

Australian
National
Phenome
Centre

Population Health Laboratory - Mass Spectrometry

An Engine for Deep
Discovery and Precision
Bioscience





Discovery, at Scale

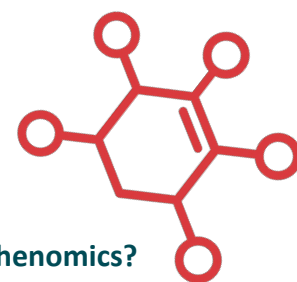
- » The Australian National Phenome Centre (ANPC) is a world-leading facility for translational research in the biosciences.

Established by Murdoch University in 2019, the ANPC delivers unmatched capability for high-resolution metabolic analysis, turning complex biology into applied translational outcomes.

Powered by advanced Nuclear Magnetic Resonance Spectroscopy (NMR) and Mass Spectrometry (MS), the ANPC generates rich analytical fingerprints that reveal how biological systems respond to genetic, environmental, and lifestyle influences.

As a national platform, the ANPC applies its capabilities across the full breadth of the life sciences, across clinical and biomedical science, animal health, agriculture and food, environmental and conservation systems.

We welcome you to view this capability statement and look forward to enabling your **Discoveries, at scale.**



What is phenomics?

Phenomics is the science of measuring biology as it functions. At the ANPC, we use a range of cutting-edge instruments and bioinformatics to capture how genes and environment interact to shape real-world biological outcomes, at scale.





Core Capabilities

The ANPC is located at the Harry Perkins Institute of Medical Research (South), adjacent to Australia's most technologically advanced public and private hospitals.

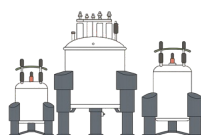
Designed with large-scale, high-throughput analysis in mind, the ANPC is purposed built to industrialise sample analysis and data acquisition using parallelised approaches that minimize downtime and maximise output.

To enable this, the ANPC uses robotic workstations and liquid handlers to synchronise workflows across NMR and MS platforms to allow for both deep discovery and high-throughput. Data is secured for interrogation using a combination of on-premise and cloud compute and storage solutions for processing and sharing.

The ANPC has been designed for operations around the clock and is functionalised with a dedicated Plant Room which houses dual water-cooled compressors for dessicant-dry air and UHP nitrogen generation, UPS battery support as well as a Helium recapture and liquefaction system for sustainability and supply resiliency.

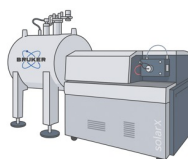


1x 800MHz NMR

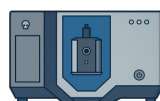


1x 400MHz NMR

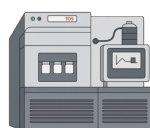
7x 600MHz NMRs



1x 7-Tesla MRMS



3x QTRAP MS



4x TQ-XS MS



2x timsTOF MS



12x QTOF MS



From Samples to Impact

The ANPC offers a complete analytical pipeline connecting biological samples to actionable scientific insights. Beyond its classical analytical chemistry capabilities, the ANPC is designed for automated workflows that integrate high-quality NMR and MS data for precision scientific throughput.



STRATEGIC NATIONAL ASSET

The ANPC was created as a capability that aligns with the **national research** priorities.



BRIDGING SCIENCE AND TRANSLATION

The ANPC's capabilities connect discovery and translational in one platform.



DIVERSIFIED IMPACT DOMAINS

Our work spans population phenotyping pipelines through to deep biological discovery.



DECISION AND INNOVATION DRIVER

ANPC outputs influence decision-making, intervention design, and drives new innovation.

Quality, Governance and Trust

The ANPC is committed to operating under a strengthened Governance and Quality framework designed to promote transparency, trust and accessibility for high-impact research. The Facility is governed by a **Steering Committee** and supported by an **Access and Operational Committee** to ensure accountability and equity of access.

The ANPC has developed a Quality Management System that conforms to **ISO 9001:2005**, with an aim to achieve **NATA ISO/IEC 17025:2017** for competence in testing, calibration and sampling in 2027.



Why Work with Us?

Our approach to engagement and access is built on clear, structured models that will provide partners with transparent pathways for collaboration. Our tiered-access schemes are designed to enable access and collaboration, from early pilot studies through to large-scale, multi-year programs. We understand the complexities associated with funding arrangements and regulatory requirements and have pathways that reduce barrier to entry. As a Core Facility of Murdoch University, we are committed to helping HDR students and Early-to-Mid Career Researchers initiate and scale their work for impact.



POPULATION-SCALE PHENOTYPING

The ANPC enables statistically robust insights by moving beyond small studies to large-scale phenotype data collection.



CROSS-COHORT COMPARABILITY

Our standardized pipeline addresses reproducibility and integration challenges across multiple studies for harmonised scientific observations.



