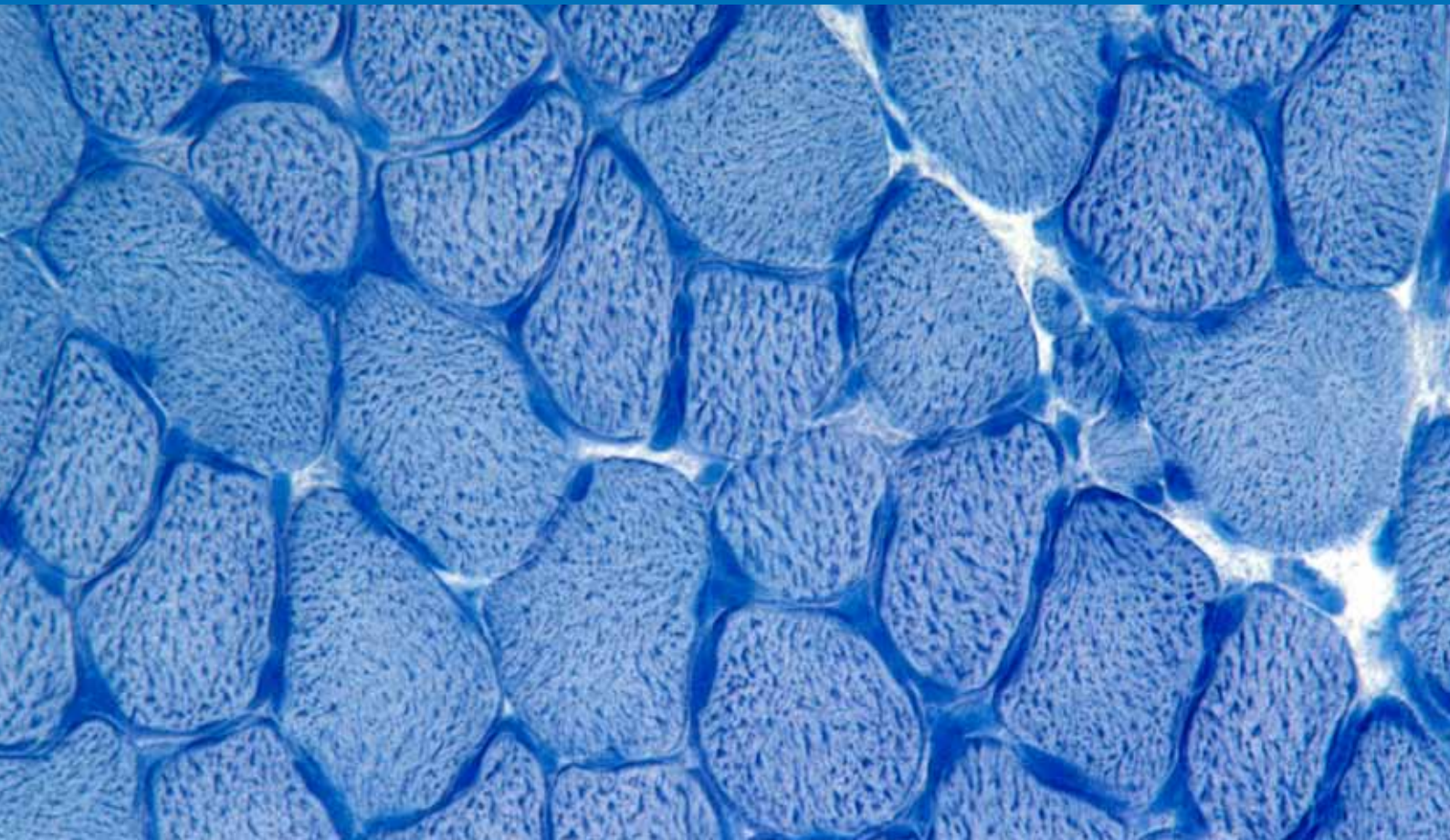


SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

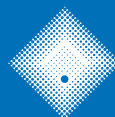
RESEARCH PROJECT GUIDE 2010



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POSTGRADUATE STUDIES

GENERAL POSTGRADUATE INFORMATION

www.vu.edu.au/postgrad

Most students enter or continue on to postgraduate programs because they wish to enhance their knowledge and training, or broaden their education with the study of a new discipline.

Postgraduate study and qualifications also have the added benefit of helping to enhance career and employment prospects. Students who have a degree with honours are eligible for postgraduate research and coursework programs. At VU, we also look for evidence of our potential postgraduate students' commitment, experience, achievement and knowledge. It is our aim that VU students who undertake research and coursework degrees will make a valuable contribution in their chosen areas and will be able to talk to general as well as specialist audiences about their work. VU has a strong commitment to ensuring each research thesis, in itself, is a high quality 'performance'. Research students are encouraged and supported to create a thesis that is original in thought, presentation and visual experience. In the creative areas, a performance, a novel, poetry or visual artwork, with an exposition, may also be submitted as part of the work. Further information on coursework programs:

Future Students

www.vu.edu.au/futurestudents

FAQs www.vu.edu.au/gotovu

Phone +61 3 9919 6100

Visit Student Service Centres situated on all VU campuses

Further information on applying for research programs:

Office for Postgraduate Research

Phone +61 3 9919 4521

RESEARCH STRENGTHS AT VU

At Victoria University (VU) we have a strong focus on research around multidisciplinary themes that have regional, national and international significance. Our strategic investment is in key areas that match our academic positioning and mission and in which we have existing research strengths.

APPLIED INFORMATICS

Specialises in research on web mining and data management, health informatics and E-health and service-oriented computing.

COMMUNICATION AND SENSOR TECHNOLOGIES

Focuses on wireless technologies, microelectronics in health and power applications, optical sensors and amplifiers, and the application of new e-technology.

DIVERSITY AND WELLBEING

This research focuses on community diversity, refugee resettlement, racial and gender discrimination and socially inclusive policies.

EDUCATION, ACCESS AND TRANSITION

This area concentrates on vocational, work-based and problem-based learning, engagement with educationally and socially disadvantaged youth, experiential learning, ICT and pedagogy, collaborative practitioner research and literacy, maths and science education.

LOGISTICS AND TRANSPORTATION

This group provides research on information technology and information systems, mathematical modelling, distribution systems, international trade, and the economics of transport and distribution.

SPORT PERFORMANCE, EXERCISE SCIENCE AND ACTIVE LIVING

Multi-disciplinary research in sport, exercise science and active living.

STRATEGIC ECONOMICS

Climate change, finance, health economics and emerging technologies are the focus of this research group.

SUSTAINABLE ENVIRONMENTAL TECHNOLOGIES

Research in this area focuses on water management, green and safe construction including fire prevention, economics, social and policy research on water use and environmental sustainability; human behaviour in fire. Our research specialities are based on economically sustainable, environmentally and culturally appropriate tourism and regional issues.

Further information on research applications:

Office for Postgraduate Research
www.vu.edu.au/postgrad
Phone +61 3 9919 4521

COURSEWORK

The University offers postgraduate coursework programs that vary in content and length. They include the following.

GRADUATE CERTIFICATE

A graduate certificate furthers the student's skills and knowledge from an undergraduate degree, or develops their vocational skills in a new area. Students completing graduate certificates can undertake further postgraduate study, depending on the subject area. Entry: Applicants usually require the equivalent of a bachelor degree or advanced diploma but relevant work experience can be recognised.

Duration: One semester of full-time study.

GRADUATE DIPLOMA

The graduate diploma is for students to develop new knowledge and specialised skills in an area not previously studied in their undergraduate degree. Completion of the graduate diploma can be recognised as part of a master degree. Entry: While normally based on a bachelor degree or diploma, exceptions can be made with appropriate work experience.

Duration: Two semesters of full-time study.

MASTERS BY COURSEWORK

A masters degree usually comprises coursework, project work and research in varying combinations. The degree enhances a student's professional skills and understanding of a specific area of knowledge. An advantage of a masters by coursework is a high level of tutorial advice and study guidance. Entry: Normally a bachelor degree, honors degree or graduate diploma. Students without formal qualifications, but who possess relevant academic or professional experience, may qualify for admission after a preliminary program.

Duration: Three to four semesters of full-time study.

PROFESIONAL DOCTORATE

Provides further qualifications based on advanced theoretical knowledge,

contemporary practice and research opportunities. Entry: A relevant postgraduate degree and relevant professional experience.

Duration: Three to four years of full-time study.

