

**Written Submission for the Pre-Budget Consultations in Advance of the
2019 Budget from Canadian Society for Molecular Biosciences (CSMB)**

Prepared by:

The Canadian Society for Molecular Biosciences - CSMB

President Dr. Moroy, (UMontreal/IRCM), Vice President Dr. Coe (RyersonU)
Past-President Dr. Hieter (UBC)

CSMB Advocacy Committee Members: Dr. Woodgett (UToronto/Lunenfeld), Dr. Baetz
(UOttawa), Dr. Stanford (UOttawa/OHRI), Dr. Baron (UMontreal),
Dr. Marignani (Dalhousie).

The CSMB recommends that the government

1) Increase investment in training. We recommend increased investment in scholarship and fellowship programs, over 4 years, to an additional \$140M per year (increases at \$35M per year). This investment is needed to ensure a sufficient and stable pipeline of highly skilled and diverse trainee scientists, innovators and entrepreneurs for the future.

2) Continue to increase investment in fundamental discovery research. We recommend increased investment to support investigator initiated fundamental research at CIHR, NSERC and SSHRC by increased investments into the granting councils. The current level of operational support at the tri-councils remains insufficient to support Canadian researchers at internationally competitive rates. The erosion of the funding base has been slowed but still continues to force many promising biomedical research laboratories across the country to contract their research efforts or close. Specifically, we support the following tri-council base increases to unfettered research to meet levels recommended in the Fundamental Science Review: an additional \$115M in 2019-2020 (to a total of \$270M), \$220M in 2020-2021 (to a total of \$405M), and \$170M in 2021-2022 (to a total of \$405M).

3) Increase investment in the Research Support Fund. We recommend increased investment, over 4 years, to an additional \$478M in Facilities and Administration costs to support institutional costs of research. This program constitutes an essential foundation for all research operations and should successively be expanded from currently around 20% to a more realistic value of 40% in order to properly support all areas of research.

Executive summary

Maintaining and improving the standard of living and quality of life of Canadian depends on the generation of new knowledge and its application into new ways of doing things and into new or improved products and processes. Therefore, fundamental research in the biological, physical, and applied sciences is a national priority and a major driver of an effective innovation economy, which Canada aspires to become. This requires the development and support of a skilled workforce – consisting of scientists, engineers, technical experts, data analysts, innovators and entrepreneurs. Science infuses every aspect of our daily lives and should always inform policy – at all levels of government. Therefore, research conducted in the laboratories, universities and hospitals across Canada is the foundation of the new knowledge that contributes to a healthy, democratic and civil society. Scientific research fuels innovation and is the engine that trains the next generation for high-quality careers in a knowledge-driven economy.

Investing in science is good for Canada and Canadians. The Canadian government recognized these principles, which were well articulated in the [Fundamental Science Review](#) and responded to the urgent need to restore investment in fundamental research

in Budget 2018. For Budget 2019, it is vital that the Canadian government builds on these investments to maintain momentum and ensure Canadian prosperity, health and well-being in the future.

Budget 2018 was significant and welcomed by CSMB and the research community at large, since it put an end to ten years of steady erosion of the federal funding base for discovery science which contributed to a [decline in Canada's productivity compared to global competitors](#). While the immediate crisis in basic support for research funding in all areas of science has been averted and significant new requirements to improve equity, diversity and inclusion in science will help to leverage the entirety of Canadian human capital, much more needs to be done to ensure forward momentum.

The CSMB, along with the vast majority of the scientific community, strongly endorses that the recommendations of the [Fundamental Science Review](#) be followed in their entirety, as soon as possible, with the following priorities.

1) Increase investment in training. We recommend increased investment in scholarship and fellowship programs, over 4 years, to an additional \$140M per year (increases at \$35M per year). This investment is needed to ensure a sufficient and stable pipeline of highly-skilled and diverse trainee scientists, innovators and entrepreneurs for the future.

2) Continue to increase investment in fundamental discovery research. We recommend increased investment to support investigator initiated fundamental research at CIHR, NSERC and SSHRC by increased investments into the granting councils. The current level of operational support at the tri-councils remains insufficient to support Canadian researchers at internationally competitive rates. The erosion of the funding base has been slowed but still continues to force many promising biomedical research laboratories across the country to contract their research efforts or close. Specifically, we support the following tri-council base increases to unfettered research to meet levels recommended in the Fundamental Science Review: an additional \$115M in 2019-2020 (to a total of \$270M), \$220M in 2020-2021 (to a total of \$405M), and \$170M in 2021-2022 (to a total of \$405M).

3) Increase investment in the Research Support Fund. We recommend increased investment, over 4 years, to an additional \$478M in Facilities and Administration costs to support institutional costs of research. This program constitutes an essential foundation for all research operations and should successively be expanded from currently around 20% to a more realistic value of 40% in order to properly support all areas of research.

Background

Fundamental research provides the knowledge base without which innovation and technological development will not take place. As scientists, we conduct internationally recognized research and train highly qualified individuals who represent the country's future. Our research grants pay to conduct research but, most importantly, for salaries and

stipends for many trainees and technical staff. These are important, middle-class jobs that exist because of federal support. In addition, a strong fundamental research culture and community in Canada is a beacon for recruitment and retention of highly qualified immigrants as we have recently seen with the success of the Canada 150 Research Chairs which have recruited excellence from around the globe. Thus, the impact of federal research funding on Canada's productivity, competitiveness and international reputation as a world leader in science and innovation is significant and should be seen as a national priority.

