outcomes and to educate physicians on treating minority populations.

The changes will give the center "more impact, more influence, more power," says Anthony Fauci, head of the National Institute of Allergy and Infectious Diseases. Fauci and NIH acting deputy director Yvonne Maddox are leading a working group examining health disparities research across the institutes that will help shape NIH's priorities for addressing health disparities in 2002.

Although major biomedical lobbying groups have pushed for the center's creation, some observers question the decision by NIH principal deputy director Ruth Kirschstein to put longtime ORMH director John Ruffin in charge instead of conducting a national competition. Ruffin has fought successfully to fund specific studies and establish new clinical centers at historically black medical schools, but a source who requested anonymity says he's "not very aggressive in moving the agenda." However, others say that Ruffin's familiarity with top NIH officials could be critical to the center's success. "It seems prudent to me to maintain the core infrastructure of the office to ensure a smooth transition," says Keith Norris, a clinical researcher at Charles R. Drew University of Science and Medicine in Los Angeles.

–JOCELYN KAISER

With reporting by Laura Helmuth.

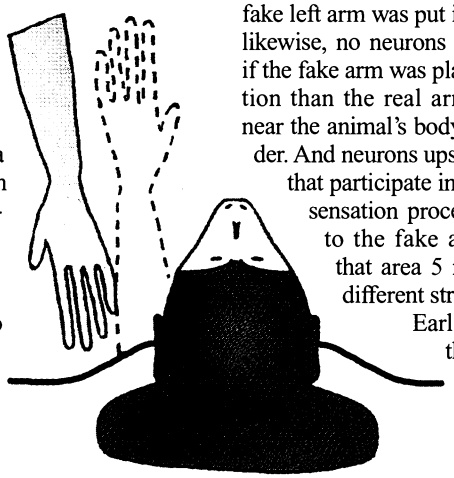
NEUROSCIENCE

Where the Brain Monitors the Body

As any klutz will attest, coordination is complicated. Just to keep track of their limbs, for example, people and animals use information from several senses, such as vision, touch, and proprioception, which tells them their body's position. Indeed, large portions of the brain are devoted to keeping track of these sensations and dictating the body's movements. "As you interact with the world, you need constant information about where the body is," says neurophysiologist Lawrence Snyder of Washington University in St. Louis. Researchers haven't known exactly where all those signals are integrated, but now a team may have located some of the neurons that first make these multisensory connections.

On page 1782, a team led by psychologist Michael Graziano of Princeton University reports evidence that a small region of the parietal cortex of the monkey brain known as area 5 may enable the monkey to integrate many sources of information about its body and thereby update its mental model of what the body is doing. The researchers based this conclusion on their finding that some area 5 neurons fire at their fastest rates when the visual feedback from a monkey's arm matches the sensory feedback, an indication that the neurons are sensitive to both streams of information.

Neuroscientists had suspected for some time that parts of the parietal cortex, located below the crown of the head, might be involved in maintaining a coherent representation of the body. One indication of this came from instances in which people with damage in the parietal cortex fail to recognize one of their limbs. Such patients might wake up startled, thinking someone put a fake leg in the bed.



Mismatched. Neurons in area 5 aren't fooled by flipped arms.

Graziano and his colleagues were inspired to look for multisensory neurons a few years ago when they uncovered "roundabout evidence" that neurons in another movement area, called the premotor cortex, are sensitive to both vision and proprioception. If neurons in areas that process the body's movement and sensations also respond directly to vision, they reasoned, such neurons might be key to integrating the different kinds of signals that provide a coherent model of the body. Graziano and colleagues then decided to track down where this integration starts—where in the brain's body-sensory system vision first makes an appearance.

To do this, the researchers devised a technique for giving a monkey information from both vision and proprioception; this would enable the researchers to identify neurons that are sensitive to whether the information matches. After fitting the monkey with a long collar that restricts its near-body vision, the researchers hide one of the animal's arms beneath a shallow ledge. They then place a realistic, stuffed monkey arm or other objects on top of the ledge, either in the same position as the hidden arm or on the other side of the body. Because of the collar, the fake arm might appear, from the monkey's perspective, to be coming from its own body.

