

**Stem Cell Network's
Submission for the
Pre-Budget Consultations
in Advance of the
Upcoming Federal Budget**



August 2020

Recommendation:

The Stem Cell Network (SCN) recommends that as part of Canada's economic recovery plan, the Government of Canada immediately provide *stable, predictable and long-term funding* to reinforce Canada's world-leading health research ecosystem, including the stem cell and regenerative medicine field. Sustained, long-term investments in health research at the levels required to drive globally competitive research will allow the stem cell research community to develop *Made in Canada* solutions that will benefit the health of Canadians and strengthen the nation's economic well-being.

Introduction:

The global coronavirus pandemic has disrupted our economy, put at risk our health, and changed the way we go about daily life. It has created enormous stress on families and businesses. Our health care systems and front lines workers have been placed at risk, while governments work to provide the supports needed to keep our country afloat. Yet, there have been some positives – many of which come from the world of science.

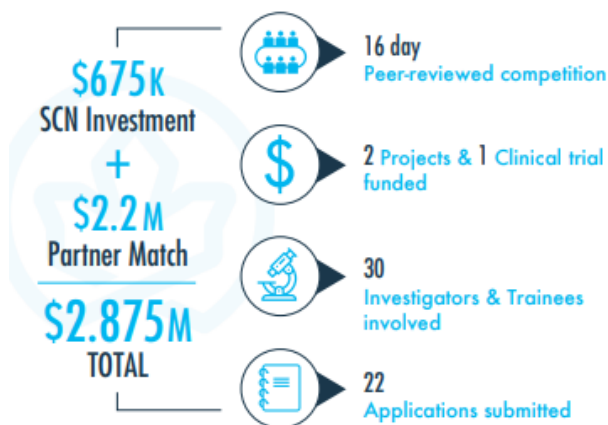
During these past months, we have seen remarkable efforts by health researchers from around the world who have been collaborating and sharing new knowledge about the coronavirus as it comes available. It was two Canadian scientific teams who isolated the coronavirus that causes COVID-19. This discovery meant that other researchers working on the virus now have the tools needed to undertake critical research without having to ship the live virus. Canadian researchers have a long history of being nimble and able to respond quickly when a pressing health crisis emerges.

This is true of Canada's stem cell research community which is supported through Canada's Stem Cell Network (SCN). At the outset of the coronavirus outbreak, SCN moved quickly to activate its research community through a Rapid Response Research Initiative. SCN expedited a call for research, turning around a comprehensive competition in a few short weeks, assessing 22 innovative applications from across the country. As a result, SCN was able to reallocate \$675K to fund a clinical trial and two stem cell-based projects related to COVID-19. This investment leveraged an additional \$2.2M in partner funding, for a full investment of more than \$2.8M.

"Since the beginning of the COVID-19 pandemic, we have been working closely with Canada's health experts and researchers, who are some of the most skilled and brightest in the world. We are making sure that Canada remains at the forefront of scientific research to help us make smart and effective decisions on the path to recovery."

*The Rt. Hon. Justin Trudeau,
Prime Minister of Canada*

SCN'S COVID-19 RAPID RESPONSE INITIATIVE



The quality of the projects funded are at the highest scientific level. The clinical trial will test a stem cell-based therapy that is designed to calm the aggressive inflammation that prevents the transfer of oxygen to the blood and damages the lungs. The two research projects will focus on different parts of the body. One will look at the brain with the goal of identifying what genes control brain cell infection and response, so we can better understand the loss of smell and taste reported by some patients. The other project will look at how lung cells and tissues become infected and what changes take place post

infection. This understanding will lead to more efficient methods for testing drugs that may be able to reduce the severity of the disease.

For nearly two decades SCN has been building a strong, dynamic national network of researchers, trainees, clinicians, industry, health charities and not-for-profits who are all committed to moving stem cell research from the lab bench to bedside. Through SCN over \$118M has been invested in stem cell research and an additional \$116M has been leveraged from partners. Over the life of the Network 21 biotechnology companies have been spun out and 24 promising clinical trials catalyzed.

