comycin interferes with nisin's ability to make these holes, presumably because it competes with the peptide in binding to Lipid II. Conversely, when the researchers fused the bacterial membranes to artificial membranes loaded with extra Lipid II, nisin's pore-forming power was bolstered.

Apparently, says Breukink, Lipid II is a special key that nisin uses to punch its deadly holes—a key that other antimicrobial peptides lack. He does not yet know exactly how Lipid II helps nisin form pores. But he is sure that the peptide attaches to a different part of the lipid than vancomycin does, which may explain why bacteria have become resistant to vancomycin but not to nisin.

Now that researchers know that Lipid II is such an Achilles' heel for bacteria, they can try to devise a whole range of compounds that exploit it. The low doses needed would reduce the risk of side effects, Ganz says, and could help make the drugs economically feasible. And by tinkering a little with the nisin gene, researchers could easily produce many slightly different derivatives, for instance if resistance arises. "This holds the promise of giving access to huge numbers of antibiotics through relatively simple means," says Hansen.

But many hurdles will have to be overcome. For one, nisin can only kill *Streptococcus*, *Staphylococcus*, and other so-called gram-positive bacteria. Another problem is that peptides have a short lifetime in the body and a higher risk of triggering allergic reactions than conventional antibiotics have. Still, the new study may help motivate the pharmaceutical industry to overcome such obstacles, says Hansen: "They just have never recognized the potential of these antimicrobial peptides." **–MARTIN ENSERINK**

SPACE

Europe Lofts X-ray Observatory

To the relief and delight of engineers and x-ray astronomers, Europe's new space workhorse, the Ariane 5 launcher, deposited a $640 million x-ray observatory into orbit on 10 December. If all goes well, the European Space Agency's X-ray Multi-Mirror Mission (XMM) will capture images of very distant sources of fluctuating x-rays, such as those produced by black holes or supernova explosions.

Onlookers at the Kourou, French Guiana, spaceport had their hearts in their throats as the Ariane 5 rocket lifted off. They remembered the fireworks caused by the first Ariane 5, which exploded in June 1996 while carrying a squadron of four space probes. The launch proceeded smoothly, however, and XMM was gradually brought into its final, elongated, 48-hour orbit that will keep it largely out of Earth's radiation belts, reports Giovanni Bignami, science director of the Italian Space Agency, who witnessed the launch. "The solar panels have also opened with no problem," he says.

The 10-meter-long spacecraft carries a set of three x-ray telescopes that together contain 58 mirrors with a total surface area of 120 square meters. These mirrors focus the x-rays onto charge-coupled device (CCD) cameras that capture images of the observed objects and also measure the wavelength of the x-rays. Two telescopes are also connected to diffraction gratings that spread out the x-rays according to wavelength so that researchers can study

Heart of gold. An engineer puts together XMM's many-mirrored scope.

x-ray spectra with a much higher precision than that from the CCDs. XMM's scopes have lower resolution than those of Chandra, the x-ray observatory launched by NASA in July, but they excel at sensitivity —they are 5 to 15 times more sensitive depending on the wavelength and can pick up fainter or more fleeting signals. Bignami, who was the principal investigator for the prime focus CCD cameras until 1998, expects that because of its elongated orbit and better shielding procedures, the CCDs will not suffer the same radiation damage that has slightly impaired some of Chandra's detectors. The CCDs can be closed off with an aluminum shield whenever XMM enters the radiation belts near Earth or during a solar flare.

Like Chandra and Astro-E—a Japanese observatory that will be launched to look at shorter wavelength x-rays in January (*Science*, 30 July, p. 652)—XMM will focus its attention on x-ray producers such as hot gases, supernova remnants, jets of material squirting out of exploding stars, and massive black holes at the centers of galaxies. Astronomers are anxiously anticipating XMM x-ray data from enigmatic black holes. Because their x-ray outputs can fluctuate rapidly, XMM's sensitivity will be an advantage

CREDITS: (LEFT TO RIGHT) ESA; COBE/NASA/ESA

ScienceScope

Cell Division The American Society for Cell Biology (ASCB)—a small but aggressive group whose members include such scientific leaders as molecular biologists Harold Varmus and Bruce Alberts—has decided to strike out on its own. The ASCB board voted last week to split from the 67,000-member umbrella group known as the Federation of American Societies for Experimental Biology (FASEB) in 2001.

