

**Across a Broad Spectrum:**  
**Submission to the Review of Federal Support to Research and  
Development**  
**Stakeholder Consultation**

**Submitted by**  
**Research Canada: An Alliance for Health Discovery**

**February 18, 2011**

## Introduction

Research Canada<sup>1</sup> takes, as its starting point, the assumption that there is a cycle to innovation. This cycle incorporates four major stages – research, development, market validation and delivery – and involves multiple players, including governments, academia, industry, not-for-profit organizations and, in the case of health, decision makers at all levels of the health system. Each of these stakeholders brings unique and essential resources to a robust innovation system and has a pivotal role to play. Research Canada is of the view that all of these stages of the innovation system require support in order to achieve innovation; its primary area of involvement as an organization, however, is in the first of these, research.

With this perspective, Research Canada contends that Question 15 in the Expert Panel Consultation Paper on Federal Support to Research and Development is the central, overarching question that provides an appropriate frame for the discussion of R&D in Canada. The question is:

***Is there a difference between R&D and innovation? If yes, how are they different? Should government focus on R&D or innovation? What should the balance be?***

Research Canada underscores the need to support the entire cycle of R&D, from discovery, through to product development and commercialization, to the marketplace and to health-care settings. It also underscores the need to invest in a balanced fashion across the continuum of activities that, in aggregate, comprise an innovation system that is predicated on research and development.

We emphasize that research is a long-term process; investments made today in discovery research may deliver their impacts years after the initial investment. The success of Canada's innovation system over the long term is, therefore, highly dependent on today's investments in discovery research. The most commercially successful products and services often begin as an idea and, through an unpredictable path of discovery, experimentation and hypothesis testing, eventually emerge as a commercializable product.<sup>2</sup> Targeted investments in areas of immediate applications, commercial or otherwise, will profoundly impede our ability to create a sustainable pipeline.

Governments must play a foundational role through consistent and sufficient support of the discovery research that is fundamental to our capacity to innovate. With this in place, it is possible to create a national economic environment and strategy that enables the multi-sectoral partnerships required for a robust innovation enterprise that will enhance R&D capacity and accelerate the translation of discovery research into the health-care system and into the global marketplace.

The **Strategy for Patient-Oriented Research (SPOR)** initiated by the Canadian Institutes of Health Research (CIHR), for instance, proposes a national and multi-sectoral partnership (the provinces, the private sector, the academic sector, health charities and health professionals) aimed at applying research advances in health care and the economy.

In this context and throughout this submission, Research Canada is aligned, and has co-operated, with six other national health organizations that together comprise the R7 and with which Research Canada is partnering in an initiative to further health innovation in Canada.<sup>3</sup> The submission will also refer to the experience of Mr. Cameron Piron and Sentinelle Medical Inc., a pioneering company devoted to transforming standard MRI machines into powerful tools for early detection of breast cancer, as an illustration of what is working, and what is not working, in government support for R&D in Canada.<sup>4</sup> **Research Canada, together with Mr. Cameron Piron, would be pleased to meet with the Panel at its convenience.**

## Responding to the Consultation Questions: Public Policy and Business Innovation

1. ***In addition to the R&D activity defined by the OECD, should government be funding other business activities related to the commercialization of R&D? If so, what and why?***

Research Canada applauded the decision of the Government of Canada to fund excellence in research, innovation and commercialization through the Centres of Excellence for Commercialization and Research (CECR) program.<sup>5</sup> Many gaps

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<sup>1</sup> See Appendix 1 for Research Canada's mandate and membership

<sup>2</sup> Council of Ontario Research Directors/Ontario Health Research Alliance Baseline Information Survey 2003 (CORD), p. 8.

<sup>3</sup> The six organizations are: the Association of Canadian Academic Healthcare Organizations (ACAHO); the Association of Faculties of Medicine of Canada (AFMC); BIOTECanada; Canada's Research-Based Pharmaceutical Companies (Rx&D); the Health Charities Coalition of Canada (HCCC); and Canada's Medical Device Technology Companies (MEDEC).

<sup>4</sup> See Appendix 2 for the Sentinelle story.

<sup>5</sup> See Appendix 3 for descriptions of the programs discussed in this submission.

remain, however, in the transition from discovery to innovation. CIHR has established the Proof of Principle (PoP) program to close some of these gaps. Research Canada supports the provision of ongoing, indeed additional, funding for such programs in order to better capitalize on our nation's capacity to extract economic value from the federal investment in discovery research.

