NURTURING
AN INNOVATION
ECOSYSTEM
GlycoNet
ANNUAL REPORT
2022

CORPORATE PROFILE

Canadian Glycomics Network (GlycoNet) is a federally-funded Network of Centres of Excellence (NCE) established in 2015 to develop carbohydrate-based solutions to unmet health needs.

GlycoNet brings together 176 funded and affiliated researchers from 35 universities and research institutions across Canada. The Network collaborates with industry, government, and non-profit partners on developing solutions for several healthcare areas: cancer, chronic disease, infectious disease, and neurodegenerative disease. In addition to funding research, GlycoNet focuses on knowledge mobilization, commercialization, networking, and partnerships to translate research into tangible benefits for Canadians. To date, GlycoNet has provided support and professional development to over 592 trainees, helping them to achieve their full potential, both during training and in the next steps of their careers.

Our Vision

Delivering solutions to important health issues and improving the quality of life of Canadians through glycomics.

Our Mission

To ensure that GlycoNet and Canada are internationally recognized as leaders in glycomics research through delivering exceptional training, bridging the gap between research and industry, encouraging entrepreneurship, as well as translating research advances into tangible benefits for Canadians.

What is glycomics?

Glycomics is the study of carbohydrates (sugars) in biological systems. Carbohydrate chains, or glycans, are found in the cell membrane of every living cell and are key to almost every biological process. The field is experiencing an explosion of activity with the recognition that there are many ways scientists can exploit biological processes involving carbohydrates to improve human health.

Commitment to Equity, Diversity, and Inclusion (EDI)

GlycoNet believes that the Canadian research landscape requires a culture change to fully realize inclusive behaviours at all levels of research. Working with the Board of Directors, EDI Committee, Management, and all members, GlycoNet is implementing several strategies to increase EDI awareness and make it a priority in daily functions. GlycoNet will continue to develop, implement, and monitor strategies for better integration of EDI throughout the network.

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Acknowledgement

GlycoNet is supported by the Government of Canada through the NCE program, a joint initiative of the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council.

Government of Canada
Networks of Centres of Excellence

Gouvernement du Canada
Réseaux de centres d'excellence

EXECUTIVE MESSAGE

A MESSAGE FROM THE BOARD CHAIR AND EXECUTIVES

Dear Colleagues,

The 2021-2022 fiscal year was one of resilience, perseverance, and growth for GlycoNet as we cautiously emerge from the pandemic. While COVID-19 continued to impact nearly every aspect of our operations, we were able to adapt and continue to fulfill our mission to improve the quality of life of Canadians through glycomics. On behalf of the Board of Directors, I am delighted to provide an overview of GlycoNet's progress and how we will help Canada build a sustainable and healthy future.

The GlycoNet community has grown to 176 research groups across the country who have worked closely with 153 funded partners from industry, foundations, and public- and private-sector research consortia to create "Made-In-Canada" health innovations. In Cycle II, GlycoNet placed a stronger emphasis on later-stage, translational, clinical, and commercialization-ready projects in the areas of cancer, chronic conditions, infectious diseases, and neurodegeneration.

This year, we have significantly increased industry engagement through our Strategic Initiatives funding program to ensure funded projects are of industrial interest and of national priority. As a result, since the beginning of Cycle II we have invested in 35 projects and our funding has been leveraged by an additional $17.1M from partners. In the past year alone, our research excellence has been evidenced by 64 refereed publications by Network Investigators (NIs) in high-impact, peer-reviewed journals. Multiple NIs were recognized with prestigious awards and major research grants.

The progress made in knowledge and technology exchange and exploitation—a strategy implemented to ensure that projects and technologies advance competitively in line with market needs—is another highlight of this fiscal year. In FY 2022, five additional patent applications were filed, and three more were granted for therapeutic candidates, biomanufacturing methods, and drug discovery platforms. Our efforts in partnerships and business development have led to an increased visibility of the Network to biopharmaceutical companies, investors, and end users. GlycoNet projects and NIs were highlighted in the media while others secured new partnerships with leading biopharmaceutical companies and technology receptors.

GlycoNet continues to cultivate entrepreneurialism in the biotech community. To date, we have supported five Canadian technology-based start-up companies in the fields of cryopreservation, cancer diagnostics, therapeutic biomanufacturing, blood transfusion, and molecular discovery. These companies continue to help grow Canada's burgeoning bioeconomy and contribute to the retention of GlycoNet-trained talent in Canada. To date, more than 40 GlycoNet trainees have been recruited to these GlycoNet-supported start-up companies.

Despite COVID-19 travel restrictions, GlycoNet established strong communication with existing and potential stakeholders to expand our Network and strengthen our relationships. Although the 2021 Canadian Glycomics Symposium was cancelled, GlycoNet supported networking and knowledge exchange activities through a Mini-Symposium, an intellectual property (IP) workshop, and glycomics webinars in partnership with the American Chemical Society's Carbohydrate Division. We also eagerly began planning for the 2022 Annual General Meeting and Canadian Glycomics Symposium.

GlycoNet strongly believes in investing in its people and forging a diverse and inclusive culture to achieve success. This year we launched a new Equity, Diversity, and Inclusion (EDI) survey to help inform future training needs and areas for improvement across the network. This year, we committed to the 50:30 challenge and incorporated several EDI initiatives across the Network. With the support of the EDI Committee, we continued to make the "Diversity and Inclusion Bootcamp" training mandatory for all NIs and highly qualified personnel (HQP), and "Bias in Peer Review" training for Committee members. In turn, NIs have been actively implementing EDI into projects, including equitable recruitment, management, and research design. Lastly, we have partnered with other NCEs to hire a Network-wide Safe Work Resource, which will act as a third-party point of contact for escalation of concerns related to harassment and discrimination.

In terms of outreach, we continued to work with the Centre for Math, Science, and Technology Education (CMASTE) to deliver training resources to secondary school teachers, aiming to incorporate glycomics research within the high school curriculum. With an initiative funded by "Encouraging Vaccine Confidence in Canada" Promoscience, we worked with CMASTE to develop vaccine literacy materials for K-12 teachers to use in educating students about information literacy and the science behind vaccines. In late 2021, we launched the first set of learning resources with a hybrid workshop that had teachers attending virtually and some pre-service teachers attending in person at the University of Alberta. With ongoing COVID-19 restrictions, nine additional workshops were held virtually and engaged approximately 280 pre-service science teachers across Alberta, Quebec, and Manitoba.

In all activities, GlycoNet relies on the exceptional leadership of the Board of Directors and Committee members who bring diverse backgrounds and complementary expertise to the organization. I am pleased to report the appointment of three new Directors: Catalina Lopez-Correa (Genome Canada), Mariela Segura (Université de Montréal), and Christopher Jones (Blakes).

Glycomics is enabling us to develop solutions to leading diseases in humans and animals, both in Canada and globally. GlycoNet is driving the translation of glycomics innovations in the quickly expanding health and biosciences sectors in Canada. This cutting-edge research has translated into substantial health and economic outcomes. Not only do we catalyze and mobilize innovations made by and for Canadians, but through national and international collaborations we continue to build and promulgate Canada's leadership around the world.

Fuelled by a diverse, talented network of academic and industrial partners, and a proven discovery-to-innovation-to-commercialization pipeline, GlycoNet is emerging as a globally unrivalled glycomics research and commercialization engine. The network has built a unique glycomics ecosystem by fostering collaborations and innovation from coast to coast, investing strategically in high-caliber translational research, and building domestic and international public-private partnerships. By continuing to leverage our existing national strength and capitalize on translating glycomics innovations, we will see exponential economic growth. I am extremely proud to be part of GlycoNet's journey to make a positive and meaningful impact on Canada's bioeconomy.

