Genome Center Grants Chosen

In a couple of weeks the National Center for Human Genome Research at the National Institutes of Health will announce its controversial—and highly coveted—research center grants. *Science* has learned which of the ten groups that applied will be receiving these 5-year grants, which will be funded at about $2 or $3 million a year.

Center grants will go to groups at the University of Michigan, the Massachusetts Institute of Technology, the University of California at San Francisco, and Washington University. The applications were apparently deemed so good, or so important to the program's goals, that NIH found alternative ways to fund at least two other proposals as well.

Three of the four centers will be tackling big mapping projects—building genetic and physical maps of entire human chromosomes or, in one case, the mouse genome. The Michigan center will focus broadly on improving technologies for tracking down disease genes. All the projects have a hefty component of technology development—working with yeast artificial chromosomes (YACs), sequence-tagged sites (STSs), and other polymerase chain reaction techniques—because the goals they have set will be tough to reach without new approaches to make mapping faster and cheaper.

When James Watson, director of the genome effort at NIH, proposed creating research centers over a year ago, the idea was met with howls of protest from a number of biologists leery of big, centralized science (*Science*, 13 October 1989, p. 204). Congress, too, has questioned the wisdom of consolidating funds in a few big groups.

These are not big new institutions being created, counters Eric Lander, who will direct the MIT center. Rather, he says, the genome centers are essentially just program project grants, or P01s in the NIH vernacular—and not even especially big ones, given the number of investigators involved. What sets the new centers apart is that there is accountability, he says: a commitment to get the job done.

Watson, too, is convinced that these tightly focused centers are the only way to meet the ambitious goals of the genome project. If all goes as planned, eventually half of the genome research budget will be divided among 10 or 20 of these centers. With this year's expected budget cutback, however, the number of centers to be established over the next few years is very much in question (*Science*, 29 June, p. 1600).

The soon-to-be-announced grants will support the following work:

- At UCSF, center director Richard Myers plans to map human chromosome 4, one of the biggest chromosomes and the site of the elusive Huntington's disease gene. The project will have five principal investigators, involving not just UC but also the University of Iowa and the Fox Chase Cancer Center.
- At the MIT center, Eric Lander plans to map the entire genome of the mouse. The project has 12 principal investigators at MIT, Whitehead, Princeton, Jackson Laboratory, and Harvard.
- The Washington University center, directed by David Schlessinger, plans three major projects: an analysis of specific regions of a number of human chromosomes and two efforts to map chromosome 7 and the X chromosome. The project has four principal investigators in St. Louis, though the first project will involve collaborations with groups around the country.
- At the University of Michigan, Francis Collins and associate director Tom Gelehrter will develop new mapping techniques and then try them out by hunting for disease genes. By improving and automating a number of steps in linkage analysis and physical mapping, the group expects to dramatically speed up the process of moving from family studies to the underlying base pair mutation, says Collins. The project has six principal investigators and involves 18 participants from around the university.
- In addition, Glen Evans and colleagues at the Salk Institute will receive a 5-year program project grant, which is, to all intents and purposes, a center grant, though probably a smaller one. The group will continue its effort to map chromosome 11.
- At Stanford, David Botstein and Ron Davis's proposal to establish a center to sequence the yeast genome will be funded instead as a 3-year feasibility study. While demonstrating that such a comparatively big genome, 13 million bases, can be sequenced quickly and cheaply, they are also trying out a new institutional structure: bringing in junior faculty as "genome fellows" on a temporary basis to get the job done.

■ **LESLIE ROBERTS**

Jittery Hubble Awaits a Cure

The Hubble telescope, its vision blurred by a misshaped mirror, continues to be plagued by another problem that came up during the first day in orbit but which has received little public attention—a case of the jitters. Engineers are hoping to try a fix next month, and they are keeping their fingers crossed. If it fails, viewing time on the telescope could remain restricted until astronauts visit the spacecraft 3 years from now.

For 15 to 20% of each orbit, the Hubble is unable to provide a steady image because the entire instrument oscillates by about one-tenth of an arc second. According to Edward Weiler, Hubble program scientist at the National Aeronautics and Space Administration (NASA), the most intense vibrations last only a matter of seconds, but the disturbance to finely targeted observations lasts longer—about 10 minutes as the telescope passes out of darkness into light and about 6 minutes as it returns.

The suspected source of trouble is the solar panel array, built on subcontract to the European Space Agency, with British Aerospace serving as the project manager. On 24 September, officials from NASA headquarters flew to Noordwijk, the Netherlands, to meet and discuss with European engineers how to cure the jitters.

British Aerospace says that all parts it contributed to the Hubble meet or exceed NASA's technical specs. But Weiler says there may have been some "misunderstanding between ESA and NASA on the interface" between the panels and the spacecraft.

NASA officials and their consultants believe the fault can be traced to some thin metal arms on the outside of the array, used to extend the solar panels. When rapidly heated or cooled, they seem to change dimension and bend just enough to cause the panels to "flap."

The resulting motion, and the spacecraft's attempt to re-target itself, can ruin an observation if it has been scheduled by ground computers to overlap the night/day transition. Whether any individual researcher loses data is just a matter of chance—"hit or miss," Weiler says. NASA considered reprogramming the ground computers to put all observations in the hours when the Hubble is protected by Earth's shadow. But redoing the schedule proved to be too difficult.

Now a better solution is in hand. Lockheed Missiles and Space has written a new software package for Hubble's onboard computer that tries to use steering mechanisms to offset the vibrations. The new logic will be beamed up to the spacecraft on 10 October, provided everyone agrees this is a safe remedy. ■ **ELIOT MARSHALL**