structures of other steroid hormone receptors. They saw interplay of the two protein helices in activated forms of every member of the family, including the estrogen and glucocorticoid receptors, suggesting that this point of contact has broad functional significance. The researchers are now trying to block this interplay in each steroid receptor to see if that does indeed prevent the receptor from being activated. If so, the insight might help researchers design drugs to block aberrant effects of any or all of these hormones. In particular, the mineralocorticoid receptor is considered a hot target for novel congestive heart failure treatments as well as new blood pressure drugs.

And if the work helps pinpoint causes for common forms of high blood pressure, it might eventually lead to earlier identification of people at risk for the disorder, enabling preventive measures to be taken. Genetic insights might also help doctors make more informed choices when prescribing from the "Chinese menu" of blood pressure drugs, Lifton says: "In the long run, we'd like to tailor our medications to the specific underlying abnormality of each patient."

–INGRID WICKELGREN

SPACE SCIENCE

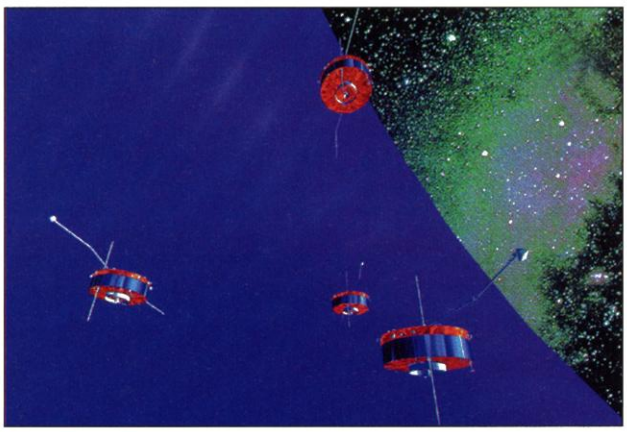
'Cluster' Prepares to Make a New Stand

Scientists who were at the Kourou space center on 4 June 1996 will never forget watching Cluster die. One moment, the mission—four identical satellites carrying 11 instruments designed to produce the first three-dimensional (3D) maps of the magnetic fields and plasmas surrounding Earth—was lofting skyward over French Guyana. Then the rocket carrying it exploded, turning one of the European Space Agency's (ESA's) most ambitious scientific projects into fireworks. "We were in shock," recalls principal investigator Nicole Cornilleau-Wehrlin of the Centre d'Étude des Environnements Terrestre et Planétaires in Vélizy, France (*Science*, 14 June 1996, p. 1579).

Dismayed scientists doubted whether ESA could muster the will, or the funds, to start over (*Science*, 28 June 1996, p. 1866). But Cluster is poised to fly again. If all goes well, four Cluster II spacecraft, built entirely from scratch, will reach orbit two at a time in mid-July and early August.

"I applaud ESA's determination to fly it again," says Cluster co-investigator Patricia Reiff of Rice University in Houston. "This is science that is not being done in any other mission before or in planning."

Credit for squeezing the Cluster II project into ESA's already tight science budget belongs to ESA's science director, Roger Bonnet, says principal investigator Donald Gurnett, a space scientist at the University of Iowa in Iowa City. "Bonnet really did a great job in convincing the European Community that they should be falling in," Gurnett says. John Ellwood, Cluster's project manager at the European Space Research and Technology Centre (ESTEC) in Noordwijk, the Netherlands, agrees. "We didn't have the money initially," he says. "It took us a year to get the mission going again."



Lofty pyramid. Cluster II satellites will orbit in tetrahedral formation to make 3D maps of Earth's magnetosphere.

To come up with 318 million euros needed for Cluster II, ESA siphoned some funds from the operations budget of the first mission, rescheduled other missions, and took advantage of improved technology. Higher capacity memory chips alone saved millions of euros, Ellwood says, by enabling the new satellites to download data to one ground station instead of two. To economize on launch costs, ESA teamed up with STARSEM, a joint venture between Arianespace and the Russian Space Agency, which will launch the quartet of Cluster II satellites on two Soyuz rockets from the Baikonur Space Center in Kazakhstan. Soyuz, the old workhorse of the Soviet Union, is considered the most reliable launcher available, with a success rate of over 98.5% in 1600 launches. At 30 million euros per launch, it is also a bargain. "Two Soyuz cost less than an Ariane 4," says Philippe Escoubet, Cluster's project scientist at ESTEC.