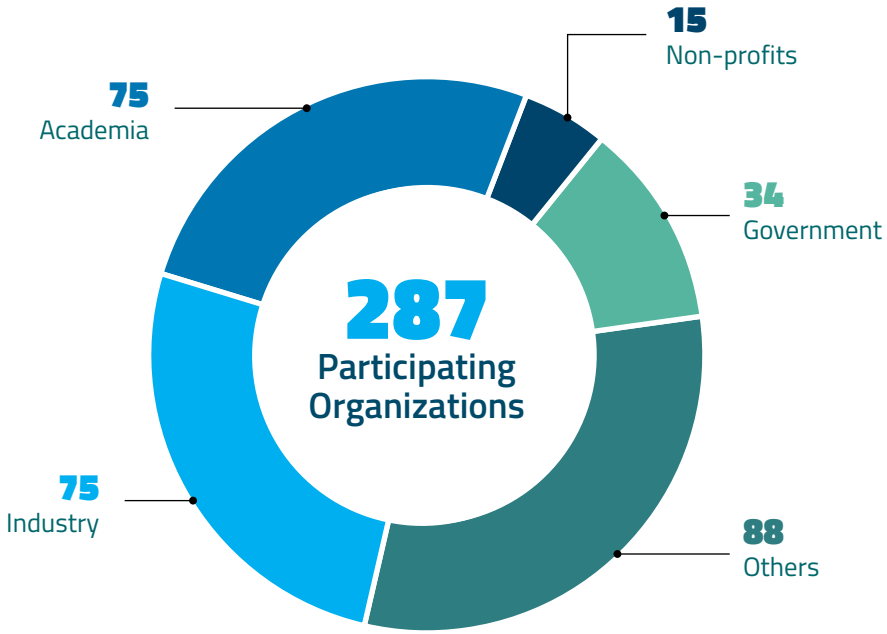
Sincerely,

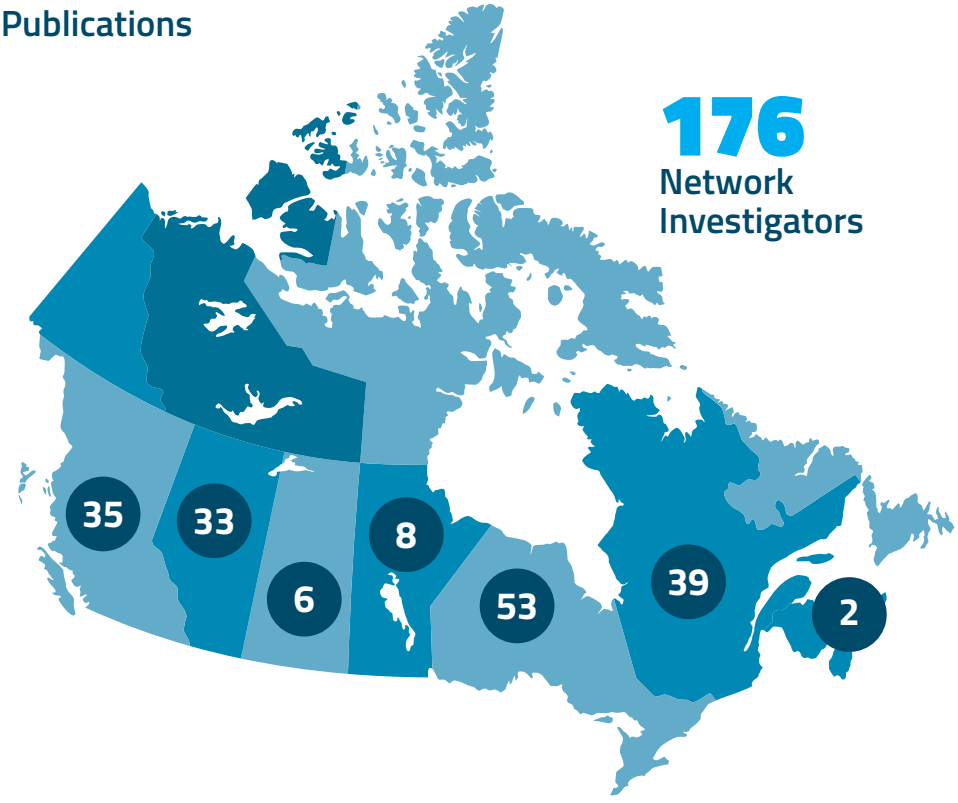
Karimah Es Sabar
Elizabeth Nanak
Warren Wakarchuk

GlycoNet
BY THE NUMBERS

135
Research Projects

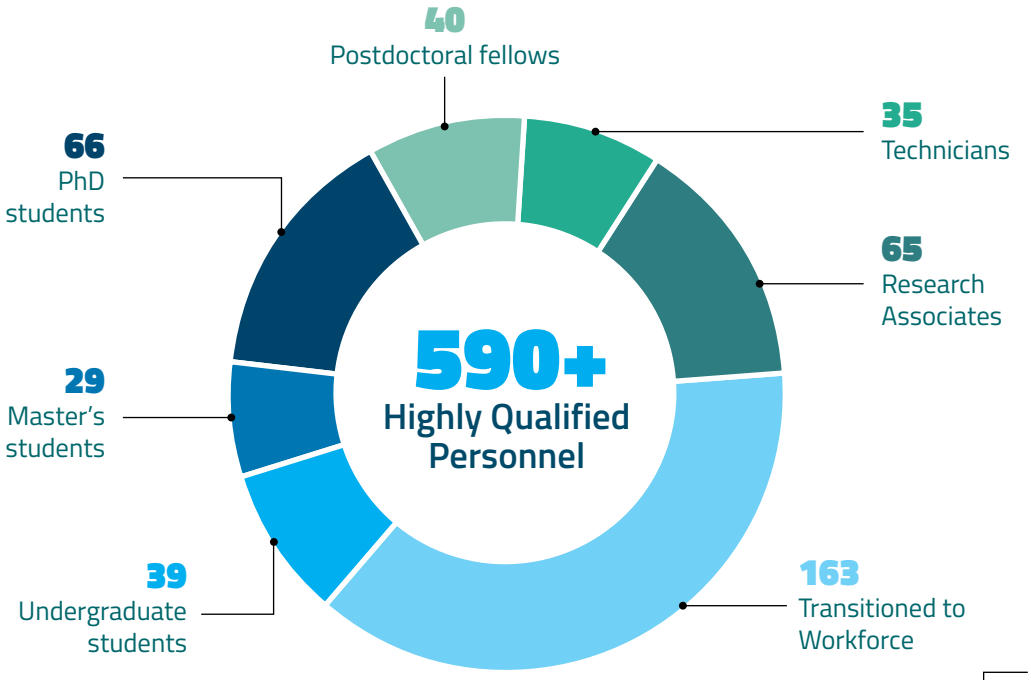
438
Peer-reviewed Publications

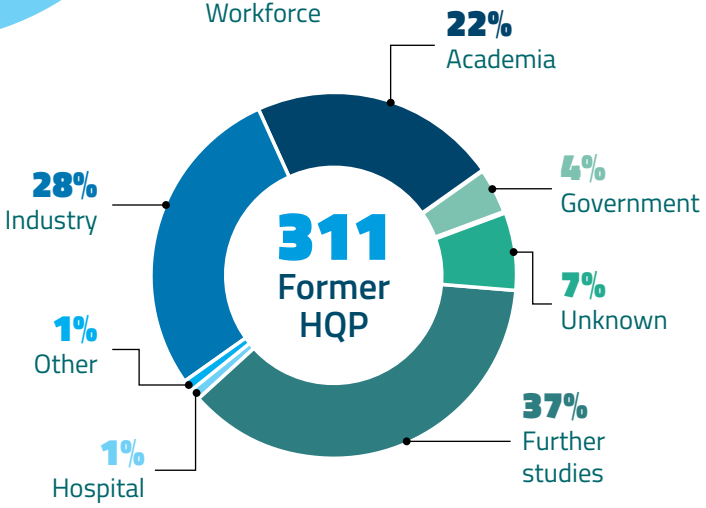




176
Network Investigators

35
Member Universities and Research Institutions





$29.1M
research funds distributed and committed

$33.4M
cash and in-kind partner contributions

COMMUNICATIONS

1,971
Twitter followers

1,228
GlycoNet newsletter subscribers

1,317
LinkedIn followers

35K+
YouTube video views

RESEARCH IMPACT

GlycoNet research is solution-driven. Every project is expected to create tangible technologies, knowledge, or applications. The outcomes must address healthcare and help Canadians from all walks of life, while delivering social and economic benefits.