The 9000-member ASCB can use its "limited resources more effectively" if staffers don't have to spend time coordinating with FASEB's policy review process, says ASCB president Randy Shekman. The society will continue to work with FASEB, he notes, but will focus on its own key interests. For example, FASEB took no position this year on federal funding of human stem cell research, while ASCB lobbied intensively in favor of government backing for the controversial studies. FASEB issued no comment on the ASCB's departure.

Tanning Salon Warning: Building the space station could be hazardous to your health. That's the message from a National Research Council panel, which last week urged NASA to find a way to warn spacewalking construction crews of impending solar storms (right). Flares and coronal mass ejections from the sun can unleash massive streams of charged particles, which could pack enough energy to harm astronauts working outside the relative protection of the space shuttle or station modules. The risk of injury is rising, as the sun will reach the peak of activity in its 11-year cycle in 2001.

Researchers, however, do not yet have a good grasp on predicting solar storms. So the panel, chaired by Boston University physicist George Siscoe, urged NASA and other agencies to use satellites, such as the existing Solar and Heliospheric Observatory (SOHO) and spacecraft slated to begin monitoring the sun next year, to anchor an early warning system that would tell astronauts when to stay indoors. NASA solar research chief George Withbroe, who requested the report, says he is confident the new space-based sentinels—which will provide more detailed data than SOHO alone—will soon give Earth-bound researchers a better grip on predicting solar events.

because it can collect more photons in a shorter exposure time from weak sources, says Jeffrey McClintock of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts. With the XMM, one can see "very special things a black hole can do and that nothing else can do," he says.

According to John Heise of SRON, the Dutch Foundation for Space Research in Utrecht, the Netherlands, this new generation of observatories that together cover the entire range of x-ray wavelengths will cause a revolution in x-ray spectroscopy comparable to the revolution caused by optical spectroscopy in astronomy in the 1930s. For example, because of the huge gravitational pull of a supermassive black hole, the gases rotating around it travel at speeds close to that of light. X-ray spectrometers will allow astronomers to directly measure the velocity of the gases in these accretion disks by looking at Doppler shifts. "This would, in my view, be the first real indication of the existence of a supermassive black hole," says Heise. He also hopes that by turning its scopes on the faint x-ray afterglow of gamma ray bursts and tracking how the afterglow decays, XMM will help astrophysicists figure out what fuels these fantastically powerful explosions.

–ALEXANDER HELLEMANS

Alexander Hellemans writes from Naples, Italy.

NIMH

Mental Health Agency Shrugs Off Critics

An advocacy group last week slammed the National Institute of Mental Health (NIMH) for spending money on topics the group says have little relevance to severe mental illness—everything from AIDS and Alzheimer's disease to research on vole mating behavior. But the criticisms, reported by major press, are misplaced, according to NIMH officials and many observers.

The attack came from the National Alliance for the Mentally Ill (NAMI), a Washington, D.C.–based lobbying group for families of the mentally ill, and its research arm, the Stanley Foundation. For years NAMI has urged NIMH to spend a larger share of its resources on studying the most crippling and costly mental illnesses: schizophrenia, bipolar disorder, depression, and obsessive-compulsive disorder. Convinced that NIMH was paying only lip service to its concerns, NAMI appointed a committee led by Stanley Foundation director Fuller Torrey, a schizophrenia researcher formerly at NIMH, to review about $420 million worth of NIMH-funded projects in 1997. It concluded that only a little over one-third of this spending was for research on major mental illnesses, and of that only a small fraction went to clinical and treatment-related research. The panel also noted that NIMH was putting more money into AIDS ($60.2 million) than into schizophrenia ($57.1 million).

