BUILDING THE

Bioeconomy

Q&A

Sustainable Business and Bio-Based Solutions with Nikki Reed

PHOTO COURTESY OF JOE PERRI

There's a lot to consider when working toward a bio-based and sustainable lifestyle, but some activists — like actress Nikki Reed — are here to help. While perhaps most well-known for her role in the *Twilight* franchise, Reed's also making waves as an environmental activist and has been cultivating an eco-friendly lifestyle. Mediaplanet asked her about sustainable living and sustainable businesses.

What sparked your desire to become an environmentalist?

I feel like everything is connected, and through curiosity and compassion I found my love of animals turning into love for the Earth and finding solutions for living with less waste became a natural next step. I've always loved animals. I started rescuing and fostering when I was little, and it never stopped. My mom has a huge heart and she always allowed us to bring home, feed, and rehabilitate any animal that needed a home.

As I got older, I started connecting the dots between animal welfare and environmental degradation, and I continue to devote my life to learning better ways to be a human.

Tell us about your socially-conscious lifestyle company, BaYou with Love. What makes the engagement rings you create sustainable?

Our engagement rings are made with recycled gold from technology, which started through our partnership with Dell. Believe it or not, most of the technology that ends up in landfills has tiny amounts of gold in it along with other materials that can be repurposed. In the U.S., over $60 million of gold is thrown away each year in cell phones.

We take the gold that's found in recycled technology and turn it into fine jewellery. I love the idea of taking waste and turning it into a treasure, and gold was the perfect material to use because refined tech gold is the same as newly-mined gold but without the environmental toll of mining. It gives people the chance to hold, feel, and hopefully fall in love with a recycled product, which could inspire them to make eco-conscious decisions in other areas as well through their newfound connection to sustainability.

Why is it important to reuse resources?

We have a finite amount of resources on this planet and the fashion industry is one of the most destructive industries in the world. At the rate we're moving, we'll destroy our planet — and our future — if we continue. If we don't start to get creative by using innovation and design to steer people toward reusables, we're screwed.

Fast fashion is one of the most harmful industries, and we have to retrain ourselves to gravitate toward products with a story — one that reflects ethical labour and Earth-friendly production.

To read the full interview, visit **innovatingcanada.ca**.

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Compostable Coffee Pods: Sustainability in Every Cup

The convenient options aren't always the eco-friendly ones — but what if your coffee could be? This Canadian-made, plant-based single-use coffee pod diverts waste from landfills and reduces carbon impact.

Abigail Cukier

Canadians love their coffee and especially the convenience of single-serve coffee pods. But consumers are increasingly concerned about the impacts of the plastic used to make traditional pods.

Enter the 100 percent compostable coffee pod. Toronto-based Club Coffee worked with University of Guelph researchers to develop PurPod100™ in 2016. Since then, Canadians have enjoyed more than a billion cups of delicious coffee in these compostable pods, while reducing their environmental footprint.

The pod replaces traditional petroleum-based plastics with plant-based materials similar to cornstarch as well as actual coffee bean skins.

"Canadians want solutions. They're thinking more about what goes into a product and how it's being disposed of," says Solange Ackrill, Vice President of Marketing and Corporate Strategy at Club Coffee, a major roaster and partner to brands like President's Choice and Maxwell House.

Consumers want sustainable solutions

Ackrill says the COVID-19 pandemic has reinforced the importance of innovative materials like the compostable ones in the pods.

"Consumers know there's a role for packaging — to protect our food and for health and safety, especially with COVID-19. But they want environmentally-sustainable solutions too," says Ackrill. "If anything, they're going to be more mindful to try and do something better."

Nicole Fischer, Head of Sustainability at Kraft Heinz Canada, thinks so too. In August, Kraft Heinz Canada — one of Club Coffee's major brand partners — started using 100 percent compostable pods in its Maxwell House coffee. The launch is part of the company's global commitment to make 100 percent of its packaging recyclable, reusable, or compostable by 2025.