Since 2015, the Network has supported 135 research projects with tailored programs that target specific stages of a project life cycle, from early-stage to commercialization. This has led to a pipeline of novel technologies, therapies, and drug candidates for cancer and infectious, neurodegenerative, and chronic diseases.

Uncovering SARS-CoV-2 infection mechanism

Using a high-throughput technology developed for investigating protein-carbohydrate interactions in complex mixtures, **Drs. John Klassen (University of Alberta) and Matthew Macauley (University of Alberta) are collaborating with Lara Mahal (University of Alberta) and Todd Lowary (Academia Sinica)** to understand COVID-19 infection. The research team finds that the spike protein on the surface of the SARS-CoV-2 virus prefers to interact with certain glycolipids (a family of molecules with carbohydrate and lipid properties) called gangliosides. This work has uncovered another layer of complexity in SARS-CoV-2 infection and suggested that glycolipids facilitate viral entry of SARS-CoV-2.

New anti-diabetic treatment approved for human trials

A new anti-diabetic compound derived from a garden flower has been approved by Health Canada for Phase 1 human trials. This compound, developed by **Drs. Stephen Withers (University of British Columbia) and Joerg Bohlmann (University of British Columbia)**, works by inhibiting the enzyme that breaks down starch. The researchers anticipate that the compound could be used as a potential treatment with fewer side effects than other options currently available for patients with Type 2 diabetes. The overall project, from the fundamental science stages to pre-clinical trials to the human trial stage now, has taken approximately 30 years of research and extensive commitment to developing a better treatment for management of Type 2 diabetes.

Molecules with anti-inflammatory effects to tackle neurodegeneration

Dr. Simonetta Sipione (University of Alberta) is leading research on gangliosides (a family of molecules with carbohydrate and lipid properties) in the brain and their protective effects against neurodegeneration. Specifically, the team is using a mouse model of Huntington's disease—a rare genetic disorder that shares certain symptoms with Alzheimer's and Parkinson's—to investigate a ganglioside called GM1. The researchers found that GM1, when administered to mouse with Huntington's disease, was able to block neurodegeneration, restore motor function to normal, reduce anxiety, and improve cognition. This finding could inform the development of a possible treatment for Huntington's disease and potentially other similar neurodegenerative diseases.

Non-steroid treatments for patients with muscular dystrophy

Duchenne muscular dystrophy (DMD) is a rare genetic disease affecting one in every 3500 children. DMD causes progressive weakness and muscle loss, with most patients not surviving beyond 30 years. Steroids are the only medicines currently available for patients that can slow down the muscle damage and weakness, but its long-term use can lead to side effects such as weight gain, weak bones, or high blood pressure. **Drs. Sachiko Sato (Université Laval), Jérôme Frenette (Université Laval), and Masahiko Sato (Université Laval)** are conducting preclinical trials of an alternative treatment or co-treatment using a carbohydrate-derived candidate. Naturally found in human breast milk, the candidate could reduce muscle damage in patients with DMD as much as 50 per cent.

Antimicrobial therapies for challenging pathogens

Cystic fibrosis (CF) is a disease characterized by persistent infection of the lungs, eventually leading to respiratory failure and premature death. What makes this disease hard to treat is that the causative bacterium *P. aeruginosa* produces communities of cells that serve as protecting agents against antibiotics. These clumped cells, called biofilms, are made mostly of sugar. **Drs. Lynne Howell (SickKids Hospital), Valerie Waters, (SickKids Hospital), Dao Nguyen (McGill University), and Don Sheppard (McGill University)** are studying the different types of sugars in biofilms produced by *P. aeruginosa* and applying the findings in sputum samples from children patients with CF. The team aims to identify patients who likely will not respond to antibiotic treatments early to prevent poor clinical outcomes associated with CF infections.

Anti-cancer drugs to improve immunotherapy outcomes

To date, immunotherapy achieves durable results in only 15-20 per cent of patients. This is largely due to the presence of high levels of "factors" produced by cancer cells, which can counteract cancer-killing immune cells. Among these factors are galectins—a family of proteins that protects cancer cells by killing immune cells, hence limiting the effectiveness of immunotherapies. **Drs. Nicolas Doucet (INRS), Yves St. Pierre (INRS) and David Chatenet (INRS)** are developing a new class of anti-galectin drugs with unique properties based on the therapeutic proteins called nanobodies. Currently, the research team is pursuing its effort towards developing these new anti-galectin drugs, aiming to improve immunotherapy for many forms of cancer.

KNOWLEDGE MOBILIZATION AND COMMERCIALIZATION

GLYCONET HAS DEVELOPED A UNIQUE APPROACH TO EVALUATING THE PROGRESS OF OUR PROJECTS, WHICH ENSURES THAT OUR TEAMS ARE ON TRACK TO PURSUE COMMERCIALIZATION AND KNOWLEDGE MOBILIZATION.

DEVELOPING A GLYCOMICS INDUSTRY CLUSTER TO SOLVE REAL WORLD PROBLEMS

GlycoNet contributes to the growth of the Canadian biotechnology industry through supporting Canadian start-ups and small and medium-sized enterprises (SMEs) in translating technologies and commercializing products:

START-UPS EMERGED FROM GLYCONET

GlyCa BioSciences

Co-founded by **Drs. Hon Sing Leong (Sunnybrook Research Institute) and Karla Williams (University of British Columbia)**, GlyCa Biosciences is perfecting the diagnostic pathway for men with suspicions of prostate cancer through a next-generation blood test. This blood test detects cancer cell fragments that contain cancer-specific sugar molecules.

ABOzymes

Built upon the discoveries of **Drs. Stephen Withers and Jayachandran Kizhakkedathu (University of British Columbia)**, the innovative technology at ABOzymes uses enzymes derived from the human microbiome to convert ABO blood surface antigens to the universal donor blood group. The company secured an additional $2.6M for its preclinical programs after raising a $1.3M of equity investment in its seed round.

PanTHERA CryoSolutions

Drs. Robert Ben (University of Ottawa) and Jason Acker (University of Alberta / Canadian Blood Services) developed a technology that uses carbohydrate-based molecules to enhance the storage of cells and tissues at very low temperatures—a process called cryopreservation. The technology will benefit patients who need cell transplants and gene therapies. Beyond cell-based therapy applications, the company is exploring the cryopreservation of human tissues and organs used in transplantation medicine and reproductive cells from fish and other aquatic species to support biodiversity conservation efforts.

48Hour Discovery

Founded by **Dr. Ratmir Derda (University of Alberta)**, the company uses its proprietary technology platform to identify drug leads within a few days and for as little as one-tenth of the cost of a traditional drug discovery agreement for a single viable pre-clinical molecule. Since its inception in 2017, the company has achieved annual sales of several millions to Biopharma companies across the world and has established a subsidiary in Seoul, Korea.

Carbaform Bioscience

Co-founded by **Drs. Robert Britton (Simon Fraser University) and David Vocadlo (Simon Fraser University)**, the company focuses on developing new technologies to improve the manufacturing of anticancer antibodies. Their proprietary technology uses carbohydrate-like molecules to tailor the glycan portion of antibodies during production. This technology improves antibody potency and will significantly accelerate the manufacturing timeline and lower manufacturing costs.

SMES SUPPORTED BY GLYCONET

Through the GlycoNet Strategic Initiative program, the Network partners with SMEs and assist and support them in their development. Several entrepreneurs from the GlycoNet community have benefited from this program.

Alectos Therapeutics, a leader in the discovery and preclinical development of small-molecule therapeutics to treat neurological disease, has recently secured a $700M licensing and collaboration agreement with Biogen for AL01811, an inhibitor with first-in-class potential as an oral disease-modifying treatment for Parkinson's Disease.

