



GlycoNet

IMPACT REPORT

2015–2025

**CELEBRATING
10 YEARS
OF HEALTH
INNOVATION**



CORPORATE PROFILE

The Canadian Glycomics Network (GlycoNet) was established in 2015 as a federally funded Network of Centres of Excellence (NCE) dedicated to developing carbohydrate-based solutions to unmet health needs. With 220 research groups from 36 institutions across Canada, GlycoNet collaborates with industry, government, and non-profit partners to address issues in human, animal, and environmental health. Beyond funding research, GlycoNet focuses on knowledge mobilization, commercialization, and partnerships to translate research into real-world benefits. To date, GlycoNet has supported over 740 trainees, fostering their growth and career development.

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, animal and environmental 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.

Acknowledgements

GlycoNet acknowledges support from the **Government of Canada** through the **NCE program** (2015–2025) and the **Strategic Science Fund** (2024–2029), and **Alberta Innovates** (2016–2020). GlycoNet Integrated Services is further supported by the **Canada Foundation for Innovation's Major Science Initiatives Fund** (2023–2029) and **Genome Canada's Technology Development** program (2023–2026). Hosted at the **University of Alberta**, GlycoNet is grateful for the University's continued support since its inception.

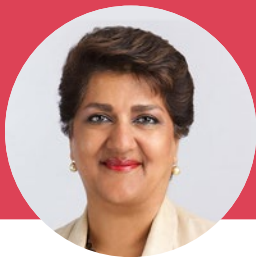
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EXECUTIVE MESSAGE



Karimah Es Sabar
Chair, GlycoNet Board of Directors



Elizabeth Nanak
Chief Executive Officer



Warren Wakarchuk
Scientific Director

Dear Colleagues,

On behalf of the Board of Directors, I am proud to reflect on GlycoNet's journey from 2015 to 2025. As with genomics 20 years ago, glycomics is at a strategic inflection point where investment is critical to unlocking the vast potential of this new frontier in bioinnovation. With the support of the NCE program, GlycoNet has grown a glycomics ecosystem that invests in research, training, entrepreneurship and partnerships to develop innovative health solutions, foster talent in glycomics, support company and job creation, and shape a diverse bioeconomy.

Through strategic collaborations, we've grown from **60** to **220** research groups across Canada, secured **\$44.4 million** in partner funding, enabled the creation of six startups, and trained **740** highly qualified personnel advancing healthcare innovation.

Our investments in **160** projects spanning chronic and infectious diseases, cancer, and neurodegenerative disorders have driven breakthroughs shaping healthcare and quality of life. Notable startups stemming from GlycoNet-funded technologies and successful commercialization include:

- **PanTHERA CryoSolutions:** Founded by **Drs. Robert Ben** (University of Ottawa) and **Jason Acker** (University of Alberta), this startup develops cryopreservation technologies for regenerative medicine and organ transplantation. With \$4 million USD in investment, it has achieved first-in-human and first-in-clinic applications, advancing cell and tissue preservation.
- **48Hour Discovery:** Founded by **Dr. Ratmir Derda** (University of Alberta), the company uses high-throughput ligand discovery to accelerate drug development. Since 2017, it has generated over \$12 million in revenue and established key industry partnerships to expand its impact.
- **Avivo Biomedical:** Founded by **Drs. Stephen Withers, Peter Rahfeld** and **Jayachandran Kizhakkedathu** (University of British Columbia), Avivo is pioneering ABO blood group modification to create universal donor blood and organs, a breakthrough set to transform transplant medicine. The research is supported by partners including the Canadian Armed Forces, Canadian Blood Services, Mayo Clinic, and a \$5 million USD grant from the U.S. Air Force.

- **Cloudburst Biotech:** Founded by **Drs. Rob Britton** and **Matthew Nodwell** (Simon Fraser University), Cloudburst Biotech is developing a class of antivirals—nucleoside analog technologies—with protected IP, translating earlier research supported by GlycoNet.
- **Carbaform Biosciences:** Founded by **Drs. David Voadlo** and **Rob Britton** (Simon Fraser University), Carbaform provides a cheaper and faster manufacturing process for improved anti-cancer antibodies—up to 50 times more potent, targeting cancer more effectively.

Additionally, we've made significant strides in clinical trials advancing health outcomes. For instance, as part of a pan-Canadian consortium focused on *Haemophilus influenzae* type a (Hia) research, **Drs. Brian Ward** (McGill University), **Joanne Langley**, and **Scott Halperin** (Dalhousie University) successfully completed a Phase 1 clinical trial of a Hia vaccine candidate. This initiative aims to address an important health issue affecting Northern and indigenous populations. Another Phase 1 clinical trial led by **Dr. Stephen Withers** (University of British Columbia) is underway for a new plant-based nutraceutical to help patients manage Type 2 diabetes.

Our partnerships have accelerated research, such as the \$700 million licensing and collaboration agreement between Alectos Therapeutics and Biogen, to develop a potential treatment for Parkinson's Disease, building on **Dr. Voadlo's** research. Additionally, **Dr. Britton** partnered with CQDM, Merck and others on a \$1.25 million project to develop antivirals for infectious disease therapeutics.

As part of our growing One Health focus, **Drs. Mariela Segura** (University of Montreal) and **Todd Lowary** (University of Alberta / Academia Sinica) are developing a vaccine against *S. Suis*, a zoonotic pathogen affecting swine and humans. The vaccine shows promise as an alternative to antimicrobials for Canada's swine industry and is being advanced through support from GlycoNet Integrated Services (GIS) and a \$1.6 million partnership with the International Development Research Centre – Canada.

