

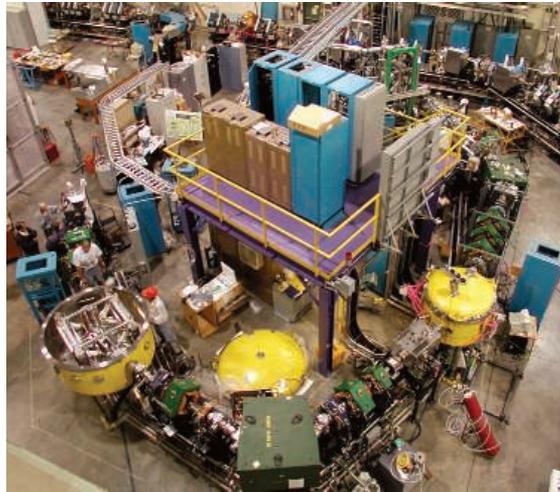
CANADA

Grants Councils Say More Isn't Nearly Enough to Keep Science Healthy

OTTAWA—Research no longer carries the political cachet it once did. That's the message Canadian science policy makers are taking from a new budget put forward last week. The Liberal Party's promise to double Canada's research effort by 2010 and put science at the top of its agenda has been undermined by disappointingly small increases for the country's three granting councils. The result, say the council chairs, is likely to be fewer grants, smaller awards, and less support for training the next generation of scientists.

"The problem is that the [political] winds are different," says Marc Renaud, head of the Social Sciences and Humanities Research Council (SSHRC). "Support for science and technology is not as strong as it used to be."

The minority government's blueprint for the fiscal year that begins on 1 April provides a little for everyone, although Prime Minister Paul Martin reserved the biggest increases for retooling the military and cutting taxes in an apparently successful bid to win over the opposition Conservative Party. Genome Canada gets \$132 million over 2 years pending an assessment of long-term national genomics needs. The nonprofit agency had been due to expire this year after spending \$300 million supporting genomics research of interest to industries such as agriculture, health, forestry, and fisheries (*Science*, 10 March 2000, p. 1732). Universities get a 6% boost in payments for indirect costs asso-



Mixed news. Canada's new budget contains upgrades to TRIUMF but not money to send scientists to CERN.

ciated with research (*Science*, 27 October 2000, p. 687). And the government has reserved \$24 million over 10 years for the new Canadian Academy of Sciences, once it becomes operational (*Science*, 22 October 2004, p. 589). The budget also provided \$178 million over 5 years for the Vancouver-based TRI University Meson Facility (TRIUMF).

But Natural Sciences and Engineering Research Council president Thomas Brzustowski lamented his failure to obtain a

larger increase. "I thought I made a good case" for a \$64 million boost, he says; instead, the council received an increase of \$18 million, or 3.3%, to its \$522 million budget. That means Brzustowski will spend an unhappy last few months in office before retiring in July, trying to reconcile rising demand with few additional resources.

For SSHRC, Renaud says a 5% boost translates into a declining success rate for applicants. And Alan Bernstein, president of the Canadian Institutes of Health Research, says that a one-time, 5% hike could jeopardize a planned expansion of clinical trials and an initiative in regenerative medicine. "It's hard to be strategic when you get these increases 1 year at a time," he says.

TRIUMF also received \$44 million less than requested. The gap, says Director Alan Shotton of the University of Alberta, means that TRIUMF won't be able to send Canadian scientists to inter-

national facilities such as CERN, Europe's high-energy particle physics lab near Geneva, although it will continue to host visiting scientists. Still, the government's continued investment in the lab was welcome news to foreign collaborators. "That facility is going to make significant contributions to science," says C. Konrad Gelbke, director of the National Superconducting Cyclotron Laboratory at Michigan State University in East Lansing.

—WAYNE KONDRÓ

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HUMAN EMBRYONIC STEM CELLS

Getting the Mice out of ES Cell Cultures

Researchers in Wisconsin have come a step closer to developing a culture for human embryonic stem (ES) cells that is free of animal products—a recipe that is essential for growing any cells that would be used for therapy in humans.

Human ES cells are tricky to grow, and many regard their culture more as an art than a science. "In general, we don't understand what is going on here," says stem cell researcher Ronald McKay of the National Institute of Neurological Disorders and Stroke in Bethesda, Maryland. But scientists have found that they need a combination of at least two animal-derived products: fetal bovine serum to nourish the cells and a layer of fetal mouse fibroblasts called feeder cells that inhibit differentiation into a variety of cell types.

Because of that, there is a risk of contamination from animal pathogens, a fact confirmed by a study published in the January

issue of *Nature Medicine*. Physician Ajit Varki and colleagues at the University of California, San Diego, identified a substance on the surface of cultured human ES cells, *N*-glycolylneuraminic acid, that is taken up from animal products and that would probably cause them to be rejected if transplanted into a patient.

To circumvent such problems, many groups have been racing to develop stem cell culture media free of animal products—mouse feeder cells in particular—with some unreplicated reports of success. Now, a group led by developmental biologist Ren-He Xu of the WiCell Research Institute at the University of Wisconsin has found that in high doses, a synthetic human molecule known as fibroblast growth factor 2 (FGF2) can do what mouse feeder cells do: sustain stem cells in an undifferentiated—or pluripotent—state.

Xu says his team, which includes James Thomson, who first successfully derived

human ES cells, discovered a few years ago that when the culture medium they normally use is not conditioned by mouse cells, it promotes stem cell differentiation, mimicking the activity of bone morphogenetic protein (BMP). That meant that there must be molecules in the feeder cells that suppress BMP activity. They have now determined that FGF2, a protein routinely used in human ES cell culture, will, if administered in high quantities in combination with BMP antagonists, inhibit BMP activity, preserving the cells in the undifferentiated state. The report appears in the March issue of *Nature Methods*.

Although Varki says the Wisconsin study is "a major step forward," he and others point to several issues that remain to be resolved—including finding ways to remove bovine serum, which also appears to be a major source of contamination.

—CONSTANCE HOLDEN

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