> ***As Canada's only organization dedicated to advancing glycomics innovation and commercialization, GlycoNet is one of our most important development partners... GlycoNet's ability to connect researchers, align multi-disciplinary translational research teams, and mobilize funding while showcasing commercial opportunities to downstream technology receptors (e.g., technology accelerators, investors, foundations and industry partners) has been an enabling resource for Alectos.***

Ovensa Inc, a company that specializes in the delivery of RNA therapeutics, antibodies and peptides using its nanomedicine and ligand targeting platforms, has secured $1.38M in seed financing. GlycoNet has supported the research on Ovensa's drug delivery platform to cross the blood-brain barrier.

AmacaThera, a clinical-stage company developing a platform hydrogel technology to address sustaining therapeutic delivery of pharmacological agents for multiple disease areas, was supported by GlycoNet to conduce its pre-clinical studies of lead molecule for post-operative, nonopioid pain therapy. The company has secured a $10.3M Series A financing to advance this molecule in clinical trials.

> ***In the case of AmacaThera, the development projects that have been undertaken with GlycoNet's support have accelerated our technology development efforts. GlycoNet has been an enabler for our organization and has contributed to our success.***

Zucara Therapeutics, a diabetes life sciences company developing the first therapeutic to prevent insulin-induced low blood glucose levels, is moving into a Phase 2 trial after announcing highly positive safety and proof of concept results of ZT-01 in Phase 1 studies in healthy volunteers and people with Type 1 diabetes. With GlycoNet's support, the company anticipates completing preclinical studies required to also advance ZT-01 into clinical development for Type 2 diabetes.

> ***At Zucara, we believe that glycomics research and innovation is so important to advance new therapeutics in diabetes. GlycoNet represents a unique Canadian vehicle that is mobilizing the efforts of Canada's world-class glycomics innovation community to improve the health and quality of life of Canadians and people worldwide.***

FUELING SUSTAINABLE BIOINNOVATIONS IN CANADA

(Highlighted in BIOTECanada's Insights Magazine Spring 2022 Issue)

In FY 2022, GlycoNet Integrated Services (GIS) was created by leveraging $35 million of existing infrastructure investment and integrating glycomics expertise across seven Canadian institutions. GIS provides globally unmatched services to academic and industry researchers worldwide. These services include:

- High throughput screening of glycan libraries to identify molecules of biological relevance in microorganisms, human and animal cells, plant pathogens, and organoids
- Synthesis of glycans by conventional or enzyme-assisted method, and by automated glycan assembly with the Glyconeer system (one of five in the world)
- Molecular discovery using DNA-encoded glycan libraries "liquid glycan array"
- Characterize biophysical properties of glycan-protein interactions

The mission of GIS is to empower glycomics research as the engine to accelerate discovery, development, and commercialization of tomorrow's glycomics-based solutions, leading to a healthier, more sustainable future.

NETWORKING AND PARTNERSHIPS

What underlines and supports all GlycoNet activities is the power of our strong and varied partnerships. The Network started with 32 partners and today it has increased to 287. We are building non-conventional partnerships to expand research capacity and collaborations with different disciplines. At the same time, we actively raise public awareness of glycomics and its untapped potential in all aspects of lives.

Our partners come from investor firms, health foundations, technology receptors, research consortia, industry, government, and a range of public and private sectors. By forging strategic alliances, we not only provide our Network members with access to world-leading expertise, but also ensure that we are targeting areas of priority and relevance to the community.

ENGAGING WITH POLICY-MAKERS

GlycoNet is making cases for glycomics to influential players such as Members of the Parliament, political staffers, lobbyists, and more. In February, **Karimah Es Sabar, GlycoNet's Board Chair and Chair, Health Bioscience Economic Strategy Table from the Government of Canada**, wrote an opinion editorial in The Hill Times pinpointing glycomics as the next hot spot for investment due to its wide applications in areas addressing health, environmental sustainability, economic growth, and post-pandemic recovery.

Read more at bit.ly/glycomics-op-ed.

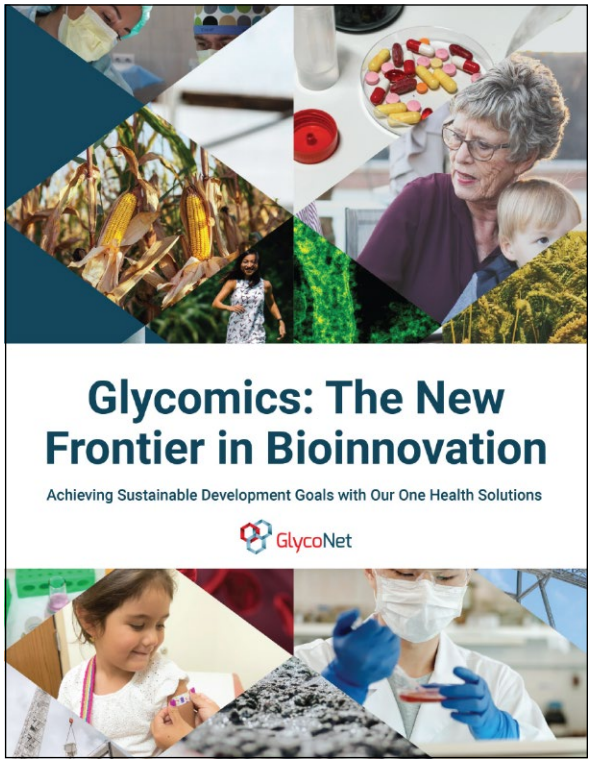
GlycoNet researchers are also making waves in raising awareness of glycomics. **Dr. Lori Burrows (McMaster University)** was one of six panelists across Canada to meet Research Canada's Parliamentary Health Research Caucus at an advocacy event "Game Changers in Health Research and Health Innovation Virtual Panel." In the event where attendees included elected officials, policy makers, and industry stakeholders, Dr. Burrows shared how glycomics research is being used to develop vaccines against tuberculosis.

SHARING A UNIFIED FRONT TO ADVOCATE FOR GLYCOMICS

As with genomics 20 years ago, glycomics is at a critical stage, a tipping point. Glycomics is expected to generate explosive growth over the next decade in the biotechnology and pharma sectors. GlycoNet researchers and executives published a report highlighting how glycomics supports Canada's One Health solutions and sustainable development. The report also included discussions about the field of glycomics in a wide variety of applications – aging, antimicrobial resistance, precision health, vaccines and antivirals, sustainable agriculture, climate change, natural products, livestock management, biomaterials, and bioenergy.

Glycomics is at the centre of a new surge of scientific and industry interest, with breakthrough innovations helping to solve pressing global challenges. Like genomics, glycomics will unlock markets valued in the tens of billions of dollars while creating high quality jobs and high growth companies.

Read more at bit.ly/glycomics-report.



FORGING ALLIANCES WITH INDUSTRY AND NETWORKS

Phase 1 clinical trial for a Hia vaccine

Partners: M[i]4, Canadian Immunization Research Network, National Research Council Canada, National Microbiology Laboratory, Public Health Agency of Canada, Northern Ontario School of Medicine, Hewitt Foundation, CIHR Institute of Indigenous Peoples' Health, InventVacc

Led by **Drs. Brian Ward (McGill University), Matthew Cheng (McGill University), Joanne Langley (Dalhousie University), Jeannette Comeau (Dalhousie University) and Scott Halperin (Dalhousie University)**, the project could have significant health and societal impact as Hia infections disproportionately affect Indigenous communities in Canada's North, across the Americas, and in Asia.

GlycoCage platform for targeted drug delivery

Partners: Crohn's and Colitis Canada, Agriculture and Agri-Food Canada, Agriculture Funding Consortium, Alberta Milk, CEGIIR Biobank, Michael Smith Health Research BC

Drs. Harry Brumer (University of British Columbia), Laura Sly (BC Children's Hospital Research Institute), Wade Abbott (Agriculture and Agri-Food Canada) and Douglas Inglis (Agriculture and Agri-Food Canada) are developing a GlycoCage platform to deliver drugs to targeted sites for patients, both human and veterinary populations, with enteric inflammatory disease. This delivery approach can eliminate systemic update while greatly reducing side effects.

