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Object: How the CIHR can create a healthy dynamic research community that provides innovative solutions for a healthy and prosperous society.

Dear Dr. Beaudet and Dr. Aubin,

With this letter, we respond to the invitation by the CIHR to submit comments on the proposed transformation of the open operating grant competition into a two-tier system of program and project grants. In short, we view this proposed dramatic transformation of peer review as missing the true opportunity our community needs to embrace: the reversal of long-term erosion of support for basic science research through a simple reallocation of resources and harnessing and enhancement of the talents of both the research community and CIHR administration. Whereas the support of the Federal government for industry-academic partnerships is very timely and appreciated, we feel that the trend towards narrow and target-oriented strategic programs has eroded the potential for innovation and caused long-lasting damage to the capacity of the biomedical research community to improve the health of Canadians. We are pleased that the Federal Government emphasized Innovation, Training and World-Class research in its last budget and we hope that the CIHR will leverage these opportunities to enable the biomedical research community to fulfill its mandate. In fact, we propose in the second part of this letter, a simple, no-cost solution to the funding deficit, one that engages the talents of the research community and of the CIHR administration, in a team effort. An effort that could make Canadian science among the most competitive in the world.

Concerning the proposed transformation of the review process including the implementation of a two-tier system of funding, we endorse the excellent analysis that was provided by Mike Tyers and his colleagues at the Université de Montréal. We see no evidence justifying the need for a complete overhaul of the current peer-review system. This system provides the most efficient means of allocating limited resources to the most promising areas of biomedical research and its applications. However, we are worried that a new system will be implemented in a top-down approach despite significant concerns of a very large part of the Canadian biomedical research community. Although we realize that CIHR funding cannot be significantly increased in the current budget environment, simple and straightforward solutions are on the table that will improve the peer-review system in order to adapt it to the current budgetary environment as explained below.

1. **CIHR should prioritize the operating grant competition ensuring a 25% success rate excluding bridge funding and strategic initiatives.** This funding level would help ensure the effectiveness of the peer-review system. Such a prioritization would require a reduction in the strategic funding envelope, but we strongly argue that in this challenging funding climate resources must fund the highest quality science and its applications to improve the health of Canadians. Reducing or eliminating small and undersubscribed strategic programs would help improve the overall efficiency and effectiveness of CIHR programs.
2. **CIHR should adopt an effective triage system similar to that at the NIH.** Peer-review committees spend considerable time discussing and scoring proposals that may reach a final score above 3.5, but that are not competitive for funding. This is an ineffective use of valuable human resources! We propose that the consensus scores of the two primary reviewers and of the reader should be averaged and that only the top 50% of applications will be discussed. In our experience, reviewers usually reach similar conclusions and grants with strongly diverging scores could still be discussed. Implementing this measure alone would lead to a considerable consolidation in the number of peer review committees needed. This would lead to increased operational efficiency and broaden the expertise on committees, which would help improve the quality of the peer-review system.
3. **CIHR should maintain in person panel meetings as the principal approach.** The current discussion documents propose various scenarios for pre-screening of shortened applications and virtual reviews to replace in person panel discussions. We are concerned that the quality of the evaluations would suffer tremendously and that funds would not be allocated to the most promising and innovative research projects. Based on our extensive experience on review panels, we conclude that in-person discussions are extremely important and effective. The person-to-person discussions of a large group of peer reviewers achieves a quality and depth of discussion that could never be obtained by virtual review or pre-screening of short pre-applications.
4. **CIHR should provide incentives to encourage the participation of its best scientists.** Peer review is a community-based process and different points were made explaining so-called reviewer fatigue and the reticence of certain well-funded scientists to participate in the peer review process. Whereas a lot of this information is anecdotal, it is clear that the participation of the best scientists is necessary to ensure quality peer review. We feel that CIHR should provide positive incentives to motivate participation, e.g. consider the extension of the grants of committee members by one cycle. Similarly, CIHR may want to consider more coercive measures, e.g. requesting credible justifications from grant recipients who do not participate in peer review, including follow-up investigation in cases of repeated refusals to participate.