"We're working to reduce single-use plastics and to divert food waste from landfills," says Fischer. "As Canada's largest food company, Kraft Heinz Canada has a significant role to play in educating consumers on sustainability and how they can reduce their environmental impact and in providing sustainable packaging to help them do so."

Canadians are looking for green packaging

Canadians certainly want alternatives. According to a Dalhousie University study, 93 percent of respondents said they were motivated to reduce single-use plastic food packaging because of its environmental impacts and half said they intend to increase food purchases with green packaging. Consumers are also increasingly concerned about the health impact of chemicals and microplastics.

"Canadians are seeing that the current path isn't necessarily sustainable and more companies are looking to replace plastics," says Dr. Sylvain Charlebois, Director of Dalhousie University's Agri-Food Analytics Lab. "The key is convenience. If you compromise convenience, you're going to lose the customer. That's why compostable products have merit. They don't require a lot of work."

The pod replaces traditional petroleum-based plastics with plant-based materials similar to cornstarch as well as actual coffee bean skins.

Compostable: designed for simplicity and sustainability

The compostable coffee pod is designed for disposal in one simple step to keep food waste out of landfills. Dr. Calvin Lakhan, a researcher in the Faculty of Environmental Studies at York University, points out that to recycle a plastic pod, coffee drinkers have to separate a foil lid, paper filter, and wet coffee grounds.

"The energy and resources used to produce compostable pods are less than one-tenth of those used to make a plastic pod," says Dr. Lakhan. "Compostable products really are a game changer, and not just for coffee pods. They have the potential to help solve other single-use plastic problems."

To reduce plastic waste and seek better solutions, visit **clubcoffee.ca**.

This article was **sponsored by Club Coffee.**

CLUB COFFEE

Plant-Based Coffee Pods: A Zero-Waste Solution to Single-Serve Plastic

Consumers want to cut plastic waste with convenient, effective solutions. A switch to plant-based compostable coffee pods delivers that kind of zero-waste solution. It's a circular economy innovation that cuts what we send to landfills by adding to the healthy compost that enriches the soil we all depend on.

Renewable materials from plants like corn and coffee beans are the heart of compostable coffee pods

Using 100 million compostable coffee pods to replace plastic ones is like taking the greenhouse gas emissions from more than 250 cars out of our air every year

Compostable coffee pods can break down in as few as five weeks in large composting facilities, while a typical plastic pod will be in a landfill for more than 400 years

Canadians throw out an estimated 100 million plastic coffee pods in a year — that's more than 5,000 CN Towers if you could stack them on top of each other

1 Billion Pod Impact

# of CN Towers
54,000 CN towers

Distance from Toronto to Ottawa
91.52 trips

Distance Around Earth
0.92 trips around Earth

Plastic Savings per Household
0.25 kg plastic per household

3 Ways Work-Integrated Learning Will Help Biotech Thrive

Work-integrated learning programs can help biotech companies attract and retain the talent they need to innovate. Learn how BioTalent Canada can help your company adapt.

Howard Miller

Howard Miller
Writer & Editor,
BioTalent Canada

In 2018, the Health and Bioscience Economic Strategy Tables released a report that projected that Canada's health and bioscience exports could double to $26 billion by 2025. The report provided recommendations to make this goal attainable.

One recommendation was talent-based. To become a world health and bioscience leader, Canada's biotech industry must attract and develop its own talent.

As part of a BioTalent Canada Labour Market Information study roundtable, Canadian biotech leaders and experts identified two primary barriers to success: access to talent and the capital to attract and retain that talent.

Work-integrated learning opens the doors to success

Work-integrated learning (WIL) programs, like those managed by BioTalent Canada, can help overcome these challenges. Such programs connect young talent to biotech and health employers across the country in the form of wage subsidies.

WIL programs, such as the Student Work Placement Program (SWPP), have many advantages that benefit both employers and young Canadians.

