Griffith UNIVERSITY
Institute for Glycomics
Queensland, Australia

Fighting diseases of global impact
griffith.edu.au/glycomics

ADVANCED MASS SPECTROMETRY FACILITY

A mutli-million dollar investment by Griffith University allowed the establishment of a new glycomics and glycoproteomics focussed Advanced Mass Spectrometry Laboratory within the Institute for Glycomics.

The Institute for Glycomics was established in February 2000 through investment from Griffith University and the Queensland State Government and is one of Australia's flagship multidisciplinary biomedical research institutes.

We strive to be world leaders in the discovery and development of next generation drugs, vaccines and diagnostics for diseases of global impact.

The Institute boasts state-of-the-art facilities combined with some of the world's most outstanding researchers with a focus on 'Glycomics', a constantly expanding field that explores the structural and functional properties of complex carbohydrates (sugars).

Glycomics research is conducted worldwide in projects that cut across multiple disciplines, applying new approaches to treatment and prevention of diseases.

The Institute's research primarily targets prevention and cures for infectious diseases and cancer, with a focus on translational research which will inevitably have a positive impact on human health globally.

This rich research environment also provides exceptional postgraduate education programs fo the world's future scientists.

The Institute also engages with industry, other premier research institutes, philanthropic organisations, and governments from across the globe, to build human capital to provide healthcare solutions to address some of the world's most intractable diseases.

The Institute houses a large mutlidisciplinary pool of expert researchers and highly trained technical and project management staff, which provides for engagement in complex contract and collaborative scientific programs.

The Institute's unique infrastructure ensures the delivery of timely, cost-effective and innovative projects without compromising on quality.

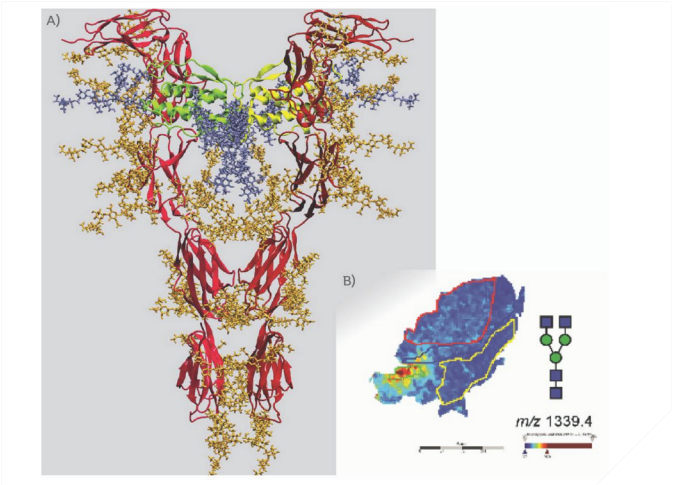
Advanced Mass Sepctrometry Facility

The Advanced Mass Spectrometry Facility forms part of the Australian Centre for Cancer Glycomics (A2CG), one of the Institute for Glycomics' centres of excellence.

A major focus of this Mass Spectrometry laboratory is to push the boundaries in biomedical research and work towards the discovery of new cancer diagnostics, drugs and vaccines, which will have a global impact.

This purpose-built facility currently hosts three state-of-the-art, high-end mass spectrometers, catering for different challenges in cancer and disease glycomics.

We are using these modern technologies to understand and



A) Glycoprotein showing glycosylation pattern. c-KIT N-glycans shown in yellow, SCF N-glycans shown in blue. Walsh, Jacob & Kolarich, unpublished.
B) MALDI imaging of ovarian cancer tumour showing differentitation of tissue.

translate the glycome changes occurring in cancer to identify new therapeutic targets, develop novel diagnostics for precision medicine, and gain a better general understanding of cancer biology.

To achieve these aims, we are using the following equipment housed within the Advanced Mass Spectrometry facility:

1. **Orbitrap™ Fusion™ mass spectrometer** coupled to a nano-liquid chromatography system, enabling us to perform multidimensional separation, detection and fragmentation of biomolecules
2. **rapifleX™ tissue imager** to visualise and identify diagnostic markers in tissue sections and understand their distribution in cancer tissues
3. **amaZon speed ion trap mass spectrometer** coupled to a nano-liquid chromatography system, providing us with the opportunity to perform clinical glycomics with the highest sensitivity and selectivity.

We are also offering one-stop services and solutions for industrial glycomics and glycoproteomics challenges and questions, with the team having over 60 combined years of experience in analytical glycobiology, glycomics and glycoproteomics.

Analytical Services

As world leaders in glycomics and glycoproteomic characterisation and profiling, we can provide specialist support for both simple and complex analyses to support basic research and commercial production.

Glycosylation signatures can be analysed from any type of sample: cell culture, purified proteins, patient bodily fluids, biopsies, histopathological tissue sections, and more.

A selection of the analyses we can provide include:

- simple glycan and glycopeptide mapping (released N- and O-glycans)
- MALDI compositional profiling
- glycoproteomic profiling with site-specific glycosylation analysis
- high throughput glycan identification and characterisation
- large tissue microarray.

These insights can be used to:

- understand the glycosylation pattern of proteins as targets
- advanced mAb design
- predict binding interference
- map tumour associated carbohydrate antigens
- understand glycoproteins as therapeutic targets
- tissue imaging
- understand tissue-specific glycosylation differences
- stratify patient groups into responders and non-responders
- provide frameworks for personalised medicine.

Key Equipment

- Bruker amaZon speed Ion Trap MS/MS
- Bruker rapifleX MALDI-TOF MS
- Thermo Scientific Orbitrap Fusion MS

About us

The Institute for Glycomics has a strategic focus on translating drug and vaccine discovery research in cancer and infectious disease 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 200 mutlidisciplinary researchers and support staff, the Institute for Glycomics is well positioned to deliver tangible clinical solutions for cancer and infectious diseases.

Contact us

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