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USA Today 6/24/05

title: Universities grid for battle for bioscience supremacy

Stem-cell research emerging as a pi

Continued from 1B

that two scientists — one from Harvard, the other the University of Michigan in Ann Arbor — are joining its Institute for Cancer/Stem Cell Biology and Medicine this fall. The school, an hour south of San Francisco, said they came partly because of California's abundant stem-cell research dollars.

Stem-cell research, while controversial, is emerging as a promising area of biotech discovery.

Cover story

Stem cells can become almost any specialized cell in the body. That means they can be induced to become cells with special functions, such as beating cells of the heart muscle.

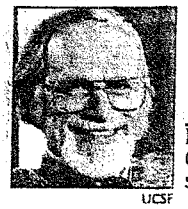
The academic contest comes as states nationwide scramble for a slice of a sector looming as a big source of economic growth. The industry, started 30 years ago, has mostly been a money-loser.

But recent advances in human stem-cell and genetics research spur hopes that biotech is closer to cures for spinal-cord injuries and other maladies. That could transform biotech into a profit machine just as states are leaning more on universities for help in boosting their economies.

"The heat is on, especially at the research universities," says George Keller, a university consultant and former chair of the University of Pennsylvania's higher-education program.

Research rivalry

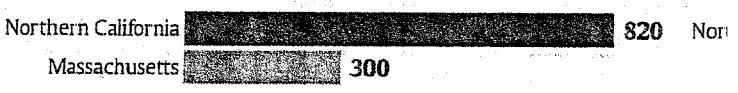
Top universities in California and Massachusetts are spending millions to win aca
University of California at San Francisco, Harvard and Massachusetts Institute of

School:	Stanford	University of Califo
Location:	Palo Alto, Calif.	San Francisco
	 Stanford News Service	 UCSF
	John Hennessy President since 2000	**J. M Bis** Ch sin
Leader's background:	Engineering	Cancer research
Biotechs it helped create:	Anacor Pharmaceuticals, Connetics	Chiron, Genentech
Inventions:	362	152
Patents received:	117	84
Start-ups spun off:	12	3

Source: Association of University Technology Managers. Figures are for 2003, most recent available. Invent

Both regions are rich in biotechs and employees

Biotechs:



Sources: BayBio trade group; Massachusetts Biotechnology Council, a trade group

Biotech clusters

Cambridge, Mass., and the San Francisco Bay area are home to a combined 1,000 biotechs and 100,000 biotech workers, industry officials say — the USA's biggest clusters.

Many, including leaders Genentech in south San Francisco and Biogen Idec and Genzyme in Cambridge, trace their births to those universities.

"It's a real cauldron of activity," Hockfield said in an interview.

Bulldozers in San Francisco stir up dust at the University of California's 43-acre Mission Bay campus, where nearby office buildings are planned in the next 15 years for biotechs that could employ 5,000 workers.

At $1.5 billion, it's the USA's biggest university biomedical expansion, UCSF says. A centerpiece is QB3, a joint venture between UCSF and sister UC campuses in Berkeley and Santa Cruz.

QB3, with a $100 million building budget, will combine 1,500 scientists from biology to computer science to physics aiming to solve medical mysteries. Executive director Regis Kelly, a neuroscientist, moved into QB3's new office last month.

Turning from a view of the glittering San Francisco Bay, he points to a room that will house 2,000 computer servers. Lashed together, they could slash the time researchers spend in early drug development, a period accounting for a chunk of the often $1 billion cost of developing a single new drug, Kelly says.

He doesn't hesitate when asked about the Broad Institute, a joint venture of Harvard and MIT similar to QB3.

"The Broad is our major competition," he says.

Broad, launched last year with a $100 million gift from Los Angeles entrepreneur Eli Broad, has 400 researchers and other employees from the schools and affiliated hospitals pursuing cancer cures.

For example, scientists are hunting for what Broad calls cancer's "Achilles' heel" — genes that cancers need to survive. Cataloging genes could speed discovery of cures.

Universities have long been engines of innovation, exploring science too dicey for even the bravest start-ups, says Michael Lytton, general partner at Oxford Bioscience Partners. It's a venture-capital firm investing in biotech start-ups.

MIT Provost Robert Brown compares his school's role in advancing the biotech industry in Massachusetts with Stanford's in the evolution of Silicon Valley. "This is the address to be," he says.

Hockfield wants to keep it that way. Her advocacy comes as the state fears losing biotechs to California, as it did with computer development in the 1980s.

"At MIT, we will do our part to make sure that this process does not repeat itself," Hockfield told the Massachusetts Biotechnology Council last month in one of her first speeches since being inaugurated.