In total, GlycoNet, its partners, and the new Canadian companies that GlycoNet has supported have directly and indirectly **generated \$788 million in GDP and supported over 7,200 jobs¹**.

As GlycoNet celebrates a decade of significant advancements, it remains committed to leading Canadian glycomics into the future—to improve the lives of Canadians and people worldwide. Thanks to the support of the NCE program, GlycoNet has built a robust network and secured public and private funding, propelling forward innovations and commercialization in glycomics. GlycoNet has established Canada as a global leader in the field, positioning the country to capture a share of the global market in glycomics therapeutics, projected to reach \$257 billion USD by 2028².

Thank you to our researchers, partners, and stakeholders for your ongoing dedication.

Sincerely,

Karimah Es Sabar, *Chair, GlycoNet Board of Directors*

Elizabeth Nanak, *Chief Executive Officer*

Warren Wakarchuk, *Scientific Director*

¹Calculated using Input-output Multipliers Table 36-10-0013-01 (2021 Statistics Canada)

²The Insight Partners. (2022). *Glycomics Therapeutics Market: Forecast to 2028*

GlycoNet **IMPACT** BY THE NUMBERS

Since 2015, with NCE funding, GlycoNet has grown to be Canada's leading network for glycomics innovation and commercialization, ranking today as one of the world's top authorities in the field.



160

Research
Projects



600

Peer-reviewed
Publications

95

Academia

152

Industry

350

Participating
Organizations

56

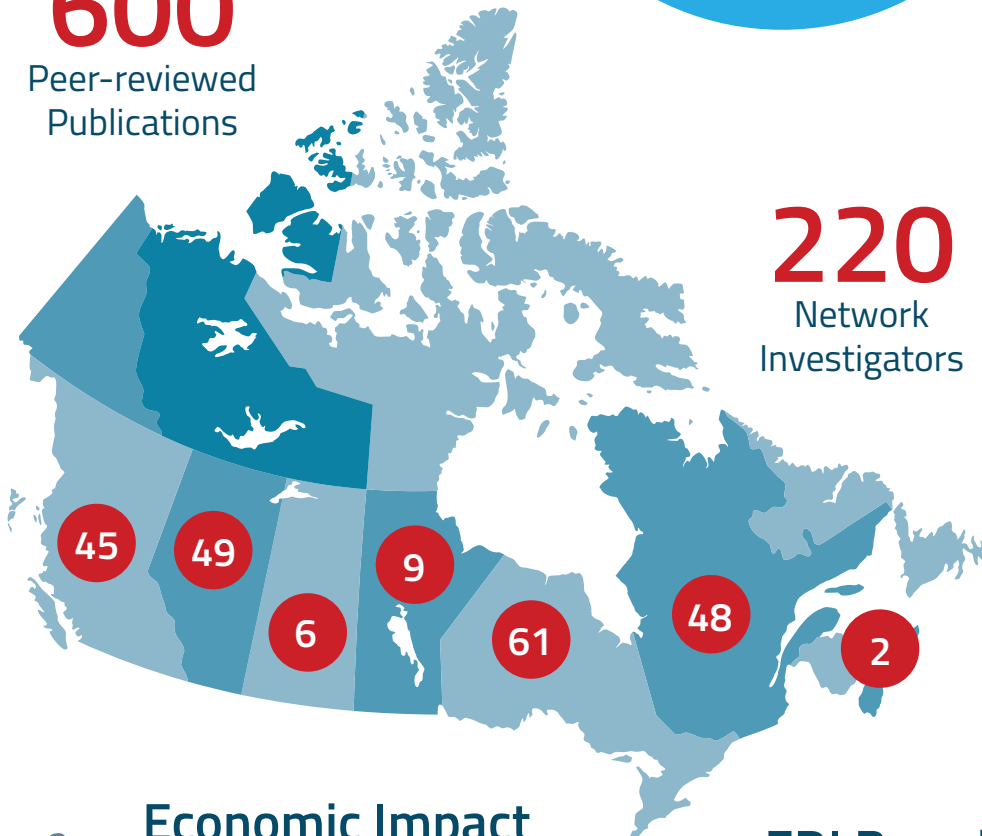
Non-profits

17

Government

30

Others



220

Network
Investigators



36

Member
Universities
and Research
Institutions



Economic Impact

GlycoNet, its partners and companies that the Network has supported have directly and indirectly:

Generated **\$788M** in GDP

Supported **7,200** jobs

(2021 Statistics Canada, Input-output Multipliers Table 36-10-0594-01)

