Report Card on the Genome Project

Human Genome Project officials and scientists had their day in the sun last week, a chance to strut their stuff before the United States Senate. Senator Pete Domenici (R–NM), one of the project's biggest fans in Congress, invited a stellar group—including Nobel laureates James Watson, who directs the genome project at NIH, and Paul Berg of Stanford—to brief him on the current status of the $3-billion, 15-year effort.

The 18 July workshop seemed doomed at the outset, as critical votes on the Senate floor emptied the room of senators and their staff, leaving the scientists awkwardly discussing the history of the project among themselves. But in the end, Domenici, who returned to hear the second half of the discussion, got what he was looking for—some accomplishments he can use to help sell the project to his colleagues. Said Domenici: "I am being told that if we are to continue to get funds for large science and large labs, we need to develop a report card."

Watson was happy to comply, noting that the latest success is the discovery of the gene responsible for Fragile X syndrome, the most common inherited form of mental retardation. Thomas Caskey of Baylor, in collaboration with Stephen Warren at Emory University School of Medicine and Ben Oostra of Erasmus University in the Netherlands, found the gene just 2 months ago—about 5 years sooner than would have occurred without the genome project, Watson claimed. Several groups determined the rough location of the gene using the newly constructed genetic map of the X chromosome. By December, Caskey and his colleagues had found a marker very close to the gene. They then cloned a piece of DNA containing the gene, this time using yeast artificial chromosome techniques developed as part of the genome project. From there, isolating the gene itself went remarkably fast, says Caskey. The Baylor group has since isolated two other disease genes; papers are in press.

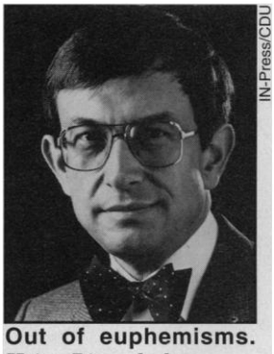
Discussion then turned to chromosome 19, which is being mapped at Lawrence Livermore Laboratory (LLL). The work, nearing completion, is turning up genes at an astonishing rate, said Anthony Carrano, who runs the genome center there. The LLL team has recently found three genes involved in DNA repair, two of which appear to be linked to known human diseases. They have also just isolated six genes that seem to be necessary for the successful continuation of pregnancy.

Next came Caltech biologist Leroy Hood, who described his group's search for immune receptor genes, which play a key role in inherited autoimmune diseases like multiple sclerosis (MS) and rheumatoid arthritis. Several groups have identified a number of immune receptor genes that predispose mice to an MS-like disease, and they have been able to prevent—and even reverse—the disease in mice. The question now, says Hood, is how to find the equivalent genes in humans. The only way, he believes, is through genetic mapping. His group has begun studying families with MS to ascertain what genes they have in common. Just this summer they found one gene associated with MS and have localized it to a region of chromosome 7 just 175,000 bases long. Hood now plans to sequence the entire region and evaluate the 15 or so genes it contains to find the culprit. He optimistically predicted that with genetic mapping techniques, it will be possible to find all the major immune receptor genes that mediate autoimmune disease within 10 years.

To Watson, this and other work clearly deserves an A on Domenici's report card. Watson noted that every year, 2000 boys are born with Fragile X syndrome who will require care for the rest of their lives, at a minimum cost of $100,000 each. That puts the burden of the disease at $200 million a year, he says—and that's just what has been requested for the genome project. "The project will pay for itself if we can go beyond the discovery of this one gene to doing something about it," he said. ■ LESLIE ROBERTS

Germany Gets Too Big for its Budget

Berlin—When German Research Minister Heinz Riesenhuber unveiled his budget last week, his ample stock of euphemisms was for once inadequate to cover the stern realities. A budget that requires "creativity for implementation, a clear setting of priorities and the use of all synergies and opportunities for saving," is how he described the package before sending it on to the Bundestag for approval. But the facts are that it diverts DM 1.6 billion (about $900 million) out of a total of DM 9.3 billion to rebuild science in the old east German states, freezes spending at Germany's 13 national research institutes, and threatens to undo 4 years of Franco-German cooperation on the Columbus space station and the Hermes space shuttle.



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Out of euphemisms. *Heinz Riesenhuber.*

Inside the old west Germany, the biggest squeals are coming from the national research institutes, which include the world-famous German Cancer Research Center in Heidelberg and the DESY high-energy physics lab in Hamburg. Noting the rising proportion of funds that the 13 institutes with their 20,000 staff take from his budget, Riesenhuber said bluntly that they cannot count on an increase in funding for the next 2 years. Because wage increases are already going through, Reinhard Grunwald, administrative director of the German Cancer Research Center said several projects may have to be put on hold. These include a just-announced innovative new Institute for Applied Tumor Biology.

It's a slightly happier story for the new east German states. Their DM 1.6 billion will provide DM 650 million for research grants and help build three new national research institutes from the remnants of the former East German Academy of Science, several new institutes for the prestigious Max Planck and Fraunhofer societies, and 35 new "blue list" institutes that are meant to be funded 50:50 by state and federal governments. Even so, at best only half of eastern Germany's scientists will be able to find jobs within this new structure.

The effects of this austere budget could be felt well beyond Germany's boundaries—in particular, on the European space program. Riesenhuber made his bluntest statement yet that Germany will have to make "distinct reductions" in its support for the French-inspired Hermes space shuttle and the space station module, Columbus. The German cabinet intends to reassess German involvement in these projects before the Bundestag budget debate in October and the critical meeting of the European Space Agency's council to be held in Munich in November. The result could be dramatic. If immediate needs in east Germany prevail, then Germany might pull out of the Hermes project. Then France would likely end support for Columbus and the ambitious European space program would come down to Earth with a bang. ■ RICHARD SIETMANN

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