Griffith University's Life Sciences Pipeline

GRIFFITH ENTERPRISE
SOLUTIONS.

Griffith University's Life Sciences Pipeline

Introduction

Griffith University is a regional leader in life sciences located in Brisbane, Queensland, Australia. Its health & bioscience based research institutes collaborate with industry and public health sectors to deliver benefits to the world through outcomes such as novel drug leads, vaccines for combating infectious diseases and healthy living programs.

Through its strategic investment program, Griffith University is a prominent research leader in:

- Drug discovery and infectious diseases; and,
- Health and chronic diseases.

Griffith University's Life Sciences Pipeline

This document has been prepared to give an overview of the R&D activities and the respective product pipeline at Griffith University in the life sciences field.

Table 1 "Therapeutic R&D Projects" lists the most advanced R&D projects, with a focus on therapeutics and vaccines, while Table 2 "Platform Technologies, Diagnostics and General Health" provides an overview of early stage projects, platform technologies, diagnostics, and services offered to the life science industry. Table 3 "R&D Foci" introduces the key life sciences R&D activities and capabilities at Griffith University.

Doing Business with Griffith University

Griffith Enterprise is the University's dedicated office for business and government engagements, innovations and new ventures. Our vision is to see Griffith successfully working in partnerships to create meaningful solutions. Our staff have commercial experience and understand the needs of industry and government partners. We offer flexible and tailored engagement terms, and a professional approach to doing business with the University.

Point of Contact

Griffith Enterprises' Business & Innovation Manager, Mr. Ujjwal Dua leads the commercialisation of the technologies offered.

Interested parties are encouraged to contact:

Mr Ujjwal Dua
Business & Innovation Manager - Life Sciences
Tel +61 7 5678 7536
Mobile +61 468 989 072
Email: u.dua@griffith.edu.au
Skype: ujjwal_griffithenterprise

Griffith Enterprise
Building G40, 8.55
Griffith University, Gold Coast campus
Parklands Drive, Southport, Queensland 4222
Australia

Table 1: Therapeutic R&D Projects

Therapeutic Asset	Therapeutic Field	Format	Origin	Managed by	Discovery	POC validated	Lead	Pre-Clinical	Phase 1	Phase 2	Phase 3	Sales
Oncology												
Glioblastoma drug candidate	Solid Cancers	SM	Griffith Institute of Drug Discovery (GRIDD)	Griffith Enterprise	•	•						
Infectious Diseases												
Anti-Parainfluenza Compounds	Parainfluenza	SM	Institute for Glycomics	Griffith Enterprise	•	•						
PlasProtecT Malaria Vaccine	Malaria	V	Institute for Glycomics	Griffith Enterprise	•	•	•	•	•			
Zika Vaccine candidates	*Zika*	V	Institute for Glycomics	Griffith Enterprise	•	•						
Liposomal vaccine for mucosal immunity	Various	V	Institute for Glycomics	Griffith Enterprise	•							
Chikungunya vaccine	Chikungunya	V	Institute for Glycomics	Griffith Enterprise	•	•	•					
Group A Streptococci (GAS) vaccine & therapeutic	Group A Streptococci (GAS)	A & V	Institute for Glycomics	Griffith Enterprise	•	•	•	•				
Dengue therapeutic	Dengue	SM	Institute for Glycomics	Griffith Enterprise	•							
3D printed wrist ligament			MHIQ	Griffith Enterprise	•	•						
Several	TB	SM	GRIDD	Griffith Enterprise	•							
Several	Fragment-based Drug Discovery	SM	GRIDD	Griffith Enterprise	•							
Pain, CNS and Neuroscience												
Mudjala Aboriginal medicine	Pain	N	GRIDD	Griffith & the Jarlmadanga Burru community	•							

FORMAT KEY: A Antibody • B Biologic□(not□ antibody) • CT Cell-based Therapy • D Drug delivery • M Multiple Drug Formats possible • □N Nutraceutical□• R Reformulation • SM Small Molecule • V Vaccine

Table 2: Platform Technologies, Diagnostics and General Health

Asset Name	Summary	Origin	Managed by	Discovery	Proof of Concept validated	Lead product	Pre-clinical	Clinical Trials	Sales
Manufacturing technology									
Codon Optimisation Technology	For improving the yield in recombinant protein production	Institute for Glycomics	Griffith Enterprise	•	•				
Diagnostic Tests									
Chronic Fatigue Syndrome	Novel biomarkers for Chronic Fatigue Syndrome	Menzies Health Institute Queensland	Griffith Enterprise	•	•				