Accelerating company progress

WIL programs are a great tool for organizations that want to — but can't — afford the salaries of the new employees needed to meet growth objectives. SWPP, for example, covers the cost of a student's salary by 75 percent up to a maximum of $7,500.

These students can have instant positive impacts. Last year, Toronto-based CleanSlate UV utilized SWPP to bring Jenna Storoschuk in for a four-month placement. In that short period, she conceptualized, built, pilot tested, and prepared new software for beta launch.

Today, hospitals across the globe use CleanSlate UV in the fight against acquired infections.

Preparing students for life after graduation

WIL programs prepare students for a seamless transition from school to the workplace.

Employers benefit greatly from hiring students with "big game" experience. Graduates with work experience know what to expect and have an easier time transitioning.

Facilitating relationships between employers and graduates

Enrollment in Canadian biotech- and health-related programs is at an all-time high. However, graduates of these programs are coveted by other industries and have been lured away. Graduates on the hunt for jobs are more likely to access their network before going outside of it. WIL programs help connect students and graduates with biotech, bioscience, and health employers, providing opportunities within these networks from an early stage.

A long history of success

BioTalent Canada's wage subsidy programs have been very successful. SWPP alone has placed more than 1,500 students in biotech roles across Canada. And with the health care sector now eligible to apply for these funds as well, that number will continue to grow.

If Canada's going to hit the Health and Bioscience Economic Strategy Tables' lofty projections, it's paramount that the talent-based recommendations be acted upon. One way is for the industry, which is full of small- and medium-sized enterprises, to access BioTalent Canada's WIL wage subsidies. They're a mutually-beneficial way to access the young talent of today and help turn them into the leaders of tomorrow.

For more information on BioTalent Canada programs and to learn whether your company qualifies, visit **biotalent.ca/programs**.

This article was **sponsored by BioTalent Canada.**

BioTalent Canada

How Biotech Is Changing the Way We Make Stuff

An increase in federal funding for engineering biology could give Canada an edge on innovative manufacturing initiatives to spur economic recovery and create homegrown jobs.

Ted Kritsonis

Dr. Bettina Hamelin
President & CEO,
Ontario Genomics
& Chair,
National
Engineering
Biology Steering
Committee

This year, the federal government invested more than $1.2 billion to support efforts to find a solution for the COVID-19 pandemic. Dr. Bettina Hamelin, President and CEO of Ontario Genomics, thinks this is an important step but worries that Canada's missing much-needed strategic investments. Bringing researchers from diverse disciplines together will capitalize on biotech's economic opportunity across health, agriculture, natural resources, and industrial biotechnology.

Merging disciplines with engineering biology

Today, too many products are made with synthetic chemistry from petroleum. Engineering biology is an emerging field that applies engineering principles to design, build, and test living cells as "mini factories" that feed on waste to make materials we use every day. "The former isn't sustainable in the long term while the latter is a huge job-creating opportunity," says Dr. Hamelin.

"For Canada to remain competitive and even lead in the creation and commercialization of these disruptive technologies, we need to take action today," Dr. Hamelin continues. "There's an undeniable global appetite for biotech investment. We're already seeing this happen outside of Canada."

A report from McKinsey & Company, a global consulting firm, suggests a "bio-revolution" would create trillions in economic value between 2030 and 2040.

Engineering biology takes the science out of the lab to create tangible household goods in ways that use resources more efficiently. Imagine using the same biological processes that helped make your favourite beer or sourdough bread to make your next winter coat.

Collaborating toward a bio-revolution

These aren't wishful ideas of the future. Global companies and innovative startups in all corners of the globe are already vying to lead in the transformation of traditional manufacturing.

