

# PD-L2 protein immunotherapy



**QIMR Berghofer**  
Medical Research Institute

THE FUTURE OF HEALTH

## Opportunity

Cancer and infectious diseases account for significant proportion early morbidity and mortality worldwide. While the role of the immune system in controlling infectious diseases is well understood, ground-breaking research has shown the immune response also controls cancer. Revolutionary new treatments, called 'Immunotherapies', work by stimulating the immune system to kill only cancer cells. Despite outstanding therapeutic benefits by the initial wave of immunotherapies, many patients and cancers are resistant to treatment and therefore new therapies are required.

Current poster child of immunotherapy is the blockade of signals to an immunosuppressive (checkpoint) receptor on T cells known as programmed cell death-1 (PD1). When PD1 on T cells binds programmed cell death-1 ligand 1 (PDL1) on DCs or tumour cells, T cells stop functioning. Antibodies directed against PD1 "take the brakes off" the immune system, and thereby allowing T cells to mount an effective attack against cancer. While blockade of the PD1 / PDL1 pathway has shown durable benefit for melanoma and other cancers, many patients do not respond or have transient responses to anti-PD1 therapy.

## Technology

Recent studies have shown that PDL2, unlike PD-L1, is not a brake on the immune system. PD-L2 aggregates on the surface of antigen presenting cells like dendritic cells and out competes PD-L1 binding PD1, to prevent loss of T cell functions. Secondly, PDL2 improves T cell functions by binding a second receptor.

A novel multimeric form of soluble PDL2 protein (sPDL2) has been developed at the QIMR Berghofer.

This protein can cure lethal malaria in mice and protect completely against reinfection after 150 days (Immunity, 2016). Similarly, sPDL2 can completely control advanced CT26 tumors and control B16.F10 tumors when combined with Treg depletion.

Our novel sPDL2 protein is an innovative therapy which both effectively blocks the PD1/PDL1 pathway due to the multimeric nature of PDL2 and directly activates T cells. Our companion diagnostic would significantly improve the accuracy of selecting patients who would respond.



# Market

The immunotherapy market is expected to grow to USD 126.9 billion by 2026 and become the oncology treatment of choice with an estimated 60% of previously treated cancer patients likely to adopt immunotherapy in this timeframe (ref).

Tumours most likely to benefit from this novel immunotherapy include gastric cancer, oropharyngeal squamous cell carcinoma, B cell lymphomas, head and neck squamous cell carcinomas and non-epithelial colon cancers.

# Lead Researcher

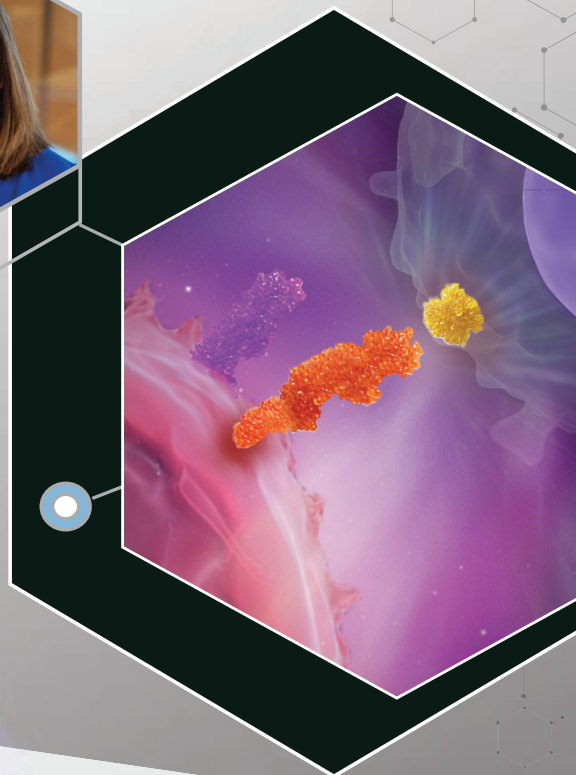
Michelle Wykes is Group Leader of the Molecular Immunology Laboratory at the QIMR Berghofer. She is an expert on “immune checkpoints” which are the basis for a new type of cancer treatment known as “immunotherapy”. Her research in “immune checkpoints” started when she was looking for the reason Plasmodium spp, which cause malaria, could evade immunity. Her group published a paradigm-shifting study which showed Programmed cell death-1 ligand 2 was essential for immunity. This line of research, published in Immunity and Nature Reviews Immunology, has led to several patents and funding to develop two novel treatments for cancer and one for autoimmunity.

# Intellectual property

QIMR Berghofer holds composition of matter, methods of use, patient selection and pharmacodynamics biomarker patent applications.

# Partnering goals

We are seeking a research collaboration with an option to license. Whereby the development partner would undertake lead optimisation and further pre-clinical and clinical development of our sPD-L2 protein. As part of the collaboration, QIMR Berghofer would be able to provide access to preclinical models, clinical samples along with mode of action analysis/biomarker exploration.



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With more than 900 scientists, students and support staff, QIMR Berghofer is one of Australia’s largest and most successful independent medical research institutes. The QIMR Berghofer Business Development Team manages over 160 patent families, offering a wealth of collaborative and commercial opportunities for industry and government. We have a strong track record of partnering with leading pharmaceutical and biotech companies to further develop

early-stage technologies, generating over \$21 million in annual commercial revenue in the last financial year. In addition to licensing and partnering outcomes, we facilitate contract research and consulting projects for industry clients. Our team includes specialists in commercialisation, IP protection, patent law, clinical trial and project management and industry-backed grant opportunities.