

Australian Centre for Cancer Glycomics (A2CG)

Translating the human cancer glycome - new advances in diagnosing, treating and preventing cancer.

All human cells are extensively decorated with a range of complex sugar moieties (glycans), which form the host cell glycome. These glycans are utilised as receptors for a variety of carbohydrate-recognising proteins, and the inter-cellular interactions between glycans and proteins play an essential role in how cells communicate with each other and their environment. Not surprisingly, they also play critical roles in maintaining health and in the pathogenesis of disease, including cancers. Yet, the language of glycan interactions remains poorly understood, particularly when compared to our knowledge of the genome and proteome. **The technology required to sequence the glycome for human clinical tissue has only recently been developed, and the Institute for Glycomics is pioneering this field.**

Extensive investment into the understanding of cancer genomics and proteomics has led to tremendous advances in cancer care. Despite this, biomarkers for many cancers remain unidentified following proteomic and genomic analyses, suggesting critical knowledge is missing. An increasing body of literature indicates that the cancer glycome is of equal importance to understanding disease pathogenesis as the genome and proteome. **The glycome represents an underexploited aspect of cancer research, and holds the key to diagnosing, treating and preventing cancers.**

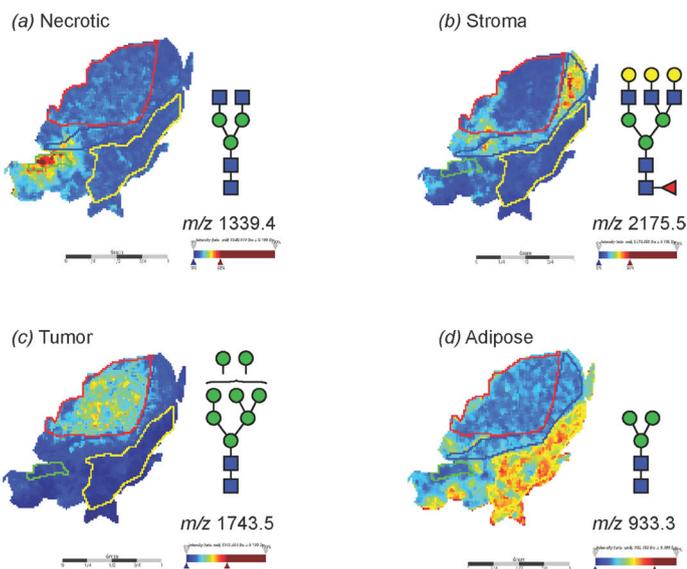
Our Vision

The Australian Centre for Cancer Glycomics was established at the Institute for Glycomics in May 2017. The state of the art equipment and infrastructure, coupled with the brightest scientific talent in the field of cancer glycoproteomics, makes the A2CG an exciting hub of truly revolutionary research.

The Institute for Glycomics and the A2CG are taking a highly integrated, systematic approach to identifying important cancer biomarkers and tumour-associated carbohydrate antigens (TACAs), underpinned by a strategic focus geared towards **translational outcomes**. The Institute for Glycomics has a proven track record in carbohydrate drug discovery and vaccine development coupled with substantial biochemistry, structural biology and medicinal chemistry infrastructure. This demonstrates the Institute's capabilities in driving discoveries from the laboratory bench to the patient bedside.

Our team of research scientists are dedicated to understanding how cancer glycans can sketch the blueprint for the next wave of drugs, vaccines, and diagnostics. Together with a **foundation partner**, who shares our vision of harnessing this unique research platform to identify new solutions to cancer, we aim to improve the future of those living with this intractable disease.

Fighting diseases of global impact



MALDI imaging mass spectrometry on formalin-fixed paraffin-embedded tissue is able to delineate between different ovarian cancer tissues, highlighting the difference in glycan expression between normal and tumour cells.

A Call to Industry

Improving knowledge of the glycan structures present in cancer cells will lead to a better understanding of how to treat the most 'un-treatable' forms of cancer. A structured, 5-year program will systematically mine the cancer glycome; an undertaking that will remarkably transform the oncology landscape. The rapid advancement of analytical technology combined with the need for more efficacious cancer therapeutics, makes this an opportune moment for investment. With advanced technological infrastructure, knowledge and distinguished human resource, the **A2CG seeks to attract a foundation partner** aspiring to significantly enhance the prospects of cancer patients through innovative and revolutionary science.

Clinical Applications

The A2CG team's extensive expertise in analytical glycoproteomics affords a research program focussing on the following clinical applications:

- **Diagnostic tools** - Glycans as novel diagnostic and prognostic disease markers
- **Therapeutic potential** - TACA identification and translation to develop monoclonal antibodies and other drug candidate technologies
- **Precision medicine** - Development of specific and targeted medicines based on cancer glycan signatures
- **Advanced imaging** - Micro-section glycomics from histopathological tissue slides to bridge histopathology and molecular imaging
- **Clinical analytics** - Development of rapid, bedside diagnostic tools using focused glycomics and glycoproteomics

An industry foundation partner would be instrumental in working with us to develop and translate these technologies into clinical solutions.

A2CG TEAM

Professor Mark von Itzstein is widely recognised as a world leader in antiviral drug discovery, glycobiology and glycochemistry. He led the discovery of the world's first influenza drug Zanamivir, now marketed by GSK with sales reaching US\$1.1 billion per annum.

Professor Nicole Packer has had a distinguished career in both industry and academia. She is the author of over 200 papers, inventor on numerous patents and co-founder of a successful biotech company.

Associate Professor Daniel Kolarich is an author on nearly 100 papers in the field of glycobiology and glycoproteomics. He led innovative Glycoproteomics Group at the prestigious Max Planck Institute, Germany.

ABOUT US

The Institute for Glycomics is a flagship biomedical research institute at Griffith University's Gold Coast Campus in Queensland, Australia. The Institute is one of only six of its kind worldwide and has a strategic focus on translating drug and vaccine discovery research into clinical outcomes. We have a strong track record in commercialisation and industry engagement, and our research leaders and business personnel have extensive experience in developing technologies for the commercial market. With over 230 multidisciplinary researchers and support staff, the Institute for Glycomics is well positioned to deliver tangible clinical solutions for infectious diseases and cancer.

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