Genome Projects Are Growing Like Weeds

NIH and DOE continue to move ahead with their plans, but other agencies are looking to get involved.

ALREADY A CENTER OF ATTENTION in biological science, the project to map and sequence the human genome will now become a Center—with a capital "C"—at the National Institutes of Health. Starting 1 October this year, the National Center for Human Genome Research will replace the Office of Human Genome Research that currently coordinates genome activities out of the office of the director of NIH.

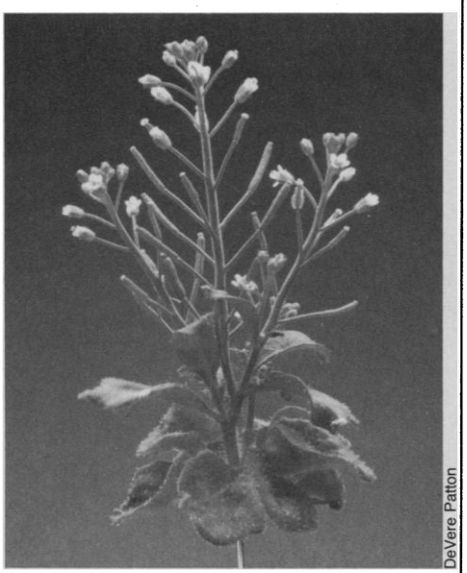
More than just an organizational reshuffle, James Watson, head of NIH's genome activities, says the change is "necessary." Without official status as a center, the genome office has been unable to make grants or enter into contracts directly, so these have had to be coordinated through the National Institute of General Medical Sciences. The new arrangement, says Watson, means "we can have our own study section and we can essentially have the staff under our own control which will manage the grants."

NIGMS will remain in the genome picture for some time yet because it has already started funding several genome projects, and also because the NIGMS council will approve Genome Center grants until a formal advisory council is established for the Center.

Another structural step should take place next month when representatives of NIH and the Department of Energy will get together to begin hammering out a national plan for genome activities, to be presented to Congress next spring. Although DOE was the first government agency to propose a national initiative to map and sequence the human genome nearly 4 years ago, NIH grabbed the reins a year ago—largely through Watson's efforts—and has been firmly in the driver's seat ever since.

Watson says coordination of the agencies' is necessary "so that we can see the [genome project] not as DOE's assault on the genome and NIH's assault on the genome, but the nation's assault."

Now, just as NIH and DOE are about to sort out their differences, the field of players looks set to enlarge: Both the Department of Agriculture and the National Science Foundation have indicated they too plan to toss their agency hats into the genome ring. The USDA already has an Office for Plant Genome Mapping Research, headed by Jerome Mitsche, but its current budget provides only $100,000 for organizational activities. But, at the NIH genome advisory committee meeting last month, Mitsche hinted that his agency might be interested in spending in the neighborhood of $500 million over the next 5 years. This figure is yet to be confirmed officially.



A weed to the wise: *Arabidopsis.*

On a more modest level, NSF is putting up what Program Director for Genetic Biology DeLill Nasser jokingly describes as "NSF's answer to NIH." On 20 July, NSF will assemble a workshop at Cold Spring Harbor to go over tentative plans to map and sequence the genome of *arabidopsis thaliana*, an inconspicuous, but nevertheless genetically interesting, weed.

"It's a wonderful model organism for plants," says Nasser. '

Arabidopsis has a relatively small genome—70,000 kilobase pairs—and it has very little repetitive DNA. "It can be regenerated for protoplasts; it can be transformed by the Ti plasmid," says Nasser. "It is a very small plant, and consequently you can grow huge numbers on a single petri plate. As Barbara McClintock says, it does nothing but reproduce."

Yet another reason for focusing on this little weed is that there is already a head start with its genetics: two genetic maps already exist, and a physical map is also well underway. Chris Somerville of Michigan State University has created an *Arabidopsis* library of yeast artificial chromosomes.

If the *Arabidopsis* project works out, it will help bring plant geneticists more in line with the rest of the genetics community, says Stanford University biologist Ron Davis. Davis says progress in plant molecular biology has been slowed by the multitude of different plants being studied. "It was Max Delbruck who started the concept that you can't do that," says Davis. "You can't work on a whole bunch of different organisms. You have to work on one, and only one."

Although NSF's plans are still tentative—and there is no money yet specifically earmarked for the project—there are four proposed project thrusts:

- A central repository for seeds.
- A central repository for described clones and DNA.
- A center devoted to completing the physical maps of the *Arabidopsis* genome.
- A center devoted to sequencing active genes by sequencing cDNA clones and ultimately sequencing the entire genome.

Somerville says the NSF workshop estimated that the project would cost about $35 million. But like molecular biologists who worried that a large project on the human genome would siphon money from other areas of molecular genetics, he worries that NSF's emphasis on *Arabidopsis* will draw money from other areas of plant science already hard-pressed for financial support.

"If we were given the option today of how we would spend that $35 million, we might choose to do it differently," says Somerville. "But the way it's been presented to us by the granting agencies, this is not an option."

Somerville's concerns may well be justified. Politically, genome projects seem to have developed a life of their own. As an example, enthusiasm for the project at the Department of Health and Human Services prompted the department to raise NIH's original budget request for the genome project to nearly $62 million. But when the NIH budget emerged from review by the White House Office of Management and Budget—an agency known more for sharp pencils than largesse—the budget had miraculously jumped to $100 million, a figure that awaits congressional approval.

Watson says there will be no trouble spending the money. He says the ample funding will attract bright people, and will allow a faster start on the centers NIH envisions to manage the project: "It will let us get the job done in 15 years, not 30," he says. ■ JOSEPH PALCA