EDI Board Challenge

GlycoNet's Board completed the 50–30 Challenge

50% women and/or non-binary people

30% representation of equity-deserving groups




740

 Highly Qualified
Personnel

\$32.3 M

 Research Funds
Distributed &
Committed

\$44.4 M

 Cash and In-kind
Partner Contributions

10

Licensing Deals


76

 Patents
Filed

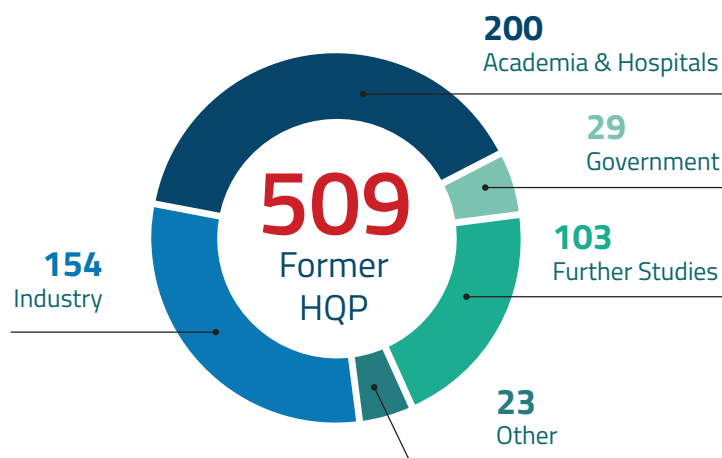
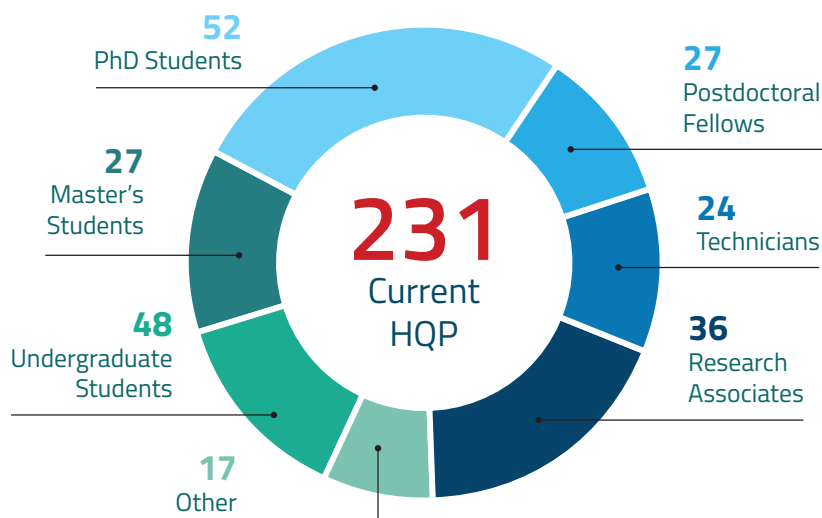
6

 Companies
Enabled

15

 Carbohydrate-based
Drug Candidates
& Tools

1,360

 GIS Users
& Clients


Communications

42

 Educational
resources for
secondary teachers

70 +

Webinars


5,500 +

 Social media
followers

80K+

 YouTube
Video Views

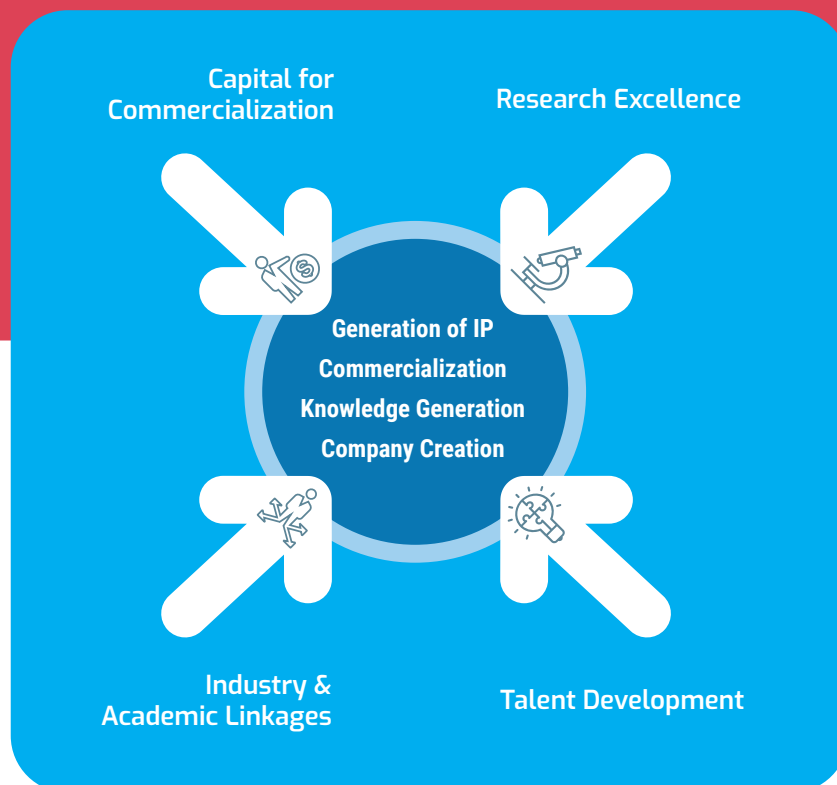
1,555

 GlycoNet
Newsletter
Subscribers

GROWING A GLYCOMICS INNOVATION AND COMMERCIALIZATION ECOSYSTEM

GlycoNet's framework for knowledge translation is built on four key pillars: research excellence, talent development, industry and academic linkages, and capital for commercialization.

These pillars work in synergy to ensure glycomics research translates into real-world applications that benefit human, animal, and environmental health. By integrating research programs with entrepreneurial training, strategic partnerships, and funding initiatives, GlycoNet has created a robust ecosystem that nurtures scientific innovation from early-stage discovery to commercial success, company and job creation. This ecosystem has grown from 60 to 220 research groups that have advanced the field of glycomics in Canada.



Translating Research into Real-World Impact

GlycoNet bridges the gap between academic research and commercial application by supporting projects that demonstrate clear translational potential. Over the past decade, GlycoNet has funded **160** projects in key health areas, including chronic diseases, infectious diseases, cancer, and neurodegenerative disorders, resulting in over **600** peer-reviewed publications. Many initiatives have progressed from seed funding to strategic, collaborative and translational projects, and promising projects will continue to advance with GlycoNet under the new Strategic Science Fund (SSF) program.



