseases, and now we're working hard on cell models of Alzheimer's and improving mouse models of the disease."

Speeding Translation of Discoveries
Allison Doupe, MD, PhD, a senior scientist and psychiatrist at the Keck Center, said the new neurosciences building will expose the Keck staff of basic-science researchers to clinical researchers on a daily basis, thereby facilitating the transition of lab discoveries into the real world.

"What do we get from being in a building where two-thirds of the people are in clinical enterprises?" she said. "We get the link to disease; we get the context. We get to help [clinicians] understand how the brain works when it's working right, and we get to understand from them how it doesn't work when it's working wrong."

Doupe said each entity within the new building will bring important strengths to the table, helping to piece together the many puzzles surrounding neurologic

disorders.

"We need to be able to deploy two different but related approaches to get the brain to use its innate abilities to learn to heal itself," she says. "The first is that, at the level of cells and molecules, we need to know what goes wrong with the brain when there is disease, and what to do to stop the process. And that's where the Department of Neurology and the IND come in.

"We also have to understand how to get a brain to relearn normal functions, and that's what we do at the Keck Center."

Though on a smaller scale than the IND, the Keck Center will also undergo an expansion in the new building, from 11 existing labs to 13 or 14, Doupe said.

Achieving Success through Innovation

Gaining a more complete understanding of brain behavior will hinge on the continued innovation of investigators like Michael Brainard, PhD, a Keck Center scientist who has shed light on human brain function and learning through his work with songbirds.

Songbirds learn their songs much like humans learn speech and have specialized brain areas for vocal behavior similar to those in humans. Brainard, a faculty member in psychiatry and physiology, has used the results of his investigation of normal adult brain function to induce new learning in adult birds once thought to be incapable of further learning.

Doupe says of Brainard's work: "Songbirds can tell us about the brains of people, and what we learn about the birds will enable us to put people into the right situation with the right stimulation and the right exercises to get the brain to relearn after it has been damaged."

The new neurosciences building will also enable collaborative groups of Keck Center faculty to undertake entirely new research initiatives, such as the plan to use optogenetics — an emerging field that combines optical and genetic techniques — to manipulate the neural activity in many different kinds of animals in order to study brain mechanisms of learning. This project recently received a $1.6 million grant from the National Institutes of Health.

Hauser hopes such groundbreaking research will lure young investigators to the field at a time when they are desperately needed.

"We are seeing a critical shortage of young people who are willing to pick up the baton from us senior people," he says. "This neurosciences building needs to become a magnet for inspiring and exciting young people toward careers in translational medicine. We hope to train a new generation of clinician-scientists who go out and make an impact internationally."

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