The Canadian Society for Molecular Biosciences (CSMB)

The CSMB represents thousands of Canada's scientists (investigators) working in the area of molecular biosciences. Our members' research programs are depend on operating grants from the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council of Canada (NSERC) mostly funding supplies and salaries of HQP. Our members are responsible for investigator-driven discovery science, which generates the new knowledge that fuels innovation and trains the next generation of scientists for jobs in the increasingly important knowledge-based economy. They also generate translational innovations and add to all stages of the translational pipeline – from fundamental discoveries to company creation or clinical trials. CSMB also actively supports the evidence-based, data-driven approaches to improving and ensuring diversity, equity and inclusion in Canadian science (e.g. Athena SWAN & ADVANCE initiatives) since a rich and diverse community of scientists, ideas, approaches to research leads to higher quality outputs that benefit all sectors of society. These initiatives, along with those already in place for the CERC and CRC programs, should be further supported and protected from future interference.

Investing in Canadian science improves the lives of all Canadians and keeps Canada competitive

The national economic value of investing in science is well known and was well articulated in the Fundamental Science Review. This remarkable document detailed the value to Canada for restoring investment into science, research and training as a key national priority; a priority that the federal government recognized in Budget 2018. Research fuels innovation, which, as stated by the OECD, [“holds the key to ongoing improvements in living standards, as well as to solving pressing social challenges.”](#) Moreover, [“skilled people play a crucial role in innovation through the new knowledge they generate, how they adopt and develop existing ideas, and through their ability to learn new competencies and adapt to a changing environment”](#).

CSMB actively promotes the value of science and scientific training in improving the quality of life of Canadians, in terms of, for example, improved understanding of disease and development of better medicines, improved understanding and protection of natural resources such as forests and watersheds and improved products and processes through advancements in materials science and bioengineering.

Investing in fundamental research will improve our ability to predict disease and to grow cells and tissues by design. Genomic science, combined with robotics, nanofluidics, photonics and laser science, along synthetic bioactive molecules, will permit scientists to repair abnormal pathways leading to Alzheimer's and Parkinson's disease, to eliminate AIDS and other deadly pandemics, to stave off heart disease, and to control infectious diseases caused by antibiotic-resistant bacteria. Rapid advances in nanotechnology, chemical biology, systems biology, stem cell biology, metagenomics, and functional genomics will generate more effective therapeutics for cancer and other diseases, while the miniaturization and automation of high-throughput analysis technologies are dramatically reducing the cost of life-saving clinical assays.

Canada needs to re-establish its global position as an international leader in these areas of research. **Our competitors** with research-driven economies recognize the tremendous contributions that fundamental science makes to society. Germany, Japan, Australia, China, and the United Kingdom have responded to this challenge and opportunity with major funding initiatives.

OECD (Organization for Economic Co-operation and Development) data for 2017 indicate that Canada spends 1.5% of its GDP on Research and Development (R&D), compared to the average OECD nations at 2.4% of GDP (<https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>). Furthermore, Canada's investment in research and development has steadily declined over the past 10 years, making it the only country in the G7 to do so. Despite the initial investments of Budget 2018, this number has not significantly changed. Therefore, we strongly encourage the Government of Canada to work over a predictable time frame towards increased spending on R&D to 3.0% of the GDP as in the most aspiring nations and as recommended by the Scientific Advisory Board of the Secretary General of the United Nations. Increased funding for R&D in Canada will enable our country to establish a complete and competitive discovery science and innovation pipeline in the natural sciences and in health research leading to a better society with increased capability to solve a multitude of global and local challenges.

CSMB members across the country provide research opportunities at the undergraduate, graduate, and postdoctoral levels to prepare young Canadians to collect and analyze data, think critically, create solutions & solve problems in their daily lives and in future careers within and beyond science (e.g business, industry, government, education, etc). Data from the 2015 [PISA report](#) suggest that Canada possesses among the highest levels of interest and aspirations towards STEM-based careers among OECD countries (31.5% boys, 36.5% girls compared to 25% boys, 23.9% girls OECD). This represents a huge resource of human capital that is currently not being leveraged effectively in Canada. Continued support for equity initiatives, along with clear institutional expectations and accountability for removing barriers to full inclusion of all sectors of society, coupled with investments in investigator-led, discovery-based research will allow for a full and meaningful leveraging of the diverse Canadian human capital which is one of our national strengths.

Research funding to scientists provides for supplies, equipment and salaries/stipends to

those conducting research at the bench. The stagnation of tri-council research funding over the last 10 years, and inflationary pressures across the board, have led to downsizing of research groups, with a subsequent loss in expertise to the research enterprise. Further investments in investigator-driven operating grants will therefore have immediate positive impact for research productivity, maximizing previous investments in human capital and infrastructure, and ensuring optimum return on previous investments.

Summary

Broad consultation of the scientific community led to the most consequential documents relating to the future of research in Canada. The Fundamental Science Review was universally accepted and endorsed by the scientific community in Canada representing a community speaking with a single voice to a shared mission. Budget 2018 demonstrated that the federal government heard that voice and accepted the foundational principle that science builds a better, brighter future for Canada. Budget 2019 must build on those critical first steps – so that all Canadians will benefit from a revitalized national scientific enterprise.