RAISING CANADA'S INTERNATIONAL PROFILE IN GLYCOMICS

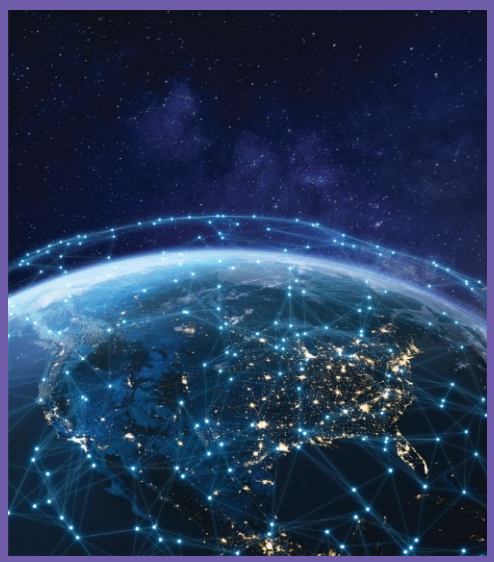
GlycoNet is creating world-class research centres across the globe. As a stakeholder under Japan's Core-to-Core Program "Establishment of Global Research Institute for Uncovering Glycan" along with **Academia Sinica (Taiwan), Institute for Glycomics (Australia), Université de Lille (France), Nagoya University (Japan) and Gifu University (Japan)**, GlycoNet is keen on facilitating the exchange of knowledge and providing training in chemical biology. Additionally, several research teams are working collaboratively on translational projects.

Mapping glycans in the brain

Drs. Matthew Macauley (University of Alberta), John Klassen (University of Alberta), Kay-Hooi Khoo (Academia Sinica), and Takashi Angata (Academia Sinica) are mapping the glycans decorated with a specific chemical moiety in the brain and studying the mechanisms by which these glycans interact with a glycan-binding protein called CD33. Because CD33 is related to Alzheimer's Disease (AD) susceptibility, the findings on the interactions between the glycans and CD33 could shed light on new ways to diagnose or treat AD.

Creating a toolkit of glycans

Drs. David Kwan (Concordia University), Ching-Ching Yu (Academia Sinica), and Chun-Hung Lin (Academia Sinica) are synthesizing tailored and complex glycans using enzymes developed from their laboratories. These synthesized glycans will be used as probes to study glycan-binding proteins under oxidative stress, a biological process eventually leading to inflammation or cell death. The connection among glycan-binding proteins, glycans, and factors that cause oxidative stress are currently unexplored. The research could open new avenues to understand the mechanisms by which certain interactions mediate processes leading to inflammation and cell death.



DISSEMINATING GLYCOMICS KNOWLEDGE ACROSS NORTH AMERICA AND EUROPE

Despite the pandemic-related restrictions, GlycoNet continues to nurture strong lines of communication with the community through targeted virtual networking meetings and webinar series. With the popularity of the webinar series, it was expanded in partnership with the American Chemical Society Carbohydrate Chemistry division and the European Glycoscience Community. **Drs. Harry Brumer (University of British Columbia) and Simon Wisnovsky (University of British Columbia)** presented their research in this series.

TRAINING AND EDUCATION

GlycoNet has distinguished itself with a well-rounded training program with the goal to train the next generation of glycoscientists. To date, the training program has made an impact on the lives of more than 590 trainees from 35 institutions across Canada.

MINI SYMPOSIA AND PROFESSIONAL DEVELOPMENT FOR TRAINEES

Three Mini Symposia were held to showcase trainees' research and allow trainees to hone their presentation skills. The Symposia were trainees only (i.e. no NIs were present). Additionally, three workshops were held as part of the Symposia to provide trainees with opportunities for professional development:

- Communicating your Science to a Broader Audience by **Dr. Torah Kachur, Science Columnist for CBC Radio One**
- Utilizing R-Studio to Better Visualize your Data by **Dr. Greta Reintjes, a Marie Sklodowska-Curie Postdoctoral Research Fellow, AAFC Lethbridge**
- Using Cognitive Science for Better Understanding your Data by **Dr. Joe Kim, Associate Professor, Department of Psychology, Neuroscience & Behaviour, McMaster University**

An IP Workshop with **Dr. Stephanie White (Kirby IP Canada) and Mr. Luc Roberts (Allos Bioscience)** was also offered. The workshop was targeted to trainees only and included presentations from the speakers, followed by a Q&A session.

INSPIRING THE NEXT GENERATION OF SCIENTISTS

The GlycoNet training program brings early-stage researchers, professionals, and highly qualified personnel (HQP) together and provides them with the knowledge and skills to drive innovation in their careers, both within and beyond academia.

Opening the door to diverse career options

GlycoNet has been instrumental in supporting my career, both as a trainee and as a new Assistant Professor. The leadership, networking, and funding opportunities afforded by GlycoNet continue to enrich my career and also that of my trainees.

Dr. Lisa Willis, Assistant Professor, University of Alberta

As a newer member of GlycoNet, I was very appreciative of the support and opportunities that GlycoNet extends to its trainees. I was able to witness firsthand the various initiatives promoting professional development and connect with a network of trainees across Canada. The Research and Travel supplement was especially rewarding as it allowed me to travel to our collaborators in Utah and learn new techniques that are considered a gold standard in my field of research. This has not only helped the research community foster a collaborative environment and given me further mentoring support, but also opened additional avenues for a more rigorous approach to our studies. GlycoNet has been very instrumental in helping me enhance the technical and leadership skills.

Ninoschka D'Souza, Doctoral Student, York University

The GlycoNet summer award was invaluable in my professional development, allowing me to direct a project with close guidance from Dr. Don Sheppard and Dr. François Le Mauff. This experience helped me mature into a more independent and critical researcher, while simultaneously being exposed to advanced experimental methods.

David Firer, Master's Student, McGill University

Acting as the Communications Officer of the GlycoNet Trainee Association - Executive Committee for two years was a launchpad for my career. This experience not only gave me exposure to non-academic career paths, but also provided me with fantastic opportunities to develop my writing and communication skills. I am really thankful to GlycoNet for all the experiences that are helping me grow in my current role as a science communicator in the biotech industry.

Revathi Reddy, Scientific Marketing Specialist, STEMCELL Technologies

NEW EDUCATIONAL RESOURCES BOLSTER VACCINE CONFIDENCE, INFORMATION LITERACY

In FY 2022, GlycoNet received a $50K "Encouraging Vaccine Confidence in Canada" Promoscience grant from NSERC to develop sustainable, proactive, and inclusive vaccine literacy material. Leveraging GlycoNet's ongoing partnership with CMASTE, K-12 teacher resources to target critical thinking surrounding vaccines, COVID-19, and information literacy were developed. These resources were shared through ten teacher workshops to a total of 280 participants across Canada.

When science educator Carol Brown started developing materials to teach about vaccines and information literacy in K-12 classrooms, she brought in a special consultant to help with creating resources for younger elementary children: her four-and-a-half-year-old son.

"High school resources were easier for me to develop because that's where I taught," said Brown, a University of Alberta Education alumnus who is hoping to embark on her PhD this year. "My son was a useful resource and my friends' kids were helpful in thinking about meeting younger students where they were, as was sharing resources with elementary education colleagues to see what they would find useful."

Brown said that meeting students where they are is crucial, and not just in terms of ensuring the material is grade level-appropriate. Given the potential for controversy around socio-scientific issues like vaccination and climate change, educators need to tread the fine line of laying out scientific evidence while nurturing curiosity among learners.

"As science teachers, we need to encourage question-asking, we need to create a space where people feel safe to ask questions without being judged," Brown said. "We can't tell people outright that they're wrong, which closes down the possibility of them even listening. We need to model open-mindedness as educators, and the willingness to admit when we're wrong as educators in order to foster that in our learners."

> ***As science teachers, we need to encourage question-asking, we need to create a space where people feel safe to ask questions without being judged. We can't tell people outright that they're wrong, which closes down the possibility of them even listening. We need to model open-mindedness as educators, and the willingness to admit when we're wrong as educators in order to foster that in our learners.***
>
> **- Carol Brown**

The resources Brown has created are part of a project, **Vaccine & Hesitancy: Teaching for Critical Thinking**, that grew from the partnership between the Faculty of Education's Centre for Mathematics, Science and Technology Education (CMASTE) and GlycoNet.