Asset Name	Summary	Origin	Managed by	Discovery	Proof of Concept validated	Lead product	Pre-clinical	Clinical Trials	Sales
R&D Tools									
Nature Bank	A collection of over 200,000 optimised natural product fractions derived from a uniquely diverse collection of over 45,000 samples of plants and marine invertebrates	GRIDD	Griffith Enterprise	●	●	●	●		
Fourier Transform Mass Spectrometry screening of fragments and natural product extracts	Use of FTMS to screen compound fragments (for drug design starting points) and un-fractionated extracts (for hit compounds) against protein targets.	GRIDD	Griffith Enterprise	●	●				
Compounds Australia	Australia's only dedicated compound management facility. It is a national resource that allows chemists to deposit small molecules into a central repository for quick and efficient access by life science research teams.	GRIDD	Compounds Australia	●	●	●	●		
Glycan Array [2]	Array of glycans for the analysis of glycan binding moieties on proteins, viruses, bacteria and cells	Institute for Glycomics	Griffith Enterprise	●	●				●

Lectin Array [2]	Array of lectins for the analysis of lectin binding moieties on proteins, viruses, bacteria and cells	Institute for Glycomics	Griffith Enterprise	●	●				●
[2] The Institute for Glycomics offers services relating to the screening of proteins, viruses, bacteria, cells and whole organisms against a comprehensive library of mammalian glycans and lectins.									

Table 3: R&D Foci

Indication	Description of project	Type of Molecules	Originating Element
Infectious Diseases	Several research groups at Griffith are pursuing multiple indications in Infectious disease, spanning viruses (eg influenza, dengue), bacteria (eg *Neisseria*, Burkholderia*, Moxarella*), protozoa (eg *Plasmodium, Trypanosoma*), and worms (eg *Schistosoma*). Therapeutic approaches and vaccines are pursued.	SM, V	Institute for Glycomics, GRIDD, Menzies Health Institute Queensland
Cancer	Cancer is the focus of a number of research groups at Griffith. Research spans the molecular mechanisms of cancer, cancer stem cells, screening of targets for the Cancer Therapeutics CRC (CTx), and cancer vaccines.	SM, V	GRIDD, Institute for Glycomics, Menzies Health Institute Queensland
Neurological diseases	Griffith researchers have established cellular models of neurological disease (Neuro Bank) to aid in disease research, diagnostics and drug development. Main indications are Parkinson's disease and Schizophrenia.	CT	GRIDD
Cardiovascular	The Heart Foundation Research Centre's research aims to unravel the molecular basis of cardiovascular disease development and progression (with a focus on ischaemic heart disease, ageing, diabetes, obesity, activity), and translate this knowledge into improved ways of reducing disease incidence, and improving therapies for heart and vascular disorders. Research is primarily undertaken within the following research programs: • Myocardiology • Cellular Stress and Defence • Vascular Tissue and Smooth Muscle • Exercise Physiology • Bone Marrow Stem Cells	SM, N, CT	Menzies Health Institute Queensland
Chronic Diseases	The Molecular Basis of Disease Research Program is focused on defining the molecular basis of common human disorders. Studies are being undertaken to identify gene variants that are involved in disease susceptibility, progression and prognosis with a focus on developing diagnostics and new therapeutics for human genetic disorders and infections.	N, D	Menzies Health Institute Queensland

Indication	Description of project	Type of Molecules	Originating Element
Chronic Diseases	The Research Centre for Clinical and Community Practice Innovation primarily undertakes research in the following programs: • Acute and Critical Care • Ageing and Older People • Healthy People and Places • Applied Health Economics • Nutrition		Menzies Health Institute Queensland
Chronic Diseases	The Behavioural Basis of Health Research Program was established is applying psychological knowledge and methods to understand human behaviour and promote health and emotional and psychological well-being of children, adults and families. • Applied Cognitive Neuroscience Research Unit • Psychological Health Research Unit • Social and Organisational Psychology Research Unit		Menzies Health Institute Queensland
Several	The Population Health Research Program focuses on the collection and analysis of qualitative and quantitative survey data, the analysis of administrative datasets, economic evaluation of health care interventions, health care financing priority, evaluation of health services and health policy, graphic information systems (GIS) studies and knowledge translation**.**		Menzies Health Institute Queensland
Bone and Muscle	The Musculoskeletal Research Program pursues systematic and patient-specific approaches to the prevention and management of musculoskeletal conditions through cross-disciplinary, multi-scale musculoskeletal research. Neuromechanics of ageing • Skeletal biology and bone adaptation to mechanical loading • Neuromechanics of ageing • Muscle function in health and disease • Prevention and management of musculoskeletal disorders		Menzies Health Institute Queensland

Indication	Description of project	Type of Molecules	Originating Element
Dental Materials and Implantology	The School of Dentistry has capabilities and expertise across dental materials including provision of testing and research services. Additionally, the School has also leading capabilities in dental implantology with experts that offer education and skills training, cell and tissue biology, computing and engineering science, microbiology and surgical expertise and clinical trials.		School of Dentistry and Oral Health
TYPE OF MOLECULE KEY: CT Cell-based Therapy • D Diagnostics • □N□Nutraceutical□• SM Small Molecule • V Vaccine			