"When we talk about using engineering biology to make useful products, we need to bring multiple disciplines and sectors together. Engineers need to work with mathematicians, computer scientists with biologists, and AI researchers with agricultural producers," says Dr. Hamelin. "They may seem unrelated, but all of these experts need to talk to each other to facilitate the synergies necessary to produce effective and groundbreaking bioengineered products. We created a nationwide biotech and biomanufacturing network to do just that."

The Canadian DNA Engineering Systems Network (Can-DESyNe) is bringing together almost 90 partners, including large multinationals, small- and medium-sized enterprises, innovative startups, and academics all committed to revitalizing Canada's manufacturing sector and capturing our share of the bio-revolution.

To join the conversation and learn more about Can-DESyNe, visit **candesyne.ca**.

This article was **sponsored by Ontario Genomics.**

Ontario Genomics 20YEARS

5 Companies Putting Canada on the Global Stage

Shelley King

Shelley King
CEO,
Natural Products
Canada

Natural Products Canada (NPC) works with some of the best and brightest innovators in the country. Their naturally-derived solutions are powerful examples of how Canada's bioeconomy is tackling today's biggest challenges. From earth-friendly materials to secure and sustainable food and water, these companies leverage national expertise to put Canada on the global stage. And NPC is tremendously proud to support them.

1 2 3

Bast Fibre Tech turns hemp fibres into fully compostable materials — just in time to meet the growing demand for sanitizing wipes.

NovoBind has developed an innovative platform to create precision biologics that protect livestock from disease and pathogens.

Island Water Technologies helps preserve our precious water resources with its brilliant monitoring and treatment systems.

4 5

Chinova Bioworks is reducing food waste with its natural preservative derived from mushrooms.

BioTEPP has created a natural biopesticide that targets a costly and damaging pest for apple and other fruit trees.

To learn more about NPC and the innovators it supports, read the full story on **innovatingcanada.ca**.

This article was **sponsored by Natural Products Canada.**

NPC Natural Products Canada

The Company at the Forefront of the Genetic Medicine Revolution

James Taylor

James Taylor
Co-Founder & CEO, Precision NanoSystems

In the nearly two decades since the human genome was first sequenced, there has been an explosion of insights into the role genes play in a vast array of diseases. These insights are implemented when creating genetic medicines, in designing RNA or DNA molecules and then delivering those molecules to affected cells. This treats disease by turning off disease-causing genes, replacing genes that are missing or incorrect, or directly repairing an issue in a patient's genome. Genetic medicine is a promising new class of medicine that wasn't possible even a short time ago.

Genetic vaccines are an important type of genetic medicine and are a leading class of vaccines being developed for COVID-19. These deliver RNA or DNA via a lipid nanoparticle (LNP) carrier to the recipient's cells to produce representative but harmless parts of viral antigens that teach the immune system how to recognize and fight the given pathogen. Genetic vaccines are faster to develop and manufacture than conventional vaccines and are a very promising technology for pandemic response.

Genetic vaccines are an important type of genetic medicine and are a leading class of vaccines being developed for COVID-19.

Vancouver-based Precision NanoSystems Inc. (PNI) is a leading supplier of genetic vaccine and therapeutic manufacturing technologies and services. PNI was founded to solve a significant challenge in manufacturing genetic medicines. Through our proprietary NanoAssemblr manufacturing platform, LNP gene delivery technology, and strategic partnerships with bio-processing technology providers, we have established ourselves as a comprehensive solution provider in the genetic medicine industry.

Enabling genetic medicines globally

Since PNI's founding in 2010, we have made significant strides in the development, commercialization, and market adoption of our NanoAssemblr microfluidic-based manufacturing platform and our GenVoy LNP technology. This has enabled genetic medicine developers across the world to easily adopt crucial gene delivery technologies.

With more than 450 instruments installed worldwide — in 19 of the top 25 pharmaceutical companies, at more than 120 companies, and at 90 academic research institutes — PNI is ensuring our NanoAssemblr systems and innovations pervade the global biotechnology ecosystem. We provide access to our research facilities, technical personnel, and technologies for custom drug development and manufacturing process development to global clients through our contract service offerings.