When the researchers recorded the responses of single neurons in area 5 of the monkey's brain, they found cells that are sensitive to whether the sight of a fake arm matches the feel of its real arm. Neurons that respond to one arm didn't change their firing rate when the researchers placed apple slices on the ledge or lined the fake arm up with the monkey's other, also hidden, arm. But when the fake arm was aligned in the same position as the real, hidden, arm, 29% of the neurons changed their firing rate.

What's more, these neurons weren't fooled by mismatched arms: Right-arm–sensitive neurons didn't fire strongly when a fake left arm was put in the right arm's place; likewise, no neurons ramped up their firing if the fake arm was placed in a different position than the real arm, say, with the palm near the animal's body rather than the shoulder. And neurons upstream of area 5—those that participate in earlier stages of body-sensation processing—didn't respond to the fake arm at all, suggesting that area 5 is the first to integrate different streams of input.

Earlier research had shown that area 5 responds to proprioceptive signals, says Snyder, but this new result suggests that "the information processed by area 5 is more multisensory, more abstract" than simple proprioception. And if area 5 neurons integrate signals from many channels, Snyder says, they might be the first stages of a "representation of where the body is in space."

–LAURA HELMUTH

CREDIT: M. GRAZIANO *ET AL.*

INDIA

Disease Data Stolen In Lab Break-In

NEW DELHI—The hard drives of nine computers, containing epidemiological data gathered from around India, have been stolen from the Indian Council of Medical Research (ICMR). The missing data, stored on personal computers in the council's Epidemiological and Communicable Diseases (ECD) unit, include published and unpublished information collected by 16 regional centers on the incidence of AIDS, malaria, tuberculosis, and other killers. Health officials say they have no idea who stole the drives, or for what purpose.

The hard drives were removed on the night of 10 November from the ICMR's third-floor offices. The thieves systematically dismembered functional computers after breaking open locks to as many as six different rooms but did not touch other, more expensive equipment on the premises. They also left undisturbed the council's main bioinformatics computer center on the ground floor.

ECD chief Lalit Kant says he is "heartbroken" by the break-in, which represents the loss of years of "sweat and blood." Individual data sets still exist in the regional centers, he notes, but what is now missing is

an overall picture of communicable diseases in India. Kant speculates that the theft might have been an inside job, because the burglars knew exactly which computers to target and because the resale value of the hard disks is negligible. Police have no suspects in the case, which is under investigation.

ICMR officials say they have no idea how the thieves might use the data, although Kant suggests that his unit might have been targeted for harassment by "jealous" competitors. Director-General Nirmal Kumar Ganguly says that "no sensitive data have been lost," but building security has been tightened considerably since the theft. "Even my bags are now searched when I leave the office every day," he notes. **–PALLAVA BAGLA**

U.K. SCIENCE BUDGET

Gene Jocks, Data Crunchers Hit Jackpot

LONDON—Unveiling its science spending plan for the next 3 years, the U.K. government last week announced major new investments in three key areas: tracking disease genes, leveraging the Internet for data analysis, and supporting emerging industries such as nanotechnology and bioengineering. Although these programs cut across a range of disciplines funded by the U.K.'s science councils (see table), the government also bestowed a long-anticipated gift on astronomers: membership in the European Southern Observatory (ESO), which will give U.K. researchers access to the world's largest optical telescope.

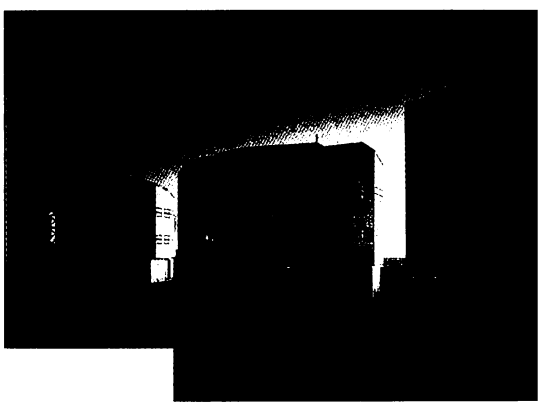
From 2001 to 2004, the U.K. government will pour $8.2 billion into science, $1 billion more than the science budget for the last 3 years—a 7% increase after adjustments for inflation. The biggest winner is genomics. It will feature as its centerpiece the U.K. Population Biomedical Collection, a project in which several centers will take DNA samples from half a million volunteers, then chart each person's medical condition and lifestyle over the coming years. The effort should allow researchers to hunt down genes linked to chronic illnesses such as cancer and heart disease. "The collection promises to be one of the most exciting scientific initiatives of recent times," says Sir George Radda, chief executive of the Medical Research Council.