During their planned 2 years of operation, the satellites will fly in a tetrahedral formation—the optimal configuration for 3D imaging. Ground controllers will vary the distances among the satellites in order to observe different parts of the magnetosphere, such as the polar cusps and the magnetotail. "If we have a perfect injection into orbit by Soyuz, some fuel will be left over, and we will be able to extend the project for a third year," Escoubet says. One benefit of the delay is that the mission will be active when the sun reaches maximum activity later this year or next year.

Among scientists, expectations are high. Says principal investigator Hugo Alleyne of the University of Sheffield in the United Kingdom: "In terms of understanding the solar wind, magnetospheric boundaries, and interactions, it will be a quantum jump."

–ALEXANDER HELLEMANS

Alexander Hellemans writes from Naples, Italy.

PLANT SCIENCE

New European Group Lobbies for Support

COPENHAGEN—Reeling from budget cuts and public doubts about genetically modified foods, European plant scientists are mounting an ambitious effort to persuade European Union (E.U.) officials to plow more money into their field. But their blueprint for change, intended to prevent them from falling farther behind their global counterparts, has so far failed to win any promises from E.U. commissioner and science chief Phillippe Busquin.

The plan was drawn up by the fledgling European Plant Science Organization (EPSO), an independent body that represents 30 leading labs from 20 European countries. The group was set up in February, and last month it presented Busquin with the 10-year plan. "There is an acute need to organize the research effort and to increase funding for plant science if Europe wants to stay competitive in this field," says the group's chair, plant geneticist Marc Zabeau of the University of Ghent in Belgium.

EPSO's top priorities include boosting funding for basic plant science and co-

Speaking up. Belgium's Marc Zabeau says European plant science is imperiled by funding cuts.

CREDIT: (TOP) ESA

ordinating research activities on both national and E.U. levels. The fundamental studies would eventually translate into new ways to raise yields and slash pesticide use. "If science is to tackle these challenges, there is a dire need for more integration," says plant geneticist Michael Bevan of the United Kingdom's John Innes Center. Zabeau sees parallel national initiatives in plant genomics in Germany and France as examples of unnecessary competition for scarce resources. At the same time, he acknowledges that collaborative research also faces many obstacles. "We have networks in place, but we need significant funding and an infrastructure that allows us to come together in practice," says Zabeau.

Under Framework 5—the E.U.'s research portfolio for 1999 through 2003—plant science no longer has its own pot of money but must compete with microbial and animal research. One result is a two-thirds reduction in the number of successful proposals (seven in the first round) compared with the previous Framework program. Among the casualties is a plan to complete work on the well-studied mustard, *Arabidopsis thaliana*. After the E.U. put up $20 million toward an international sequencing effort, "all funding was denied for the final phase," says EPSO coordinator Karin Metzlaff.

National funding for plant research has also declined, with Denmark and the Netherlands particularly hard hit. Dutch authorities are in the midst of implementing a 30% cut over 5 years and have ended funding for all collaborative projects. All Danish programs in plant biotechnology will expire by 2002, and no new initiatives are planned.

That alarms industry, which relies upon a strong public-sector commitment to basic research, says Georges Freyssinet, head of global genomics research at Aventis CropScience in Lyons, France. "The next 5 to 10 years will be essential," he says, warning that now is the worst possible time to be reducing government support for plant research. European companies may need to move research operations elsewhere if the political culture surrounding genetically modified foods does not improve, he adds.