PNI is a driver of the genetic medicine revolution

PNI is supporting drug developers to translate transformative medicines to patients through the manufacturing of genetic medicines under the good manufacturing practices required for human administration. Our technology enables the translation of drug candidates from the bench to the clinic faster and at a lower risk than was previously possible.

PNI's mission is to accelerate the creation of transformative medicine and to bring life-changing medicines to patients. Our NxGen technology and expertise have accelerated the development of genetic vaccines and therapeutic platforms, and most of PNI's clients are continuing to develop advanced medicines. Through our innovations, PNI is enabling the next wave of medicines in infectious diseases, cancer, rare diseases, and others.

PHOTO COURTESY OF JOANNA LIN

To learn more about how PNI is addressing unmet needs in the bioeconomy, visit **precisionnanosystems.com**.

This article was **sponsored by Precision NanoSystems.**

PRECISION NANOSYSTEMS
Celebrating Ten Years

PRINCE EDWARD ISLAND
BioAlliance

The Bioscience Sector Has Emerged in Prince Edward Island

Canada's smallest province has established a unique and favourable business environment for a thriving bioscience industry through an effective partnership between industry, research, and government. Over the past decade, the bioscience sector has grown to become the second largest industry in Prince Edward Island.

The Canadian Alliance for Skills and Training in Life Sciences (CASTL) is a first-of-its-kind partnership between academia, industry, and government to address the future skills needs of the Canadian life sciences sector. CASTL offers multiple applied learning streams to acquire the academic knowledge and technical and professional skills to have a successful career in life sciences.

Emergence is Canada's Bioscience Business Incubator, specializing in helping startups and early-stage companies move from research and technology development to commercial success. Emergence provides companies in the program with business incubation services including mentorship and advisory services, access to networks and resources, and the Critical Path mentorship program.

The Bioscience Manufacturing Incubator will be a 20,000 square foot facility comprised of six fully-serviced, self-contained suites to support pilot-scale manufacturing of bio-based products. It's essential infrastructure that allows companies to move from research and development to commercial manufacturing efficiently and economically.

How the Pandemic Supercharged Biodextris' Business

John Mukherjee

The COVID-19 pandemic prompted an unprecedented influx of vaccine and therapeutic projects for Canadian biotechs — and the biologics experts at Laval, QC-based Biodextris are rising to the challenge.

The burning question of the moment — "How fast can every Canadian receive a COVID-19 vaccine?" — depends on domestic production capabilities. Currently, Canada doesn't have the capacity to manufacture biologics on a scale appropriate to vaccinate the nation's population against COVID-19. While smaller batches of a vaccine could be produced domestically, our medical sector relies entirely on China, the U.S., and European countries for large-scale production.