**2. *Does Figure 2, the model of business innovation presented above, capture the key structural factors and inputs to innovation? If not, what is missing?***

Figure 2 effectively presents a model for business innovation, but is missing one key element: where these innovation activities take place. The model assumes that they all take place within a business environment; in reality, many of these activities take place in universities and, in the case of health innovation, hospital-based research enterprises and academic health science centres. This has been increasingly the case in recent years, as large private sector enterprises conduct less and less discovery research themselves and increasingly carry out research in partnership with the public sector.

**3. *Regarding capital, is there an adequate supply of risk capital for Canadian firms at each stage of their growth (start-up, small, medium, large)? If not, why not? Where returns on investment are low, what are the reasons and potential solutions?***

Lack of external investment in the form of venture, or risk, capital, drove Sentinelle to seek a non-Canadian buyer. Despite revenues doubling and tripling each year, external investment was required if the company was to grow to its full potential, but could not be found in Canada's "atrocious" funding environment. Hologic, its American buyer, has since invested more than \$10 million in the company's growth, investment Sentinelle was unable to secure in Canada.

**4. *Regarding ideas and knowledge, do you believe it is important for Canadian firms to perform their own R&D and, if so, what do you believe are the key factors that have been limiting business R&D activity in Canada?***

While critical for companies and citizens to reap the benefits of R&D performed in Canada, Research Canada does not hold the view that every company must perform R&D. It is becoming increasingly common for MNEs to obtain R&D through buying smaller companies and/or in licensing their R&D. Further, these MNEs are increasingly supporting their R&D through partnerships with academic health science centres and universities. In light of this "open" model of innovation, it is vital that academic institutions have the support they require for discovery research through the federally supported Tri-Council.

**5. *Regarding networks, collaborations and linkages, what are the main impediments to successful business-university or business-college partnerships? Does the postsecondary education system have the right capacity, approaches and policies for effective partnerships with business?***

A robust innovation enterprise requires a strong foundation of multi-sectoral partnerships. Partnerships promote collaboration, support shared responsibility and accountability and enable important efficiencies on the road to innovation. Partnerships succeed when they share an overarching goal and a vision.

To a large extent, universities and research institutions do not have the skills and capacity they require to take full advantage of the business and public sector development opportunities that exist as a result of publicly funded research carried out by their researchers. Cameron Piron, the CEO of Sentinelle, was exceedingly frustrated by this lack of expertise, which prevented him from establishing partnerships with institutions apart from his initial partner, Sunnybrook Health Sciences Centre. Piron says universities need to develop an "open for business" attitude and suggests that this could enable the development of a "best practice" that would support a standardized approach across institutions.

Despite these shortcomings, businesses and universities have established several joint ventures over the years, including the Sanofi Pasteur Human Vaccine Challenge Unit at Dalhousie University, funded by the university, the Canada Foundation for Innovation (CFI) and Sanofi Pasteur; and the Wyeth Chair in Vaccinology at the BC Children's Hospital. This last initiative recognizes the key role that academic investigators played in taking research through clinical development and licensure of important life-saving paediatric vaccines in Canada.

**6. *Regarding the creation of demand for business innovation, what role, if any, do you believe the government should play in being a "first customer" for R&D investments in Canada?***

Research Canada agrees that Canada must find ways to attract increased private sector investment while ensuring that the public interest is protected. In the health arena, this refers to three major private sector industries – pharmaceuticals, biotechnology and medical and assistive devices – each with its own requirements for doing business in Canada. Multi-national pharmaceutical companies, for example, must convince parent companies to see Canada as an attractive environment for investment. Factors such as the expertise and research infrastructure that exist in Canada and the small market size, which makes investment less risky, make this easier.

