Professor David Adams, Director
Health Innovations Research Institute (HIRi)

http://www.rmit.edu.au/research/institutes/healthinnovations
Health Innovations Research Institute (HIRi)

Translating fundamental science into better health outcomes

RMIT HIRi takes an integrated approach to address key health issues facing the Australian community in the 21st century through research programmes focusing on understanding how the human body functions at a molecular and cellular level. This knowledge will inform innovative therapeutic strategies to target disease states.

The primary goal of the institute is to translate basic science discoveries into effective, safe therapeutic outcomes.
Health Innovations Research Institute (HIRi)

• A research institute

The RMIT mission is “to create and disseminate knowledge to meet the needs of industry and community”. The Health Innovations Research Institute is a new RMIT initiative that seeks to better connect the diverse communities around health enterprise to more effectively address the changing needs of biomedical research and society. **It capitalises on existing institutional strengths to build increased research and translation capacity in identified areas of socio-economic health burden.** These include cardiovascular diseases, insulin resistance and diabetes, obesity, arthritis, mental health disease and stroke.

• The research

The HIRi brings together key researchers and groups from a range of Schools at RMIT involved in the following discipline areas: applied physics, biotechnology, cell biology, chemistry, exercise metabolism, biomedical engineering, herbal medicine, nanotechnology, physiology and pharmaceutical sciences. Interdisciplinary and cross-institutional research programmes will be coordinated with industry partners and other stakeholders. We seek to achieve a deeper understanding of the pathophysiology of diseases and to develop new ways to treat the changes that occur as these diseases progress.

HIRi will also provide a platform for state-of-the-art infrastructure and technologies to enable virtual research and development capabilities to be shared with research and industry partners.
Health Innovations Research Institute (HIRi) - Programs

The four unique research programs are:

• **Ion channels and transporters as therapeutic targets**
  Program Leader: Prof. David Adams

• **Metabolism, exercise and disease**
  Program Leader: Prof. Phil Poronnik

• **Traditional and complementary medicine**
  Program Leader: Prof. Charlie Xue

• **Electromagnetism: biophysical modulators**
  Program Leader: Prof. Irena Cosic
Metabolism, exercise and disease

Projects:
• Molecular physiology of membrane transport
• Skeletal muscle energy metabolism related to exercise training and health
• Regulation of vascular tone, the influence of disease on vascular reactivity and new pharmacological approaches
• Role of the central nervous system in diseases such as heart failure, obesity and diabetes and neuropathic pain
• Vaccines against parasitic and bacterial diseases, structure/function of pathogen proteins
• Physical activity and aging
Traditional and complementary medicine

Projects:
• Growing evidence-based Chinese medicine: providing rigorous laboratory and clinical scientific evidence of the quality, safety and efficacy of Chinese herbal therapies.
• Traditional herbal medicines as sources of new therapeutic drugs: bioassay-guided identification, isolation and structural modification of novel compounds in traditional herbal therapies for the treatment of intractable diseases.
• Production of traditional Chinese medicines and herbal therapeutics: providing the foundation for Australian horticulture for the development and delivery of certified herbal ingredients for Chinese herbal medicine practice.
• Addressing the public health issues associated with herbal medicine usage and promoting evidence-based herbal medicine health care.
Electromagnetism: biophysical modulators

Projects:

• Systemic environmental radiation health impacts - providing foundation and community studies on bio-effects ambient electromagnetic radiation.
• New therapeutic applications of electromagnetic radiation - such activities will be directed to wound healing, sleep therapy, biomedical signal diagnostics and macromolecular activation (modulation of protein activity).
• Physiological health monitoring - providing innovations to improve the reach and effectiveness of physiological health monitoring through the design and application of compact, low power, multi-function ambulatory monitoring systems (ECG, blood pressure waves, pO$_{2}$, skin impedance, blood pressure etc.)
Ion channels and transporters as therapeutic targets

Projects:

• **Conotoxins: Selective probes for nicotinic receptor structure and function**
  ARC Discovery Project Grant (2007-2009; $990,000)

• **Dissecting pain pathways with conopeptides**
  NHMRC Program Grant (2005-2009; $7.2 million)

• **Venom peptide modulators of pain pathways**
  NHMRC Program Grant (2010-2014; $6.4 million)

• **Functional maturation of adult neural progenitor cells**
  NHMRC Project Grant (2008-2010: $593,625)
Health Innovations Research Institute (HIRi)

A community institute

• As an integral part of RMIT University and the College of Science, Engineering & Health, with linkages in the Colleges of Business and Design and Social Context, HIRi is also an institute for the broader community.

• In addition to research and teaching, HIRi is developing outreach initiatives that include public lectures and tours, “discover science” workshops for the public, a “scientist in the classroom” project, extensive exercise and health programmes as well as professional development courses for teachers and health professionals.

• In conjunction with the Schools of Art and Creative Media, we are also developing artist- and writer-in residence projects that will explore the creative aspects of biomedical research.
**HIRi - a leader in curriculum innovation**

*research informs the science curriculum*

- Differentiation in the Biomed sector by providing state-of-the-art learning experiences for students in research active Institute environment
- iGEM - team for international genetically engineered machines competition (>100 universities jamboree held at MIT)
- **C2S2** - Creative Science Curriculum Solutions - virtual thinktank around global issues in science education (international collaboration with ALTC, CEIT, MIT, Harvard and others)
- Postgrads - professional development involved in teaching
- Public laboratories initiative (Robyn Williams ABC)
- Public lecture series
- Student writing in *Cosmos* magazine
HIRi Vision in Research

Ensure differentiation-complementarity in the sector

• Attract Research Fellows
• Increase research profile – more competitive national grants
• Provide strong mentoring and leadership to maximise success in grant applications
• Aim for high impact journals
• Increase RHD student numbers
• Build critical mass/ integration around programs
• Establish a vibrant research hub
• Build cross-institutional collaborative networks (North East Corridor Research Hub)
• Explore further industry links