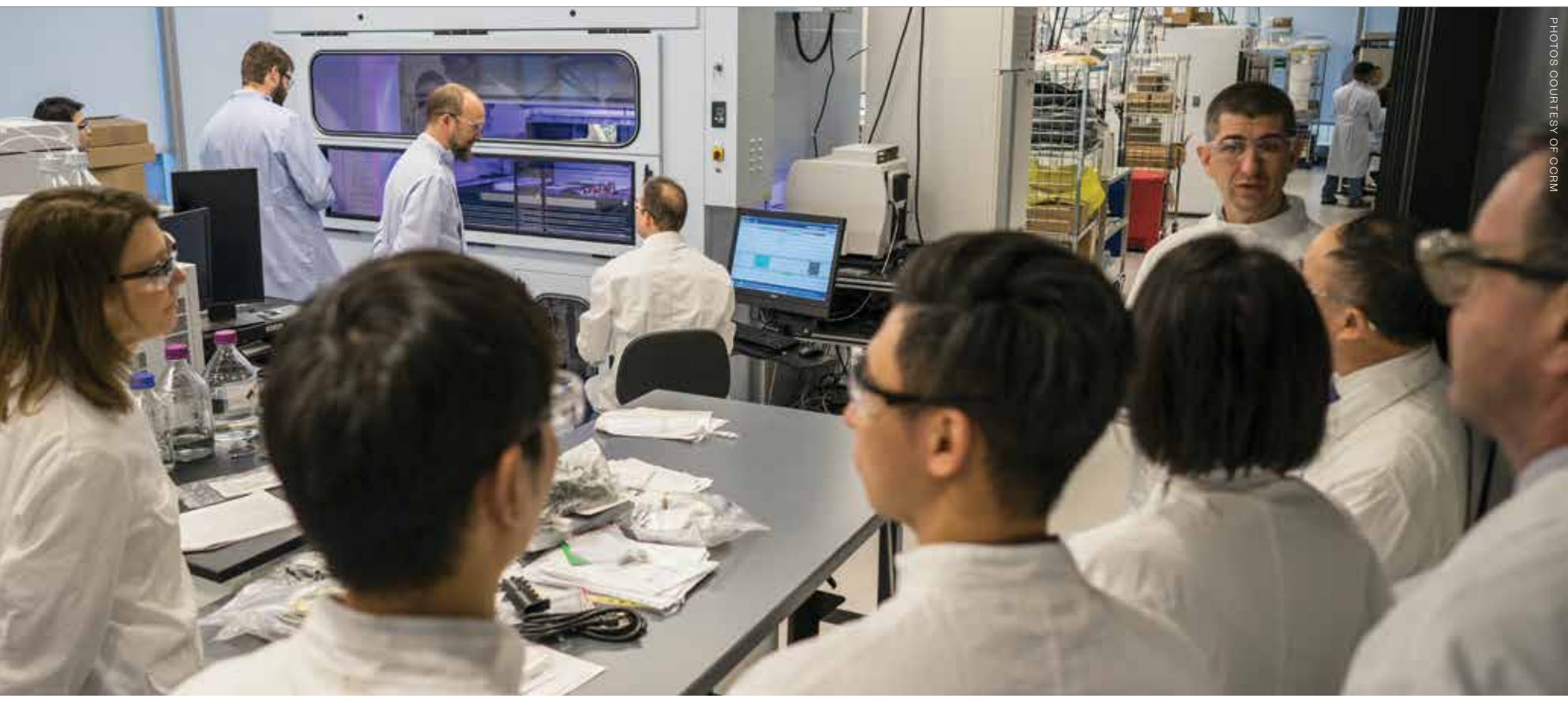
Biodextris, however, had already begun assessing shortages in Canada's biologics supply chain before the pandemic. Now, they're focusing on how large-scale, domestic manufacturing can become a reality.

Dr. Joseph Zimmermann
President & CEO, Biodextris

Read the full story of how Biodextris is helping in the fight against COVID-19 at **innovatingcanada.ca**.

This article was **sponsored by Biodextris.**

biodextris
bringing innovation to life



PHOTOS COURTESY OF CCRM

Made-in-Canada Treatments: Leveraging Scientific Excellence and Innovation

Cell and gene therapies are the future of medicine, and Canada has an opportunity to be a global player in this space — but only with strategic public-private partnerships and continued investment.

Ken Donohue

Dr. Michael May
President & CEO, CCRM

Regenerative medicine, including cell and gene therapies, is the hottest sector in the life sciences, with record investment globally. With no winners currently in the race to be the centre of global cell and gene therapy manufacturing, this is Canada's opportunity.

"We need to be quick and strategic about exploiting this gap," says Dr. Michael May, President and CEO of the Centre for Commercialization of Regenerative Medicine (CCRM). Based in Toronto, CCRM is a centre of excellence dedicated to commercializing regenerative medicine-based technologies and cell and gene therapies. "Most health care products in Canada are imported, but we have a chance to innovate and create therapies here that will enhance patient outcomes and create economic development."