"We have a long existing relationship with CMASTE, providing professional development opportunities to Canadian science educators," said GlycoNet CEO Elizabeth Nanak. "When we saw an opportunity to improve knowledge surrounding vaccines, GlycoNet applied for a NSERC PromoScience grant to encourage vaccine confidence. This funding and collaboration with CMASTE provided the foundation to quickly develop and disseminate classroom materials to answer very pressing needs."

"The grant was approved on the basis that we would produce resources that showcased the science, but … they would not be just about vaccines," said Kerry Rose, director of CMASTE. "This is about scientific literacy. Our goal is to make these resources so they can be used after the pandemic is over. They're about evaluating which information sources to trust in and outside of school."

Some of the videos and text resources are intended for early elementary learners, such as those that centre on the storybook **The Sad Little Fact** by Jonathan Winter and Peter Oswald, which Brown's son found at the library. Others, intended for junior and high school students, examine the history and science of vaccines, and challenge students to identify reliable information sources on which to base health decisions.

"We have six different scenarios where people have to decide if they should get a vaccine or not. On purpose some are designed so that when students do the research, they might find it probably wouldn't be a good idea to get a particular vaccine," Rose said. "In some cases, there's pros and cons. It's designed to help students realize vaccine decision-making is a risks-vs-benefits kind of thing, and the kinds of research you would do to find out those risks and benefits."

The resources also include **interviews with GlycoNet scientists** like University of Alberta pediatric cardiologist Dr. Lori West and McMaster University immunologist Dr. Dawn Bowdish, who talk about how to have constructive conversations around socioscientific issues like COVID-19, as well as encouraging students to consider careers in science.

Brown says she hopes the resources will give teachers a way to approach important topics that might seem too contentious to take up in the present moment, when vaccination and other public health measures are subject to backlash.

"There have been other vaccines in the news like the MMR [measles-mumps-rubella] vaccine, which some celebrities have inaccurately linked to autism, and the ramifications of that persisted for a long time. It's not the first time vaccinations have been a hot topic, but they're in the public eye much more. Hopefully these resources will give teachers a way of addressing these topics that they feel comfortable with."

Since late 2021, CMASTE has organized virtual professional development sessions around these materials to help educators across Canada start using them immediately. Rose says the the speed with which the project came together—in the space of less than a year—shows interdisciplinary collaboration and knowledge mobilization for the public good in action.

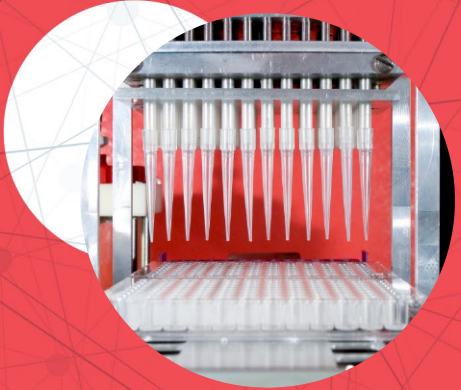
"I think it's a great example of a situation when you have a pre-existing relationship between faculties and leverage to reach a lot of people in meaningful ways," Rose said. "Reaching preservice and practicing teachers as they're teaching in front of thousands of students about vaccine hesitancy and scientific literacy—I can't think of a more appropriate project to be working on right now."

This article is republished from Illuminate magazine (University of Alberta Faculty of Education).

LEADERSHIP AND MANAGEMENT

EFFECTIVE MANAGEMENT AND STRONG GOVERNANCE

GlycoNet's Board of Directors plays an important role in guiding the Network. The Board and management team aim to deliver a strong and sustainable legacy for the healthcare sector in Canada comprised of world-leading researchers, innovative technologies to address medical needs, an engaged stakeholder community, and a roadmap to a healthier Canada.



Board of Directors transition

GlycoNet welcomed three new Board members: **Dr. Catalina Lopez Correia (Genome Canada), Dr. Mariela Segura (Université de Montréal), and Mr. Christopher Jones (Blakes)**. These individuals have collective expertise in IP, operations, strategic partnerships, commercialization, knowledge mobilization, ethics, research, and governance, as well as many years of experience in the academic, provincial, federal, and industry sectors.

Dr. Harry Brumer (University of British Columbia) agreed to join GlycoNet leadership as Associate Scientific Director.

Dr. Elizabeth Nanak, GlycoNet CEO, was part of the 4th cohort of the adMare Executive Institute, a custom-designed program focused on advancing leadership skills amongst Canadian life sciences professionals. Learning from this experience will help in leading change as the Network transitions to post-NCE funding.

BUILDING A GLYCONET LEGACY

Accruing the success from the Network since 2015, GlycoNet continues to propel Canada's leadership in glycomics and make a positive impact on the lives of people in Canada and worldwide. Our legacy is not only built on the commitment to serving the needs of our people and our society, but also forging a sustainable path to drive the growth of Canada's bioeconomy. In addition to accelerating glycomics research and commercializing technologies of priority to Canadians, GlycoNet is supporting SMEs and creating domestic employment opportunities in the biotechnology and life sciences sectors. On a global scale, GlycoNet is increasing Canada's competitive edge by enabling company formation, building international public-private partnerships, and attracting foreign investments. To achieve our vision of improved quality of life through glycomics, GlycoNet is working with key stakeholders in industry, government, and academia to plan and implement strategies, ensuring that our legacy supports a strong, sustainable economy for future generations.

Commitment to Equity, Diversity, and Inclusion

GlycoNet continues to promote and embed EDI in all Network activities. Several new initiatives were implemented in FY 2022:

- A commitment to the ISED 50-30 Challenge which aims to increase diversity on GlycoNet Board and leadership. GlycoNet's goal is to complete this challenge (gender parity, "50%", and significant representation,"30%", of other equity-deserving groups) in FY 2023.
- An in-person EDI training for the Board, facilitated by NI and EDI expert, Dr. Lisa Willis (University of Alberta) that included a case study, scientific literature describing barriers to inclusion, and strategies to create a more inclusive work environment.
- A mandatory Diversity and Inclusion Bootcamp in both English and French to NIs and HQP and a Bias in Peer Review training for committee members.
- An updated survey to measure GlycoNet's progress in EDI. The updated survey was expanded to include questions to probe the level of inclusiveness within the Network. These questions relate to training, EDI practices, and levels to which individuals feel valued, heard, and respected.

NETWORK COMMUNITY

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- CHU Ste-Justine
- Concordia University
- Dalhousie University
- Hospital for Sick Children
- Institut de recherches cliniques de Montréal
- Institut national de la recherche scientifique
- Lawson Health Research Institute
- London Health Sciences Centre
- McGill University
- McMaster University
- Queen's University
- Research Institute of the McGill University Health Centre
- Ryerson University
- Simon Fraser University
- Sir Mortimer B. Davis Jewish General Hospital
- Sunnybrook Research Institute
- Université de Sherbrooke
- Université Laval
- University of Alberta
- University of British Columbia
- University of British Columbia - Okanagan
- University of Calgary
- University of Guelph
- University of Lethbridge
- University of Manitoba
- University of Montréal
- University of Ottawa
- University of Quebec at Montreal
- University of Saskatchewan
- University of Toronto
- University of Victoria
- University of Waterloo
- University of Western Ontario
- University of Windsor
- Wilfrid Laurier University
- York University

PARTNERS

Universities and research institutions

- Academia Sinica
- Alberta Glycomics Centre
- Alberta Machine Intelligence Institute
- BC Children's Hospital
- California Institute of Technology
- Campus Alberta Neuroscience
- Centre for Health Evaluation & Outcome Sciences
- Cross Cancer Institute
- Harvard/Massachusetts General Hospital
- Immunology Drug Discovery Group for CNS Disorders
- Integrated Biobank of Luxembourg
- Krembil Research Institute
- Memorial Sloan Kettering Cancer Center
- Oxford University
- Scripps Research Institute
- SPARC BioCentre
- Stanford University
- The Ferrier Research Institute
- University of California
- University of Maryland
- University of Oklahoma
- University of Texas
- Wisconsin College of Medicine