Targeted Drug Delivery with GlycoCage Technology

Drs. Harry Brumer and **Laura Sly** (University of British Columbia), also in collaboration with **Dr. Wade Abbott** (Agriculture and Agri-Food Canada/University of Lethbridge), are developing GlycoCage Technology, an innovative drug delivery platform that uses specialized carbohydrates to protect medications and release them precisely in the gastrointestinal tract of humans and other animals. This targeted approach is designed to increase drug effectiveness while minimizing side effects—offering new hope for more than 320,000 Canadians living with inflammatory bowel disease (IBD). In 2024, the team received several grants from Crohn's and Colitis Canada, the Canadian Institutes for Health Research, and GlycoNet (via the Strategic Science Fund, including matching funding from Michael Smith Health Research British Columbia) to further advance this promising technology to improve human health.



A Simple Blood Test for Scleroderma

Scleroderma is a rare autoimmune disease affecting about 17,000 Canadians, leading to skin hardening and, in severe cases, internal organ damage. Alarming, up to 40% of patients with serious complications die within five years of diagnosis, underscoring the urgent need for early detection and better prognostic tools. In collaboration with Scleroderma Canada and the Arthritis Society of Canada, **Drs. Lisa Willis** and **Mohamed Osman** (University of Alberta) have developed a simple blood test that detects a newly identified biomarker—a sugar called polysialic acid—to aid early diagnosis and help predict disease severity. This breakthrough could transform disease management and pave the way for more targeted treatments. Their research is now being further advanced under the SSF program and through a collaboration with the National Scleroderma Foundation.



Uncovering a Pathway to Tackle Alzheimer's Disease

Dr. Matthew Macauley (University of Alberta) is pioneering a novel approach to Alzheimer's treatment by targeting a specific form of the protein CD33, which plays a key role in how immune cells function in the brain. By modulating this carbohydrate-binding protein, his research aims to boost the brain's natural immune response and reduce the accumulation of amyloid plaques—one of the defining features of Alzheimer's disease. Early results from preclinical models are promising, and the work is progressing through strong collaborations with both industry and research partners, including the Alzheimer Society of Canada.



Slowing the Breakdown of Starch for Diabetes Management

Dr. Stephen Withers (University of British Columbia) has developed a new treatment for Type 2 diabetes using Montbretin A, a natural plant-derived compound that slows the digestion of starch. By inhibiting the enzyme alpha-amylase, Montbretin A helps prevent rapid spikes in blood sugar levels after meals. Results from pre-clinical trials have shown fewer side effects (e.g. bloating) than existing drugs, and a Phase 1 clinical trial is now underway.

Improving How Antibiotics and Antifungals Fight Infections

Biofilms, which are composed of sugars that protect bacteria and fungi from treatments, are a major obstacle in infection management, particularly in hospital-acquired and chronic infections. **Drs. Lynne Howell** (The Hospital for Sick Children / University of Toronto) and **Donald Sheppard** (McGill University) developed enzymatic therapies that degrade these sugar-based biofilm structures, thus breaking the microorganism's protective barrier and enhancing the effectiveness of antibiotics and antifungals in treating chronic infections. This approach has demonstrated success in preclinical models of cystic fibrosis and other biofilm-associated infections. This research has also attracted the attention of industrial partners.



Advancing a New Approach to Diagnose and Monitor Parkinson's Disease

Parkinson's disease (PD) currently lacks a reliable diagnostic test, with doctors relying on symptoms and family history to identify the condition. With support from both GlycoNet and GlycoNet Integrated Services, **Dr. David Vocadlo** (Simon Fraser University) has developed a novel method to measure the activity of an enzyme closely linked to PD that can be found in both brain and blood cells. In collaboration with the **Michael J. Fox Foundation** and **Roche**, the team is advancing new methods to aid both diagnosis and treatment, leading to patent applications. This collaboration has attracted interest from pharmaceutical and biotechnology companies, offering hope for earlier detection and potential treatments.



GlycoNet Integrated Services: A One-Stop Shop for Accelerating Research

Established in 2022, **GlycoNet Integrated Services** (GIS) is a national platform offering access to specialized glycomics tools and expertise. GIS supports glycan screening, synthesis, structural analysis, and biophysical characterization, accelerating the development of new therapeutics, diagnostics, and biomaterials.

- **\$35M** in infrastructure across **7** Canadian institutions
- **1,360** GIS users and clients



Advancing Diagnostics in Organ Transplantation

Led by **Drs. Lori West** and **Anne Halpin** (University of Alberta), this project explores antibodies to ABO blood group sugars to expand organ donor options for transplant patients. GIS provided glycan synthesis and analytical tools to support the development of a more precise diagnostic test, enhancing ABO-histocompatibility in transplantation. This technology advanced through GIS is now enabling the development of a new start-up company.



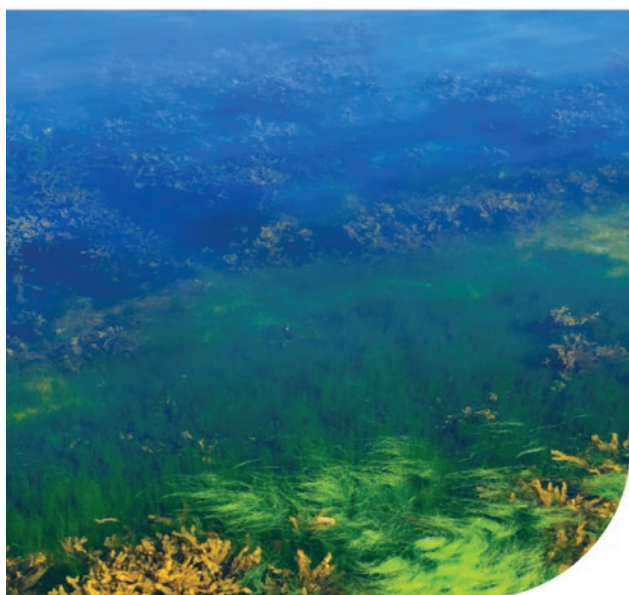
GlycoNet and GIS have been amazing to work with and we would not be able to do this work without them. The technology we're developing will enable more people to receive life-saving transplants.

