Centre for Medical Bioscience (CMB)

Overview
The Centre for Medical Bioscience forms the hub of molecular biology research in the Illawarra Health and Medical Research Institute (IHMRI), and many of our members work in state of the art facilities in the new IHMRI building at the UOW.

The Centre brings together a multidisciplinary team of chemists and biologists from the Schools of Chemistry and Biological Sciences with a common interest in the molecular basis of disease and disease prevention. CMB researchers collaborate closely on exciting research programs focused primarily in three key areas: anti-microbial agents (e.g. targeted at new anti-bacterials and vaccines), age-related diseases (cataract; neurodegenerative and inflammatory disorders), and cancer (new therapeutics for breast and prostate cancer).

CMB’s translational programs are underpinned by basic science directed at discovery of biological targets and their structural and functional characterization. We aspire to develop new drug leads to more effectively tackle diseases associated with ageing and to address problems of cancer and drug resistance in infectious disease. Our close alignment with the Centre for Medicinal Chemistry provides ready access to complementary expertise in drug design and chemical synthesis. We are also a regional centre of expertise in biotechnology.

CMB is growing rapidly: there are now 14 team leaders, 17 Research Fellows and more than 30 postgraduate research students associated with Centre projects. Our work is well funded by research grants from the ARC and NHMRC; 10 of our members hold competitive Fellowships.

CMB Research
The Centre has three broad research programmes directed at development of novel therapeutics for:

- Age-related diseases
- Infectious diseases
- Cancer

Due to increasing life expectancies, age-related neurodegenerative diseases like Alzheimer’s have become a major health burden. CMB researchers are focussing on the molecular mechanisms that lead to neurodegenerative disease with a view to developing therapeutic strategies.

In a related area, a major new grouping of our researchers focusses on how chaperone proteins including those in human blood protect other proteins from being misfolded during development of a variety of “protein folding” disorders like motor neuron disease, Alzheimer’s and Parkinson’s disease.

Development of resistance to current drugs by pathogenic micro-organisms is of very serious concern. CMB researchers are tackling this problem by several complementary approaches. For example, small molecule compounds that interfere with essential processes in bacteria are being discovered that have potential for development into a new generation of antibiotics. Studies of fundamental mechanisms of bacterial survival and pathogenesis provide information on which to base this work.

CMB’s Basic Cancer Research and Drug Development grouping works on understanding the biological processes underlying cancer progression, and develops methods for cancer prevention, detection and treatment. They use a range of cell and molecular biology techniques, medicinal chemistry and preclinical animal models to meet the demand for novel anti-cancer drug testing and research leading to a range of innovative cancer treatment options. CMB researchers use a wide range of modern techniques and instrumentation. In particular, our unique mass spectrometry facilities are providing new insights into biomolecular interactions involved in disease states or their prevention.

CMB Collaborations
Members of the Centre have built many national and international collaborations with other Universities, Research Organisations and Companies. Some examples include the University of Sydney, the Australian National University, the Universities of Cambridge (UK) and Groningen (the Netherlands), the Victor Chang Cardiac Research Institute, and NSW Agriculture. Collaborations overseas include colleagues from many countries including the USA, UK, France, Germany, China, Saudi Arabia, the Netherlands and Thailand.
## UOW Research Themes

- **Environmental Sustainability**
  - Past, Present and Future

- **Innovative Materials, Engineering and Manufacturing**

- **Health and Medical Research**

- **Information and Mathematical Sciences**

- **Society, Policy and Culture**

## UOW Research Strengths

- **Australian Health Services Research Institute**
- **Centre for Archaeological Sciences**
- **Centre for Health Initiatives**
- **Centre for Medical Bioscience**
- **Centre for Medical Radiation Physics**
- **Centre for Medicinal Chemistry**
- **Centre for Statistical & Survey Methodology**
- **Engineering Manufacturing**
- **Engineering Materials Institute**
- **GeoQuEST Research Centre**
- **Information & Communication Technology Research Institute**
- **Institute for Conservation Biology & Environmental Management**
- **Institute for Innovation in Business & Social Research**
- **Institute for Mathematics & its Applications**
- **Institute for Social Transformation Research**
- **Institute for Superconducting & Electronic Materials**
- **Institute for Transnational & Maritime Security**
- **Intelligent Polymer Research Institute / COE for Electromaterials Science**
- **Interdisciplinary Educational Research Institute**