



TROPICAL HEALTH AND BIODISCOVERY

Queensland is in a strong position to contribute to solutions for current and emerging challenges in tropical health and medicine. Most of the world's population will live in a tropical climate by 2050. There are outstanding opportunities here for Queensland and Australian tropical medicine given Queensland's tropical location and our expertise in tropical and emerging diseases. Our location also provides easy access to the fast-growing nations of the Asia–Pacific region, who seek solutions to long-standing tropical health issues.

Queensland has a comparative advantage in tropical health and medicine expertise through its position as a developed economy spanning a wide variety of tropical zones, and its underpinning excellence in tropical health and medicine research. For example, the Australian Institute of Tropical Health and Medicine is Australia's dedicated tropical health and medical research institute. The institute's newly completed infrastructure, based at James Cook University in northern Queensland, facilitates world-leading research that improves healthcare solutions for tropical populations.

Queensland's unique tropical biodiversity, world-class biotechnology research and development capabilities and supportive legislative environment provides significant opportunities that can be harnessed for the discovery and development of innovative solutions to tropical health challenges and novel natural products for drug development. Australia is one of only 17 countries recognised to have extraordinarily high levels of biodiversity or 'megadiversity'. These 17 countries have less than 10% of the global surface, but support more than 70% of the biological diversity on earth. Australia is the only megadiverse nation on earth that is a developed nation with relatively low population density. Moreover, Queensland is Australia's most biodiverse state, with 13 terrestrial and 14 marine bioregions supporting more than 1000 types of ecosystem. The *Biodiscovery Act 2004* (Qld) facilitates streamlined, sustainable access to Queensland's native biological resources for biodiscovery, while returning a fair and equitable benefit to the community.

Discover more about the life sciences opportunities in Queensland

The **Queensland Science Capability Directory** provides information on Queensland's key research capabilities, science expertise, and collaboration and investment opportunities.

➔ qld.gov.au/ScienceDirectory

On the road to success

“Queensland is well placed to capitalise on its unique biodiversity and tropical location for the discovery, innovation, development and trialling of new medicines, diagnostics, vaccines and tropical health solutions.”

Professor Louis Schofield,
Director, Australian Institute of Tropical Health and Medicine, JCU

Rainforest reveals new anti-cancer drug candidate

Tigilanol tiglate (EBC-46) is a novel small molecule with anti-cancer and other activity being developed by QBiotics as a local treatment for solid tumours in humans and companion animals (dogs, cats and horses). The drug is a Protein Kinase C activator that destroys tumours within five to seven days, with rapid healing of the site and excellent cosmetic outcome. Tigilanol tiglate was discovered from a far north Queensland tropical rainforest plant by applying the EcoLogic™ approach to drug discovery. EcoLogic™ was developed by QBiotics' parent entity EcoBiotics. Tigilanol tiglate is currently being evaluated for safety and dose determination in a phase I/IIA clinical trial in human patients with cutaneous or subcutaneous solid tumours. Twenty one patients with a range of tumour types, including melanoma, squamous cell carcinoma, basal cell carcinoma, breast adenocarcinoma, angiosarcoma and lymphangiosarcoma, have been treated to date. The drug is also in the final stages of a veterinary pivotal field efficacy study in the USA for an FDA-CVM registration.

➔ www.qbiotics.com

Detecting multiple biomarkers on a single paper-based strip

The molecular engineering research group at the University of the Sunshine Coast has developed a platform technology for the detection of multiple biomarkers on a single paper-based strip test, including the first embedded digital-like 7-segment display on a lateral flow device. The technology is being applied for the detection of tropical pathogens including dengue, malaria and Zika viruses. Detection in clinical materials can be achieved in as little as 10 minutes, with a sensitivity down to less than 10 copies/uL. Opportunities for licensing and collaboration are available through start-up company BioCifer Pty Ltd. ➔ www.biocifer.com

“Sensitive detection of multiple highly pathogenic organisms in less than 10 minutes is a game-changer for the diagnostics industry.”

Dr Joanne Macdonald,
University of the Sunshine Coast/Biocifer Pty Ltd

Malaria cure getting close

Griffith University's progress towards a cure for one of the world's most deadly diseases is edging closer after human clinical trials of a malaria vaccine developed by the Institute for Glycomics were a success. The research team, led by Professor Michael Good and Dr Danielle Stanisic, has shown the world-first whole blood-stage malaria parasite vaccine PlasProtect®, tested in collaboration with the Gold Coast University Hospital, is safe and induces an immune response in humans. To co-develop or sponsor clinical development of PlasProtect®, contact: Dr Chris Davis, General Manager, Institute for Glycomics, Griffith University, p +61 7 555 27033.

