

Research capability
delivering value



Biomedical and Health Innovation

Enabling Capability Platform

Contact us to partner for a better future

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[www.rmit.edu.au/research/research-expertise/
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Addressing the global health challenge

Humanity is facing major health challenges due to worldwide population growth, increasing urban density, pollution and the rapidly ageing population.

The burden of disease is escalating across the globe, while endemic infectious diseases are overwhelming health systems in under-resourced countries and are at risk of spreading to other countries. More effective drugs, vaccines, health monitoring and community-level intervention programs are needed to safeguard human lives and community wellbeing.

RMIT's **Biomedical and Health Innovation Enabling Capability Platform** (ECP) brings together hundreds of highly respected, cross-disciplinary experts who are passionately committed to addressing the unresolved health challenges in our society.

Our research affiliates are specialists in a wide range of areas, including the health, biomedical and natural sciences; traditional and complementary medicine; data analytics; marketing; global, urban and social studies; business and design. They are combining their diverse expertise and collaborating with external partners to develop cost-effective health interventions and quickly bring them to the market.



Giving our partners a life-saving edge

Our Biomedical and Health Innovation ECP serves as a streamlined, single point of contact within the University for biomedical and health-related research projects and partnerships. This ECP also works closely with RMIT's other seven Enabling Capability Platforms.

We are forging corporate, government and non-profit sector partnerships to co-create innovative solutions that achieve giant leaps forward in biomedical technology, healthcare and public health.

A Sector Expert Research Advisory Group of biomedical and health industry leaders and stakeholders will help shape the future direction and priorities of this capability platform.



Our vision

Magdalena Plebanski, Director,
RMIT Biomedical and Health Innovation ECP



We will harness the multidisciplinary excellence at RMIT and work with our industry partners to address areas of medical need and deliver interventions for healthy living.

Our focus will be on disease prevention and using holistic approaches to health care to tackle the needs of growing and ageing populations. We will also help stop the spread of regional and global infectious diseases.



Examples of Biomedical and Health Innovation ECP collaborative research projects

RMIT is partnering with two Melbourne hospitals to create a world-first aerosol pharmaceutical intervention to treat babies born after fetal growth restriction (FGR).

FGR is a global health problem and babies born after FGR often suffer brain damage and lifelong disability for which there is no treatment. Also, there are no treatments that improve placental function, and clinicians have limited options for treating outcomes of an FGR pregnancy. The options of treating these small, under-developed babies are few and intrusive.

However, our preclinical studies have identified the thyroid hormone analogue DITPA as an ideal therapeutic, but the problem remains - how to administer it rapidly, effectively, and safely in high and low resource settings? The project aims to develop a patent-ready, portable, low-cost, easy-to-use device to deliver DITPA non-invasively as an aerosol into the airways or nasal passages of FGR infants. If successful, this will have worldwide application and transform medical practice by providing a much-needed treatment for neonatal brain injury.

This project is being funded by RMIT's ECP Opportunity Fund with support from our industry partners.



A collaborative partnership has been established between leading Australian and international researchers who specialise in microbeam radiotherapy and immunotherapy. This innovative partnership is developing protocols for potentially revolutionary new cancer treatments.

Synchrotron Microbeam Radiotherapy (MRT) is an experimental form of radiotherapy that is fundamentally different to conventional radiotherapy (CRT). MRT uses small beam sizes and extreme dose rates. There is emerging evidence from pre-clinical studies that these different physical parameters increase the body's tolerance to radiation treatments and the ability to stimulate the immune system to fight cancer tumours.

Our partnership brings together leading researchers from within RMIT and other research institutions in Australia, Germany and the USA.

This project is being funded through RMIT's ECP Capability Development Fund.

Key capabilities

Hundreds of expert research affiliates in disciplines ranging from health and biomedical sciences, to complementary medicine; engineering; data analytics; marketing; and global, urban and social studies.

Internationally recognised areas of research excellence in:

- > analytical chemistry
- > complementary and alternative medicine
- > pharmacology and pharmaceutical sciences
- > clinical sciences
- > food sciences and technology
- > medical physiology

Additional specific research strengths in:

- > ageing and chronic inflammatory diseases
- > biomedical engineering and biosciences
- > integrative and preventative healthcare
- > drug discovery and delivery, particularly natural products
- > cognition and brain biology
- > vaccines and nanotechnology
- > cancer and human clinical trials
- > infectious diseases and global health

Research facilities and centres, including:

- > The new NanoMicro Research Facility with nine laboratories
- > An Advanced Manufacturing Precinct for state-of-the-art biomanufacturing
- > Traditional Chinese medicine practitioner and complementary medicine qualifying school and clinics
- > Network of allied collaborating hospitals
- > The RMIT Centres for Micro/Nanomedical Research; Advanced Materials and Industrial Chemistry (CAMIC); Science, Health and Engineering Educational Research (SHEER); Urban Research; and Applied Social Research

Close relationships with:

- > federal and state governments
- > Industry Growth Centres
- > major industries, research institutions, hospitals and networks in Australia (including regional Australia), Asia and Europe

Research and innovation priorities

Ageing population

Our partnerships will pursue fundamental and applied research in ageing, developing:

- > new understanding of ageing biology
- > innovative therapies, diagnostics and monitoring tools for diseases in the elderly: cancers, musculoskeletal, inflammatory, cognitive
- > improvements and leap innovations in areas of need in existing health care models, and
- > optimised, practical and comprehensive community interventions such as vaccinations, drugs and lifestyle changes

Population growth and urbanisation

We will drive understanding of how urbanisation impacts human health by researching:

- > respiratory health and pollution
- > working and living in stressful environments
- > public health and abnormal behaviour, and
- > the prevention, early detection, treatment and amelioration of urban diseases

Regional and global citizenship

We will focus on:

- > Indigenous and regional health in Australia
- > global disease, epidemics and pandemics
- > endemic and emerging infectious diseases, and
- > biosecurity and biodiversity

4.0 revolution and personalized medicine

We will focus on the opportunities arising from:

- > The omics revolution: to provide individually tailored health interventions
- > The digital revolution: to empower remote health monitoring and communication across patients and healthcare providers
- > The 4D printing and nanomaterials revolution

RMIT'S ENABLING CAPABILITY PLATFORMS (ECPs)

- > Advanced Materials
- > **Biomedical and Health Innovation**
- > Advanced Manufacturing and Fabrication
- > Design and Creative Practice
- > Global Business Innovation
- > Information and Systems (Engineering)
- > Social Change
- > Urban Futures

Key application areas

MEDICAL
PRACTICE, DIAGNOSIS,
MONITORING AND
TREATMENT

PUBLIC HEALTH
CARE, DISEASE
PREVENTION AND
CONTROL

PHARMACEUTICAL
AND VACCINE
INNOVATION

GOVERNMENT
AND PUBLIC
POLICY

HEALTH
SUSTAINING LIVING
ENVIRONMENTS