Anne Halpin, Assistant Clinical Professor, University of Alberta



Developing a Cost-Effective Vaccine for a Sustainable Swine Industry

Drs. Mariela Segura (University of Montreal) and **Todd Lowary** (University of Alberta/Academia Sinica) are developing a carbohydrate-based vaccine targeting *Streptococcus suis*, a swine and zoonotic pathogen. GIS supports the project with carbohydrate synthesis and glycoengineering expertise, helping create a cost-effective vaccine to protect both livestock and humans. Given the threat of *S. suis* to Canada's \$5 billion swine industry, this vaccine could significantly reduce economic losses and reduce reliance on antimicrobials. Building on research supported by GlycoNet, the team has secured \$1.6 million in funding from the International Development Research Centre (IDRC) – Canada and the UK Department of Health and Social Care's Global Antimicrobial Resistance Innovation Fund (GAMRIF) to continue development.



Providing Tools to Monitor Marine Ecosystem Health

Dr. Yves St-Pierre from Institut National de la Recherche Scientifique (INRS), in collaboration with Parks Canada and Fisheries & Oceans Canada, is investigating molecular-level changes in marine organisms, which act as early indicators of environmental impacts. As part of this research, GIS provided essential tools for analyzing multi-omics signatures from mussels, seabirds, and fish, aiding the team in identifying next-generation biomarkers to assess the impact of climate change on marine ecosystems.

Strengthening Canada's Bioeconomy Through Commercialization and Entrepreneurship

Many GlycoNet-funded projects have progressed from research discovery to commercialization, showcasing the effectiveness of the Network's innovation continuum. GlycoNet's commitment to innovation extends beyond research funding to actively supporting the creation and growth of biotech companies.

GlycoNet, its partners, and the new Canadian companies that GlycoNet has supported have directly and indirectly **generated \$788 million in GDP and supported more than 7,200 jobs¹**.



One of GlycoNet's most notable success stories is **PanTHERA CryoSolutions**, a company specializing in next-generation cryopreservation technologies, which have significant implications for regenerative medicine, transplantation, and biobanking.

Founded by **Drs. Robert Ben** (University of Ottawa) and **Jason Acker** (University of Alberta), PanTHERA's journey began with early-stage funding from GlycoNet's Catalyst Grant, enabling proof-of-concept research on ice recrystallization inhibitors (IRIs). Subsequent support through Strategic Initiative and Start-up Company Grants helped scale up manufacturing processes and optimize formulations. In 2020, PanTHERA secured a \$4 million USD investment from **BioLife Solutions** and **Casdin Capital**, marking a significant milestone in its commercialization journey. By 2024, the company had achieved key industry milestones, including first-in-human and first-in-clinic applications of its cryopreservation technology. The company has also achieved Good Manufacturing Practice (GMP) in production and is currently selling its product worldwide.

PanTHERA CryoSolutions has been recognized for its contributions to biotechnology innovation, receiving prestigious 2024 awards from **BioAlberta** and **ASTech**, which highlight the company's impact on improving cryopreservation methods and expanding applications in healthcare and life sciences.

Company Highlight

PanTHERA CryoSolutions Advances Cell and Tissue Preservation

- **2016**
 - Catalyst Grant
 - > Proof of Concept
- **2017**
 - Institute for Biomedical Entrepreneurship Workshop
 - PanTHERA incorporation
 - Partnership Activities
 - Start-up Grant for Business Development Associate
- **2018**
 - Strategic Initiative funding to scale up manufacturing of IRIs and pharmacokinetics formulation
 - Lab space through leveraging Industrial Research Assistance Program
 - Technology licensing
- **2019**
 - Strategic Initiative with National Research Council
 - > IRIs for cryopreservation of CAR-T cells
 - 1st Commercial Sale
- **2020**
 - Start-up Grant for legal and business strategy
 - \$4M USD investment
 - > BioLife Solutions
 - > Casdin Capital
- **2024**
 - GMP Production
 - 1st in human, 1st in clinic, 1st in tissue-based application
 - BioAlberta and ASTech Awards

● Training and Partnership Activities

● Funding Provided by GlycoNet

● PanTHERA's Development Stages and Activities

¹Calculated using Input-output Multipliers Table 36-10-0013-01 (2021 Statistics Canada)

Company Highlight

48Hour Discovery Speeds Up Drug Development



Originating from **Dr. Ratmir Derda's** research (University of Alberta), 48Hour Discovery began with novel applications of cutting-edge liquid glycan array technology and phage display. With early support from GlycoNet, the company built its powerful molecular discovery platform and expansion beyond glycomics — enabling the rapid identification and optimization of peptides for therapeutics, diagnostics, and targeted radiopharmaceuticals.

Since its founding in 2017, **48Hour Discovery** has grown to a 20-person team, generated over \$12 million in revenue, and formed partnerships with major pharmaceutical companies across oncology and beyond.