PATHWAYS

Many of these programs offer a pathway of full articulation between courses. This means a graduate certificate provides one semester's credit towards a graduate diploma, which in turn provides two semesters' credit towards a masters degree by coursework. For further information refer to the pathways maps in this guide or visit: www.vu.edu.au/futurestudents

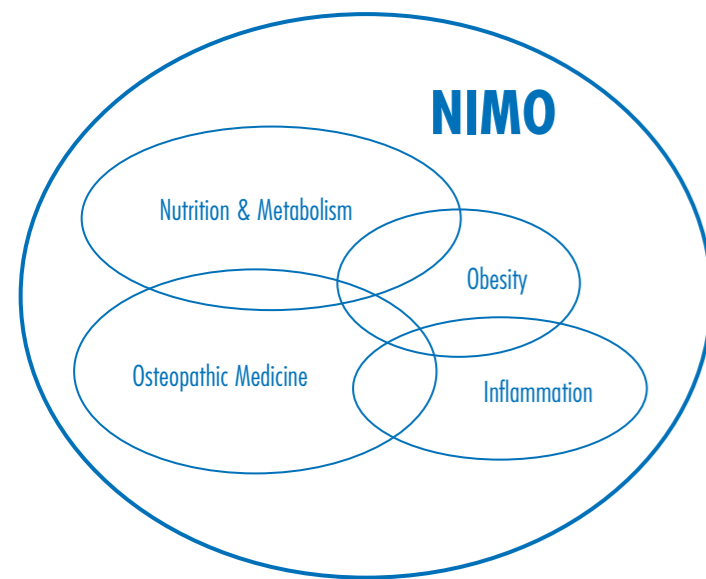
SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES RESEARCH

WHY DO HONOURS OR POSTGRADUATE STUDY?

HEALTH INNOVATION PROVIDING POSITIVE OUTCOMES (HIPPO)

'Translating innovation in experimental medicine into positive health outcomes for the community'

The school of Biomedical Sciences research focus is Nutrition and metabolism, Inflammation, Osteopathic Medicine and Obesity (NIMO). Within this central research focus, there are three strategic research clusters: healthy ageing, obesity prevention and complementary and alternative health. Research within these strategic areas satisfies the National Research Priorities (NRP) as described by the NH&MRC of Promoting and Maintaining Good Health (NRP2) and National Health Priorities (NRP5) of cancer, diabetes and obesity in particular.



The school research is also linked with major Victoria University research initiatives, with staff also being members of, or collaborating with members from, the Institute of Sustainability and Innovation (ISI), Institute for Sport, Exercise and Active Living (ISEAL) and the Australian Community Centre for Diabetes (ACCD).

There are many things that need to be considered before you choose an honours project – the laboratory where you will work, your supervisor, other support staff and; especially the research topic! It is a busy year, so you should choose a project interests you.

You may be have already completed honours, or be thinking of progressing to a higher research degree. Victoria University also offers high quality Masters and Doctoral programs by research in sciences that are designed to further educate you such that you can become an independent and sought after researcher in your own right.

Thus, in this booklet, you will find some basic information as to the structure of the honours year and an introduction to postgraduate study. More importantly, you will also find a list of the projects that staff will be offering to honours and postgraduate students. In most cases the projects can be adapted to either honours or postgraduate students, so take some time to consider what your interests are, and speak directly to the staff involved so that you can make an informed decision – after all, it's your future!

HONOURS COURSE DESCRIPTION

SHBM BACHELOR OF SCIENCE (HONOURS) – BIOMEDICAL SCIENCE

SHNF BACHELOR OF SCIENCE (HONOURS) – HEALTH NUTRITION AND FOOD SCIENCE

Course Co-ordinator

Dr Alan Hayes: Ph – 9919 4658, email - alan.hayes@vu.edu.au

PREREQUISITES

A faculty honours score of at least a credit average over the three years of your undergraduate degree, with a score of 65% or better in third year level subjects is required to be eligible for honours. Acceptance is subject to the availability of supervisors and suitable projects; placements are therefore competitive.

Students should discuss their eligibility and potential research area with the Honours Coordinator. Any deviations to the prerequisites listed above are at the discretion of the Course Co-ordinator after advice from the confirmed supervisor and discussion with the Head of School.

OBJECTIVES

The Science Honours degree program aims to develop the student's ability in the areas of independent thinking, critical evaluation, experimental design, data analyses, interpretation of data, oral and written reporting of data and laboratory skills. Additionally, it aims to improve the student's knowledge base in an area related to Biomedical Science or Ecology and Sustainability at an advanced level.

Students are expected to learn and develop the following skills:

- planning, implementing and communicating a research project
- critical evaluation of research papers
- understanding the role of a research scientist within a community setting
- interpretation of a body of knowledge leading to innovative research questions and testable hypotheses
- knowledge of appropriate experimental design and data analyses
- laboratory techniques sufficient to obtain a substantial body of work, either as results or optimisation of a methodological approach
- critical evaluation of one's own findings and their impact on current knowledge
- clear, concise and precise communication, both oral and written

- aptitude and ability to take on employment or further post-graduate study without close supervision and with a high degree of responsibility

The Science Honours degree program consists of a coursework component and a research project component.

COURSEWORK COMPONENT

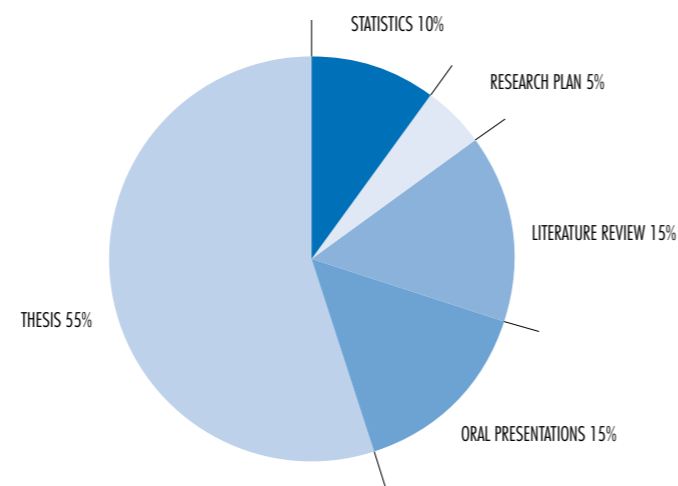
- Research conduct, ethics and training
- Critical review of research papers
- Oral and written presentation skills
- Advanced experimental design and statistics

RESEARCH COMPONENT

- Comprehensive review of scientific literature
- Original, supervised research project
- Oral presentations to school members

ASSESSED ITEMS

- Advanced experimental design and statistics
- Research plan
- Written review of the literature
- Oral presentations covering background, research design and outcomes
- Written thesis at the end of the year, not exceeding 12,000 words (55% of the total mark for Honours as a whole) including defence of thesis



POSTGRADUATE RESEARCH COURSE DESCRIPTION

SRHC MASTER OF SCIENCE (RESEARCH)

EPHC DOCTOR OF PHILOSOPHY

Contact

Dr Alan Hayes: Ph – 9919 4658, email - alan.hayes@vu.edu.au

PREREQUISITES

Honours, Honours equivalence, 4-year degree with minor-thesis component, or significant research experience. Acceptance is subject to the availability of supervisors and suitable projects and placements are competitive. Students are encouraged to contact potential supervisors (through the above contact) to discuss their eligibility and potential research area.

Objectives - taken from Guide to Research Degrees – the full details about research degrees at VU and the downloadable publication can be found at www.vu.edu.au/postgrad

A research degree requires a high level of self motivation and independence of thought and action. Students are expected to plan and manage their time according to the work they undertake. They must make further judgments about their research as their degree progresses. During the course of the degree, the student will also experience a definite shift from dependent to independent researcher.

A Masters by Research (MSc) degree is awarded after examiners are satisfied that the student has demonstrated:

- A thorough understanding of the relevant techniques in the field of research by both a thorough review of the literature and their application;
- Competence in the chosen field through judicious selection and application of methods to yield a significant body of work;
- Capacity to critically evaluate and effectively present this body of work.

The thesis for a Masters by Research degree is expected to be between 30,000–60,000 words, and the time taken to complete a Masters degree is two years equivalent full-time.

The Doctor of Philosophy (PhD) degree provides training and education in research under appropriate supervision, with the objective of producing researchers capable of conducting research independently, at a high level of originality and quality. A doctoral student should uncover or create new knowledge by the discovery of new information, formulation of theories, development of new approaches, or the innovative re-interpretation of existing ideas, theories or approaches.

A Doctor of Philosophy degree is awarded after examiners are satisfied that the student has, through a systematic series of enquiry around a central research question, demonstrated:

- A deep and thorough understanding of the relevant techniques in the field of research;
- Competence in the chosen field through judicious selection and application of methods to yield a significant body of work;
- Capacity to critically evaluate and effectively present this body of work;
- Independence of thought and approach;
- An original contribution to knowledge.

A PhD thesis is expected to be 60,000–100,000 words long and the time taken to complete a PhD is three years EFT (36 months).

RESEARCH PROJECTS SUMMARY

The biomedical sciences group is involved in four broad areas of strategic research emphasis:

- (1) 'Biomedical Sciences', which includes genetics, inflammation, osteopathic medicine and women's health;
- (2) 'Food Science';
- (3) 'Muscle and Exercise Metabolism'; and
- (4) 'Nutrition'.

While many projects will cover more than one area (as will staff) due to the integrative nature of research within the school, the projects listed within this booklet are loosely organised within these groupings with the relevant staff members indicated.

