Examples of drug development expertise available at The University of Auckland.

**PROTEOMICS AND BIOMEDICINE**

**KEY PERSONNEL:**
Professor Garth Cooper, Associate Professor Rod Dunbar and Doctor Kerry Loomes

**EXPERTISE:**
- Diabetes
- Metabolism
- Obesity
- Cardiovascular disease
- Immunology
- T cells
- Neurodegenerative disorders
- Cell culture

The group has made major advances in the understanding of disease mechanisms in diabetes and related syndromes such as obesity and cardiovascular disease. Based on these mechanisms, effective new strategies have been developed for disease detection and therapy, with an emphasis on prevention of disease progression. A core human immunology project is the design and testing of peptide-based vaccines to stimulate T Cells. These vaccines have applications as both therapeutic vaccines for cancer and preventative vaccines for infectious diseases. The group also has a particular interest in peptide hormone biology.

Research into myo-inositol oxygenase (MIOX), which is involved in the breakdown of inositol compounds, and whose activity is increased in diabetes, has collaborative outreach into structural biology and synthetic chemistry areas and offers a platform for new therapeutic strategies for diabetes.

**STRUCTURAL BIOLOGY**

**KEY PERSONNEL:**
Professor Ted Baker

**EXPERTISE:**
- Structure based drug design
- Addressing molecular basis of disease
- Engineering proteins with altered functions
- Genomics - defining new drug targets, finding functions of unknown genes

The Laboratory of Structural Biology comprises an internationally-recognised team focusing on the importance of three-dimensional structure in biology.

The multidisciplinary approach to biological questions includes research in structural genomics, structure-based drug design, protein engineering, and structure determination by X-ray crystallography, electron microscopy and NMR.

The lab is particularly involved in determining the three-dimensional molecular structure of proteins involved in human disease, to understand exactly how they function and design drugs to block their activity.

The lab is led by Professor Ted Baker, who served as President of the International Union of Crystallography for 3 years and is a current member of 3 international scientific advisory boards.

**THE CENTRE FOR BRAIN RESEARCH**

**KEY PERSONNEL:**
Professors Richard Faull, Alan Barber, Mike Dragunow and Peter Thomas

**EXPERTISE:**
- Human brain Bank
- Molecular, cellular and clinical neuroscience
- Neurodegeneration
- Neuroprotection and therapeutics
- Neurogenesis
- Psychopharmacology and neurodynamics
- Plasticity and signalling
- Cognitive and computational neuroscience including brain imaging
- Sensory and motor neuroscience

The Centre is a unique partnership between scientists, doctors and the community.

The expert team is committed to identifying and developing new treatments for neurological conditions via world-class research and international collaborations.

The Centre hosts over 40 neuroscience research groups, and partners with the leading neurologists, neurosurgeons and physicians in the region. New innovations developed in the Centre are directly trailed in local hospitals.

Researchers utilise advanced scientific technologies including the invaluable resources of the Neurological Foundation of New Zealand Human Brain Bank, housed within the Centre. The bank holds tissue from over 400 brains categorised in minute detail.

Current research interests lie in Alzheimer’s disease, stroke, epilepsy, Parkinson’s disease, Huntington’s disease, mental health, hearing and deafness, motor neuron disease and multiple sclerosis among others.

**ZEBRAFISH MODEL SYSTEMS**

**KEY PERSONNEL:**
Professors Phil Crosier and Kathy Crosier

**EXPERTISE:**
- Zebrafish model systems genetics
- Drug screening
- Toxicology
- Real-time imaging
- Transgenics

This group has developed an extensive and advanced state of unique transgenic zebrafish lines for investigations into innate immunity, inflammatory disorders, lymphatics and cancer.

The world-class zebrafish facility uses a comprehensive range of genetic tools and performs high-content screening of drug candidates. The team also uses zebrafish to identify drug effects and toxicity in specific organs. An early developer of zebrafish models, the team has over 15 years zebrafish genetics expertise ranging from haematopoiesis to innate immunity.

The group works in research areas that include transcriptional regulation of haematopoiesis and lymphoid development by tools genes, models of leukaemia, lymphatic development and mucosal immunity.

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**Contact:** innovation@auckland.ac.nz

**AUCKLAND UNISERVICES LIMITED**
Level 10, University House, 70 Symonds Street, Auckland
Private Bag 93029 AMC, Auckland 1142, New Zealand
www.uniservices.co.nz, +64 9 3737 522
In the field of Life Sciences and Biomedicine, The University of Auckland consistently ranks* in the top 8% of the world’s 700 leading universities. Through UniServices, the University’s research has resulted in 14 novel compounds entering clinical trials, with several of these being first-in-class.

The University of Auckland

New Zealand’s largest university, The University of Auckland is an international centre of learning and academic excellence. Partnerships between The University of Auckland, biotechnology and pharmaceutical companies have expanded rapidly in recent years. This has been driven by a significant increase in the commercially valuable intellectual property generated at the University and supported by strong links between team leaders at the University with leading international universities, companies and research institutions.

The University is viewed favourably on an international scale for its ability to undertake high standard research more efficiently and at considerably less expense than universities in other countries. *QS World University Rankings (2012)

Auckland UniServices

Auckland UniServices Limited is a wholly owned company of The University of Auckland. It manages all the University’s commercial research and consultancy partnerships, forms new business ventures based on University research and owns and develops the University’s intellectual property estate.

