insects are much looser than those for insects meant to attack plant pests; the latter require data on the host range of candidate species.

But Robert Pemberton, a U.S. Department of Agriculture research entomologist in Fort Lauderdale, Florida, says the tide is beginning to shift. Biocontrol policies are now being talked about, he says: "We're having a lot of meetings between the biological control community and ecologists."

–MARI N. JENSEN

Mari N. Jensen is a science writer in Tucson, Arizona.

MICROBIOLOGY

Fighting Bacterial Fire With Bacterial Fire

Smearing bacteria on open sores seems like the worst approach to preventing infection. But work presented last week at the annual meeting of the American Society for Cell Biology in San Francisco suggests that applying a harmless bacterium or its products to surgical wounds may thwart infections by the dangerous pathogen *Staphylococcus aureus*, a major cause of hospital-acquired infections and one that grows more threatening as the incidence of antibiotic resistance rises.

Although physicians have previously pitted one bacterium against another to prevent infections of the intestinal and genitourinary tracts—say, eating yogurt with live cultures to combat diarrhea—this is the first attempt to use a friendly microbe to prevent infection of surgical wounds, say experts. "The idea is certainly unique and probably feasible," says microbiologist William Costerton of Montana State University in Bozeman.

The bacterium, known as *Lactobacillus fermentum*, seems to exert at least part of its protective effects by secreting a protein that prevents *S. aureus* from binding to its target cells, reported Jeffrey Howard, Gregor Reid, and colleagues at the University of Western Ontario in London, Ontario. If so, says Richard Novick, a microbiologist at New York University School of Medicine, researchers will have to reevaluate their thinking about how such bacterial interference works. Conventional wisdom attributes the infection-fighting effects to bacteria-killing toxins, says Novick. But "here's a beautiful example of bacterial interference that's caused by a substance that probably blocks colonization or adherence by the other bacteria."

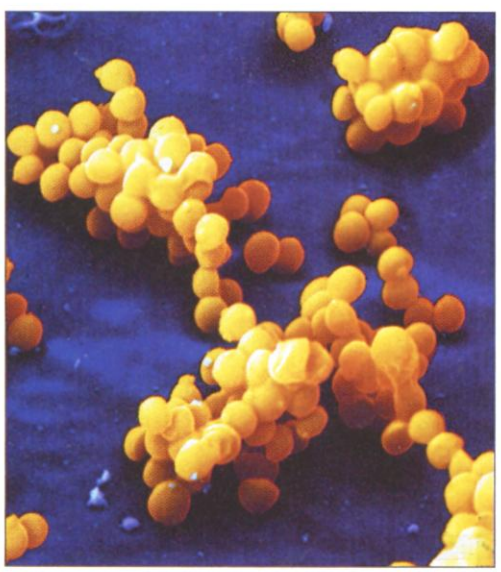
The current work extends previous experiments in which Reid and his colleagues showed that substances secreted by *Lactobacillus* inhibit the binding of *S. aureus* to synthetic surfaces such as polystyrene. Perhaps, the researchers reasoned, *Lactobacillus* or the material it secretes could also keep *S. aureus* from setting up shop in animal tissues.

To test this idea, they placed small pieces of silicone under the skin of rats to mimic a surgical implant and then added *S. aureus*. As expected, serious infections emerged at the wound sites within 3 days. But adding live *Lactobacillus* during the surgery protected the animals. None of the nine rats that received the largest doses of the beneficial bacteria developed infections, compared with five of nine controls. The secreted material worked, too. It reduced the incidence of infection by approximately 90% compared to controls.

The researchers next tried to nail down the molecules responsible for the beneficial effects by analyzing the mixture *Lactobacillus* discharges. One active component turned out to be a protein that Reid had previously found blocks microbial adherence to polystyrene. Follow-up experiments established that this protein alone hampers the ability of *S. aureus* to cause wound infections in rats.

The protein may work by outcompeting *S. aureus* for the pathogen's binding sites in tissue. *S. aureus* gains a foothold in the body by grabbing a protein called collagen, and the *Lactobacillus* protein also binds this host protein. Although the researchers have not yet established that its protective effects are due to this binding, others in the field are excited that the team is homing in on the molecular details of bacterial interference. "It's the first instance that I know of where modern biochemistry and genetics has been used to study bacterial interference," says Costerton.