<p>Biomedical Sciences</p> <ul style="list-style-type: none"> • Cardiovascular Disease • Genetics • Inflammation <ul style="list-style-type: none"> • Osteopathic Medicine <ul style="list-style-type: none"> • Women's Health 	<p>Dr Anthony Zulli</p> <p>Dr Swati Baidur-Hudson</p> <p>Professor Heng Seow</p> <p>Dr Deanne Skelly</p> <p>Dr Gary Fryer</p> <p>Dr Patrick McLaughlin</p> <p>Professor Lily Stojanovska</p>
<p>Food Science</p>	<p>Dr Nivedita Datta</p> <p>Dr Osaana Donkor</p> <p>Dr Vijay Mishra</p> <p>Associate Professor Mikel Duke (ISI)</p> <p>Professor Nagendra Shah</p> <p>Dr Todor Vasiljevic</p>
<p>Muscle & Exercise Metabolism</p>	<p>Dr Ronnie Blazev</p> <p>Dr Nicoleta Dragomir</p> <p>Dr Alan Hayes</p> <p>Dr Emma Rybalka</p> <p>Dr Chris Stathis</p>
<p>Nutrition</p>	<p>Associate Professor Jack Antonas</p> <p>Dr Michael Mathai</p> <p>Dr Andrew McAinch</p> <p>Dr Xiao Su</p> <p>Dr Hock Hin Yeoh</p>

BIOMEDICAL SCIENCES

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NEW THERAPIES FOR BIG PROBLEMS – TACKLING CARDIOVASCULAR DISEASE

DR ANTHONY ZULLI

Heart disease remains a big problem in society, and new medications are necessary to help combat this increasing burden. We have found that the stimulation of 'beneficial' receptors can help restore normal artery function, and this project will help discover the precise mechanisms of action which will lead to novel therapeutic options.

ANTISENSE STRATEGIES FOR TREATMENT OF CHRONIC DISEASES AND INFLAMMATION

PROFESSOR HENG SEOW

miRNAs are a class of single stranded RNA molecules which bind to mRNA targets and inhibit its translation. Recent evidence indicates that altered miRNA expression correlates to the pathogenesis of diseases such as cancer. However, the biological functions of the identified miRNAs are still not well-studied. In our study, sequence specific anti-sense molecules will be designed and used as miRNAs inhibitors to study the functions of miRNAs in various cells such as adipocytes, liver, muscle and cancer cell lines. The possibility to inhibit inflammation by downregulating the miRNAs involved with anti-miRNAs will be investigated.

THE ROLE OF PROTEIN COMPLEXES IN NORMAL KIDNEY FUNCTION

DR DEANNE SKELLY

One of the first signs of diseases such as hypertension and diabetes is kidney damage, which is associated with excessive protein excretion in the urine. The loss of protein is due to damage to the tubular system. Research suggests that a complex of proteins is required for uptake by the tubules. Projects in this area will use techniques such as recombinant protein expression, PCR, RNA extraction, SDS-PAGE and Western blot to investigate the different proteins in the complex, and what regulates their formation and function.

This project may also involve collaboration with researchers at RMIT.

THERAPEUTIC EFFECTS OF COMPLIMENTARY THERAPY USED AS A NON- HORMONAL ALTERNATIVE IN POST-MENOPAUSAL DIABETIC WOMEN

PROFESSOR LILY STOJANOVSKA

Diabetes is a metabolic disorder that can lead to cardiovascular complications and subsequent mortality. Menopause is characterised by decreased levels of oestrogen hormone, which leads to psychological and cardiovascular disorders. Many postmenopausal women suffer from moderate - to - severe menopausal symptoms, including impaired sexual function. Diabetes significantly impairs the sexual performance of diabetic women. Vascular impairment and psychological complaints have been implicated in the pathogenesis of decreased libido and sexual dysfunction. Hormone therapy (HT) is the treatment most commonly used to relieve menopausal symptoms, however, HT has been associated with an increased risk of breast cancer and stroke. In particular, diabetic postmenopausal

women are discouraged to take HT, as it significantly increases the risk of cardiovascular complications and mortality. This has motivated many women to cease HT and look for alternative treatments.

Maca is the root from the plant *Lepidium Meyenii*, which is grown in Peru and widely available in US and Australia. It is consumed by women as an alternative product to HT. Initial research provides support for the beneficial effects in post-menopausal women in improving symptoms and sexual dysfunction. Other potential benefits in female diabetic post-menopausal woman, remain largely unexplored. *G. tsugae* var *Reishi*, a Chinese red mushroom has a long history of use in folk medicine worldwide. In vitro and clinical studies have shown that the bioactive components of Reishi mushrooms exert hormonal effects, possibly prevent chronic diseases and alleviate symptoms associated with hormone-dependent disorders. Studies show that Reishi mushrooms have immunomodulatory actions which have implicated their potential therapeutic effect against cancer as well as indication of their beneficial effect on the metabolic profile and glucose metabolism in overweight women thus improving cardiovascular risk profile. This project aims to investigate the effects of two complementary supplements, Maca and Reishi on hormonal, metabolic, cardiovascular and immunological markers as well as symptoms including sexual dysfunction in postmenopausal women with type 2 diabetes, comparing them with an age-matched control group.

HEALTH BENEFITS OF NON-CALORIC NATURAL SWEETENER IN POST-MENOPAUSAL WOMEN

PROFESSOR LILY STOJANOVSKA

Stevia is a natural low calorie sweetener made from the plant *Stevia rebaudiana*. With its extracts having up to 300 times the sweetness of sugar and zero calories, stevia has garnered attention with the rise in demand for low-carbohydrate, low-sugar food alternatives. Medical research has also shown possible benefits of stevia in treating obesity, hyperglycemia and hypertension. Stevia comes in two glycoside forms; stevioside and rebaudioside A (RebA). To date most of the studies have been conducted on stevioside showing insulinotropic, glucagonostatic and antihyperglycemic effects in animals and humans. However, little scientific data is available on RebA, which is supposed to help normalise blood pressure and blood sugar and may have an effect on weight control. The aim of this study is to investigate the beneficial effects of RebA supplementation in soy beverage in postmenopausal women.

SPROUTED/MALTED GRAINS AS NATURAL SOURCES OF GABA FOR PROMOTING SLEEP AND ENHANCING MOOD

PROFESSOR LILY STOJANOVSKA

GABA (Gamma amino butyric acid) is an important neurotransmitter produced by the body from the amino acid glutamic acid. Studies have shown that GABA increases the body's sleeping cycle. Many regular grains like brown rice contain GABA, and sprouting increases GABA content. This study will look at the GABA levels in a range of sprouted grains and their effectiveness in promoting sleep and enhancing mood.

EFFECTS OF COMPLEMENTARY THERAPY ON SEXUAL FUNCTION IN WOMEN WITH TYPE 2 DIABETES

PROFESSOR LILY STOJANOVSKA

Diabetes is a major health problem, affecting over 1 million Australians and just as many undiagnosed individuals. The major complication of diabetes is heart disease, resulting in the nation's biggest mortality. Maca is the root from the plant *Lepidium Meyenii*, which is grown in Peru and widely available in the US and Australia. It is consumed by women as an alternative product to HT. Initial research provides support for the beneficial effects in post-menopausal women in improving symptoms and sexual dysfunction. Other potential benefits in female diabetic post-menopausal women remain largely unexplored. This project aims to investigate the effects of Maca on sexual dysfunction in peri-menopausal women with type 2 diabetes, comparing them with an age-matched control group.





FOOD SCIENCE

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β- GLUCAN-EXTRACTION, CHARACTERISATION AND USE IN FOODS

DR VIJAY MISHRA

β-glucans have been reported to have several health benefits, such as lowering blood cholesterol, improving glucose and insulin responses, and boosting immunity when sufficient quantities are consumed. These are not digested in gastrointestinal tract and are therefore classed as soluble dietary fibre. Cereals (oat and barley) and certain yeasts and mushrooms contain glucans of varying structures and composition. The levels present in these sources vary. In order to derive any health benefits these need to be extracted in pure form and incorporated into different foods. The project aims at extraction and purification of β-glucan from varieties of barley and oats grown in Australia, measurement of functional properties, particularly gel formation and processing characteristics, evaluation of the effect of addition of β-glucan in bakery products, such as bread, biscuits and cakes with a view to deliver health benefits, and finally to simulate the digestion of these products containing β-glucan.

STABILITY OF SOUP EMULSIONS

DR VIJAY MISHRA

Soup manufacturing is a multibillion dollar processed food industry, which markets soups in several different forms, such as canned, aseptically processed and reconstitutable dry soup powders. As there are many varieties available, different ingredients are used in their manufacture to cater to various taste and flavour perceptions. A generic process of manufacturing involves blending oil and water in the presence of a suitable emulsifier, breaking oil into small droplets, addition of suitable flavours and/or other ingredients and commercial sterilisation. The stability depends on several factors, which include the type and concentration of a surfactant, the temperature and time used in the processing, the size and distribution of the dispersed droplets and physical properties, such as density and viscosity of the two phases. These systems should be suitably protected against destabilising forces during commercial sterilisation. The proposed study endeavours to characterise cream soup emulsions in order to help explain the chain of events that relate their stability to various influencing factors by employing the microscopic and rheological methods. The research will focus on the development of a method for microstructural characterisation of soup and measurement of rheological properties. The change in the microstructure as a function of formulation, process, thermal processing schedule and storage conditions will be investigated.