Exciting opportunities for investment and collaboration

Pipeline of novel anti-inflammatory proteins from hookworms

James Cook University (JCU) is developing a suite of protein molecules for various autoimmune and allergic disorders. Using its expertise in hookworm biology and recombinant protein production and development, JCU has identified a pipeline of proteins that show anti-inflammatory activity in in-vitro assays as well as in in-vivo mouse models of disease, specifically ulcerative colitis and asthma.

JCU is interested in progressing identified candidate proteins through development in collaboration with industry partners. Contact: JCU Office for Research Services, p +61 7 478 15011.

Stroke treatment from the funnel-web spider

Researchers at the Institute for Molecular Bioscience at The University of Queensland have developed a novel peptide (Hi1a) from the Fraser Island funnel-web spider that protects the brain even when administered up to eight hours after stroke. Since Hi1a should be suitable for patients suffering from both ischemic and haemorrhagic stroke, it promises to radically change clinical management of stroke by allowing first responders to administer potentially life-saving drugs to stroke victims prior to hospital admission. UniQuest is seeking investment or licensee partnerships to further develop this candidate. Contact: Dr Stephen Earl, p+61 (0)421 780 689, s.earl@uniquest.com.au.



Professor Glenn King researching the chemistry of venoms from arthropod predators, such as spiders, scorpions and centipedes, to develop novel pharmaceuticals to treat chronic pain, epilepsy and stroke.

Subtropical grass pollen allergy diagnostic and immunotherapy

Grass pollens are a major cause of hayfever and allergic asthma globally. Queensland University of Technology researchers have developed a high-throughput diagnostic test for clinically important allergies to subtropical Bahia and Johnson grass pollens, and an immunotherapy (desensitisation treatment) for the regulation of the allergic response. The diagnostic test would be the first available standardised test for Bahia and Johnson grass allergy. The immunotherapy offers improvements over whole-pollen extract-based therapies, including optimal efficacy through standardised dosing, and recombinant manufacturing. QUTbluebox seeks an investment or development partner. Contact: enquiries@qutbluebox.com.au.

Queensland offers

- Developed economy in the tropics, with expertise in tropical issues
- Natural environment that provides great opportunities to discover new pharmaceuticals and materials
- Highly skilled researchers with international experience and connections
- Ongoing investment by government to support commercialisation of innovation
- A pipeline of opportunities in health, agriculture and industrial biotechnology
- Ideal location at the crossroads of the Asia-Pacific.

Facilities and capabilities

Queensland boasts a critical mass of research centres across biotechnology, food and agriculture, health and medical sciences, and offers distinct advantages for conducting clinical trials. Queensland has nine universities, including three of Australia's 10 largest universities.

Australian Institute of Tropical Health and Medicine is Australia's dedicated tropical health and medical research institute. The Institute's newly completed infrastructure, based at James Cook University in northern Queensland, facilitates world leading research that improves healthcare solutions for tropical populations.

QIMR Berghofer Medical Research Institute is one of the largest medical research institutes in the southern hemisphere, with research divisions and programs concentrating on clinical tropical medicine and health areas, including the collaborative Australian Centre for International and Tropical Health

Queensland Health's Tropical Population Health Unit provides population health services with expertise in health surveillance, coordination of disease control initiatives, environmental health surveillance and specialised health advice. Queensland's biodiversity provides opportunities for new drug discoveries.

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The Nature Bank compound collection is available to assist researchers worldwide to discover compounds needed for medicines, from the wonderful biodiversity of Queensland and the region.”

**Professor Ron Quinn AM,
Nature Bank Founder, Griffith Institute for Drug
Discovery, Griffith University**

Nature Bank is a library of approximately 120,000 extracts and drug-like fractions produced from a unique and extensive collection of 63,000 plant and marine invertebrate samples sourced from tropical Queensland, Tasmania, China, Papua New Guinea and elsewhere. Contact: Griffith Institute for Drug Discovery gridd@griffith.edu.au. ➔ www.griffith.edu.au/institute-drug-discovery/nature-bank

Life Sciences Queensland Limited (LSQ) is Queensland's peak industry group, working to assist the growth of individual firms and organisations, and build the profile, capacity and capability of the sector to ensure long-term economic, social and environmental benefits to Queensland. ➔ www.lsq.com.au

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