This Canadian advantage leverages our legacy of scientific excellence — stem cells were discovered in Toronto in the 1960s — and a growing industry of cell and gene therapy companies. There's an assumption, according to Dr. May, that if you build the right ecosystem — company creation, technology development, and a trained and skilled workforce — everything will fall into place.

Strategic partnerships key to success

The foundation of this ecosystem exists through partnerships with post-secondary institutions, the building of an industry consortium to leverage the ideas coming from academia, and the driving of tech development and products that people can invest in. CCRM is now working on the third stage, which is about bringing together venture capital to support promising startups and scale up manufacturing capacity.

Achieving success requires thoughtful collaboration. In 2016, CCRM created a partnership with GE Healthcare, now Cytiva, and the Government of Canada to establish a facility in Toronto where bright minds and state-of-the-art equipment come together. This centre is helping to move cell and gene therapy closer to the promise of large-scale and cost-effective treatment for patients by focusing on advanced manufacturing technologies and processes.

Dr. May stresses that partnerships aren't one-offs and need to be strategically linked. Another example is CCRM partnering with Toronto's University Health Network to build a good manufacturing practices facility to manufacture cells and viral vectors for Phase 1 and Phase 2 clinical trials.

New biomanufacturing campus being planned

Relying on our history of scientific excellence isn't enough — what's holding us back is our lack of capacity to manufacture cell and gene therapies for Phase 3 clinical trials and commercialization. This is why CCRM is bringing together industry, academic, and investment partners to create a bio campus in Southern Ontario for the commercial manufacturing of cell therapies.

"We can achieve significant efficiencies by integrating the training, manufacturing, logistics, and supply chain, along with space for innovation incubators," says Dr. May. "By working together, we can build more critical mass to support venture capital, which will lead to made-in-Canada products that can be manufactured and used domestically, but also exported globally. This will provide the ecosystem and resources to scale and keep companies in Canada."

According to Dr. May, the impact for Canadians if we don't act now is that we'll be last in line for novel therapies, and young entrepreneurs and innovation will go elsewhere.

i Read the full story of how CCRM is supporting domestic innovation and manufacturing at **innovatingcanada.ca**.

This article was **sponsored by CCRM.**

CCRM Commercializing Living Therapies

From Vaccine Work to Plasma Therapy, Bioscience Is Booming in Manitoba

Veronica Stephenson

Tracey Maconachie
President, Bioscience Association Manitoba

Did you know that Manitoba has become a veritable hub for bioscience, supported by a dedicated community of researchers? In the early months of the COVID-19 pandemic, researchers around the province quickly mobilized to tackle questions around potential pre-treatments (prophylactics), medicines for active infections, and factors around the health of vulnerable populations.

One landmark study looked at the antimalarial drug hydroxychloroquine, which was initially hypothesized to be a potential treatment for COVID-19. An international clinical trial, whose Canadian arm was led by the University of Manitoba's Dr. Ryan Zarychanski, confirmed that the drug is not an effective treatment for COVID-19 — a major breakthrough given the drug's popularity in the media at the time.

Cutting through the noise with Discovering COVID

Keeping up with the latest updates on COVID-19 can be a serious effort given the speed of the news cycle. That's why Bioscience Association Manitoba created the newsletter Discovering COVID, which shines a spotlight on Manitoba's research community and offers evidence-based, plain-language answers to common questions about COVID-19.

Past topics include detailed explainers about vaccines and antivirals, debunking myths about mask usage and various alternative treatments, and Q&As with notable researchers.

> **Bioscience Association Manitoba created the newsletter Discovering COVID, which shines a spotlight on Manitoba's research community and offers evidence-based, plain-language answers to common questions about COVID-19.**

i To sign up for the Discovering COVID newsletter, visit **biomb.ca/discovering-covid**.

This article was **sponsored by Bioscience Association Manitoba.**

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