MINIMAL PROCESSING OF FRUIT AND VEGETABLES

DR VIJAY MISHRA

Market for minimally processed fruit and vegetables (MPFV) is growing worldwide, estimated to reach a value of \$50-60 million per annum in Australia. Minimal processing involves trimming, peeling, cutting, washing, sanitization, disinfection, and packaging of fruit and vegetables. Due to loss of natural defence mechanisms, the quality of MPFVs deteriorates at a faster rate resulting in to significant product losses. In addition, safety of these products has been recently questioned due to their role as a carrier of food pathogens such as Salmonella, E. coli and Listeria. The project aims at investigating the mechanism of the loss of quality, microbial ecology and application of a range of preservation methods to improve shelf stability. The study aims at evaluating use of selected coatings, reduction of water activity and modified atmosphere packaging with an objective to improve shelf stability.

PROPERTIES OF DAIRY PROCESSING SLUDGES

DR VIJAY MISHRA

The state of Victoria produces and processes majority of milk produced in Australia. The dairy processing industry generates large quantities of wastewater containing high concentration of organic matter, nutrients and salts. The industry is seeking ways to minimise the BOD levels at source and reuse wastewater in addition to finding suitable means of processing and disposal of sludges of varying composition. The study investigates the source and characteristics of sludges generated by determining the physical, chemical and biological properties. The data so generated will be used to predict the nature of the sludge and propose a suitable treatment/disposal strategy. A computer based decision support model will be developed to aid the decision making process for sludge disposal.

ANTIOXIDANT IN FRUITS AND VEGETABLES

DR VIJAY MISHRA, PROFESSOR JOHN ORBELL

Antioxidants may be considered to fall into two general categories; namely fat soluble (lipophilic) and water soluble (hydrophilic). These compounds are found in a variety of foods and beverages and are believed to have health benefits. It is believed that antioxidants have a role in stabilizing free radical species. Preventative antioxidants impede free radical formation from unstable precursors. Chain-breaking antioxidants interrupt the chain reactions that free radicals undergo at the stages of propagation and branching. Chain-breaking antioxidants are widely studied and their mechanism of action is considered to be by hydrogen atom transfer (HAT). Indeed, HAT is currently accepted to be the predominant mechanism for auto-oxidation induced by free radicals. The aim of this study is to evaluate the effect processing of fruit and vegetables fibres on the antioxidant

activity, with the aim of improving nutritional status of processed foods. The project intends to evaluate effect of common processing treatments such as blanching on the antioxidant activity in selected fruit/vegetable. You will focus on anthocyanins.

MICROPARTICULATED WHEY PROTEINS - FUNDAMENTALS AND FUNCTIONALITIES

DR TODOR VASILJEVIC

Whey proteins (WP) present an excellent nutritional source in addition to their functional properties such as stabilizing and emulsifying ability frequently exploited in the food industry. The functional properties of WP are largely determined by processing history especially heat treatment applied. In order to fully utilize functional properties of WP in different food systems, they need to be recovered in their native, undenatured state and subsequently incorporated in the food matrix. However, current technological processes for the recovery of WP usually incorporate membrane processes followed by spray drying, a process involving application of heat and water removal for extended long-term stability of the WP powder. On the other hand, this treatment often results in a detrimental effect on the functional properties of WP through denaturation especially if performed outside the physiological pH. Such obtained WP may be further destabilized upon addition to a food system, where they may interact with other food components, i.e. hydrocolloids. The rate of reaction is enhanced in the presence of heat at low pH, presenting e.g. a major obstacle for inclusion of WP to fruit beverages. The aims of the project are to apply a novel method that involves high pressure shearing with simultaneous heating for generation of microparticles with improved physical functionalities; to establish processes governing aggregation kinetics during microparticulation and to suggest possible applications. These studies will primarily use techniques in biochemistry, protein chemistry, food science and engineering

LONG TERM PRESERVATION OF BIOACTIVE MATERIALS

DR TODOR VASILJEVIC

The removal and/or immobilization of moisture from biological materials has been one of the most practiced methods of the long-term preservation. The extension of shelf life of perishable food products by drying or freezing and the delivery of various active compounds prepared by drying in the pharmaceutical industry are the examples for the application of this methodology. Furthermore, biomedical science and industry use cryopreservation to prevent the loss of the functional properties of important cellular materials. Although lowering of moisture content may improve stability of biological materials and prevent deteriorative reactions such as enzymatic and microbial changes, it may also alter the functionality of these materials. Pharmaceutically and medically important biological materials, i.e. bioactive proteins, cellular and tissue materials, would lose their important functional properties upon water removal, while dry and frozen food products would have altered sensory characteristics. The importance of water in maintenance of the functionality of biological materials has become apparent, instigating the need for identifying underlying mechanism(s) leading to a loss of functionality and ways to prevent its occurrence.

Stabilization of cellular materials during drying is widespread in nature; many plants and animals have the ability to survive almost complete dehydration, a phenomenon known as anhydrobiosis. A common mechanism of stabilization in these organisms is the accumulation of large amounts of disaccharides, especially sucrose and trehalose as well as selected amino acids and their derivatives, quaternary amines and their sulfonium analogues i.e. glycine betaine and carnitine, and several other chemicals. During initial drying stages, these compatible sugars likely protect cellular structure first through "the preferential exclusion", a mechanism by which proteins are preferentially hydrated and protected. In the later drying stages, the functionality of biological materials is possible achieved by compatible solutes replacing the water that is normally hydrogen-bonded to polar residues preventing a break down or collapse thus regaining the active conformation upon rehydration. This latter mechanism may be accompanied with the phase transition of compatible sugars, which may form an amorphous matrix in the cytoplasm, thus immobilizing bioactive material in the glassy matrix, preventing molecular movement and loss of the structural conformation.

These studies will primarily use techniques in biochemistry, food science and technology and some of the project objectives would be: (i) to define the thermophysical behaviour of naturally occurring osmolytes; (ii) to establish the mechanism of membrane stabilisation by selected osmolytes in the model system such as liposomes; (iii) to establish the preservation mechanism of the activity and conformation maintenance of complex multimeric model proteins such as

hemoglobin; (iv) to establish the permeating ability of selected osmolytes across artificial and biological membranes; and (v) to define the effect of cooling, drying and rehydration rate on the effectiveness of selected osmolytes in the functionality preservation.

EXPLORATION OF THE INTERACTIONS OF DAIRY CONSTITUENTS ON THE SURFACE OF NEW MEMBRANES

DR MIKEL DUKE, DR PETER SANCIOLO, DR TODOR VASILJEVIC AND
DR NICOLETA DRAGOMIR

This project will focus on the exploration of the interaction of constituents in dairy on membranes, such as proteins, acids, sugars and salts, using analytical techniques such as confocal microscopy. Membranes are extensively used in dairy, and there are many new membrane types emerging. Their performance can however be compromised by the constituents listed so it's important to explore the degree of this fouling by analytical techniques. In this project, membranes will be exposed to dairy components and then subject to characterisation to explore the effects on the membranes. One of the key techniques to be used is confocal microscopy.

MEMBRANE SYSTEMS FOR PURIFICATION OF LACTIC ACID

DR MIKEL DUKE, DR PETER SANCIOLO AND DR TODOR VASILJEVIC

Lactic acid has many great uses in pharmaceuticals, foods, biodegradable plastics and chemicals industries. It is produced by the fermentation of glucose, but its purification is costly and inhibits the commercial success of lactic acid. In this project, membranes will be explored to purify lactic acid and potentially reduce the cost of the purification process. Various membranes will be trialled and compared with each other to choose the best performance in an environment representing the real process conditions.

EXERCISE METABOLISM AND MUSCLE PHYSIOLOGY

IMPROVED ENZYME-BASED DIPSTICK METHOD FOR CYANOGEN DETERMINATION

DR HOCK HIN YEOH

Regular intake of sub-lethal level of HCN may cause irreversible neurological disorders. Such ill-effects of consuming cassava-based food with residual level of cyanogens are evident in developing countries where cassava is a staple food. An enzyme-picrate paper/dipstick procedure has been developed as a convenient, simple and accurate method that could be used in the field by a non-skilled operator to estimate the amount of cyanogen in the cassava based food. Since 1995, several hundreds enzyme-picrate paper kits have been distributed free to stakeholders in developing countries. There are two limitations in this procedure that we would like to improve upon, namely the reaction time for analysis and stability of the picrate paper. Reducing the analysis time from an overnight incubation to 30 mins or less could offer the operator a quick analysis. Improving the stability of the picrate paper will increase the shelf life of the test kit. An improved analytical method will certainly contribute to reducing health risks in the consumption of cassava in the developing countries. The method could also be used by industries dealing with the production of cassava based foods. Biochemical techniques associated with protein isolation, enzyme assays and kinetic studies will be used in this project. A good background in chemistry will be useful.