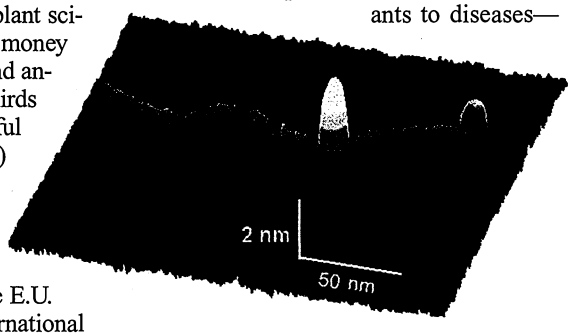
E.U. officials have already begun to plan for the sixth Framework Program, which starts in 2004. And although Busquin confesses that the plant science community has his ear, he says that "risk assessment and ethical aspects are important issues that have to be addressed." The research chief also doesn't want to be seen as catering to a particular discipline: It is "impossible at this point to promise more funds for individual fields," he says. **–LONE FRANK**

Lone Frank writes from Copenhagen.

DNA IMAGING

Getting a Feel for Genetic Variations

Even before last week's news of the near-completion of the human genome sequence, researchers had set about the arduous task of figuring out just how the sequence differs among individuals—and how those variations may predispose people to various illnesses. Current genetics technologies make it relatively straightforward to determine where such differences lie on a given chromosome, say, chromosome 11. But determining which of the two copies of that chromosome the change resides on—a necessary first step toward linking those variants to diseases—has proved challenging indeed. Now a team of researchers at Harvard University and the Massachusetts Institute of Technology (MIT) has come up with a novel atomic imaging microscope that may dramatically speed this task.



Fingered. A microscope easily spots a specially tagged site along DNA.

The microscope is a modification of the popular atomic force microscope (AFM), which uses an ultrasharp tip to map surfaces of everything from computer chips to DNA at the atomic level. The new version caps a conventional silicon tip with a carbon nanotube, an ultrathin, strawlike network of carbon atoms a mere nanometer or so across. By using this molecule-sized tip, the researchers —led by Harvard chemist Charles Lieber and MIT geneticist David Housman—were able to get their AFM to march down a strand of DNA and identify uniquely shaped reporter molecules engineered to tag the genetic variations. In this case, these variations are sites along a chromosome that harbor a one-letter difference in spelling called a single-nucleotide polymorphism (SNP).

As they describe in the July issue of *Nature Biotechnology*, the Harvard/MIT group—which includes postdoc Adam Woolley, then-postdoc Chantal Guillemette, and grad student Chin Li Cheung—was able to feel its way around one of the most vexing problems in genetics: haplotyping. Haplotyping is the task of figuring out exactly

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ScienceScope

Preventive Medicine Top U.S. research universities can do a far better job of protecting human subjects, says a new report by the Association of American Universities (AAU). The report (www.tulane.edu/~aau) urges the AAU's 61 member schools to beef up their Institutional Review Boards, which oversee clinical studies, by seeking outside accreditation and enrolling more nonscientists. AAU President Nils Hasselmo says that such changes could make redundant proposed legislation that would broaden federal oversight of clinical research (*Science*, 16 June, p. 1949). The report also proposes that the government help foot the bill.

Space Squabble Relations between the Administration and Representative James Sensenbrenner (R–WI), who chairs the House Science Committee, are strained on a good day. But his NASA authorization bill has added a new layer of stress.

The bill, H.R. 1654, would kill Triana, a pet project of Vice President Al Gore to beam satellite images of Earth (below). It also orders NASA to get a refund from the Russians for any space station delays and blocks the agency's ability to keep revenue from commercial deals. After the Administration threatened a veto, Sensenbrenner offered a "grand compromise" that would save Triana. But last week, at an inconclusive conference between House and Senate members, Democrats complained that some of Sensenbrenner's demands were not in the original bill approved by the House and that their suggestions were ignored.

Capitol Hill observers say that the way Sensenbrenner handles the squabble could affect his bid to chair the Judiciary Committee in the next session. "If he wants to show that he can be conciliatory, this is not the way to do it," harrumphs one Democratic aide.

Short Leash Energy Secretary Bill Richardson has given new security czar James Gordon until 5 September to work out a new arrangement with the University of California (UC) for its management of the nation's nuclear weapons labs. The UC contract runs until 2002, but Richardson says its performance "is unacceptable and must be addressed immediately." UC officials say they "welcome the opportunity to work with [the Department of Energy]."

Contributors: Wayne Kondro, Michael Balter, Eliot Marshall, Andrew Lawler