Other Start-ups Founded by GlycoNet Investigators

AVIVO

- **Avivo Biomedical overcomes blood type barriers:** Each year, over 4.5 million patients in the U.S. and Canada need blood transfusions—a number that continues to rise. Avivo is pioneering ABO blood group modification technologies, making donor blood and organs universally compatible. The company builds off the work of **Drs. Stephen Withers, Peter Rahfeld** and **Jayachandran Kizhakkedathu** (University of British Columbia), as well as the essential support of GIS, which provided necessary ABO antigens to advance the company's technology. Avivo could revolutionize transfusion and transplantation medicine, significantly expanding the availability of blood and donor organs, reducing waitlist times and saving lives. The company has completed seed financing, entered a know-how license agreement with the Mayo Clinic, and the technology has brought in a \$5 million grant from the U.S. Air Force. Other key partners include the Canadian Armed Forces, Michael Smith Health Research BC, and Canadian Blood Services.

GlyCa BioSciences

- **GlyCa BioSciences improves detection of prostate cancer:** Focused on glycan-based cancer diagnostics, GlyCa BioSciences was founded by **Drs. Hon Leong** (University of Toronto) and **Karla Williams** (University of British Columbia) to develop innovative biomarkers for early prostate cancer detection, leveraging GlycoNet-supported research to create next-generation diagnostic tools.



- **Cloudburst Biotech enhances antiviral strategies and pandemic preparedness:** **Dr. Robert Britton's** lab (Simon Fraser University) developed a scalable 3-step method for producing nucleoside analogues, which are crucial building blocks for drug development. This breakthrough led to several patent applications, a \$1.25 million multi-partner project which included Merck, Servier, Amgen, CQDM and GlycoNet, and ultimately, the launch of Cloudburst Biotech (co-founded with **Dr. Matthew Nodwell**). This spin-off company now specializes in creating therapies for cancer and viral infections.



- **Carbaform Biosciences boosts antibodies to fight cancer:** Founded by **Drs. David Vocadlo** and **Robert Britton** (Simon Fraser University), Carbaform specializes in carbohydrate-based technologies to generate improved biotherapeutics for cancer. GIS played a key role in enabling the development of the technology, which enhances therapeutic antibodies to better target cancer cells.



The improved antibodies can bind up to 50-fold more potently, making them far more effective, and this can also allow you to target cancers that you wouldn't normally be able to attack using a standard anti-cancer antibody.

Dr. David Vocadlo, Professor, Simon Fraser University

Supporting Canadian Small and Medium Enterprises (SMEs) of Economic Value

GlycoNet's strategic funding demonstrates the power of targeted support in glycomics. By partnering with Canadian small and medium-sized enterprises (SMEs), GlycoNet connects companies with academic researchers and funding opportunities, as well as access to specialized glycomics services. These collaborations enable companies to leverage GlycoNet's expertise and resources to develop cutting-edge therapies, significantly advancing glycomics research and translating it into practical healthcare solutions, enhancing Canada's capacity to produce advanced therapeutic products.



- **Alectos Therapeutics treats neurodegenerative diseases:** Access to cutting-edge GIS facilities have helped Alectos Therapeutics advance GBA2 enzyme inhibitors for neurodegenerative diseases like Parkinson's, leading to a \$700-million licensing and collaboration agreement with Biogen.



- **Zucara Therapeutics prevents hypoglycemia:** In collaboration with **Dr. Michael Riddell** (York University), Zucara is advancing ZT-01, a drug to prevent hypoglycemia in insulin-dependent type 1 and type 2 diabetes. ZT-01 is now in Phase 2 development, and Zucara's glycomics-driven approach has attracted significant investment, including a \$25 million USD Series B round in 2025 with Sanofi, the Perceptive Xontogeny Venture Fund and the T1D Fund, one of the largest disease-focused investing funds in the world.. The company's progress was recognized with the 2025 Emerging Company of the Year award from Life Sciences Ontario.



- **AmacaThera improves patient care:** GlycoNet's strategic funding to **Dr. Molly Shoichet** (University of Toronto) facilitated the development of innovative hydrogel-based drug delivery systems for post-surgical pain management. The technology's potential led to the spin-off company AmacaThera, which successfully secured \$16 million in series A financing to achieve Phase 1 clinical trials. AmacaThera is now raising series B financing to complete Phase 2 clinical trials and advance pipeline products with strategic partners.

Other SMEs supported by GlycoNet include **Bright Angel Therapeutics** and **Ovensa**.



We've been strong supporters of GlycoNet for a number of years. The productive and effective collaboration between GlycoNet researchers and industry, of which we are a part of, is really an important cornerstone of drug discovery and the Canadian healthcare ecosystem.

Dr. Ernest McEachern, President and CEO, Alectos Therapeutics

DEVELOPING TALENT TO DRIVE GLYCOMICS INNOVATION

A thriving innovation ecosystem requires a highly skilled workforce, and GlycoNet has invested in training, recruiting, and retaining top talent in glycomics.

Over the past decade, the Network has provided training and professional development opportunities to 740 highly qualified personnel (HQP), equipping them with the expertise needed to excel in academia, industry, and government.



I have participated in the GlycoNet Trainee Associate Executive Committee as the vice chair, secretary, and EDI committee representative since 2021. This has given me the opportunity to learn about GlycoNet's governance and develop trainee-focused professional development programming. I have especially appreciated the chance to meet my peers and Network Investigators at the Canadian Glycomics Symposia in Banff and Edmonton and virtually through GlycoNet's Webinar series and other online programming. It is encouraging to have an organization like GlycoNet build a community in Canada that allows young researchers to thrive.