About Griffith University – fast facts

- Five campuses spanning the Brisbane to Gold Coast corridor, Queensland, Australia.
- Research-intensive university ranking in top 3% of universities worldwide according to various prestigious ranking systems.
- Over 45,000 students
- 38 Research Institutes

Health and Knowledge Precinct, Gold Coast

- New $1.76 billion, 750-bed Gold Coast University Hospital
- Link to the greater Gold Coast region by a new light rail service from the Gold Coast campus
- New Griffith Health Centre

Figure 1 – New Gold Coast University Hospital

Figure 2 - The new Griffith Health Centre, adjacent to the Hospital

Griffith University Research Institutes

The Griffith Research Institute of Drug Discovery (GRIDD)

(www.griffith.edu.au/institute-drug-discovery)

GRIDD works to discover treatments for diseases such as cancer, neurological diseases (Parkinson's & Schizophrenia) and infectious diseases (Malaria, Sleeping Sickness, Tuberculosis). GRIDD brings together chemists and biologists together to work on multidisciplinary projects, collaborating with scientists around the world.

GRIDD is recognised internationally as a key research centre in natural product chemistry and olfactory stem cells.

Fast Facts

- Our Core Resources include Nature Bank (www.nature-bank.com.au), a lead discovery resource based on natural products, Neuro Bank, a unique collection of patient-derived olfactory stem cells, and the Compound Australia (https://www.griffith.edu.au/science-aviation/compounds-australia), which is becoming Australia's national small molecule repository.

- GRIDD houses 170 researchers, support staff, research students and visitors in 2 purpose-built research buildings and on Griffith's nearby Nathan Campus.

- Key researchers within GRIDD include Prof Jenny Martin (Director, GRIDD), Prof Ron Quinn, (creator of Nature Bank), and Prof Alan Mackay-Sim (creator of Neuro Bank)

- Core Resources are supported by Major Equipment including NMR, Bioaffinity Mass Spec, flow cytometry, microarrays, extensive imaging (eg. HCS and xCelligence platforms), an animal facility, well-equipped molecular biology and chemistry labs, tissue and cell culture rooms and PC2 and PC3 laboratories.

The Institute for Glycomics

(www.griffith.edu.au/glycomics)

Griffith University's Institute for Glycomics discovers drugs and vaccines for infectious diseases and cancer. This multi-disciplinary Institute is the only one of its kind in the southern hemisphere and only one of a few worldwide. It collaborates with leading scientists around the globe to build a critical mass around carbohydrate-based research in areas of clinically significant diseases.

Fast Facts

- The Institute has a infectious disease program that includes a range of tropical diseases. This program has a focus on research into tropical diseases such as malaria, melioidosis, and dengue fever as well as other clinically significant bacterial (eg *Neisseria*, *Streptococcus* A), parasite (schistosomes, trypanosomes) and viral (influenza, rotavirus, chikungunya, parainfluenza) diseases. The Institute also has a growing research effort in novel approaches towards the discovery of new cancer therapies. In support of these two research themes the Institute has a range of unique array and other facilities that are not available anywhere else in Australia.

- The Institute for Glycomics houses 140 researchers, support staff, research students and visitors in 2 purpose-built research buildings and on Griffith's Gold Coast Campus.

- Key researchers of the Institute include Professor Mark von Itzstein (Director), Professor Michael Jennings (Deputy Director), Professor Michael Good AO and Professor Suresh Mahalingam.

- Core resources are supported by Major Equipment including NMR, HPLC, Mass Spec, flow cytometry, Computational chemistry, microarray technology, 13,000 rodent animal facility, well-equipped molecular biology and chemistry labs, tissue and cell culture rooms, PC2 and PC3 laboratories and a GMP vaccine manufacture suite.

Menzies Health Institute Queensland

(http://www.griffith.edu.au/health/menzies-health-institute-queensland)

The Menzies Health Institute Queensland (MHIQ) is a large multidisciplinary life science research institute with a focus on chronic disease prevention - specifically cancer, cardiovascular disease, infectious diseases and mental health. Research at MHIQ encompasses behavioural, molecular and clinical aspects of chronic diseases.

Fast Facts

- The MHIQ has currently more than 235 members, from all schools of the Griffith Health group, including, medical sciences, medicine, dentistry, pharmacy, physiotherapy, exercise science, nursing, and psychology.
- It includes the Heart Foundation Research Centre, incorporating staff with expertise in Cardiovascular Science. This Centre is an accredited National Heart Foundation research centre.
- Key researchers within MHIQ include Prof Susan Chambers (Director, MHIQ), Prof David Shum (Dean Research Health), Prof Paul Scuffham, Prof David Lloyd, Prof Sheena Reilly (Pro Vice Chancellor Health), Prof Sonya Marshall-Gradisnik, Prof Saso Ivanovski and Associate Prof Nigel McMillan.
- Besides classical life sciences research, MHIQ conducts research in Clinical and Community Practice Innovation, Behavioural Basis of Health, and Population Health.