He suggests that bacterial interference may have advantages over conventional antibiotics, which wipe out good

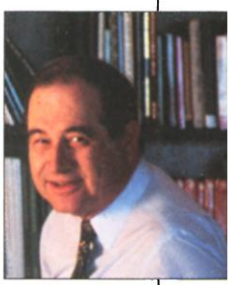


CREDITS: (TOP TO BOTTOM) RICK KOZAK; OLIVER MECKES/OTTAWA/PHOTO RESEARCHERS

No way in? Infections by *S. aureus* bacteria like these may be prevented by blocking their attachment to host cells with a *Lactobacillus* product.

ScienceScope

Going Home After 2 years at the helm of U.S. science policy, White House science adviser Neal Lane, 62, will head back to academe when the Clinton Administration ends next month. The physicist said last week that he will return to Rice University in Houston, Texas, as its first ever professor without portfolio, able to teach in any department. Lane was Rice's provost in 1993 when recruited to head the National Science Foundation. He moved to the White House in 1998, where he cemented a reputation as a genial politico who preferred to work outside the spotlight.



Top Quark After more than two rudderless years, France's National Institute of Nuclear and Particle Physics (IN2P3) finally has a new captain. On 15 December, the French government named Jean-Jacques Aubert, the institute's scientific director, as head. The IN2P3 had been without a chief since October 1998, when former chief Claude Detraz went to the CERN physics center near Geneva.

Aubert, a physicist from Marseilles, came to national attention 2 years ago when he wrote a report for former research minister Claude Allègre proposing that the IN2P3 merge with the French Atomic Energy Commission's institute for nuclear and particle physics, called DAPNIA (*Science*, 23 April 1999, p. 569). But this controversial idea—which many physicists feared would make the IN2P3 subservient to the commission's research priorities—now appears dead in the water, sources tell *Science*. In fact, some researchers doubt that Aubert's appointment will make much of a difference at all to the chronically underfunded IN2P3. Says one physicist, who asked to remain anonymous: "It just means business as usual."

Genome Gift A record-breaking grant aims to put Indiana University (IU) on the genomics map. The Lilly Endowment of Indianapolis last week announced a $105 million gift to jump-start the Indiana Genomics Initiative, which will focus on genomics, bioinformatics, and bioethics. The grant—the largest ever given by the charity and the richest ever won by IU—will help the school add 75 investigators over the next 3 years. The cash will help "attract a stellar array of intellectual talent," predicts Lilly president N. Clay Robbins.

Contributors: Jeffrey Mervis, David Malakoff, Michael Balter

bacteria along with the bad, leaving any resistant organism a "clear field." But Novick cautions that *S. aureus* could develop resistance to a drug based on the *Lactobacillus* protein as well. "You never want to say a bacterium isn't able to do something," he says.

Still, experts are intrigued by the possibility of using the purified *Lactobacillus* protein instead of the intact microbe to protect wounds against infection. Even though *Lactobacillus* is one of the most benign bacteria known, "you're going to find one person who'll succumb to an infection," says Novick. Further studies will be needed to determine if *Lactobacillus* and its protein can be put to clinical use. But this might be one germ worth snuggling up to. **–EVELYN STRAUSS**

LABORATORY ANIMALS

Congress OKs Plan for Retired Chimps

Congress has approved a retirement plan for chimpanzees that have helped to further medical science. On 6 December, the Senate put the final stamp of approval on the Chimpanzee Health Improvement, Maintenance, and Protection (CHIMP) Act. It authorizes the Department of Health and Human Services to spend $30 million to set up and administer a system of retirement sanctuaries for chimpanzees no longer needed for research. But congressional supporters say that funds for the plan, which they hope will save money in the long run, should come out of the National Institutes of Health's (NIH's) existing budget. President Clinton was expected to sign the bill this week.

U.S. biomedical research facilities care for approximately 1600 chimpanzees. In the early 1980s, NIH launched a breeding program to satisfy an expected growth in demand for chimpanzees in HIV trials. But that demand never materialized, once researchers discovered that most chimps do not get sick from HIV. In 1997, the National Academy of Sciences recommended that the government set up a system of sanctuaries to house unneeded animals, which can live for up to 50 years, more cheaply than at research facilities.