We feel that the above measures would strengthen the peer review system and improve the overall quality of biomedical research funded by the CIHR. In addition, they would reduce the number of peer-review committees and significantly reduce the cost of the peer review process thereby increasing the operational efficiency of the CIHR.

Next, we explain a simple strategy by which CIHR bureaucrats can capture the fruits of basic research for the benefits of Canadians by effectively harnessing the strengths of their community, at no cost. Lessons may be taken from an editorial written by Dr. Gerald Fink that was published in the prestigious journal *Science* in which he pays homage to Herman Lewis who was at the time director of the US National Science Foundation¹. Dr. Fink applauds Dr. Lewis for having the vision and creativity to

find a loophole around a rule that was blocking Dr. Fink from advancing a new research direction. Prof. Fink relates how the results of this research led to the timely discovery of a vaccine for Hepatitis B, a virus carried by over 300 million people. Consequently millions of lives have been saved. The wisdom of Herman Lewis as the top bureaucrat of a National funding agency was in understanding what his role was in the team that makes up the biomedical research community and knowing how to make the system work more efficiently; for individual researchers in the lab, the biomedical community and the greater society. The central question that CIHR bureaucrats must confront is to define their role in advancing biomedical discovery, innovation and translation to treatments. In addition, they need to demonstrate to government officials and the general public, how these goals are being achieved.

In our opinion, the answer is simple, home grown and consistent with basic Canadian values. Preston Manning accurately described the problem and eloquently spells out a solution in a recent editorial in the *Toronto Globe & Mail*². Mr. Manning was addressing how to translate the fruits of university research into innovative products, but what he said equally holds for translating basic research into health benefits. As he relates, Canada has armies of talented researchers, entrepreneurs and bureaucrats at Research Councils. What is lacking is innovative ways to bring these talents together to achieve effective knowledge transfer. One standard and flawed response has been to place the challenge onto the backs of researchers, requiring them to become entrepreneurs at the expense of their true talents. As Manning eloquently compares, this is like putting together a winning Olympic hockey team by asking a star forward to be the goalie. His solution is very easy *“Let the universities focus primarily on basic research and training students to serve as the prime carriers of advanced science and technology to the marketplace”* and *“Let governments, therefore, shift their emphasis toward serving primarily as facilitators, enablers and partners with other players.”* At present the CIHR is trying to turn forwards into goalies; redirecting resources from research funded based on excellence and innovation towards much less competitive, strategic programs of limited scope and scientific value. This strategy is destroying the performance of the Canadian biomedical research community. **We feel strongly that the Research Councils must reverse this policy and propose a simpler strategy of achieving knowledge translation into applications that benefit the health of Canadians.**

We feel that in the last budget, the Federal Government has advocated for a better approach. Important steps will be made towards the implementation of this vision by modifying the mandate of the NRC and by providing incentives to industry as well as to the Research Councils to stimulate basic research as well as industry-academic collaborations. If the CIHR is to serve as the facilitator, enabler and partner with other players needed to create benefits for society, it needs to reallocate the resources that they have to enable a robust academic research enterprise. In addition, it needs to serve as an effective body for analyzing, integrating and transmitting information about basic research accomplishments to government officials, the business community and other stakeholders. At the same time, they must communicate more effectively with the basic research community to determine how best to utilize the information that they collect. The CIHR could arrange for individual researchers to meet companies, investors and families affected by diseases. Our experience is that people suffering from illnesses and their families are quite knowledgeable and clearly understand the need for fundamental research because hope is often a long-term commitment. Terry Fox and his family taught us this lesson decades ago. Currently, there is little effort on the part of CIHR to directly connect its many talented researchers to either the lay community or to business investors interested in discoveries from University-based biomedical research.