Increasingly, market validation in terms of Canada being a first customer for R&D investments is important and requires improvements in regulatory environments, intellectual property and tax policy. Such market development in “one’s backyard” is critical, says Piron, and is a common element of success among Canadian companies. In the health field, Canadian institutions and hospitals are highly regarded internationally; having these as reference customers is a tremendous advantage, one that increasingly predicates future sales in the international market place

In addition, governments can adopt financial incentives, such as “proof-of-concept” funding, that can stimulate and support the adoption of innovation. Such incentives are a key ingredient for creating a culture of innovation in Canada. In this regard, and cognizant of the stringent economic times, the Government of Canada might, nonetheless, consider increased investment in proof-of-concept funding through the launch of a federal matching program, analogous to the funding algorithm adopted by CFI. Given the growing provincial interest in extracting economic value from the investments made in discovery research, the time may be right for a federal-provincial partnership in supporting proof-of-concept, with strategies for adopting successful practices.

**7. *Regarding talent, is Canada producing sufficient numbers of graduates with the right skills to drive business innovation and productivity growth? If not, what changes are needed? Where demand for advanced skills is low, what are the reasons and what changes, if any, are needed?***

A robust innovation system depends on a critical mass of health and other researchers. Highly qualified and innovative people – whose training is delivered in Canada’s universities, hospitals and research institutes – are critical to each stage within the innovation cycle. These trainees become a vital resource for industry, a material benefit that is recognized by Canadian businesses, and is, indeed, a draw to do business in Canada. Hence programs supporting increased capacity for training highly qualified Canadians must be increased – recognizing at the same time, however, the importance of balancing investment in salary support, infrastructure and operating grants.

Research Canada encourages the re-instatement of publicly funded career development programs providing support along the career development path from junior to intermediate to senior and clinician scientists. The Canada Research Chairs program is a critical program for supporting established scientists; it is not, however, a replacement for a continuum of career-development programs that protects our human capital at every stage of their training. Sustainable funding models for salary support for health researchers are urgently required if we are going to protect our pool of talent for business innovation and productivity growth.

The S<sup>2</sup>B (Science to Business) program is an excellent start to provide scientists with the business training to support the commercialization of their research and ongoing support is urgently needed. New programs and ongoing support of existing programs like CECR and PoP dedicated to increase the ability of academic institutional offices of technology transfer to assist researchers in finding external investors to further the transition from discovery to innovation would enhance Canada’s ability to extract economic value from knowledge.

**8. *Can you describe whether and how your firm employs students currently enrolled in community colleges, polytechnics and universities, and what government measures could make it easier to work with students during their academic programs and to recruit them after their graduation?***

Most private companies employ students for summer programs and through co-op programs. Sentinelle, for instance, employs some 30-50 students each year; these students are essential to developing the next generation of employees, Piron says. He notes, however, that the tax credit for hiring these students is not substantial and thus not a consideration in hiring them. Longer terms for these students (12-16 months instead of the current four) and better tax credits would play a significant role in encouraging companies to hire more students.

Equally important, however, is the support many companies provide to high school students, through programs such as the Sanofi Aventis Biotalent Challenge (SABC), which encourages students to engage with biotechnology from an early stage. When followed through their university careers, most of the students who participate in the challenge go on into science and biotechnology in no small part due their experiences with it.

## **Responding to the Consultation Questions: Federal Role and Programs**

**9. *With which federal programs supporting business or commercially oriented R&D in Canada do you have direct experience and knowledge? In your view, which of these programs are working, and why? What programs are not working, and why not?***

Through our membership we have direct experience with the Centres of Excellence for Commercialization and Research (CECR) program, as well as with smaller programs such as CIHR’s PoP program. Both of these programs are working

well, and promise to accelerate the process of extracting economic value from knowledge. Research Canada recommends that the CECR program be extended for at least another five-year cycle, selecting those that have achieved commercialization and other high-impact milestones for continued support.

The PoP program is an innovative approach to meeting the challenge of commercializing and mobilizing knowledge from research discoveries; at only \$5.7 million in grants for successful applicants, however, it is far from adequate to meet even current needs. Appendix 3 sets out Research Canada's recommendations for its improvement; as noted in question 6, above, however, a federal-provincial matching grant program could amplify support for the PoP program.

The success of programs such as CECRs and PoP lies, to a great extent, in their ability to bring together academic researchers and those with professional business acumen with the private sector, both investors and existing companies (see question 5, above) and other relevant stakeholders. Research Canada encourages the Government of Canada to continue investing in programs which assist in developing these linkages.