Stem cells are actively used in the regenerative medicine field. They are often thought of as the body's building blocks. With more than 200 types of cells in the body, only stem cells can develop into tissues and organs. Regenerative medicine is a translational science that uses stem cells for the repair or regeneration of cells, tissues and organs with the goal of establishing normal function. The potential is extraordinary for fighting diseases and illnesses that cost the health care system upwards of \$190B annually. The existence of stem cells was first confirmed by two Canadians from the University of Toronto, Drs. Ernest McCulloch and James Till in the early 60s. Since then Canadian scientists have been leading the way in developing the field.

SCN has been integral to establishing Canada's reputation as a global leader in stem cell and regenerative medicine. A recent international survey of over 150 stem cell researchers from 12 countries conducted by UofA researchers showed that **Canada is among the top three most significant contributors to the stem cell field**, along with the United States and Japan. The majority of these experts indicated that Canada plays a significant leadership role in the field with contributions that have grown substantially over time.

Looking to the Future:

Investors around the world call regenerative medicine the next frontier, it is *the* field that matters the most for health. A recent draft report by the Alberta-based Institute of Health Economics, in assessing the current state and future prospects for the Canadian regenerative medicine sector states, "it is clear that there will be CONSIDERABLE growth in the stem cell and wider regenerative medicine sector in the next 15 years and that Canada harbors key strengths in scientific capacity to aid in that growth. Past efforts by established research teams and Canadian networks have clearly contributed to increased awareness and its growth. **If Canada were to capture only 5% of**

One of the newest entries into the Canadian biotech market is Morphocell Technologies out of Quebec. It was with funding support from SCN that the Scientific Founders, Drs. Max Paganelli & Claudia Raggi were able to spin out the company in 2018. This innovative company is developing a technology (ReLiver™) that has the potential to prevent up to 80% of liver transplants for acute liver failure. Dr. Paganelli credits the Stem Cell Network for investing in his research when others saw it as high risk.



the projected \$77B USD market, this could represent over \$5B CAD in potential growth, which in turn translates to over an additional 6,000 jobs.”

SCN recently commissioned a study to measure the impact of its funded research. The report found, “The research supported by SCN is consistently strong and of exceptional quality, having a considerable impact on the field.”

SCN and its two decades of success have created the environment for continued growth and we are well positioned to help fuel Canada’s 21st century knowledge economy – *the key to our national economic recovery.*

However, it should be noted, the OECD reports Canada invested only 1.56% of GDP on research and development (R&D) in 2018. That is well below the OECD member state

average of 2.4% and put us in second to last in G7 countries, just above Italy. More importantly, the majority of G7 countries have increased their levels of R&D funding over the past five years, excluding Canada which has seen investment dollars decline¹. To compete in the global market, it is critically important to recognize how we compare in terms of spending priorities and respond to the increasing gap that is becoming more difficult to address with each passing year.

As we look to the future, the COVID-19 crisis has proven we need to consider *Made in Canada* solutions that will benefit the health and economic well-being of our country. Investments in health research, training and supporting infrastructure are essential. A new cell therapy or a vaccine will not be helpful unless it can be manufactured and commercially scaled. Bio-manufacturing in Canada is a central component for delivering vaccines to treat diseases such as COVID-19, or novel cell therapies for the treatment of cancers and other chronic or rare diseases. Today, Canada’s biomanufacturing industry is underdeveloped, creating a risk for Canadians to access therapies and vaccines in a timely manner. Developing a commercial-scale manufacturing sector that accounts for technology development, the training of highly qualified people, research and standardization of practices to ensure the safe and cost-effective delivery of therapies, must be national objectives. Such a system can be an economic driver employing thousands and producing personalized therapies that will benefit Canadians and people around the world.