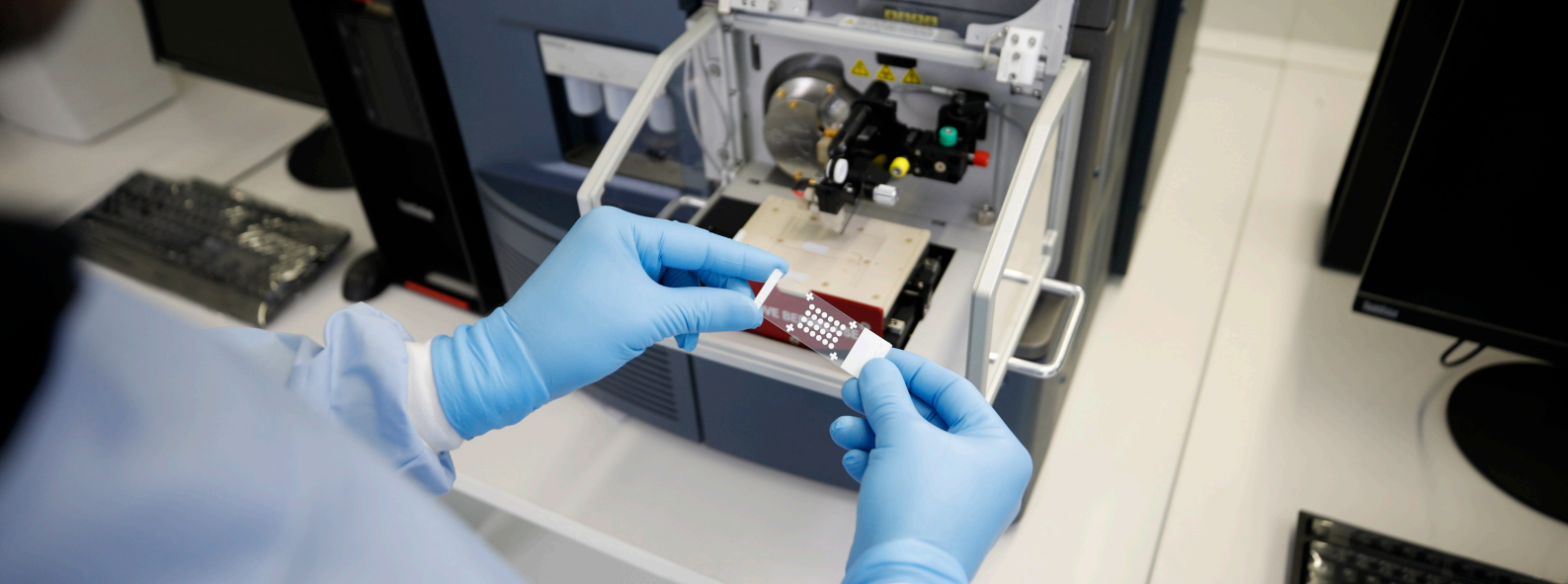
INTEGRATED MULTI-OMIC INSIGHTS

We use multiple technology platform to combine biological datasets that address complex modern biological questions effectively.

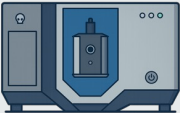
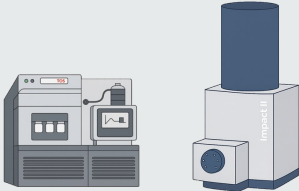


SCALING UP DISCOVERY

Our team provides comprehensive assistance throughout the research project lifecycle to accelerate and de-risk discovery and innovation.



ANPC Clinical Panel

		
Lipid profiling	NMR profiling	Targeted pathways
SCIEX 7500 MS	Bruker 600MHz IVDr NMR	Waters TQ-MS Bruker Impact II QTOF-MS
Semi-quantitation	Absolute quantitation	Absolute quantitation
6 lipid sub-classes	3 main categories	3 targeted assays
Human serum/ plasma	Human serum/ plasma/ urine	Human serum/ plasma
• >1000 analytes • Sterol Lipids • Neutral lipids • Sphingolipids • Glycerophospholipids • Lysophospholipids, • Mitochondrial lipids	• 112 lipoprotein parameters, • 41 small molecules • GlycA/B markers	• 30 amino acids and biogenic amines • 24 analytes from tryptophan pathway • 17 bile acids
Delivers clinically actionable, high-resolution lipid profiles by resolving disease-linked lipid species and providing insights that go far beyond standard lipid panels, enabling deeper assessment of cardiovascular, inflammatory, and systemic disease risk	These three assays deliver standardised population-scale phenotyping by resolving lipoprotein particle abundance and lipid composition, enabling cross-cohort and longitudinal integration with multi-Omic and clinical data, and providing stable markers of chronic and acute inflammation that supports cardio-metabolic risk stratification.	These three targeted MS assays extend our NMR small-molecule capability by delivering higher sensitivity for low-abundance amino acids and biogenic amines, integrating immune, neurological and metabolic biology in a single readout, and uniquely capturing broad analyte diversity.