USE OF NATURAL POLYMERS FOR THE RECOVERY AND STABILIZATION OF AIR-DRIED LINAMARASE

DR HOCK HIN YEOH AND DR BRONWYN WATSON

Successful application of an enzyme as biosensor depends not only its specificity for the substrate but also on the extent its activity can be retained when it is kept dehydrated at room temperature. In the development of linamarase-based sensor (dipstick) for linamarin, we found that gelatin together with polyvinylpyrrolidone could be used to stabilize and keep the enzyme active when stored at room temperature. In this project we would like to explore the use of other natural polymers, such as starch, in the retention and storage of linamarase at room temperature, and their impact on the kinetic properties of the enzyme. Findings could lead to development of new or improved sensors for linamarin or in other applications. This project will involve the use of biochemical techniques associated with enzyme preparation, spectrophotometric enzyme assays and enzyme kinetic studies.

REDUCING CYANOGEN CONTENT FROM CASSAVA DURING PROCESSING

DR HOCK HIN YEOH AND DR BEE MAY (RMIT UNIVERSITY)

The edible storage root of cassava is a staple food to 800 million people in the developing countries. In Australia, the consumption of cassava has increased due to increasing popularity of tapioca chips and veggie chips. Since the cassava root contains a cyanogenic glucoside which can be broken down into hydrogen cyanide (HCN), it is important that the food products are safe for consumption. In February 2008, the NSW Food Authority published an advisory note regarding the consumption of cassava based food as potential health risks. In March 2008 the Food Standards Australia New Zealand recommended lowering the cyanogen content of cassava based food from the 25 ppm to 10 ppm. The latter has been recommended by FAO as regular intake of sub-lethal level of HCN may cause irreversible neurological disorders. A process that effectively reduces the cyanogen content in cassava based food products will benefit the various stakeholders, namely consumers, cassava growers in the developing countries and Australian industries. This project will examine different approaches including an enzyme based treatment that could lead to effective removal of cyanogen from cassava roots during processing. You will learn about the biology of cassava as well as biochemical principles and techniques associated with enzymes.

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DO HOMOLOGOUS MUSCLES FROM RATS/MICE OF DIFFERENT STRAINS DIFFER WITH RESPECT TO MYOSIN HEAVY CHAIN (MHC) ISOFORM/FIBRE TYPE COMPOSITION?

DR RONNIE BLAZEY

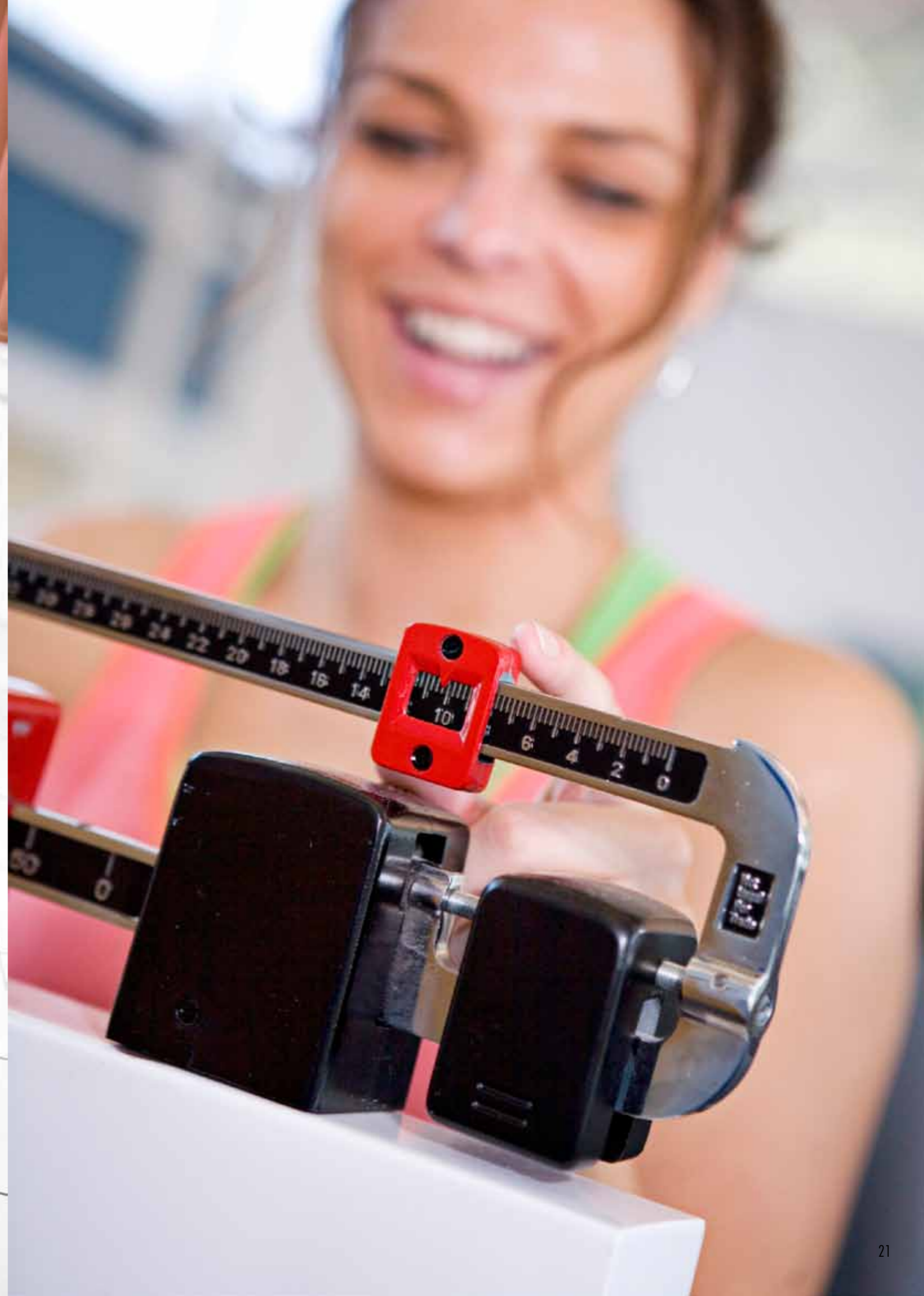
Recent research efforts concerned with muscle physiology have focused on the molecular diversity and plasticity of skeletal muscle. Indeed, there is now a growing awareness regarding the molecular complexity of single muscle fibres among physiologists concerned with basic and applied aspects of skeletal muscle with respect to muscle development, function, and disease. For example, an increase in the proportion of certain fibre types within a given muscle may be an indication of a muscle that is undergoing a transformational change. Similarly, the appearance hybrid fibres (single fibres that possess 2 or more myosin heavy chain isoforms) may be an indication of a muscle that is specialized for specific mechanical activities.

The purpose of this project is to systematically examine at a single fibre level the myosin heavy chain isoform composition of functionally different muscles isolated from different rat/mice strains commonly used in physiological research. It is hypothesized that subtle molecular differences exist between homologous muscles from different strains that translate into functionally meaningful differences.

FUNCTIONAL CHARACTERISATION OF THE TONGUE CONTROLLING MUSCLES IN THE CANE TOAD *BUFO MARINUS*

DR RONNIE BLAZEY

Protraction and retraction of the tongue in the cane toad *Bufo marinus* is accomplished by 2 extrinsic muscles, the genioglossus and the hyoglossus, respectively. While considerable research has focused on elucidating the mechanism by which the tongue is used for feeding, very little is known about the functional properties of the muscles that control the tongue. Thus, the aim of this project is to functionally characterise the tongue-controlling muscles of the cane toad with respect to calcium/strontium activation properties and myosin heavy chain isoform composition.



COMPARISON OF LACTATE DEHYDROGENASE ISOENZYMES IN MAMMALIAN AND AMPHIBIAN SKELETAL MUSCLES

DR RONNIE BLAZEY

The enzyme Lactate dehydrogenase (LDH) plays an important role in the interconversion of pyruvate and lactate. This enzyme exists as five isoenzymes in mammalian tissues, each catalysing the same reaction, but exhibiting different kinetic properties, depending upon their subunit composition. The amount and distribution of these enzyme forms is characteristic for a particular tissue and can be a useful way of fingerprinting (i.e. identifying biochemically) a tissue. Currently there is little information on the LDH isoenzymes in amphibian skeletal muscle. This project will compare the LDH isoenzyme composition in a number of limb and trunk skeletal muscles and the cardiac muscle of rats, mice and cane toad.

VISUALISATION, DISTRIBUTION AND CHARACTERISATION OF IMPORTANT CONTRACTILE PROTEINS IN VERTEBRATE SKELETAL MUSCLE USING CONFOCAL MICROSCOPY

DR RONNIE BLAZEY AND DR NICOLETA DRAGOMIR

A highly organised matrix arrangement of various contractile proteins and organelles is confined within the sarcomeres of vertebrate skeletal muscle. Using results obtained by physiological and biochemical means as a basis, this project will use confocal fluorescence microscopy to obtain a better understanding of the function and dynamic interactions of important contractile and contractile-related proteins in vertebrate skeletal muscle. Preparations comprising fresh single muscle fibres/cells, whole muscle sections, and biochemically prepared myofibrils will be utilised to identify and characterise important contractile and contractile-related proteins such as myosin, actin, dystrophin, titin, obscurin, and calsequestrin.