Joshua Kofsky, Vanier Scholar & Graduate Student, Queen's University



From my experiences as GlycoNet HQP, building a strong foundation in areas such as Good Laboratory Practice (GLP), Good Manufacturing Practice (GMP), Good Clinical Practice (GCP), and Quality Assurance/Quality Control (QA/QC) has significantly supported my career development. This expertise has been helpful in securing project manager positions within vaccine development centers and has further enabled me to excel in this field.

Pooja Choudhary, Project Manager, Vaccine and Infectious Disease Organization (VIDO)



Retaining Talent and Promoting Leadership in Glycomics

GlycoNet has been successful in retaining top scientific talent by providing career development opportunities, research funding, and commercialization support. Many researchers trained within the Network have transitioned into leadership roles. By offering a strong professional network and access to state-of-the-art facilities such as GIS, the Network has created an environment where scientists can continue advancing their research while contributing to major industry and clinical advancements.

Recruiting Leading Scientists to Expand GlycoNet's Expertise

Beyond recruiting and retaining talent, GlycoNet has played a pivotal role in attracting world-class researchers to Canada.

- **Dr. Peter Rahfeld**, a former trainee who now serves as the CSO of Avivo (formerly ABOzymes), a company pioneering ABO blood group modification technologies.



- **Dr. Anne Halpin**, a former trainee, and now an Assistant Clinical Professor at the University of Alberta, co-founded GlycoBead Diagnostics Inc., a company commercializing a high-resolution ABO antibody assay developed through GlycoNet-supported research.



- **Drs. Sicheng Lin** and **Francois LeMauff**, former trainees who now are node managers of GIS.



- **Dr. Lara Mahal**, a globally recognized glycomics expert who was brought to the University of Alberta as a Canada Excellence Research Chair (CERC). Her work in systems-based approaches to glycan regulation has strengthened GlycoNet's research capacity.



- **Dr. Matthew Macauley**, previously at The Scripps Research Institute, was recruited to GlycoNet and the University of Alberta, where he has progressed to Associate Professor and has been pioneering studies in glyco-immunology and neurodegenerative diseases.



- **Dr. Simon Wisnovsky** became an Assistant Professor at the University of British Columbia and a Network Investigator at GlycoNet in 2021. Having completed his postdoctoral fellowship in the lab of Nobel Prize laureate Dr. Carolyn Bertozzi, his group now uses CRISPR genomic screening technologies to explore genetic mechanisms regulating cellular glycosylation.



Former Trainees Becoming Network Investigators and Leaders

A testament to GlycoNet's training success is the growing number of former HQPs who have transitioned into Network Investigators (NIs) and independent researchers. These individuals, who began as GlycoNet trainees, have gone on to establish their own research programs and contribute to the broader glycomics ecosystem.



Dr. Chantelle Capicciotti Queen's University
*Tier 2 Canada Research Chair in Chemical Biology,
2024 Ontario Early Researcher Award*

A former trainee at Dr. Robert Ben's lab (University of Ottawa), she now leads innovative research in cell surface glycosylation and therapeutic applications.



Dr. Landon Edgar University of Toronto
2022 Connaught New Research Award

Focusing on developing new chemical tools to study glycan modifications in health and disease, Dr. Edgar completed a postdoctoral fellowship at The Scripps Research Institute before returning to Canada to establish his own research group.



Dr. Omar El-Halfawy University of Regina
2021 CIHR Early Career Investigator Award

Dr. El-Halfawy has built an independent research program focused on microbial glycan interactions and antibiotic resistance mechanisms.



Dr. Michael Meanwell University of Alberta
2021 Governor General's Gold Medal

After completing a postdoctoral fellowship at Bristol-Myers Squibb, Dr. Meanwell joined the University of Alberta, leading his group on exploring novel glycan-based strategies for drug discovery and therapeutic development.



Dr. Samy Cecioni University of Montreal

A former HQP in Dr. David Vocadlo's lab at Simon Fraser University, Dr. Cecioni now leads a glycomics research group at the University of Montreal.



Dr. Karla Williams University of British Columbia
Tier 2 Canada Research Chair in Oncology

Dr. Williams trained with Dr. Hon Leong at Western University and now leads research focused on cancer metastasis and the development of non-invasive methods of cancer detection and monitoring.

COMMUNITY ENGAGEMENT AND GLOBAL PARTNERSHIPS

GlycoNet actively fosters a strong network engaging with researchers, industry leaders, policymakers, and the public through strategic events and outreach initiatives that support public education and advocacy for research-driven policies. Through uniting diverse expertise in partnerships nationally and globally, we drive cutting-edge research that directly translates into improved health and economic impacts. Since 2015, GlycoNet has grown from 30 to 300 partners that include industry, foundations, government, and international institutions.



Educational Outreach and Public Engagement

- **Glycomics Public Forum (2015):** Featured renowned science communicator Jay Ingram to explain the importance of glycomics research in human health and disease.
- **Classroom Glycomics Resources (2015-present):** Developed classroom resources and workshops on glycomics for high school teachers, in collaboration with the Centre for Mathematics, Science, and Technology Education (CMASTE), with a focus on reaching educators in rural and underserved communities.



42 classroom resources on glycomics for high school teachers



- **Encouraging Vaccine Confidence in Canada (2022):** Created educational materials with CMASTE to promote vaccine literacy among teachers and students.



6 vaccine literacy resources



5 educational videos to encourage vaccine confidence



280+ teachers attended in-person and online workshops about GlycoNet's vaccine resources

- **Indigenous Outreach (2018):** Supported a chemistry workshop as part of the Canadian Chemistry Conference to introduce Indigenous high school students to STEM fields and career paths.
- **Glycomics Webinar Series (2020-present):** Established a global webinar series focused on cutting-edge carbohydrate science, including joint webinars with the American Chemical Society Carbohydrate Division and European Glycoscience Community.