Industry and technology receptors

- 48Hour Discovery Inc.
- ABOzymes Biomedical Inc.
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- Alectos Therapeutics
- Amgen
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- Aspect Biosystems
- Atara Biotherapeutics
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- IRICoR
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- Mirexus
- Mitacs
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- Molecular Forecaster
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- Ovensa Inc.
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- Phoenix Nest Inc.
- PlantForm
- Quark Venture
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- StemCell Therapeutics
- SynAD
- Taysha Gene Therapies
- TRB Chemedica
- TRIUMF
- Waters Corporation
- Wellesley Therapeutics
- WuXi App Tec
- Zucara Therapeutics
- Zymeworks

Canadian & International Government Departments/ Agencies

- Agriculture and Agri-Food Canada
- Alberta Health Services
- Alberta Innovates
- Alberta Livestock and Meat Agency
- BC Knowledge Development Fund
- Canadian Immunization Research Network
- Canadian Poultry Research Council
- CNRS France
- National Cancer Institute
- National Institute of Health
- National Research Council
- Ontario Research Fund
- US Department of Defense
- Western Economic Diversification

Foundations and Funding Agencies

- Alzheimer's Society of Canada
- Australian Red Cross
- Austrian Science Fund
- Canadian Blood Services
- China Scholarship Council
- CIFAR
- Crohn's and Colitis Canada
- Cystic Fibrosis Canada
- David Braley Centre
- Fondation Armand-Frappier
- Fondation du cancer du sein du Québec (FCSQ)
- Hewitt Foundation
- Jesse's Journey
- Komen Foundation
- Michael J. Fox Foundation for Parkinson's Research
- Michael Smith Foundation for Health Research
- Sanfilippo Children's Research Foundation
- Societé canadienne du cancer
- The Smithsonian

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- **Yves Dory**, Université de Sherbrooke
- **Yves St-Pierre**, Institut National de la Recherche Scientifique
- **Zhou Xing**, McMaster University
- **Ziv Gan-Or**, McGill University

FINANCIAL STATEMENTS

Canadian Glycomics Network

INDEPENDENT AUDITOR'S REPORT

To the Members of Canadian Glycomics Network

Our qualified opinion

In our opinion, except for the possible effects of the matter described in the *Basis for qualified opinion* section of our report, the accompanying financial statements present fairly, in all material respects, the financial position of Canadian Glycomics Network (the Network) as at March 31, 2022 and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

What we have audited
The Network's financial statements comprise:

- the statement of financial position as at March 31, 2022;
- the statement of operations for the year then ended;
- the statement of changes in net assets for the year then ended;
- the statement of cash flows for the year then ended; and
- the notes to the financial statements, which include significant accounting policies and other explanatory information.

Basis for qualified opinion

In common with many not-for-profit organizations, the Network derives revenues from contributed services, the accuracy of which is not susceptible to satisfactory audit verification. Accordingly, verification of these revenues was limited to the amounts recorded in the records of the Network. Therefore, we were not able to determine whether any adjustments might be necessary to contributed services revenues and related research project funding expenditures for the years ended March 31, 2022 and 2021. Our audit opinion on the financial statements for the year ended March 31, 2021 was modified accordingly because of the possible effects of this limitation in scope.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the *Auditor's responsibilities for the audit of the financial statements* section of our report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our qualified opinion.

FINANCIAL STATEMENTS

Canadian Glycomics Network

INDEPENDENT AUDITOR'S REPORT

Independence
We are independent of the Network in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada. We have fulfilled our other ethical responsibilities in accordance with these requirements.

Responsibilities of management and those charged with governance for the financial statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the the Network's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the the Network or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Network's financial reporting process.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Network's internal control.

FINANCIAL STATEMENTS

Canadian Glycomics Network

INDEPENDENT AUDITOR'S REPORT

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Network's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Network to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

PricewaterhouseCoopers LLP

Chartered Professional Accountants

Edmonton, Alberta
July 27, 2022

FINANCIAL STATEMENTS

Canadian Glycomics Network

STATEMENT OF FINANCIAL POSITION

As at March 31, 2022

	2022 $	2021 $
Assets		
Current assets		
Cash	109,794	138,180
Short-term investments (note 3)	242,805	241,770
Accounts receivable	35,043	28,397
GST receivable	2,620	93
Prepaid expenses	11,675	10,152
Due from Network Host (note 4)	7,546,277	6,575,864
	7,948,214	6,994,456
Long-term investments	25,000	25,000
	7,973,214	7,019,456
Liabilities		
Current liabilities		
Accounts payable and accrued liabilities	112,083	84,155
Deferred revenue (note 5)	7,432,333	6,455,241
	7,544,416	6,539,396
Net Assets		
Unrestricted net assets	428,798	480,060
	7,973,214	7,019,456

Approved by the Board of Directors

DocuSigned by: Christine Charette 910BD667415D4EB... Director

DocuSigned by: Walter Dixon FCF15B36D38E4C4... Director

The accompanying notes are an integral part of these financial statements.

FINANCIAL STATEMENTS

Canadian Glycomics Network

STATEMENT OF OPERATIONS

For the year ended March 31, 2022

	2022 $	2021 $
Revenue		
Grants (note 5)	4,509,932	5,740,716
Contributed services (note 6)	150,000	150,000
Services	33,522	78,116
Interest income	1,036	4,501
Symposium	-	550
	4,694,490	5,973,883
Expenditures		
Research project funding	3,543,971	5,005,552
Salaries and employee benefits	737,273	669,860
Communications	123,070	61,876
Other	97,852	41,725
Training programs	71,510	92,492
Professional fees	44,272	24,593
Symposium	41,352	1,168
Travel	38,590	6,239
Insurance	12,488	10,866
Consulting fees	11,297	5,238
Office	9,342	8,597
Equipment	7,416	5,202
Patent costs	4,000	12,238
Seminars, workshops and networking	3,319	8,653
	4,745,752	5,954,299
(Deficit) excess of revenue over expenditures for the year	(51,262)	19,584

The accompanying notes are an integral part of these financial statements.

FINANCIAL STATEMENTS

Canadian Glycomics Network

STATEMENT OF CHANGES IN NET ASSETS

For the year ended March 31, 2022

	2022 $	2021 $
Balance – Beginning of year	480,060	460,476
(Deficit) excess of revenue over expenditures for the year	(51,262)	19,584
Balance – End of year	428,798	480,060

The accompanying notes are an integral part of these financial statements.

FINANCIAL STATEMENTS

Canadian Glycomics Network

STATEMENT OF CASH FLOWS

For the year ended March 31, 2022

	2022 $	2021 $
Cash provided by (used in)		
Operating activities		
(Deficit) excess of revenue over expenditures for the year	(51,262)	19,584
Changes in non-cash working capital items		
Accounts receivable	(6,646)	70,695
Prepaid expenses	(1,523)	(1,317)
Accounts payable and accrued liabilities	27,928	(78,722)
GST receivable	(2,527)	6,288
Due from Network Host	(970,413)	(795,378)
Deferred revenue	977,092	730,537
	(27,351)	(48,313)
Investing activities		
Short-term investments redeemed	200,000	356,514
Short-term investments purchased	(201,035)	(241,770)
Long-term investments purchased	-	(25,000)
	(1,035)	89,744
(Decrease) increase in cash during the year	(28,386)	41,431
Cash – Beginning of year	138,180	96,749
Cash – End of year	109,794	138,180

The accompanying notes are an integral part of these financial statements.

FINANCIAL STATEMENTS

Canadian Glycomics Network

NOTES TO FINANCIAL STATEMENTS

March 31, 2022

1 Nature of operations

Canadian Glycomics Network (the Network) is a world-leading network of glycomics researchers and trainees, government laboratories and industry partners that was incorporated on February 4, 2015. The Network addresses key challenges in human health. The Network's research, in collaboration with Network partners, led to novel approaches for preventing and treating disease. The operations of the Network are primarily funded from the Government of Canada through the Network Centres of Excellence of Canada (NCE) program and the ongoing support from the University of Alberta (the University or the Network Host). The Network is related to the University by virtue of the fact that the University is its hosting institution under the NCE program. The current funding agreement with the Network Host extends to March 31, 2024. The Network is a not-for-profit organization and, accordingly, is exempt from income tax in accordance with Section 149(1)(e) of the Canadian Income Tax Act and Section 35 of the Alberta Income Tax Act.