CHARACTERISATION OF HUMAN SKELETAL MUSCLE BIOPSIES ACCORDING TO MYOSIN HEAVY CHAIN (MHC) ISOFORM COMPOSITION

DR RONNIE BLAZEY AND DR ALAN HAYES

Vertebrate skeletal muscle is comprised of numerous single muscle fibres/cells, where each muscle fibre is composed of functional units referred to as sarcomeres. Within each the sarcomere are the myofibrillar proteins responsible for muscle contraction: myosin and actin. Whilst myosin ATPase staining techniques have been traditionally used for classifying muscle fibres in human skeletal muscle, these techniques are not able to effectively identify muscle fibres containing more than one myosin heavy chain isoform (i.e. mixed or hybrid fibres). Thus, this project will use single fibre electrophoretic separation (using SDS-PAGE) in order to identify the myosin heavy chain isoforms found in populations of single muscle fibres isolated from human skeletal muscle biopsies. Classification of human whole muscle according to fibre type composition will enable a better understanding of muscle function.

METABOLIC CONTROL IN SKELETAL MUSCLE

DR ALAN HAYES, DR EMMA RYBALKA, DR CHRIS STATHIS

The metabolic rate (i.e. rate of ATP utilisation) in skeletal muscle is several hundred-fold greater during maximal activity compared with rest. To prevent decreases in ATP in the muscle fibre the flux through metabolic pathways involved in the resynthesis of ATP, such as glycolysis, increases to meet this increased demand. The mechanisms involved in the regulation of metabolism are still being established. Good understanding of these processes may lead to new targets for weight loss or treatment of diseases such as muscular dystrophy and diabetes.

MUSCLE GROWTH AND FAT LOSS – THE ONLY WAY TO LIVE (LONGER!)

DR ALAN HAYES, DR EMMA RYBALKA, DR CHRIS STATHIS

Maintaining lean muscle mass is important for one's health and longevity, with a number of apparently unrelated diseases (AIDS, Crohn's diseases, chronic heart failure, diabetes) all exhibiting muscle wasting and weakness. Further, the gradual gain in fat mass as we age now appears to create a state of chronic low grade inflammation. Thus, in both human participants and/or animal models, we aim to investigate the effects of a variety of different exercise and/or dietary supplements on exercise performance, fat and muscle mass and the mechanisms by which they act.

EFFECTS OF ANABOLIC DRUGS ON RECOVERY OF SKELETAL MUSCLE FOLLOWING INJURY

DR ALAN HAYES, DR EMMA RYBALKA, DR CHRIS STATHIS

Muscle injury is a way of life, and improving the rate of recovery of muscle function is important, from getting weekend athletes back to work, to returning elite athletes to the sporting arena. This project will involve subjecting damaged skeletal muscles to anabolic drugs such as creatine and taurine and investigating the recovery of structure and function.

ENDURANCE EFFECTS OF WHEY PROTEIN ON TRIATHLETES

DR ANDREW MCAINCH, DR CHRIS STATHIS, DR ALAN HAYES

Most people will accept that protein ingestion will aid in the building of muscle mass during a resistance training program. However, if this increase is lean mass, then it may also benefit endurance athletes. Coupled with some evidence that whey protein may be able to improve muscle oxidative function, we aim to investigate whether ingestion of whey protein can improve the performance of elite endurance athletes.

POTENTIAL THERAPIES FOR MUSCULAR DYSTROPHY

DR ALAN HAYES, DR EMMA RYBALKA, DR CHRIS STATHIS

Duchenne Muscular Dystrophy (DMD) is a severe, progressive disease characterised by skeletal muscle degeneration and early death. While genetic cures remain some way off, ways of maintaining function and alleviating the symptoms need to be pursued. This project will investigate the treatment efficacy of a number of natural supplements and manufactured drugs on the contractile, histochemical and metabolic properties of dystrophic muscle.

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THE REGULATION OF NUTRIENT UTILIZATION AND ENERGY EXPENDITURE IN MUSCLE

DR ANDREW MCAINCH

Obesity and type 2 diabetes mellitus (T2DM) are complex diseases in which environment (ie. diet and physical activity) and genes interact to confer disease susceptibility. Skeletal muscle is pivotal to whole body energy use; by virtue of its mass it accounts for approximately 30% of resting metabolic demands, and also has the capacity to regulate energy use between the major oxidative fuels, being either fat or carbohydrate. Several research groups have identified a reduced capacity for fat oxidation as a fundamental defect that increases the propensity for weight gain. An impaired capacity to use fat as a fuel source may also persist following weight loss. Perturbations in muscle fat metabolism may also contribute to the development of type 2 diabetes. Fat stored within muscle cells as triglyceride (IMTG), is negatively related to insulin action, a key impairment in diabetes. A number of projects will be available during 2009. These will involve the study of the effects of obesity and diabetes in: leptin, adiponectin, endocannabinoids and different free fatty acids on muscle cell energy metabolism. Research techniques will include the culture of muscle cells, mRNA analysis using Real Time RT-PCR, and protein analysis using western blotting, glucose uptake, fatty acid oxidation and siRNA.

THE REGULATION OF WEIGHT AND ASSOCIATED METABOLIC ABNORMALITIES IN HUMANS

DR ANDREW MCAINCH

Obesity and type 2 diabetes mellitus (T2DM) are complex diseases in which environment (ie. diet and physical activity) and genes interact to confer disease susceptibility. Projects in this area will involve studying the adaptive changes in humans following dietary and exercise manipulations. A number of projects will be available during 2009. These will involve projects solely located at St Albans as well as possible collaborative projects with Dr McAinch's colleagues at Deakin University, Baker Heart Research Institute and/or Monash University. These projects will require dietary skills and/or exercise knowledge.

NUTRITIONAL PREVENTION OF OBESITY

DR XIAO SU

Seafood and Fish oil capsule contains two main omega-3 polyunsaturated fatty acids (n-3 PUFA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These fatty acids have health benefits and have been reported to lower the blood pressure and plasma triacylglycerol levels, and reduce the risk of coronary heart disease. In addition, they can improve inflammatory condition; reduce the symptoms of diabetes as well as a range of other disorders. The WHO recommended dietary intake of these n-3 PUFA is 650 mg/day which is much higher than the average dietary intake in Australia. The health effects of regular consumption of seafood and supplementation of fish oil on the concentration of plasma triacylglycerol, total cholesterol, HDL, LDL will be investigated. The composition and content of health-benefiting n-3 PUFA will also be studied.

STRATEGIES FOR PROMOTING HEALTH-BENEFITING FATTY ACIDS IN FOOD

DR XIAO SU

Regular consumption of seafood has been reported to reduce the risk of coronary heart disease, arthritis, diabetes, depression and certain types of cancer. This is due to the high concentration of omega-3 polyunsaturated fatty acids (n-3 PUFA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Manipulation of animal feed can improve the concentration of these n-3 PUFA, and have consequential benefits on human health. The study will investigate the effects of feed supplemented with fish oil and vegetable oils on Victorian farmed seafoods. The mechanism of lipid metabolism involved in the process will also be studied.

ANTI-NUTRITIONAL FACTORS IN FOOD

DR HOCK HIN YEOH AND DR XIAO SU

The food we consume affects our well-being if it contains undesirable elements. These could be natural toxins such as cyanogenic glycosides and/or anti-nutritional factors, such as enzyme inhibitors. The objective of this project is to assess the extent to which such anti-nutritional factors could be present in the tuber crops and vegetables that are commonly consumed, and if present how they could be removed. The latter is better appreciated by investigating the properties of the respective constituents. You will learn various biochemical techniques associated with protein isolation and spectrophotometry. In addition, you will experience making your own dipsticks for cyanogen analysis.

WHY CHOOSE VU

At VU, we are passionate about education, research and training without being stuffy in our approach. We're A New School Of Thought, which is why 3900 postgraduate students chose VU in 2009.

The University leads the way in many emerging career areas, including multimedia, tourism, hospitality, sport and recreation, biotechnology, transport, storage, distribution and logistics.

Our multi-award winning tourism and hospitality program continues to attract more students to these courses than any other Australian university.

Our primary areas of research investment are:

- Sports science, rehabilitation and exercise
- Sustainable environmental technologies in water treatment and building construction
- Social inclusion, cultural diversity and well-being in work and the community.

We are also growing our research capabilities in:

- Food technology
- Telecommunications and sensor technologies
- Educational access through school vocational and work-based learning
- Logistics, transport and supply chain management.

VU offers high-quality teaching, work-ready skills and course flexibility – our students thrive in this environment.

STUDENT SERVICES



STUDENT SERVICES INFORMATION

For general Student Services information:
www.vu.edu.au/futurestudents

Access the site above for a large range of VU services and facilities.