70+ webinars



31K+ YouTube views of webinars

20 Policy Advocacy

GlycoNet is active in advocating for glycomics research and its impact on health and innovation through op-eds and publications, its engagements with Research Canada's Parliamentary Health Research Caucus and meetings with key provincial and federal officials. These events have been instrumental in raising government awareness and securing policy support to advance research and commercialization in the field.

International Leadership and Collaborations

Annual Canadian Glycomics Symposium: The Symposium serves as the premier annual event for researchers and industry professionals to share advancements, establish partnerships, and discuss the future of glycomics. Since its inception, the Symposium has grown to attract over 160 national and international participants annually.

- **Joint Symposium with the 10th Warren Workshop in GlycoBioinformatics (2024):** This biennial event was hosted for the first time in Canada, alongside the Canadian Glycomics Symposium, and included 140+ national and international attendees who participated in sessions on glycan arrays and glycoinformatics, fostering knowledge-sharing and new collaborations.

International Partnerships: GlycoNet has been active in establishing partnerships with international groups to raise the profile of glycomics, enhance knowledge exchange, create new training opportunities, and develop joint research initiatives, such as:

- A trilateral research partnership with Canada, Taiwan, and Japan
- Joint research and partnerships through the Japan Core-to-Core Program and the Japan Institute for Glyco-core Research (iGCORE)
- Knowledge exchange and training opportunities through the Australian Glycoscience Society

Strategic Partnerships to Address Major Health Challenges

GlycoNet builds strategic partnerships by collaborating with academic institutions, industry leaders, healthcare organizations and government agencies to accelerate the development of glycomics-based solutions. These collaborations enable the network to tackle national and global health challenges by pooling expertise and resources to translate discoveries into solutions to major health issues. GlycoNet has enabled the development of new vaccines, treatments, and tools to combat infectious diseases without contributing to the global health challenge of antimicrobial resistance.

Tackling Infectious Diseases and Antimicrobial Resistance

A vaccine against *Haemophilus influenzae* type a (Hia):

Hia is a serious infection that causes pneumonia and other invasive diseases, disproportionately affecting Northern and Indigenous communities. Despite its severity, no vaccine currently exists. GlycoNet played a pivotal role in advancing a potential Hia vaccine by assembling key collaborators, securing clinical leadership, and critical funding. This collaborative effort led to the successful completion of a Phase 1 clinical trial, led by **Drs. Brian Ward** (McGill University), **Joanne Langley**, and **Scott Halperin** (Dalhousie University). Key partners in this milestone include the National Research Council, Public Health Agency of Canada, Canadian Immunization Research Network, Canadian Centre for Vaccinology, National Microbiology Laboratory, InventVacc, McGill Interdisciplinary Initiative in Infection and Immunity, and Indigenous community members.

Glycan-based feed additives: Drs. Wesley Zandberg (UBC-Okanagan), **Wade Abbott** (University of Lethbridge), and **Alisdair Boraston** (University of Victoria) are collaborating with Agriculture and Agri-Food Canada and Alberta Agriculture & Forestry to develop glycan-based feed additives to combat poultry infections, which would provide an alternative to antimicrobials and support the growth of Canada's \$6.8 billion poultry industry.



GLYCONET LEADERSHIP AND LEGACY

Building a Sustainable Future for GlycoNet and Glycomics in Canada

Thanks to the support of the NCE program, GlycoNet has built a robust network and secured public and private funding, propelling forward innovations and commercialization in glycomics. GlycoNet has established Canada as a global leader in the field, positioning the country to capture a share of the global market in glycomics therapeutics, projected to reach \$257 billion USD by 2028 (*The Insight Partners, 2022*).



GlycoNet's efforts are crucial in maintaining Canada's role in developing advanced therapies and transforming glycomics research into substantial healthcare and economic outcomes. Following the NCE program's conclusion, GlycoNet transitioned to new funding models, ensuring ongoing innovation and expansion into new glycomics applications, thereby strengthening Canada's bioeconomy:

- **Strategic Science Fund (SSF) (2024-2029):** Supports GlycoNet's continued research, training, and industry collaborations.
- **Canada Foundation for Innovation (CFI) (2023-2029):** Aims to enhance GlycoNet Integrated Services (GIS), ensuring state-of-the-art glycomics research infrastructure remains available to Canadian scientists.



By supporting GlycoNet Integrated Services, the Canada Foundation for Innovation is proud to invest in a critical network of infrastructure that facilitates world-class glycomics work and has made Canada an international leader in glycoscience.

Dr. Roseann O'Reilly Runte, former President and CEO, Canada Foundation for Innovation (2022)

Expanding GlycoNet's Legacy in Research and Innovation

GlycoNet has successfully united glycomics researchers across Canada, creating a dynamic innovation and commercialization ecosystem that distinguishes the country on the global stage. This network effectively bridges gaps in research translation and talent development, fostering entrepreneurship in bioinnovation and strengthening the Canadian bioeconomy. Supported by the NCE program, GlycoNet has established a strong foundation and achieved global recognition in glycomics. Positioned for future growth, the network is focused on securing diverse funding sources, enhancing industry and academic partnerships, and providing comprehensive access to specialized services and infrastructure. Through these strategic efforts, GlycoNet is committed to driving forward health innovation through glycomics, ensuring sustained impact for years to come.



Harnessing the power of glycomics to deliver made-in-Canada health solutions.





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