We feel that instead of downloading the tasks and further increasing the pressures on individual researchers, CIHR should engage in an open dialogue with the biomedical research community and with other stakeholders in order to improve knowledge translation into applications. We are convinced that

with adequate and appropriate allocation of funding to our talented researchers engaged with our equally talented bureaucrats and entrepreneurs, we can form a formidable team. By working together in harmony, we can achieve our real objective: Perform and translate ground-breaking research that all Canadians can share pride in, and perhaps, save millions of lives.

We are grateful to CIHR for engaging its community into this open discussion process and we thank you in advance for the consideration of the points made in this letter.



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¹Gerald R. Fink, Science, vol. 271, 1 March 1996, pp. 1213.

²Preston Manning, The Globe and Mail, December 28, 2011

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Science's Next Wave

Editor: John Benditt

EDITORIAL

Bureaucrats Save Lives

What a time to be a federal employee! In the rush to downsize government, politicians have demonized bureaucrats, reducing them from drones to vampires. Yet I and many of the scientists I know have a very different image of federal bureaucrats. My personal hero is Herman Lewis, whose administrative career at the National Science Foundation (NSF) from 1962 to 1986 earned him a reputation as an extraordinary champion of progress in science. Lewis not only brought high standards to the NSF, but also made a decision that saved millions of lives.

In 1977, my students and I devised a scheme to transform common bakers' yeast by coaxing the yeast cells to take up and replicate virtually any DNA molecule. However, at that time the government advisory body most involved in the oversight of DNA research, the Recombinant DNA Advisory Committee (RAC) of the National Institutes of Health (NIH), prohibited such experiments in yeast. Enmeshed in the hysterical national debate over the potential dangers of recombinant DNA research, the RAC was loath to move into uncharted territory. When I appealed to the RAC, I was told, "It will probably be 2 years before we can even consider such experiments in yeast."

Thwarted by the imbroglio at NIH, I sought Herman Lewis's advice. In a moment of inspiration, he said, "You have an NSF grant. The NSF is not constrained by the rules of the NIH RAC." Lewis identified a loophole that had escaped everyone else: He had the authority to approve novel ideas within the context of our peer-reviewed NSF grant. Shortly thereafter—on 26 October 1977—he officially authorized our experiments. Within a few weeks, we demonstrated that our scheme worked and opened a new avenue for drug and vaccine development. Faced with inconsistent policy between two federal agencies, the RAC voted on 9 March 1978 to permit yeast experiments. By sanctioning our experiments, Lewis had accelerated the genetic engineering of yeast by 2 years.

Lewis's decision to permit the yeast experiments led to a completely unexpected bonanza: the formulation of a safe, effective, and inexpensive vaccine against hepatitis B. This virus, carried by about 300 million people worldwide, is transmitted through blood and sexual contact. Because chronic infections can ultimately lead to cirrhosis of the liver and liver cancer, millions of those infected die. In the late 1970s, the only vaccine available was derived from human serum; it was in short supply, and those treated risked infection with other blood-borne viruses carried by the vaccine.

Using our new technique, William Rutter of the School of Medicine at the University of California, San Francisco, and Benjamin Hall of the University of Washington introduced the gene for the hepatitis B coat protein into yeast. The resulting genetically engineered yeast produced vast quantities of highly immunogenic but noninfectious virus particles, which were developed into a commercial vaccine by Merck in 1986. This vaccine is effective against hepatitis B, carries no blood-borne viruses, and is available in unlimited quantities. Without Lewis's intervention, the hepatitis B vaccine would have been delayed by 2 years and millions of lives would needlessly have been lost. Why did Lewis intervene and buck the system? In a recent letter, he summarized his motivation: "I learned that if you were a little aggressive, had confidence in your scientific judgment and exercised some imagination, you could get lots done within the system to catalyze science. I came to realize that, although talented bench scientists drive science, responsible and judicious administrators could be important factors in the driving team. I can honestly state that I genuinely, though vicariously, shared with lab scientists the excitement of a new insight or discovery that was a consequence of a decision I uniquely made. It is not exactly accurate to say that 'I was just doing my job,' but in context I believe it is acceptable shorthand."