MIT and other schools guard billions in government research money flowing to biotech and other "life sciences" that combine engineering, biology, math and other disciplines.

Last year, life sciences accounted for 54% of the $54.1 billion in federal research spending, up from 41% in 1994.

...ising area of biotech discovery

...ic dominance over biotech and to nurture nearby biotech businesses. Stanford, ...chnology already lead in discoveries spurring business start-ups of all kinds.

...ia	Harvard	MIT
	Cambridge, Mass.	Cambridge, Mass.
...hael ...p ...ellor ...1998	 Harvard University News	 MIT
	Larry Summers President since 2001	**Susan Hockfield** President since 2004
	Economics	Neuroscience
	Ariad Pharmaceuticals, Infinity Pharmaceuticals	Biogen Idec, Genzyme
	119	**452**
	59	**152**
	4	**15**

...are those reported to tech transfer offices.

Employees:

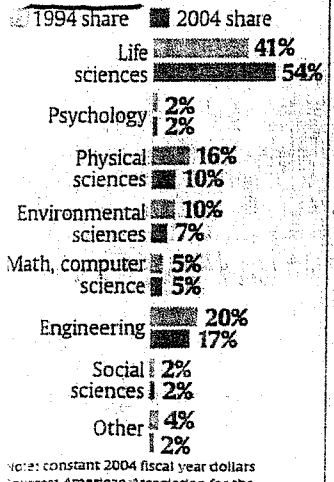
...n California 85,000

...s ...tts 30,000

By Karl Gelles, USA TODAY

Follow the money

Universities are expanding biotech programs as the federal government shifts more research money to life sciences.



...ote: constant 2004 fiscal year dollars
...ources: American Association for the ...dvancement of Science, National ...cience Foundation

By Adrienne Lewis, USA TODAY

...easure of that shift: MIT, ...h about $1 billion in research ...nts, for the first time got more ...m the National Institutes of ...alth in 2003 than from its long-...e patron, the Defense Department. "Last year, it blew through the roof," Brown says.

Potential pitfalls

Still, for all of its potential benefits to schools, biotech poses political and financial risks.

Human embryonic stem-cell research is opposed by many social conservatives who compare it to abortion because it often destroys embryos.

Harvard collided with Massachusetts Gov. Mitt Romney last month when he unsuccessfully sought to limit legislation boosting stem-cell work at the school and elsewhere.

There are campus politics, too. Many Harvard professors are upset about Summers' leadership as he pushes deeper into science. The former Treasury secretary lost a rare no-confidence vote by the Arts and Sciences faculty three months ago, partly because of his remarks about the suitability of science as a career for women.

At Stanford, former professor James Clark, a co-founder of Netscape Communications, withdrew $60 million of his promised $150 million gift for an initiative, Bio-X, to protest restrictions President Bush imposed on the federal funding of embryonic stem-cell research.

Started in 1998, Bio-X combines faculty from across campus in computer science, physics and other fields.

The newest participants will likely include Stefan Heller of Harvard and Michael Clarke of the University of Michigan, the two scientists coming this fall.

They hope to tap some of California's $300 million in annual stem-cell research money in the next 10 years. Heller studies how stem cells might be turned into sound-sensing cells as a possible cure for deafness. Clarke studies the role of stem cells in breast cancer.

Financial risks loom when schools pursue new disciplines, hoping to generate more research and other income.

Harvard, in Cambridge, is developing a new campus in nearby Allston, on the Boston side of the Charles River, that will have a heavy science focus. It's a project the school compares with UCSF's Mission Bay, which Summers has toured.

Harvard's Hyman, hired in 2001 from the National Institutes of Health, says the school wants more "useful collaborations with industry."

But tacitly conceding that closer corporate ties are controversial, he says Harvard is committed to research driven by faculty and student interest and not solely "by the pursuit of commercial gain."

Critics such as Professor Gary Rhoades at the University of Arizona worry that schools cozying up to biotech and other industries will be ethically compromised in the pursuit of riches. A scientist with a corporate consulting deal might be less willing to publish research that could be useful to other scientists.

Moreover, schools with fewer resources than an MIT or a Stanford might copy their pricey biotech investments, then raise tuition to pay for them.

"We play follow the leader," says Rhoades, who co-authored a book on the subject last fall, *Academic Capitalism and the New Economy*.

That might mean following UCSF, where the QB3 program has been charged by lawmakers with boosting California's economy by retaining biotechs and nurturing new ones. That underlines the pressure public universities shoulder in a 21st century driven by biology.

QB3 chief Kelly says private schools such as MIT, Harvard and Stanford can bide their biotech time.

"They don't have to worry about hustling," he says. "I like to hustle."