**10. If you have direct experience and knowledge of the SR&ED tax credit, what are your views in relation to the following:**

**a. Does the current structure of the SR&ED tax credit encourage incremental investment in R&D? Does it free up capital to invest in other aspects of innovation activities in the firm? Does this vary by size, ownership, sector or nationality of the firm?**

The SR&ED tax credit is the lifeblood for small companies. As Cameron Piron has explained, the continued investment that results from the SR&ED tax credit is essential in ensuring that a company can engage in research to extend and expand their product lines, thus ensuring a given company's sustainability.

Piron also notes, however, that the current structure, while encouraging investment for small and medium-sized companies (SMEs), cuts off investment once a company grows past a certain size, resulting in reduced investment at an artificial point. The loss of the tax credit, once a company can no longer apply for it, has a detrimental impact on the amount of potential future investment in R&D.

Research Canada encourages the government to consider broadening SR&ED eligibility to include a broad continuum of health-related research, in alignment with the Organization for Economic Cooperation and Development (OECD). In addition, permitting milestone payments to biotechnology firms acquiring drug or biologic intellectual property rights would be a powerful support to a crucial emerging sector.

In light of the increasing focus by regulators on the entire life cycle of drugs and biologics, the federal government should permit research in areas such as health economics; health-care management; studies that address socio-economic factors; pharmaco-economic studies that build on known health outcomes; and studies to develop new methodologies and models for a broad continuum of health-related research to be eligible for the SR&ED tax credit. Further, given the potential commercial impact of the hundreds of millions of dollars spent on R&D by research hospitals, the federal government should review how SR&EDs apply to them, in particular examining the rules governing both the "expenditure limit" and who is deemed to be an "excluded corporation".

These changes to SR&ED would encourage collaborative, interdisciplinary research and attract new capital for Canada's biotechnology sector.

**b. What are the strengths and weaknesses of the refundable portion of the SR&ED tax credit for Canadian-controlled private corporations and to what extent does it encourage the growth and commercial success of SMEs?**

One issue that has been identified is the timing of the payment; for small and medium-sized enterprises in particular, every month counts. Some banks will finance the cheque once certain conditions are met, but that typically happens at a later point. Another issue that has been identified is the capped value of the refund, as it does not encourage very significant investments and the credit does not apply to patent costs. Patenting of concepts should be funded in lock step with the development of technology. A strong intellectual property position is paramount for engaging further investment and defending a firm's position in the market. A final issue is that the SR&ED cannot be used in conjunction with other programs such as the Industrial Research Assistance Program (IRAP), making applying to these programs less beneficial.

The strengths of the refundable credit are that it appears to be audited fairly, does enforce some structure to research programs and the funding is, ultimately, truly essential to maintaining a long-term technology development plan.

*c. Bearing in mind the improvements being made by the Canada Revenue Agency, are there additionally opportunities for change to simplify the administration of the SR&ED tax credit and facilitate the application process?*

A well-defined process where research programs can be audited early in the process in an efficient manner would be helpful, as opposed to being audited and denied later in the process. Simplifying the process and making it less daunting, particularly to new businesses, and ensuring they receive assistance in producing appropriate documentation and financial statements in accordance with normal business process would help companies without their having to resort to expensive specialists.

**11. How could the Government of Canada lighten the administration requirements of its programs on recipients and improve outreach to business?**

According to the experience of Cameron Piron, clear and meaningful criteria for funding are required. For instance, grants should be focused on the merits of a company's project and potential for growth, not on its financial position or on criteria such as having venture capital at an early stage, which is clearly inappropriate.

**12. How could the Government of Canada be more innovative and responsive to meet new needs or opportunities, and try alternative service delivery approaches to its programs?**

Government leadership is required to remove obstacles to commercialization of research through changes to the intellectual property regime, keeping in mind the opportunity costs, and to the tax treatment of early-stage investment (see questions 6 and 10, above).

In addition, aligning various programs would be important; a great deal of time is currently required to put together applications that are similar in nature, but different enough to require significantly more work than is truly necessary. As well, many timelines are not appropriate for fast-growing businesses. Support in marketing Canadian innovative companies through awards or other forms of publicity can also be helpful.

Finally, the government could foster and support the creation of consortia that bring together researchers, Academic Health Networks and decision makers.