Training the Next Generation of Highly Skilled Talent:

A vibrant research and bio-manufacturing sector requires skilled talent. SCN has an impressive track record in training our future research talent and skilled labour force. 3,000+ researchers have taken advantage of SCN’s 7,000+ training opportunities. A recent impact analysis that tracked 1,500 of SCN’s former and current trainees (MSCs, PhD and Post-doctoral fellows) found that 82% of trainees are currently employed in Canada. Just under 20% are working in the biotechnology/pharmaceutical industry. Within this sector, 38% are at the managerial level and 9% hold executive leadership positions. This suggests that there is minimal brain-drain in the sector as

¹ OECD Data: Gross domestic spending on R&D <https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>

"The SCN is the backbone of the Canadian stem cell community and participating in its programs enrich [sic] the scientific and professional training of all its members. Cohesion across the country has been foundational for the success of the Canadian stem cell research landscape, and I hope we don't lose out on that for future generations."

Samantha Yammine, PhD, UofT

economy retaining talent will be critical to building domestic capacity. Supporting the next generation who will commercialize the results of research and lead Canadian growth in an emerging and internationally competitive regenerative medicine sector is also vital. This effort will require strategic investment and stable resources led by a trusted training partner, like SCN, that can deliver for the benefit of Canada.

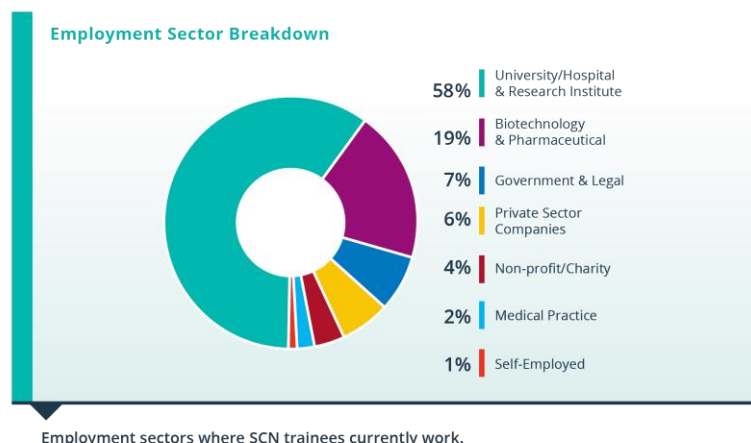
Conclusion:

It is possible for Canada to meet the vision laid out in the 2018 federal Economic Strategies Table Report that recommended doubling the size of the health and biosciences sector. The members of Canada's Stem Cell Network stand ready to do their part by developing the leading-edge technologies and therapies needed to treat rare and chronic diseases. Among other initiatives, this will require a federal commitment to support the emerging area of stem cells and regenerative medicine through immediate, stable, predictable and long-term funding.

Thanks to federal support in budget 2019, SCN received funding up to March 31, 2022. This welcome decision came within 8 days of SCN shutting its doors. To avoid repeating this uncertainty, **SCN is seeking an indication in the upcoming budget that it will be renewed beyond March 2022 for no less than five years.** In order to ensure the highest-quality research is conducted, a minimum of three years is needed to execute on a scientific project, followed by a reporting period on results that will allow for the next stage of work, including early stage clinical trials. This timeframe is critical as high-quality, multi-disciplinary and globally relevant research projects take time to design, secure funding partners and staff with committed experts from various fields. With such a timeframe in place SCN is confident that it will be able to match federal funding at a 1:1 ratio with support from non-federal partners.

trainees from the field are remaining in Canada because they can identify valuable employment opportunities within our borders.

As we think to the future and the recovery of the Canadian



As this committee considers Canada's economic recovery, we urge you to recognize the critical contribution to be made by the stem cell sector and build on the strong foundation already in place. Establishing a five-year funding framework will allow SCN to sustain its support for research at the pace and costs required to conduct quality research which will be vital to maintaining and indeed advancing our leadership in stem cell research and regenerative medicine globally.