Armed with the analysis, Torrey's group last week fired a public broadside at NIMH, accusing the institute of straying into research on diseases—particularly AIDS and Alzheimer's—and on basic neuroscience already being pursued by better endowed divisions of the National Institutes of Health. The panel also asserts that NIMH is supporting "almost no behavioral research that is relevant to severe mental illnesses," instead probing matters such as infant sleep disorders and "how married couples [with new babies] make judgments about fairness in the division of housework." Contends Torrey, "Many people at NIMH are very comfortable with a research portfolio which covers every form of human behavior ever described." Taking a cue from former Senator William Proxmire and his Golden Fleece Awards in the 1970s, NAMI issued a list of projects it flogged as unworthy of funding.

NIMH defends its research strategy. In a statement, the institute explained that the AIDS dollars were congressional earmarks, but insists the money has been well spent, as mentally ill people are at high risk for the disease. As for the non-AIDS research in its budget, which in fiscal year 2000 amounts to roughly $970 million, 80% goes to research directly related to mental illnesses. And NIMH points out that since 1997, it has launched four big clinical trials on major illnesses.

Unimpressed. Criticisms of research spending are shortsighted, says director Hyman.

Without singling out projects, NIMH director Steven Hyman told *Science* that there are a few studies on NAMI's hit list, taken on before his arrival at NIMH in 1996, that he's "not pleased to be funding." Hyman promises to continue phasing out questionable or irrelevant research, which he says amounts to a trivial portion of his budget. Overall, however, Hyman says the NAMI report misses the mark, arguing that it presents "a very shortsighted and to me shocking eschewal of neuroscience." Other advocacy groups have sprung to NIMH's defense. The American Psychological Society, for one, urged the agency to "stand firm in the face of these unwarranted and divisive attacks." Indeed, says Elliot Gershon of the University of Chicago, a schizophrenia researcher formerly at NIMH, NAMI's complaints are outdated: The institute began shifting its focus away from behavioral studies and into the biology of mental illnesses years ago.

NAMI leaders portray themselves as rendering a public service. "We're helping Dr. Hyman with our report," claims schizophrenia researcher Irving Gottesman of the University of Virginia, Richmond, who helped compile it. "It will give him ammunition to resist encroachments on NIMH's original mission."

–CONSTANCE HOLDEN

MARS EXPLORATION

Changes to Missions Could Delay Science

The silence from Mars is leading to a lot of talk on Earth. With two Mars probes lost in less than 3 months, NASA is hurriedly organizing a blue-ribbon panel to reexamine its ambitious plans for a series of flights that would bring back martian soil and rocks in 2008. Meanwhile, NASA managers are considering whether to send additional navigation and communication systems to Mars to guide future spacecraft, a safety step that could delay some experiments.

NASA Administrator Dan Goldin was expected this week to name the members of a panel that will examine not just the future Mars program but also how the Pasadena, California–based Jet Propulsion Laboratory (JPL) and contractor Lockheed Martin of Bethesda, Maryland, managed the ill-fated Mars Climate Orbiter and Mars Polar Lander missions. "Whatever the panel says we ought to do, we're going to go fix it," NASA Administrator Dan Goldin told CNN on 11 December. The panel's report is due in March. A separate failure review board, to be set up shortly, will examine what went wrong with the $165 million polar lander that failed to phone home after descending into the martian atmosphere on 3 December.

Ed Weiler, NASA's space science chief, says JPL will develop a revised roadmap for Mars exploration, which the panel will then critique. The current plan includes launching an orbiter, lander, and rover in 2001; a 2003 launch of a lander and rover to collect samples; a 2003 mission to place small communications satellites around the planet; and a 2005 lander to gather up the samples and fly them back to Earth.

The panel's most pressing task is to figure out what to do with the 2001 mission. Components that will ease the lander onto the surface, very similar to those on the polar lander, are already arriving at JPL in

CREDIT: NIMH