**13. Are there any gaps in the Government of Canada's support to business and commercially oriented R&D? Do firms performing R&D in other countries have an advantage over Canadian firms because of access to programs that are not available in Canada? What would be the principal features of new programming to fill these gaps?**

Research Canada strongly supports measures to improve and expand both CIHR's Proof of Principle (PoP) program and the CECR program, as part of an integrated strategy to facilitate collaborations cross the public, private and academic sectors.

The largest gap identified by Sentinelle is the funding of companies as they enter the order-fulfillment cycle. Changes to the IRAP program to reflect features of programs such as New York State's Strategic Partnership for Industrial Resurgence (SPIR) would be valuable. Encouraging investors through tax credits would be an innovative approach to ensuring SMEs have the capital they need to grow.

**14. What lessons and best practices can be taken from provincial business and commercially oriented R&D programs, and how should the two orders of government align their programming?**

Research Canada applauds the commitment of provincial and territorial ministers of science and technology to continuous communication in order to build on each others' initiatives and develop synergies that will support innovation across the other ministries and country. Research Canada further encourages the Government of Canada to ensure it is at the table when these ministers meet, in order to facilitate their work and provide a national perspective. Specifically, policy alignment is required both within the Government of Canada, specifically between Health Canada and Industry Canada and among levels of government. The creation of incentives to encourage this collaboration and alignment should be explored.

## **Conclusion**

The overarching thrust of this submission is the need to contemplate the "whole" of an integrated innovation system. A review of the "front end" of the system and one of its key products, businesses, will indeed provide measures that ameliorate some private sector challenges, which is, of course, a good thing. It does not, however, embrace the root challenges. Achieving an integrated system of innovation is predicated on understanding all of its elements; fixing one element of the system will not ensure the intended goal. A firm commitment is required to the upstream investment in discovery research that keeps the commercialization pipeline rich and deep. In its absence, and without balanced

investments in infrastructure, operating grants and salaries, Canada risks jeopardizing its ability to capitalize on past material investments, and will undermine current and future investments. The input provided in this submission reflects this necessity.

## Appendix 1: About Research Canada

Research Canada: An Alliance for Health Discovery is an evidence-based, national alliance of health research stakeholders dedicated to advancing health research in Canada. Its members are drawn from the academic, voluntary and private sectors and include research hospitals, universities, industry and not-for-profit organizations. Research Canada advocates for health research funding and supports the creation of a policy environment that enhances investment in health research from all sectors. Research Canada takes a broad view of health research that considers the totality of the health innovation system and that appreciates the full range of steps required to translate research concepts into health impact.

### *Research Canada's Members*

- *Alberta Health Services*
- *Baycrest Centre for Geriatric Care*
- *BIOTECanada*
- *Canada's Research-Based Pharmaceutical Companies*
- *Canadian Association of Occupational Therapists*
- *Canadian Cancer Society*
- *Canadian Consortium for Nursing Research*
- *Canadian Cystic Fibrosis Foundation*
- *Canadian Diabetes Association*
- *Canadian Foundation for Dental Hygiene Research and Education*
- *Canadian Healthcare Association*
- *Canadian Pain Society*
- *Canadian Physiotherapy Association*
- *Canadian Society of Biochemistry, Molecular & Cellular Biology*
- *Canadian Society for Immunology*
- *Capital District Health Authority*
- *Centre for Addiction and Mental Health*
- *Centre Hospitalier de l'Université de Montréal – Research Centre*
- *Centre Hospitalier Universitaire de Québec – Research Centre, QC*
- *Centre Hospitalier Universitaire de Sherbrooke – Research Centre*
- *Child & Family Research Institute*
- *Children's Hospital of Eastern Ontario (CHEO) Research Institute*
- *Clinical Research Institute of Montreal*
- *College of Family Physicians of Canada*
- *Council for Canadian Child Health Research*
- *Covenant Health Research Centre*
- *Douglas Mental Health University Institute*
- *Friends of CIHR*
- *GE Health Care, Canada*
- *Hôpital Sainte-Justine Research Centre*
- *Hospital for Sick Children Research Institute*
- *Infectious Diseases Research Center of Laval University*
- *IWK Health Centre*
- *Juvenile Diabetes Research Foundation*
- *Kingston General Hospital*
- *Lawson Health Research Institute*
- *Leukemia & Lymphoma Society of Canada*
- *McGill University Health Centre Research Institute*
- *McMaster University*
- *Montreal Heart Institute*
- *Newfoundland and Labrador Centre for Applied Health Research*
- *Ontario March of Dimes*
- *Ontario Neurotrauma Foundation*
- *Ottawa Centre for Research and Innovation*
- *Ottawa Hospital Research Institute*
- *Pan Provincial Vaccine Enterprise (PREVENT)*
- *Parkinson Society Canada*
- *Pfizer Canada Inc.*
- *Providence Health Care Research Institute*
- *Provincial Health Services Authority*
- *Queen's University Faculty of Health Sciences*
- *Samuel Lunenfeld Research Institute*
- *Sanofi Pasteur Limited*
- *Schizophrenia Society of Canada*
- *St. Michael's Hospital*
- *Sunnybrook Health Sciences Centre*
- *The Royal College of Physicians and Surgeons of Canada*
- *Thunder Bay Regional Health Sciences Centre*
- *Thunder Bay Regional Research Institute*
- *Toronto Rehabilitation Institute*
- *University Health Network*
- *University of Manitoba Faculty of Medicine*
- *University of New Brunswick*
- *University of Ottawa Heart Institute*
- *University of Toronto Faculty of Medicine*
- *University of Western Ontario*
- *uOttawa Institute of Mental Health Research*
- *Vancouver Coastal Health Research Institute*
- *York University*

