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World's Most Dangerous Germs, Coming to a Campus Near You?

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At the western edge of the University of California at Davis campus, on a vacantplot of farmland, officials are proposing to build a new laboratory whose internal operations and outside appearance would be like none other at a university.

Inside, some employees would wear spacesuitlike protective gear to work with the world's most dangerous microbes, like the Ebola virus. Outside the fortress-like building, trenches, berms, a double set of fences, and blast-hardened walls would protect it against car bombers.

To the university, it is a chance to aid the country's efforts to combat terrorism. To worried citizens, it is a risky, unnecessary endeavor that doesn't belong in a college town.

The university is one of a handful that have applied to the National Institutes of Health for a grant to build a high-security "biosafety" laboratory designed to safely contain dangerous microbes that cause diseases for which there are no known treatments.

The NIH plans to award one or two such grants of up to $150-million each by October, and UC-Davis and at least five other universities around the country are vying for the prizes. In cities like Galveston, Tex., and Chicago, institutions' proposals for the labs have attracted little attention or debate so far.

But in Davis, where town-gown tensions have been growing for some years, reaction has been passionate. Citizens and some faculty members have denounced the lab as a possible threat to public health. The Davis city council unanimously voted to oppose the project.

Safety Concerns

The elaborate security precautions strike some people as inconsistent with a college environment. Critics say the university consulted far too little with the public about the risks. "There isn't certainty in the methods of science or the

people who implement them," says Miriam J. Wells, a professor of anthropology who opposes the lab. "Accidents happen."

In addition, some outside observers question the need to build the most-secure version of laboratories for bioterrorism research on any college campus and say they belong at secure government facilities instead. Some experts say that other colleges could run into similar public opposition as the federal government pours millions of dollars into bioterrorism research at campuses across the country.

Defenders of the proposed biosafety labs say they will actually be safer than existing labs built for studies of less-dangerous but potentially lethal microbes at UC-Davis and other colleges. Nevertheless, they acknowledge that the labs present a public-relations challenge.

The government's proposal to build more of the most-secure laboratories, designated "Biosafety Level 4," grew out of the anthrax attacks of 2001. Currently, only two laboratories in the United States have significant amounts of Level 4 space: the U.S. Army's Fort Detrick in Frederick, Md., and the Centers for Disease Control and Prevention, in Atlanta.

NIH officials say the nation needs more lab space at this highest level of containment. More Level 4 laboratories will accommodate a rapid expansion of research into ways to prevent and treat diseases caused by anthrax and other dangerous microbes that might be used by terrorists.

Congress provided the construction dollars when it approved an NIH plan to spend $1.7-billion this year for research to counter bioterrorism, a fivefold increase over last year.

Besides extensive physical security, the new Level 4 laboratories would have special ventilation systems to protect lab workers from infection, and containment doors to prevent the escape of microbes into the environment. Scientists working with the most-hazardous microbes would wear body suits with their own air supplies, as depicted in movies like Outbreak.

The new labs would tap into the expertise of professors at the universities where they are located. Scientists from other nearby colleges would visit to collaborate on research. The laboratories would also serve as a training ground for new

scientists entering this specialized area of research, of which there are relatively few.

The construction grants will be by far the largest single awards ever given by the NIH, which usually gives limited dollars to colleges to erect buildings. Applications for the awards were due in February. NIH officials say that the identities of the applicants are confidential.

But six universities have publicly announced their bids in order to help build community support and calm any anxiety about the projects. Besides Davis, they include Boston University, Oregon Health and Science University, the University of Illinois at Chicago, the University of Maryland at Baltimore, and the University of Texas Medical Branch, in Galveston. The New York State Department of Health is also seeking a grant.

Using its own funds, Galveston is already building a smaller version of a Level 4 laboratory, which will be the first such facility located on a college campus when it opens this fall. The NIH is also building its own, new Level 4 facility in Hamilton, Mont., and plans to pay for the construction of additional Level 4 space at Fort Detrick that will be shared with the Army.

Although the Level 4 space is the most controversial, NIH officials say it will take up only a minority of floor space in the building, which will also include other areas where researchers will study less-dangerous microbes, and as a result, need less-elaborate containment equipment. In addition, the NIH is considering awarding another $75-million among up to eight regional groups of universities to construct buildings that contain only these less-elaborate laboratories, which are designated Level 3.

Tensions in Davis

To officials at the Davis campus, the university seems like a natural to land the grand prize of a Level 4 laboratory grant from the NIH. It already has primate- and veterinary-research centers as well as a college of medicine, all of which would participate in the research. And Davis's would be the first and only such laboratory on the West Coast, in the nation's most-populous state.

