edge falls in the northeast where the subcontinent plows under Asia to push up the Himalayas. Strain is building there far faster than within the subcontinent, so fast that great earthquakes should be rupturing one segment or another of the Himalayan plate boundary every few decades on average to relieve the strain, says Bilham. "You need 14 or 15 [large] earthquakes to let the entire arc rupture," he says. "We've had only three in the last 200 years; that leaves at least 11 to go. It looks as though they could happen at any time."

Bilham's particular concern is the massive riverside cities on the plain south of the mountains, where millions of people live on ground that could turn to mush when shaken by a big, distant earthquake. "It looks pretty grim to me," says Bilham.

As for the Bhuj quake, Ramamurthy promises a complete "scientific postmortem." The lessons, however, will be hard to apply. **–RICHARD A. KERR**

With reporting by Pallava Bagla in Ahmedabad.

BIOINFORMATICS

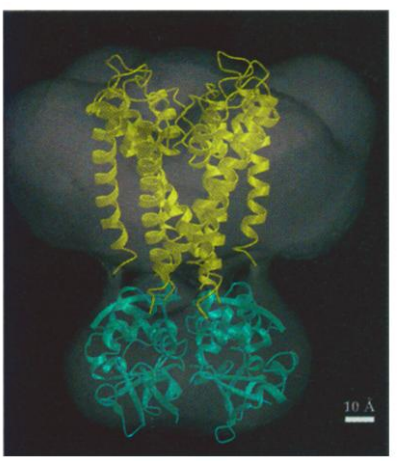
Hughes to Build Own Tech Research Center

Best known as a virtual institute, the Howard Hughes Medical Institute (HHMI) of Chevy Chase, Maryland, will soon make a vast expansion in bricks and mortar. The heavyweight biomedical organization this week announced it will spend $500 million over 10 years on a suburban research center that will develop cutting-edge bioinformatics, imaging, and other tools. It will also serve as an incubator for visiting scientists—even those who aren't HHMI investigators.

The intramural research campus will be a major departure for the $12 billion HHMI, which since 1953 has focused on funding an elite corps of researchers at academic campuses around the country and nourishing a stable of education and training programs. But HHMI president Thomas Cech wants to develop expertise in new technologies, broaden the institute's reach, and continue Hughes's mission to support the best research. "This is something that will cut across all of biomedical science," says Cech.

The few researchers who have heard about HHMI's closely guarded plans are enthusiastic: "It sounds like they're going to create a great playground" that will encourage the kind of mixing among disciplines needed to develop these technologies, says Harvard Medical School neuroscientist Carla Shatz, a former HHMI investigator who now serves on its medical advisory board. "I think it's an amazing opportunity."

The institute will break ground in 2003 on a 112-hectare site in Virginia, about a 45-minute drive from its present headquarters. Plans call for spending $200 million to $300 million on a cluster of buildings with 46,000 square meters of space on the site, bordering the Potomac River in Loudoun County and not far from Dulles International Airport. The campus, which will eventually house up to 300 scientists and has room to double in size, should open by 2005 with an annual operating budget of roughly $50 million. But it won't be another Whitehead or Salk Institute, says HHMI vice president for biomedical research Gerry Rubin: "They don't leave two floors vacant for visitors [like we will]."



Technological leap. Hughes's planned "collaborative" center may develop tools such as the new electron microscope technique used to make this first-ever 3D image (in gray) of a voltage-gated ion channel.

Cech, Rubin, and David Clayton, vice president for science development, came up with the idea for a "collaborative research campus" as Cech was preparing to take the institute's helm in January 2000. They wanted to cap the number of HHMI investigators—which soared in the 1990s as the institute's endowment grew—at around 350 to keep the program manageable. With money to spare, institute officials decided to feed investigators' insatiable appetite for high-tech tools such as bioinformatics software and low-temperature electron microscopy. The trio wanted to ensure that all HHMI investigators—not just those at wealthy campuses—could get access to these tools and the expertise needed to run them. But being just a service center "sounded dull to us," Cech says.

The 24 resident investigators, who won't have tenure, are likely to include physicists, computational scientists, engineers, and other discipline-crossing experts who "don't fare very well in the traditional academic system," as well as top talent from industry, Rubin says. Although the research topics have yet to be defined, HHMI's leaders are talking about hot fields such as proteomics and bioinformatics; they're also discussing new tools for imaging cells and tissues in live animals. "A lot of the things we'll be doing are more typical of the best biotech companies," Rubin says. But although HHMI will seek patents on discoveries, fostering business start-ups "is not a major goal," Rubin says. Nor is making money. "We're not doing this as a way to increase our endowment," he notes.

The center will spend half its budget on a second mission: incubating new ideas by funding the most interesting proposals to be carried out at the plush new facilities. Some researchers might bring along a few grad students or postdocs to learn new software, analyze samples, or develop new instruments. Others may be scientists from far-flung institutions who want to work on a compelling idea—one that won't necessarily involve technology. The visitors may stay just a few weeks or take a sabbatical year. HHMI will pay all the bills, putting up as many as 100 scientists on campus and giving them lab space. "There's no place in the world that does that," Rubin says. The center will also host courses similar to those at New York's Cold Spring Harbor Laboratory, which Cech says is "just saturated."

This plan won't end the shortage of qualified people in bioinformatics, note experts such as Sean Eddy, an HHMI investigator at Washington University in St. Louis, Missouri. But "in the short run, centralized facilities ... do seem like they'll be a good way to maximize the utility of a small number of skilled bioinformaticians," Eddy says. While observers at the National Institutes of Health are awaiting details, they say the new center should complement NIH's own recent efforts to bolster bioinformatics and imaging through a new institute. "Computational biology is likely to be the driving force in biology for the foreseeable future," says Marvin Cassman, director of the National Institute of General Medical Sciences. **–JOCELYN KAISER**

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