### *Research Canada's National Partners (R7)*

- *Association of Canadian Academic Healthcare Organizations*
- *Association of Faculties of Medicine of Canada*
- *BIOTECanada*
- *Canada's Research-Based Pharmaceutical Companies*
- *Health Charities Coalition of Canada*
- *MEDEC Canada's Medical Device Technology Companies*

## Appendix 2: The Case of Sentinelle

In the early years of the 21<sup>st</sup> century, Cameron Piron, a graduate student at the University of Toronto, developed a better way to use magnetic resonance imaging (MRI) to diagnose breast cancer. The Vanguard® System he developed and then licensed from Sunnybrook Health Sciences Centre is a tool that improves the ability of physicians to quickly and accurately diagnose breast cancer using MRI. The technology means shorter testing times, reduced costs, better imaging and 3-D visualization software for reading the MR images. The integrated system allows patients to be scanned, have the cancer detected and have a physician perform a biopsy in one visit. The company he created to commercialize this discovery is called Sentinelle Medical.

Piron launched Sentinelle Medical in 2005, with a focus on making its product compatible with all three existing types of MRI equipment, as manufactured respectively by General Electric, Siemens and Toshiba. Sentinelle first set out to attract General Electric and eventually landed all three companies as clients. Piron was awarded the Premier's Catalyst Award for Best Young Inventor and was named *R&D Magazine's* Innovator of the Year, the first Canadian ever to be so named. His company was exceedingly successful, doubling and tripling its revenues each year.

Despite Sentinelle's success, Piron was unable to attract the external investment he needed to grow his company. In 2010, he sold Sentinelle to Hologic, Inc. (HOLX), a publicly traded US company specializing in medical imaging tools to improve women's health. Since then, Piron says, Hologic has invested some \$10 million in Sentinelle.

The story isn't all negative. Piron made it a condition of sale that Sentinelle remain in Canada; he was considering several offers to buy the company but, he says, other owners would likely have dismantled the company altogether. Today, Sentinelle has about 150 employees in Canada, a number Piron expects to increase to 300 in the next year. In addition, the company is paying some \$4 million each year in licensing fees to Canadian research institutions, including Sunnybrook and the University Health Network in Toronto, Ontario and the Robarts Research Institute in London, Ontario. But, Piron says, if ownership of the company could have stayed in Canada, he would be considering going public and listing it on the Toronto Stock Exchange. In addition, jobs that went to Hologic's offices in the US would have stayed in Canada. And, he adds, he would never have sold to a US company if he could have achieved the kind of working capital he needed to grow Sentinelle in Canada.

Canada, observes Piron, has great talent. It is a great environment in which to test discoveries. But its funding system is, in his words, "atrocious", harder in Canada than in any other country in the world. In his experience, there is no support from Canadian banks, including the Business Development Bank, whose mandate is to create and develop Canadian businesses through financing and venture capital. And, he says, his situation is not unique. He continually meets entrepreneurs in multiple fields who cite the lack of investment as an impediment to their success. Today, Piron is investing in small companies, companies he says are "doomed" without capital investment.

