SCIENCE IN CANADA

Funding Crisis Grips Genome Research

Canada's genome program, which leapt out of the starting blocks with great promise 4 years ago, is suddenly struggling to stay on its feet. It was plunged into crisis this summer as the Canadian government followed through on a 4-year plan to cut research budgets, a policy that will extend through 1999. In keeping with the new austerity, the chief contributor to the Canadian Genome Analysis and Technology program (CGAT)—a ministry called Industry Canada—said it cannot give CGAT any more support. Without a big backer, the $22-million, 5-year program, which has funded everything from mapping of human chromosomes and sequencing mouse immune system genes to research on social issues, will soon run out of grant money.

CGAT's second largest contributor—the Medical Research Council (MRC)—has offered $5 million toward a renewed genomics program, but only if others put in twice as much. The Canadian National Cancer Institute has offered $1 million, as has the Social Sciences and Humanities Research Council, but so far, CGAT's leaders haven't found anyone with deep pockets willing to kick in the rest of the money. The result: An effort that rivalled the U.S. and British genome projects in quality is about to hit the wall. The first round of CGAT grants will expire next summer. And CGAT is already telling researchers not to apply for new grants.*

Half a dozen leading Canadian geneticists contacted by *Science* said they're concerned that if Canada allows the existing CGAT program to disappear, it may never regain the lost ground. For example, Peter St. George-Hyslop of the University of Toronto, a leading Alzheimer's geneticist, says, "It's very worrying not to have that expertise [in genomic technology] being cultivated within one's own country." Lap-Chee Tsui of the Toronto Hospital for Sick Children, a pioneer of human chromosome 7 research and a discoverer of the cystic fibrosis gene, thinks a cut in the genome program (which partially funds his work) could make it hard for Canadian researchers to get quick access to new technologies in the future. "It's like computers," Tsui explains. "If you're involved in developing a new computer, you get the newest model; if not, you have to wait for someone to give you an old one." Michael Hayden of the University of British Columbia, adds: "It's a very tough situation" affecting "the whole climate for research in Canada."

Ronald Worton, director of research at the Ottawa general hospital and chair of CGAT's management council, says he's been trying to round up new contributors, but hasn't "sorted it out yet." Worton is concerned that potential sponsors may be put off by negative news reports, and he insists the program has not been abandoned. He's hoping for a last-minute rescue this fall. But MRC president Henry Friesen says the "fiscal reality that we're in today" makes it "very improbable" that CGAT will continue in its present form. The funding promised so far isn't enough to sustain the old CGAT structure, says Friesen.

One "realistic option," Friesen suggests, would be for genome scientists to adopt an entirely new structure: a "centers of excellence" arrangement that links academic researchers with industry. To do this, he says, scientists would have to confederate into a "network" and apply "en masse" for funding as a single management unit. They would have to name a single management group, identify specific research goals, and sign up industry partners. This kind of partnership might appeal to the Natural Sciences and Engineering Research Council, which is encouraging industrial partnerships in other areas of research, says Friesen, and it would help provide a business-linked economic rationale for the genomics program. But, as Friesen notes, efforts to make this dramatic shift in management are coming "a bit late" to avoid disrupting some grants.

Even if it could be pulled together in a hurry, a network arrangement might not appeal to some of the scientists now funded by CGAT. For example, Ford Doolittle, the geneticist at Dalhousie University, Halifax, whose team is sequencing the archaebacterium *Sulfolobus solfataricus*, has qualms about shifting from the traditional academic style to this more corporate approach to supervising research. He and another Dalhousie scientist, Michael Gray, believe that peer review—rather than network-based goal setting—is more likely to produce excellent results.

As Canadian genome researchers continue looking for sponsors, some say their task is being made more difficult by leaders in the U.S. human genome program. The Americans have boasted so often that they're below budget and ahead of schedule that Canadians are beginning to believe that they can't keep up or that "everything's been done," says Tsui. That sends "exactly the wrong message" to politicians, Tsui believes. "Of course we can't compete with the U.S. and U.K.," Tsui says, but he adds that in certain areas of genomics, "we are world leaders."

–Eliot Marshall

For a complete list of CGAT grantees, see http://cgat.bch.umontreal.ca/CGAT/projects.html.

NEUROSCIENCE

Learning Defect Identified in Brain

Researchers who study learning disabilities have known for years that many children who lag behind in language or reading skills have trouble distinguishing between certain spoken syllables known as phonemes. Now a research team led by Nina Kraus of Northwestern University has found what may be a biological basis of that problem. By recording brain waves, they showed that in at least some of these children the brain's auditory system simply doesn't recognize the syllables as different. The finding, which is reported on page 971, is exciting, says Purdue University speech pathologist Rachel Stark, because it is the first to "demonstrate neurophysiologically that these children are different from those who are developing language and reading normally."

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Wired. A child is prepared for the hearing study.

It also dovetails with the recent discovery that computer games designed to teach language-impaired children to distinguish between certain rapidly delivered sounds can boost their language skills (see *Science*, 5 January 1996, pp. 27, 77, and 81). That finding, by Paula Tallal of Rutgers University in Newark, New Jersey, and Michael Merzenich of the University of California, San Francisco, grew out of earlier work by Tallal. It implied that children who have trouble distinguishing phonemes have a defect early in the brain's processing of sounds, before phonemes reach its special language centers. The current results support that notion by demonstrating a neurological defect in the early sound-processing pathway, and might lead to ways to identify children who would benefit from speech–sound training methods, including Tallal's and Merzenich's.

Kraus and her coworkers began their study by testing the ability of learning-impaired children to distinguish between different closely related phonemes. As expected, they found that the kids had a much harder time than normal children, although the effect was not uniform, and certain combinations, like "da" versus "ga," were more problematic than