Also capturing a large share of new funding are projects that aim to digest once-unfathomable amounts of data, an area the U.K. government calls "e-science." Epitomizing the challenge is the Large Hadron Collider (LHC), a proton accelerator scheduled to come on line at CERN, the European particle physics laboratory near Geneva, in 2005. Each of the LHC's four detector experiments, which will probe the nature of matter and the origins and evolution of the universe, are expected to churn out more than 1 petabyte (1 quadrillion bytes) of data—equivalent to a mile-high stack of CD-ROMS—every second. Much of the $137 million in new funding will go to DATAGRID, a pan-European project based at CERN to develop shared databases.

Climate change research, too, will benefit from this database approach. Besides getting a $10 million infusion for climate modeling, the Natural Environment Research Council (NERC) will fund projects aimed at determining whether the British Isles are on the brink of a rapid cooldown. Thanks to the Gulf Stream, part of the so-called conveyor belt in the Atlantic Ocean that brings warm water northward and cold water southward, northwestern Europe is currently 5° to 10°C warmer, on average, than other regions at these high latitudes. Some scientists believe that global warming might destabilize the conveyor belt. If so, the conveyor belt could weaken or turn off some time in the next century—as it appears to have done in the past—and that could trigger much icier conditions in northwestern Europe. In response to that threat, NERC will spend at least $15 million over the next 5 years on studies of the North Atlantic aiming to assess the likelihood of a conveyor breakdown and the impact that would have on the United Kingdom. Says a NERC spokesperson, "We hope that this program will act as a trigger to enable other countries to get funding for research in this field."

Astronomers have special reason to celebrate this week: Pending final negotiations, starting in 2002 they will have access to all ESO facilities, including the vaunted Large Millimeter Array and the Very Large Telescope, both situated in the Atacama Desert in Chile. They will also get in on the planning of ESO's proposed next-generation ground-based scopes, dishes about 50 meters in diameter that would form a facility called the Overwhelmingly Large Telescope, or OWL. "This is excellent news," says Mike Edmunds of the University of Wales, Cardiff, who chairs the Particle Physics and Astronomy Research Council's (PPARC's) astronomy vision panel. PPARC's decision to cast its lot with ESO shows that whereas U.K. politicians are bitterly divided over how tightly they should yoke Britain's economy to the European Union's, scientists themselves are no isolationists. "Entry to the ESO is consistent with the trend towards global cooperation," notes Luke Georghiou, a science policy expert at Manchester University.

But the commitment to ESO—$14 million a year for the next decade—could entail sacrifices at home, because PPARC's budget rise likely won't cover the entire ESO bill. "The main worry is what could be cut domestically to pay for it," says Georghiou. A PPARC spokesperson discounted rumors that ponying up ESO dues would force the closure of the Jodrell Bank Observatory in Cheshire and its venerable Lovell radio tele-



Chile reception. U.K. spending plan will give astronomers access to ESO's Very Large Telescope.

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SOME BIG WINNERS IN U.K. SCIENCE, 2001–04

Research Council	Project	Funding ($ millions; next 3 years)
Medical Research Council	Genomics, including U.K. Population Biomedical Collection	74
Engineering and Physical Sciences Research Council	Bioinformatics (genome program)	18
	e-science: engineering applications	24
Particle Physics and Astronomy Research Council	European Southern Observatory	42
	e-science: data processing for LHC and ASTROGRID virtual observatory	37
Natural Environment Research Council	Rapid climate change in northwestern Europe	9
	e-science: climate and oceanographic modeling	10
Biotechnology and Biological Sciences Research Council	Genomics: gene function, research, and structural biology	46
	Bioinformatics	11