STUDENT SERVICE CENTRES

Located at 10 VU campuses, these centres provide access to a range of services for current and future students. These include course information, enrolments, fee payments and general student administration. The Centres feature computer terminals to access online services such as student email and the VU Internet.

Current students: www.vu.edu.au/askvu
Future students: www.vu.edu.au/futurestudents
FAQs www.vu.edu.au/gotovu
Phone +61 3 9919 6100
Visit Student Service Centres situated on all VU campuses

STUDENT ADVISORY SERVICE

The Student Advisory Service provides a comprehensive advice, information and referral service, and manages the Student Lounges where information is available to all students.

Student advisers can assist you with assessment issues, student progress hearings, discipline hearings, feedback and complaints. They can take on an advocacy role if you would like someone to speak on your behalf, where the relevant policies provide for this.

STUDENT SERVICES



MYVU PORTAL

MYVU is a web portal that provides individualised information including:

- Courses
- Scholarships
- Graduations
- Fees
- Timetables
- Examinations

STUDENT CONTACT CENTRE

The Student Contact Centre provides a range of services to current and future students by web and phone. These include course information, MYVU Portal password assistance, general student administration, enrolment and fee enquiries.

Current students: www.vu.edu.au/askvu

Future students: www.vu.edu.au/futurestudents

FAQs www.vu.edu.au/gotovu

Phone +61 3 9919 6100

Visit Student Service Centres situated on all VU campuses.

COMPUTER FACILITIES

Modern computer laboratories with the latest hardware and software are available at each VU campus.

Windows and Apple computers are used in teaching laboratories and open-access facilities. The latest Microsoft software and an extensive range of multimedia software are used across VU. Students have access to the internet and email, and all students receive an email address for personal use.

A central IT help desk is also available to answer student queries.

SPORT AND FITNESS

Our services and facilities include:

- Sport clubs, campus sport programs and representative sport opportunities
- Quality fitness centres at Footscray Park, St Albans, Sunbury and Werribee Campuses
- A heated, state-of-the-art 10-lane, 25-metre swimming pool at Footscray Park Campus
- A first-class athletics track and rugby field at Werribee Campus
- Multi-purpose sports halls at Melton, Footscray Park and Footscray Nicholson Campuses
- Tennis courts at Werribee, Footscray Park and St Albans Campuses
- A range of other sporting equipment, from scuba to golf

CAREER DEVELOPMENT

www.vu.edu.au/careers

VU's Student Career Development (SCD) website, above, provides access to a range of information and services tailored to the needs of students, graduates, staff, employers and professional associations. SCD assists students' career management skills for more positive employment outcomes. Services include:

- Career development programs and workshops
- Student portfolio development
- Careers counselling, fairs and employer visits
- Resume-checking by email
- A VU Jobs Board to email you jobs of interest

STUDY SUPPORT

tls.vu.edu.au/SLS

Student Learning Services can help you with study skills and academic writing.

Higher Education: The Student Learning Unit offers workshops throughout semesters, as well as summer and winter schools during the semester breaks. Some workshops are tailored to the needs of specific faculties. Individual consultations are also available.

TAFE: The Concurrent Assistance (CA) unit assists students with writing assignments, working out what class teachers want, understanding textbooks, computer skills and how to write things in their own words. CA helps you with your immediate problem, and gives you the skills to tackle similar problems successfully in the future.

STUDENT SERVICES

COUNSELLING

Counselling services are available at most VU campuses. You can discuss any personal or relationship matter with a counsellor, and get help with study plans, time management and exam techniques.

FINANCIAL ADVICE

Student welfare staff can help you with budgeting, financial planning, claims for Youth Allowance/Austudy and tuition fee extensions. An adviser can also provide information about financial assistance including emergency relief, rent assistance and Centrelink benefits. Loans are available to assist students who are able to demonstrate financial need for study-related purposes. Loans are not available for school fees.

EQUITY AND SOCIAL JUSTICE BRANCH

www.vu.edu.au/equity

VU's values of equality of opportunity for students and staff, and diversity for its contribution to creativity and the enrichment of life, are supported by the Equity and Social Justice Branch (ESJB) in fostering a climate of acceptance, tolerance and co-operation and the prevention of unlawful or discriminatory behaviour. ESJB develops and implements university-wide policies and programs designed to maximise the access, participation and success of students from diverse and disadvantaged backgrounds.

VU has established procedures for receiving feedback and handling complaints of alleged discrimination and harassment as defined under Commonwealth and State anti-discrimination legislation. For further information, you can contact one of the University's trained equity advisers at the site above.

RECREATION

www.vu.edu.au/Current_Students/Campus_Life/index.aspx

Student Services helps you to get connected and involved, through:

- Entertainment — performers, film screenings, BBQs and market stalls
- Clubs and societies including social interest, cultural, faculty or sport based
- Major events, campus activities and trips
- Student arts and band competitions
- Help and advice for student organised activities

CHILD CARE

Victoria University has children's centres on Footscray Park, Footscray Nicholson, Newport and Werribee campuses, and the Jindi Woraback childcare centre at St Albans Campus. These centres provide high quality care and education for children from three months to six years of age. A pre-school program is also offered at each centre. VU's childcare centres have been accredited by the National Childcare Accreditation Council with the highest possible rating. Each centre runs programs designed to meet children's individual developmental needs.

The subsidised daily rate for students is \$58.50.

For more information phone:

Footscray Park Children's Centre

+61 3 9919 4578

Footscray Nicholson Children's Centre

+61 3 9919 8698

Newport Children's Centre +61 3 9919 8476

Werribee Children's Centre +61 3 9919 8098

Jindi Woraback +61 3 9364 6855

LIBRARY SERVICES

www.vu.edu.au/library

VU's services at 12 library sites provide students with access to:

- a warm, friendly student-focused environment
- photocopying, computing and printing facilities
- an extensive range of electronic and print resources
- a comprehensive information skills training program

HEALTH SERVICES

A doctor is available by appointment at Footscray Park Campus for advice and assessment on general health issues, contraception, sexual health, nutrition and injuries. Consultations are bulk-billed on presentation of a Medicare card.

DISABILITY SERVICES

Advice and academic support for students with a disability or a chronic medical condition is available, including:

- note taking
- sign interpreting
- provision of materials in alternative formats
- assistance with alternative assessment arrangements, including modifications to formal examinations

Students requiring support should register with Disability Services when they enrol.

Phone +61 3 9919 2193

Email disability@vu.edu.au

Students with a hearing impairment can also contact TTY— Teletypewriter by phoning +61 3 9919 2508.

STUDENT ASSOCIATION

www.vusu.org.au

The Victoria University Student Association (VUSA) is recognised as the 'peak student body' representing the interests of all Victoria University students. Within VUSA, the International Students Association (ISA) represents international students, and the Postgraduate Association represents postgraduate students.

All three student organisations have their own constitutions and elected committee structures to facilitate the executive committee's interactions with the University.

ALUMNI RELATIONS

www.vu.edu.au/alumni

Victoria University welcomes current students and graduates into its alumni community. With more than 250,000 graduates, the VU alumni community is a great way to expand your networks and update your personal and professional skills. Benefits include:

- an extensive program of personal and professional development sessions
- career assistance
- regular email newsletters
- opportunities to join special interest groups and international chapters
- discounts to a wide range of services for financial members

For more information contact Alumni Relations:

Email alumni@vu.edu.au

CHAPLAINCY

Chaplains are available to help with questions about spiritual and related matters.

MOONDANI BALLUK ACADEMIC UNIT

www.vu.edu.au/MoondaniBalluk

The Moondani Balluk Indigenous Academic Unit, staffed by and for Indigenous Australians, offers the Bachelor of Arts (Kynandoo) aimed specifically at Indigenous Australians and for non-Indigenous students interested in working with or for Indigenous communities or groups. Kynandoo is a Wurundjeri word meaning 'clever'.

Kynandoo offers units dealing with Indigenous Australia and global Indigenous cultural and leadership issues, and then gives you the space to take a set of subjects specific to your career goals.

The vision for Moondani Balluk is to create and foster a culturally safe environment that welcomes, nurtures and recreates community — a community that is embedded in relationship to the land, culture, law and Elders. We wish to share Indigenous knowledge and to translate and implant Indigenous practices into all our work, research and teaching. We provide advice, academic support, curriculum development and admissions assistance for Indigenous students.

For more information contact Moondani Balluk:
Phone +61 3 9919 5549
Email moondani.balluk@vu.edu.au

CAMPUSES

TRANSPORT TO OUR CAMPUSES

All VU campuses are serviced by public transport. For campus locations, see the list below and the map on the next page. Rail, tram and bus concession forms are available at the start of each year from Student Support.

For more information and timetables phone Metlink on 131 638 or visit www.metlinkmelbourne.com.au

The University operates a free evening shuttlebus service at the Footscray Park and St Albans campuses during semester to provide a safe link to local train

stations. The Footscray Park service provides a link to the Student Village.