## Appendix 3: Program descriptions

The following are fuller descriptions of programs referred to in the text of this submission:

**Banting Postdoctoral Fellowships Program:** The objective of the Banting Postdoctoral Fellowships Program is to attract and retain top-tier postdoctoral talent, both nationally and internationally, to develop their leadership potential and to position them for success as research leaders of tomorrow, positively contributing to Canada's economic, social and research-based growth through a research-intensive career. Seventy fellowships are awarded each year by the three federal granting councils. <http://banting.fellowships-bourses.gc.ca/home-accueil-eng.html>

**Canada Research Chairs:** The Canada Research Chairs program is a permanent program establishing 2,000 research professorships in eligible degree-granting institutions across the country. The program awards Tier 1 Canada Research Chairs to outstanding researchers acknowledged by their peers as leaders in their field. Tier 2 Canada Research Chairs are awarded to exceptional emerging researchers acknowledged by their peers as having the potential to be leaders in their field. [www.chairs.gc.ca](http://www.chairs.gc.ca)

**Centres of Excellence for Commercialization and Research:** In 2007, the Government of Canada invested \$285 million over five years to create the Centres of Excellence for Commercialization and Research (CECR) program. This innovative model creates centres to advance research and facilitate commercialization of technologies, products and services within the four priority areas identified in the federal Science and Technology (S&T) Strategy. There are currently 17 active CECRs. [http://www.nce-rce.gc.ca/NCESecretariatPrograms-ProgrammesSecretariatRCE/CECR-CECR/Index\\_eng.asp](http://www.nce-rce.gc.ca/NCESecretariatPrograms-ProgrammesSecretariatRCE/CECR-CECR/Index_eng.asp)

**Proof of Principle:** This program, established by the Canadian Institutes of Health Research, is designed to advance discoveries/inventions towards technologies that can be commercialized, with a view to attracting new investment and creating new science-based businesses. The program provides one-year grants to projects leading to products with a demonstrated market and opportunity. A review of the structure, objectives and focus of the program by CIHR and an increase to \$20 million over each of the next five years could significantly increase the discoveries that advance to the marketplace and into health systems. In addition, making the program more flexible in the amount of grants and their time frame to better meet individual projects' needs and in the requirement for a private sector investor in the second phase of the program would make the program more effective. In addition, university and hospital-based technology should be eligible for grants to develop their own inventions. [www.cihr-irsc.gc.ca](http://www.cihr-irsc.gc.ca)

**Sanofi-Aventis BioTalent Challenge:** Created in 1994, the Sanofi-Aventis BioTalent Challenge (SABC) is a high-level science competition now held in 14 cities and regions across Canada that introduces high school students to the world of biotechnology. Student teams develop proposals for research projects of their own design and are paired with university-level mentors in their community who provide expert advice and access to equipment and supplies to carry out the projects. Finalists from each province compete in the national competition held each year at the National Research Council in Ottawa. The winner represents Canada at the BioGenius International competition held every year at BIO. (BIO 2011 will be held in Washington, DC June 27-30). [www.sanofibiotalentchallenge.ca](http://www.sanofibiotalentchallenge.ca)

**Science to Business (S<sup>2</sup>B):** This program, established by the Canadian Institutes of Health Research, provides funding to Canadian business schools to recruit recent PhD graduates in health research to participate in a health or biotechnology stream MBA. [www.cihr-irsc.gc.ca](http://www.cihr-irsc.gc.ca)

**Scientific Research and Experimental Development (SR&ED) Tax Credit:** The SR&ED program is a federal tax incentive program, administered by the Canada Revenue Agency (CRA), that encourages Canadian businesses of all sizes and in all sectors to conduct research and development (R&D) in Canada. It is the largest single source of federal government support for industrial R&D. <http://www.cra-arc.gc.ca/sred/>

**Vanier Graduate Scholarships Program:** The Vanier Canada Graduate Scholarships (Vanier CGS) program is designed to attract and retain world-class doctoral students by offering them a significant financial award to assist them during their studies at Canadian universities. Vanier Scholars demonstrate leadership skills and a high standard of scholarly

achievement in the social sciences and humanities, natural sciences and engineering, and health-related fields.  
<http://www.vanier.gc.ca/hp-pa-eng.shtml>