One of the NIH's selection criteria is to distribute the labs more widely across the United States to provide analytical capacity in the event of a large outbreak of a serious disease of unknown origin -- such as sudden acute respiratory syndrome, or SARS. Although the virus responsible has caused relatively few deaths so far, scientists at first didn't know how serious or lethal the virus was, or its origin.

Still, the proposal for a Level 4 laboratory in Davis came as an unpleasant surprise to many of its citizens.

They said the university was not forthcoming soon enough with the details. University officials held the first public meeting about the project in late January, just two weeks before the NIH deadline for applications. Some of its competitors had started similar sessions a month or more earlier.

There were already raw feelings in Davis about other recent university projects. The university's plans to build on-campus housing for its burgeoning student body struck some residents as an attempt to end-run the city's land-use policies, which are aimed at keeping the leafy, laid-back town from growing too fast.

And in the early 1990s, the university was blamed for improperly dumping on its property radioactive and chemical wastes from a 30-year study of the possible health effects of nuclear bombing. Neighboring farmers said the toxins contaminated their wells.

Given that history and Davis's liberal reputation, the project's opponents and some of its friends say the university should have been more careful about the proposed Level 4 lab. After all, the city of Davis was designated by its council as off limits to nuclear weapons. "This is a town that creates underroad crossings for toads," says Ms. Wells, the anthropologist. "This is a socially conscious, engaged community. I was surprised by the lack of understanding of the community they were operating in."

Although the project has won backing from other elected boards in the region, including the county's board of supervisors, feelings among citizens and politicians in Davis remain strained. "If NIH awards the funds to UCD, there will be a citizens' revolt, including recalls of elected officials who

support the lab, and what I predict will be peaceful but massive civil disobedience," says one of the city's councilmen, Michael J. Harrington, in an e-mail message. "I will lead it, including to jail if necessary."

Despite the opposition, the university is not giving up. Virginia S. Hinshaw, provost and executive vice chancellor, who is in charge of Davis's bid for the controversial project, says university officials began meeting with community leaders months ago. The NIH's relatively short deadline for grant applications left the university little time to work up enough details of its proposal to release it to the public. But the university had planned all along, she says, to hold a series of community meetings throughout 2003 to educate citizens about just what a Level 4 lab involves and its safety and security protections.

"We have been very open about this," says Ms. Hinshaw, who is a virologist.

A Senator Weighs In

But at meetings of the city council in January and February, local citizens, including some professors, said that wasn't being open enough.

"The feeling was that they had prepared a 900-page proposal with lots of technical details and kind of plopped it down in front of us and said, Any questions?'" says Michael W. Maher, a professor of accounting and management.

Fifty-four members of Davis's 2,000-member faculty signed a petition against the project. Most of them are from the social sciences. But among the opponents is John R. Roth, a professor of microbiology and a member of the National Academy of Sciences.

Opposition to the project has already caused the university's proposal to lose some important support. U.S. Sen. Barbara Boxer, a California Democrat, had endorsed the project in January. But in March, she wrote the NIH to "urge you to consider alternatives for siting this facility in Northern California." In an attempt to find some compromise, the university has begun exploring other sites a few miles away from the campus.

One of the NIH's selection criteria for Level 4 grants is support from the community. Rona Hirschberg, a senior program officer at the NIH who is overseeing the grants, says that opposition like that in Davis "will undoubtedly be a factor" in the final decision, but that it is too soon to say exactly how much of one. The most-important criteria, Ms. Hirschberg says, are the scientific and technical merits of the application.

If citizens' complaints weren't enough of a problem for the university's grant application, officials also had to deal with an embarrassing problem that supplied ammunition to the laboratory's critics: a missing monkey.

In February, a rhesus monkey used in research at the university's primate center escaped, apparently down a sewer. A search proved unsuccessful, and the monkey is now presumed dead.

It was the first such escape in the primate center's 40-year history. Ms. Hinshaw notes that the biocontainment lab would have a much higher, "totally different" level of security than the primate center does.

Still, residents wondered, if the university couldn't stop a monkey, could it guarantee that dangerous microbes from the Level 4 lab would stay locked up? At a subsequent public meeting, one of the opponents to the Level 4 lab dressed in a monkey costume, and others wore monkey masks.

Target for Terrorists?

Although some experts believe a Level 4 laboratory might attract terrorists, others say a greater risk is the threat that an unscrupulous researcher might smuggle out a dangerous microbe. The Federal Bureau of Investigation suspects, but has not proved, that the 2001 anthrax attacks were caused by a scientist with access to a government biosafety laboratory.

The university argues that its precautions will guard against this threat. The security plan calls for psychological evaluations of workers to screen for unstable people. To enter the building, scientists would have their palms read by scanning machines. Inside, they would work in pairs, watched by cameras. Armed guards would patrol the building.

University officials note that scientists would be working with only small quantities of the most-dangerous materials. In the worst-case scenario, any bombing or explosion at the building would incinerate the microbes before they could be released, they argue.