CREDIT: (BOTTOM) JIM TUTEN/ANIMALS, ANIMALS

Green acres. Congress wants sanctuaries for chimpanzees no longer needed in research.

The final bill represents an unhappy compromise both for NIH officials and many animal welfare activists. Although activists sought "permanent retirement" for the chimps, the legislation now allows research on retired chimps in "special circumstances," after approval by the sanctuary's board of directors and a 60-day public comment period. "I don't think that's any kind of protection at all," says Eric Kleiman, a spokesperson for In Defense of Animals, an animal rights group in Mill Valley, California.

On the other hand, NIH, which wanted the chimps available for future research on new pathogens or new vaccines, says it must now clear a formidable administrative hurdle to do that. "Even though theoretically animals could be removed ... there are too many provisos," says Judith Vaitukaitis, director of the National Center for Research Resources at NIH, which oversees federally funded primate research centers. Chris Heyde of the Society for Animal Protective Legislation, a Washington, D.C., group that lobbied for the bill, agrees that it would be difficult to bring the animals out of retirement. "We were able to sit down and put hurdles in the way," he says. "The permanent retirement [concept] is still there."

–GRETCHEN VOGEL

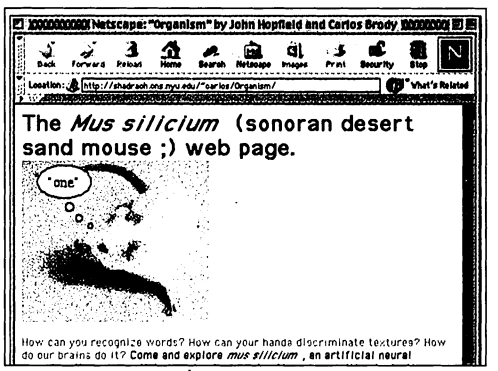
NEUROSCIENCE

Neural Net Contest Draws Online Crowd

When two computational neuroscientists announced an online contest last September to reverse-engineer a simulated set of neurons, neither thought the event would attract much attention beyond a small group of their colleagues. But *The New York Times* ran an article on the competition, and 25,000 people visited the site. Now, the researchers think they may have found a new method for stimulating scientific communication.

"The idea of a puzzle really tickled people," says Carlos Brody, a postdoctoral researcher at New York University. He and his former adviser, Princeton University neuroscientist John Hopfield, challenged the community to figure out the principles underlying a neural network they'd created that responds to sounds. Contestants could feed the program their own sound files and analyze the neural net's simulated bursts of activity, or they could look at archived responses to sound files Brody and Hopfield had presented to the net. In an optional second part of the contest, researchers were asked to use the principles derived from Brody and Hopfield's program to build their own artificial neural network. The networks had to recognize the spoken word "one." The prize: $500 and a Visor hand-held computer.

And the winner is? Twenty groups submitted answers to both contests, but the first to get it right was a team led by David MacKay, another former student of Hopfield's now at Cambridge University in the United Kingdom. (MacKay says he used no insider information.) The team noticed that the simulated neurons didn't seem to care how fast a test word was spoken. As long as the right sound elements occurred in the right order, the artificial neurons gave the right response. This could only occur, they reasoned, when neurons associated with different elements of the test word fire synchronously. "Whether [this mechanism] is actually being used in the brain, I don't know," says MacKay, "but it's a great idea." One of MacKay's students, Sebastian Wills, then constructed a neural network built on this principle.



The challenge. Contestants described how an artificial neural net, nicknamed *Mus silicium*, recognizes the word "one."

Hopfield says such contests sharpen neuroscientists' ability to analyze experimental data. "We thought it would be instructive for the neurobiology community, especially the young community," says Hopfield. Solving the puzzle was possible if a researcher just stepped through it logically, says David Tank, a neuroscientist at Lucent Technologies' Bell Labs in Murray Hill, New Jersey. "I think it turned out to be a valuable thing to try."

Other researchers are not sure the technique is widely applicable. "I think it's kind of fun," says Larry Abbott, a physicist at Brandeis University in Waltham, Massachusetts, "but I don't think it's a sensible way to disseminate scientific results in general." Abbott thinks the future of this kind of contest—if there is one—lies in posing unsolved problems and coordinating researchers' activities via the Web. "The key is to come up with the right questions." **–JOHN S. MACNEIL**