There are many administrators like Herman Lewis who should be honored for just doing their jobs. We are fortunate, today, to have a legion of gifted public servants who possess invaluable knowledge and experience gained at the forefront of science. Ill-considered measures to discredit the bureaucracy will alienate these leaders and ultimately cost us lives.

Gerald R. Fink

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THE GLOBE AND MAIL 

PRESTON MANNING

The right players in the right roles for innovation gold

Preston Manning

From Wednesday's Globe and Mail

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Science-based innovation is vital to improving the economic, environmental and social well-being of Canadians.

Cal Stiller, one of our most accomplished medical scientists and entrepreneurs, has therefore offered this challenge: Canada should resolve to “own the innovation podium,” just as we aimed to own the podium in Vancouver at the Winter Olympics.

In the case of the Olympics, Canada especially sought to own the podium in hockey. To achieve that objective, Steve Yzerman was given the job of assembling and managing the necessary talent. He had a great pool of goalies, defencemen and forwards from which to choose. The greatest challenge was to mould them into a gold-winning team.

In competing with the world to excel in science-based innovation, Canada also has an impressive talent pool – world-class academics and scientists, innovative entrepreneurs and business executives, dedicated and experienced public servants. The greatest challenge is to get them to play the innovation game as a team at a gold-winning level.

By the time hockey players get to the national or international level, everyone knows his role. In the innovation game, however, the most appropriate roles for the major players are not nearly as well defined, assigned, or accepted.

University-based scientists are urged to more aggressively pursue the commercialization of their work – a task that entrepreneurs and business people are usually better equipped to perform. Corporations that ought to be taking the initiative spend far too much time waiting for governments to take the lead. And government efforts to stimulate innovation are often unfocused and diffused through multiple departments and programs.

The lack of teamwork among Canada's key players in the innovation game is compounded by serious communication gaps. Business executives and politicians complain that the science community fails to express its findings in a commercially relevant or politically communicable form. Scientists respond that far too many business people and politicians are scientifically and technologically illiterate.

Is there a division of labour that can enable Canada to own the innovation podium at the international level? I believe there is.

Let the universities focus primarily on basic research and (together with the polytechnics and colleges) on training students to serve as the prime carriers of advanced science and technology to the marketplace.

With respect to commercialization, let this be the primary focus of the entrepreneurs and business executives whose primary goal is wealth creation.

As for governments, it is time to acknowledge that the public is increasingly skeptical about “big government solutions to big challenges,” including innovation. Let governments, therefore, shift their emphasis toward serving primarily as facilitators, enablers and partners with other players.

Of course there will still be circumstances when universities should commercialize, businesses should facilitate and governments should lead. But let such occasional departures from basic roles arise out of real-time interactions and good communications among the players rather than from a priori prescriptions.

Are there examples where this division of labour has worked? I think of Fred Marsh, the hockey entrepreneur who developed and commercialized the Marsh Flexible Goal Peg that permits the hockey net to break away from its moorings when hit by a player.

The Marsh peg is composed of a unique blend of rubber and plastic, the chemistry of which was explored and defined long ago in some university lab. But it was Marsh the entrepreneur who saw the need for the peg, initiated and completed its development as a commercial product and marketed it to the hockey world. “Governments” too played a crucial role – in this case the governing bodies of the Western Hockey League and the NHL – by testing the Marsh peg and eventually buying it.

But the clock is ticking. The coaches have assembled the team for last-minute instructions. No time now for further discussion, conferencing, or report writing – only time to repeat the game plan: “Academics and scientists, investigate and educate; entrepreneurs and business executives, initiate and wealth create; governments, facilitate. And all of you, communicate. Now let’s get out there and win innovation gold!”

Preston Manning is president and CEO of the Manning Centre for Building Democracy.