There has never been an incident of diseases accidentally escaping a Level 4 laboratory and infecting people, either accidentally or intentionally. The potential risks should be balanced against the need to involve university experts in developing vaccines and treatments against microbes that might be used by terrorists or cause new, naturally emerging diseases, some experts say.

"The idea of relative risks is simply over these people's heads," Jerry L. Hedrick, a professor of biochemistry, says of the critics. "A lot of everything that people do in life has some risk associated with it, like driving an auto. The risk factor here is really very small." Mr. Hedrick supports the laboratory but his research is unrelated to the studies that would be conducted there.

Some opponents question any involvement by the university in the project wherever it is built. In particular, they worry that some research will be classified, although the university says it has no plans to conduct such research.

And although the NIH and the university promise that the bioterrorism-related research would be strictly defensive -- the U.S. government halted research to develop biological weapons in 1969 -- some opponents wonder if that could change.

Questions About Cost

Some faculty members worry that the university has not been specific enough about how it will pay for the project. The NIH will require the grant recipients to provide some of the total construction costs. In Davis's case, that would be $25-million of the total $190-million, with the State of California providing another $25-million.

The university's share would come from the state's share of projected federal reimbursements for administrative overhead costs associated with the facility. The university would also have to apply to the NIH for other grants to cover the laboratory's operating expenses of at least $10-million a

year.

Because Davis is a public university with a tight budget, "I think this will have a serious impact on the rest of the university if this does not work out as planned," says Mr. Maher, the management professor. "If this were a business plan, I would give it an F,' because it's not all laid out."

Some opponents have also challenged the scientific need for such facilities and the wisdom of locating a Level 4 lab at any university.

Most of the limited volume of research required on the most-dangerous microbes could be accommodated in the government's existing Level 4 labs, says Richard H. Ebright, a professor of chemistry at Rutgers University at New Brunswick, who is an expert on bioterrorism. The physical security at Fort Detrick in Maryland is much tighter than on university campuses.

The government recommends that a Level 4 laboratory always be used for research involving only a subset of the most-serious known infectious agents. These include viruses that cause hemorrhagic fever, such as Ebola, and tick-borne encephalitis.

"I think it's unlikely there will be a large increase in the number of researchers interested in working with BSL-4 agents," Mr. Ebright says.

The NIH would be better off using its construction grants to build more Level 3 laboratories at universities, as long as it also helped improve their security, he adds. In the short term, federal officials are most worried about the threat from two other microbes -- anthrax bacteria and smallpox virus. Federal guidelines allow anthrax bacteria to be studied in a Level 3 lab, which is significantly less expensive to build.

Most research on anthrax does not require the highest level of containment because it can be treated with antibiotics if diagnosed early enough. And by international treaty, no researchers may work with the small amount of smallpox virus outside the CDC, one of only two locations in the world where samples are known to be archived. (The other is in Russia.)

Location, Location

It is unlikely that many academic researchers could do meaningful research by occasionally visiting the Level 4 labs at Fort Detrick or the CDC, counters C.J. Peters, one of the nation's foremost experts in deadly viruses, who is now a professor of microbiology and immunology at the Texas Medical Branch at Galveston. Before arriving there in 2001, he supervised the CDC's Level 4 laboratory for 10 years and previously worked at the one at Fort Detrick.

"We're not talking about hopping on a plane" to travel to a Level 4 laboratory, "and you bring everything you need in a suitcase," says Dr. Peters, who will direct Galveston's Level 4 lab.

Although much of the necessary research related to bioterrorism can safely be conducted in a less-secure, less-contained environment, Dr. Peters says it will greatly enhance researchers' productivity and safety if they have quick access to Level 4 space within the same building for some experiments, as Galveston's and Davis's plans envision.

Those kinds of arguments seem to have convinced citizens in Galveston. The lab under construction and the new building proposed by the university have drawn scrutiny but very little of the alarm seen in Davis. In the end, local culture will dictate how such new labs are received -- as Dr. Peters notes with a chuckle, "you know, Texas is not California."

The federal government encourages researchers who study dangerous microbes, which could be used by terrorists, to prevent the organisms from infecting laboratory workers or escaping into the outside environment. As the danger increases, so does the stringency of the required procedures

Microbes studied can cause human disease through accidental needle sticks, ingestion, or exposure to mucous membranes. Examples: Hepatitis aerosol form, researchers work with them inside containment cabinets that filter airborne microbes. Gloves and face masks are used as needed. Access Materials studied can cause serious or lethal disease. decontaminate lab clothing before washing it. Access to the lab is through two containment doors in sequence. Air is pumped into the lab to prevent Materials studied pose a high risk of death or life-threatening disease, and include microbes that cause diseases for which there are no disease, and

include microbes that cause diseases for which there are no

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