For a timetable contact Facilities Management at St Albans Campus on +61 3 9919 2290 or at Footscray Park Campus on +61 3 9919 4150



CITY FLINDERS CAMPUS
300 Flinders Street, Melbourne (Melway map 2F)
Access: Direct train, tram and bus services from all parts of Melbourne



CITY KING CAMPUS
225 King Street, Melbourne (Melway map 2F)
Access: Direct train, tram and bus services from all parts of Melbourne



CITY QUEEN SITES
283 and 295 Queen Street, Melbourne (Melway map 2F)
Access: Direct train, tram and bus services from all parts of Melbourne



FOOTSCRAY PARK CAMPUS
Ballarat Road, Footscray (Melway map 2S F4)
Access: Train to Footscray station, local bus, or 10 minutes by car from the CBD



FOOTSCRAY NICHOLSON CAMPUS
Corner Nicholson and Buckley Streets, Footscray (Melway map 2S E10)
Access: Train to Seddon or Footscray stations, local bus, or 10 minutes by car from the CBD



NEWPORT CAMPUS
80 Champion Road, Newport (Melway map 55 H6)
Access: Train to Newport or North Williamstown stations, or 15 minutes by car from the CBD



ST ALBANS CAMPUS
McKechnie Street, St Albans (Melway map 25 K3)
Access: Train to St Albans station, local bus, or 30 minutes by car from the CBD

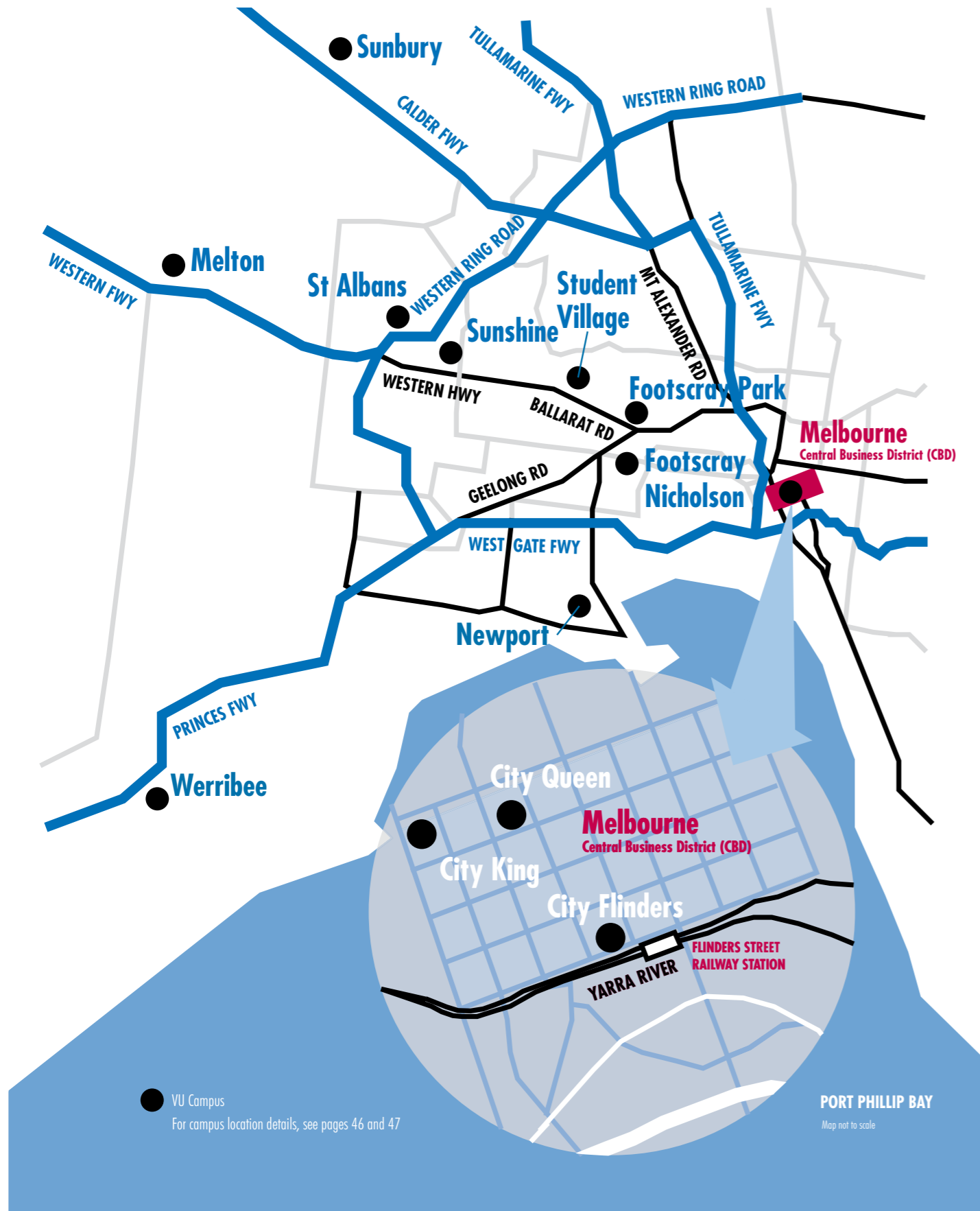


SUNSHINE CAMPUS
460 Ballarat Road, Sunshine (Melway map 26 J10)
Access: Train to Sunshine or Albion stations, local bus, or 15 minutes by car from the CBD



WERRIBEE CAMPUS
Hoppers Lane, Werribee (Melway map 206 H5)
Access: Train to Hoppers Crossing station, local bus, or 30 minutes by car from the CBD

VU CAMPUS LOCATIONS



APPLICATIONS

ADMISSIONS INFORMATION

For general admissions information:
www.vu.edu.au/futurestudents

POSTGRADUATE DEGREES

Coursework: Applications for most postgraduate coursework programs are made direct to the University. Course indexes and hardcopy Direct Admission/Supplementary Information forms can be downloaded from the Future Students website at www.vu.edu.au/futurestudents (click on the 'Applications forms' link).

For some courses, applications can also be submitted online at: <http://myvuportal.vu.edu.au>

Research: For details on a Masters by Research or Doctor of Philosophy, please contact the Postgraduate Research Unit on +61 3 9919 4521.

Doctor of Business Administration:

For the Doctor of Business Administration phone +61 3 9919 1076 or email nick.billington@vu.edu.au

Doctor of Education:

For a Doctor of Education phone +61 3 9919 4478 or email artscourses@vu.edu.au

INTERNATIONAL APPLICANTS

Please email VU International: international@vu.edu.au or phone +61 3 9919 1164.

SCHOLARSHIPS

For more information, visit www.vu.edu.au/scholarships or contact the Scholarships Office: Email scholarships@vu.edu.au Phone +61 3 9919 5568.

Victoria University offers a range of scholarships to prospective and continuing students.

VU's Undergraduate and TAFE Scholarships Office has a range of scholarships for Australian residents, including Commonwealth Education Costs and Accommodation Scholarships. There are 475 VU Access Scholarships including 100 for TAFE students.

The VU Foundation also co-ordinates many scholarships from donors and benefactors of the University. These benefit students who are in need of financial support for their studies.

Scholarships are available to full-time students who meet one or more of the following criteria: are on a low income, have dependent children, have moved from a rural or regional area to study, have an Indigenous background, are returning to study, have completed Year 12 in the western region of Melbourne, or experience other significant educational disadvantages. You can apply online once you have enrolled or re-enrolled.

International students can contact VU International for scholarship information at www.vu.edu.au/international

Postgraduate research scholarships, contact the Office for Postgraduate Research at www.vu.edu.au/postgrad or phone +61 3 9919 4659.

STUDY ABROAD

Visit www.vu.edu.au/international/studentexchange or contact Victoria Abroad: Email educationabroad@vu.edu.au Phone +61 3 9919 1319

Scholarships include a Travel Grant for students who meet the criteria to study abroad on exchange. Students may go on exchange for one semester or one year at an international institution with which Victoria University has a formal exchange agreement.

VU has more than 60 student exchange agreements with prestigious institutions throughout Asia, Europe, the United States, Mexico and Canada.

INTERNATIONAL

More than 4000 international students study at Victoria University's Melbourne campuses. The majority are from India, the People's Republic of China, Malaysia, Vietnam, Pakistan, Thailand, and Indonesia, while increasing numbers are from the Middle East, Mauritius, Japan, North America and Scandinavia.

For information about VU's English Language Intensive Language Courses for Overseas Students (ELICOS), TAFE, undergraduate and postgraduate programs available to international students see the relevant International Course Guide. For copies of the guides, contact Victoria University International (VUI):

Email international@vu.edu.au
 Phone +61 3 9919 1164

OFFSHORE PROGRAMS

VU delivers a diverse range of programs from diploma to masters level in Bangladesh, East Timor, Indonesia, the People's Republic of China, Hong Kong, Malaysia, Singapore, Vietnam and Germany.

Students can complete their academic programs in these countries or transfer to VU in Melbourne for part of their studies. For more information about offshore programs contact the relevant VU faculty.

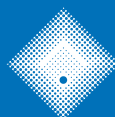
VTAC

For information about the VU postgraduate courses offered through VTAC, visit the VTAC website at www.vtac.edu.au or refer to the hardcopy VTAC Guide (available from newsagencies from late July 2009).

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