In 2012, UniServices’ revenue was over US$12m and the company directly employed over 700 research staff on commercial contracts. UniServices has a track record of successful research programs for companies such as Genentech, Roche, Novartis, Pfizer, AntiSoma, Supergen and The Global Alliance of TB.

UniServices is actively involved in the transfer of technology to the private sector, with over 350 licenses and the formation of over 35 new businesses based on intellectual property developed at the university. Such companies are operating in New Zealand, the United States and the United Kingdom.

Recent Highlights

- UniServices spin-out Pathway Therapeutics (est. 2008), a Pig-kinese company, raised AUD$3m in series A financing from 3 Australian investors. Through continued collaboration with UniServices the program progressed quickly and Pathway recently completed a positive Phase I trial for its lead candidate, PTVT3307.
- Codi Therapeutics, a wound healing company spun out of The University of Auckland in 2001, raised USD$20m in series A financing, including investment from Australian and US venture capital firms. Codi recently completed a positive Phase Ib trial for HEXAGON™ in patients with chronic venous leg ulcers.
- Established in 2003, UniServices spin-out Priacta raised USD$15m with US, Australian and New Zealand venture capital groups and investment from Genentech and Roche. Priacta draws on a broad portfolio of IP across 9 chemical families and focuses on the development of hypoxia-activated prodrugs that target cancer cells. In 2012 Priacta put a second candidate into clinical trials, initiating a Phase I for PBI05 in erlotinib-resistant Non Small Cell Lung Cancer. On-going collaboration with UniServices and scientists at The University of Auckland has been a key factor in Priacta’s success.
- Over the last 5 years UniServices’ oncology clinical trial business has expanded by approximately 400%. This growth was driven by new Phase I and II trials, with an emphasis on biomarker detection. The majority of trial sponsors are global pharmaceutical companies who recognise Auckland’s excellence in this field.

Pre-clinical drug development expertise available for partnership

UniServices brings together The University of Auckland’s multidisciplinary teams to create a world-class capability for drug development. The following are examples of the University’s expertise in this field. These teams are not pure ‘blue sky’ researchers, nor are they classical CROs; they are drug developers with academic thought leadership and a proven track record.

**AUCKLAND CANCER SOCIETY RESEARCH CENTRE**

**KEY PERSONNEL:**

- Professors BR Donny, Bruce Baguley, William Wilson and Associate Professor Mark McKiege

**EXPERTISE:**

- Medical chemistry (small molecule)
- Experimental oncology
- Pre-clinical models
- Strimal targeting
- Tumour biology
- Translational medicine

Established in 1998, the ACSCR is an academic group that understands commercial collaborations, and has worked closely and successfully with leading global pharmaceutical firms as well as academic collaborators. It is at the forefront of drug discovery and development; eight new anticancer drugs from its research programmes have been taken to clinical trials.

The Centre includes molecular modellers, medicinal chemists, molecular and cellular biologists, pharmacologists and clinicians. The Medicinal Chemistry group has unmatched experience in the design and synthesis of bioactive molecules with anti-cancer and anti-bacterial activity. Other groups have developed an array of in vitro assays for predicting in vivo activity and metabolism, and in vivo assays for late stage drug development. The team has commercial experience in assay validation, GLP/GMP process design and implementation, and other Gx/Regulatory requirements.

**BRIMBLE MEDICINAL CHEMISTRY GROUP**

**KEY PERSONNEL:**

- Professor Margaret Brimble

**EXPERTISE:**

- Peptide, peptidomimetic, lipopeptide and glycopeptide chemistry
- Synthesis of long peptides using native chemical ligation
- Bioactive molecular synthesis
- Heterocyclic chemistry

The Brimble group has partnered with several pharmaceutical and biotechnology companies in the development of antibacterial and antifungal agents, as well as agents to treat neurodegenerative diseases. The team has also been successful in the development of peptide mimics of peptide-based drug candidates for use in human clinical trials and the synthesis of long peptides and glycopeptides as vaccine components.

The lab has extensive experience in the synthesis of bioactive natural products, active against a range of diseases including cancer, peptic ulcer disease and diseases affecting the central nervous system such as Alzheimer’s, multiple sclerosis and achaemic stroke. The synthetic work is supported by rigorous structure determination using NMR, mass spectrometry and X-ray crystallography resources. The Brimble group specialises in asymmetric synthesis, heterocyclic chemistry, organometallic chemistry, organic synthesis and solid phase peptide synthesis using both conventional techniques and microwave technology.

**SIGNAL TRANSDUCTION PATHWAYS IN DISEASE**

**KEY PERSONNEL:**

- Professor Peter Shepherd

**EXPERTISE:**

- Cell signalling
- Cell function
- Biochemistry
- Metabolism
- Insulin signalling
- Kinase pathways
- Cancer therapeutics

Led by Peter Shepherd, a Professor of Cellular Signalling, this laboratory focuses on the signal transduction pathways mediated by lipid kinases and also on how metabolites such as glucose impact on these signalling pathways. These studies have uncovered defects in signalling pathways that contribute to diabetes and cancer. Such knowledge has allowed the group to collaborate and develop strategies to overcome these defects, leading to the development of new drugs to treat these major diseases.

The team of 10 researchers has provided the founding science behind 2 biotech start-ups, and has an impressive publication and patenting record.

Further examples overleaf...