2 Summary of significant accounting policies

Basis of presentation

These financial statements have been prepared by management in accordance with Canadian accounting standards for not-for-profit organizations (ASNPO). The preparation of financial statements for a period necessarily includes the use of estimates and approximations, which have been made using careful judgment. Actual results could differ from those estimates. Significant areas of estimation included in these financial statements are the estimate of fair value of contributed materials and services. These financial statements have, in management's opinion, been properly prepared within reasonable limits of materiality and within the framework of the accounting policies summarized below.

Short-term investments

The Network accounts for short-term investments with maturity dates between three and 12 months from the date they were acquired using the cost method, whereby the investment is initially recorded at cost and earnings from such investments are recognized only to the extent that they are received or receivable.

Long-term investments

The Network accounts for long-term investments in a Canadian private biomedical company using the cost method, whereby the investment is initially recorded at cost and earnings from such investments are recognized only to the extent that they are received or receivable. The Network records a decline in value if it is other than temporary.

Revenue recognition

The Network follows the deferral method of accounting for contributions. Externally restricted contributions are recognized as revenue in the year in which the related expense is incurred. Unrestricted contributions are recognized as revenue in the year received or receivable if the amounts to be received can be reasonably estimated and collection is reasonably assured.

Canadian Glycomics Network

NOTES TO FINANCIAL STATEMENTS

March 31, 2022

Projects funded by the Network receive cash and in-kind contributions of services, personnel and supplies from other funders. These contributions are not recorded in the financial statements of the Network as they are not revenue of the Network.

Contributed services

Contributed services are recorded in the financial statements at fair value on the date contributed when fair value can be reasonably estimated and the contributed services would have otherwise normally been purchased by the Network.

Financial instruments

Financial assets and liabilities are initially recognized at fair value and are subsequently accounted for at amortized cost using the effective interest rate method. Financial assets measured at amortized cost are tested for impairment when there are indicators of impairment.

3 Short-term investments

Short-term investments held consist of the following:

	2022 $	2021 $
RBC Royal Bank one year cashable GIC, issued on November 17, 2021 and maturing on November 17, 2022, bearing interest of 0.70%	200,900	-
RBC Royal Bank redeemable GIC, issued on October 4, 2021 and maturing on April 4, 2022, bearing interest of 0.15%	41,905	-
RBC Royal Bank redeemable GIC, issued on November 16, 2020 and maturing on November 16, 2021, bearing interest of 0.45%	-	200,000
RBC Royal Bank one year cashable GIC, issued on April 5, 2020 and maturing on April 5, 2021, bearing interest of 0.35%	-	41,770
	242,805	241,770

4 Due from Network Host

Due from Network Host are amounts held in trust by the University in its role as network host under an agreement dated February 4, 2015 and amended on February 13, 2020 between the Network and the Network Host. Under the terms of the agreement, the Network Host is responsible for receiving and administering grant funding received under the NCE program and providing administrative support in the disbursement of funds as directed by the Network.

Canadian Glycomics Network

NOTES TO FINANCIAL STATEMENTS

March 31, 2022

	2022 $	2021 $
NCE funds held by Network Host	7,243,590	6,283,762
Network Host funds	302,687	292,102
	7,546,277	6,575,864

5 Deferred revenue

Funding received in the year includes grants from the NCE program, which are restricted to eligible expenditures under the terms of the grant agreement.

Details of the changes in deferred revenue from NCE are as follows:

	2022 $	2021 $
Balance – Beginning of year	6,243,944	5,474,002
Grant received	5,398,974	6,446,253
Amount recognized as revenue	(4,439,059)	(5,676,311)
Balance – End of year	7,203,859	6,243,944

Details of the changes in deferred revenue from other grantors are as follows:

	2022 $	2021 $
Balance – Beginning of year	211,297	250,702
Grants received		
Network Host	88,050	25,000
Amounts recognized as revenue	(70,873)	(64,405)
Balance – End of year	228,474	211,297

Deferred revenue from all grantors is as follows:

	2022 $	2021 $
Deferred revenue – NCE program	7,203,859	6,243,944
Deferred revenue – other grantors	228,474	211,297
Deferred revenue	7,432,333	6,455,241

Total funding that is restricted in use to eligible expenditures under the grant agreements is made up of due from Network Host of $7,546,277 (2021 – $6,575,864) and funds (paid) received in cash of ($113,944) (2021 – ($120,623)) totalling $7,432,333 (2021 – $6,455,241).

Canadian Glycomics Network

NOTES TO FINANCIAL STATEMENTS

March 31, 2022

6 Contributed services

The Network Host provides contributed services to the Network. In-kind contributions from the Network Host totalling $150,000 (2021 – $150,000) relate to the use of scientific equipment and supplies and salaries and benefits paid on behalf of the Network by the Network Host.

The Network Host provides office space, certain administrative services and services of the Scientific Director for which no revenue or expenses are recognized in these financial statements.

7 Financial instruments

Financial instruments consist of cash, short-term investments, accounts receivable, GST receivable, due from Network Host and accounts payable and accrued liabilities. Due to the short-term nature of these instruments, the carrying value approximates fair value. The Network is exposed to various risks through its financial instruments. The following provides a measure of the Network's exposures and concentrations as at March 31, 2022. Unless otherwise noted, it is management's opinion that the Network is not exposed to significant credit, liquidity or interest rate risk.

Liquidity risk

Liquidity risk is the risk the Network will not be able to meet its obligations as they fall due or to fund any commitments the Network has planned. The Network is exposed to this risk mainly in respect of its accounts payable and accrued liabilities. The Network manages liquidity risk through the management of its capital structure in conjunction with cash flow forecasting, including anticipated investing and financing activities.

Credit risk

The Network is exposed to credit risk related to due from Network Host. The Network monitors the balance due from Network Host and does not consider that it is exposed to significant credit risk due to the creditworthiness of the Network Host.

Interest rate risk

The interest rate risk is the risk the Network's cash flows might be adversely affected by a change in the interest rates. As the Network's investments are in fixed interest rate investments, it is not considered to be exposed to interest rate risk.

Canadian Glycomics Network

NOTES TO FINANCIAL STATEMENTS

March 31, 2022

8 Economic dependence

The operations of the Network are primarily dependent on NCE funding received from the Government of Canada and ongoing support from the University in its role as network host. The original funding agreement with the NCE and the Network Host agreement with the University ended on March 31, 2020. On February 13, 2020, the Network entered into a new three-year funding agreement with the NCE and the Network Host commencing on April 1, 2020. Also, effective February 13, 2020, the Network entered into an amendment to the Network Host Agreement with the University, which extended the term of the original agreement to match the new NCE funding agreement.

9 COVID-19 and the war in the Ukraine

Since December 31, 2019, the outbreak of the novel strain of coronavirus, specifically identified as COVID-19, has resulted in governments in Canada and Alberta enacting emergency measures to combat the spread of the virus. These measures, which include the implementation of self-imposed quarantine periods and social distancing, have caused material disruption to businesses globally resulting in an economic slowdown. Governments and central banks have reacted with significant monetary and fiscal interventions designed to stabilize economic conditions.

Subsequent to year-end, on February 24, 2022, Russian forces invaded Ukraine, resulting in an armed conflict and economic sanctions on Russia. The war has affected economic and global financial markets and exacerbated the ongoing economic challenges, including inflation and global supply chain disruptions.

The most significant impact on the Network has been escalating costs and the difficulty these could present to the investigators in completing their research. The Network is monitoring the situation closely.

It is not possible to reliably estimate the length and severity of these developments and the impact on the financial results and condition of the Network in future periods.

CANADIAN GLYCOMICS NETWORK

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