

# SCHOOL OF MEDICINE HONOURS PROJECTS INFORMATION PACK

Are you interested in doing Honours in 2016?



Read all about the projects on offer  
as outlined in this information pack.

See key dates on page 2.

Expression of Interest Form is at the  
end.

# KEY DATES

## Monday 2<sup>nd</sup> November 2015 –

Submit Expression of Interest Form to StudentHub 41– marked attention MEDI400 Honours co-ordinator (Barbara Meyer)

## Friday 6<sup>th</sup> November 2015 –

Submit Undergraduate Course Application Form to UniAdvice

For those interested, this year's cohort of Honours students will be presenting their final seminars on:

Monday 2<sup>nd</sup> November (9am-1pm)

Wednesday 4<sup>th</sup> November (9am-1pm)

In room 24.G02 – you're welcome to come along

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Hamstring exercises for injury prevention: Nordic or not?

**Primary Supervisor:** John Sampson

**Primary Supervisor email:** [jsampson@uow.edu.au](mailto:jsampson@uow.edu.au)

**Co-supervisor/s:** Ric Lovell (University of Western Sydney)

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

The current study will innovatively examine a unique unstable form of isometric exercise. This study is a chronic training intervention and the student will examine the neural adaptations following the first 8 weeks of the program. Exercises performed on an unstable surface are functionally relevant, increase muscle activation and can reduce injury risk to a greater extent than traditional stable strengthening exercise. However, no previous study has examined the effects of an unstable isometric exercise designed to increase hamstring strength and prevent injury.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on ..., etc):**

Dr Sampson has a number of projects looking at injury risk in soccer players. This chronic intervention will run for 12 weeks, although the student will examine only the neural adaptation in the first 8 weeks of the program. A second Hons project examining the acute effects of the unstable and Nordic exercises is a second hons project Dr Sampson has on offer and this project although independent is directly linked. The information gained from these projects will contribute to a larger (PhD) project that will examine the impact of the FIFA 11 (or modified FIFA 11) training program on injury risk in a large cohort of community level soccer players.

### **What is the specific role of the Honours student? (50 words)**

The student will be responsible for training participants, recording experimental data pre-post training and analyzing the results for their thesis.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

The student will need to develop skills in recording and interpreting data from EMG and Force platforms and in managing people throughout the course of a training intervention

### **Research methods to be used:**

Between groups experimental training study

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Exercise Physiology

### **Other requirements (e.g. drivers' license, out-of-hours work, etc):**

Driver's license and out of hours work

### **Funding (if available):**

**Commencement date:** December 2015.

**Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Hamstring exercises for injury prevention, an acute analysis: Nordic or not?

**Primary Supervisor:** John Sampson

**Primary Supervisor email:** [jsampson@uow.edu.au](mailto:jsampson@uow.edu.au)

**Co-supervisor/s:** Ric Lovell (University of Western Sydney)

**Academic Unit/ Research Program:** School of Medicine

**Short description (100 words maximum, no references required):**

The current study will innovatively examine the acute effects of a unique unstable form of isometric exercise designed to improve hamstring muscle strength. Exercises performed on an unstable surface are functionally relevant, increase muscle activation and can reduce injury risk to a greater extent than traditional stable strengthening exercise. However, no previous study has examined the effects of an unstable isometric exercise designed to increase hamstring strength and prevent injury.

**How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

Dr Sampson has a number of projects looking at injury risk in soccer players. This acute analysis will be performed complement a chronic training study examine the effects of unstable isometric hamstring and Nordic exercises. The information gained from these projects will contribute to a larger (PhD) project that will examine the impact of the FIFA 11 (or modified FIFA 11) training program on injury risk in a large cohort of community level soccer players.

**What is the specific role of the Honours student? (50 words)**

The student will be responsible for delivering the exercise program, recording experimental data and analyzing the results for their thesis.

**How does this provide an appropriate research project for an Honours student? (100 words maximum)**

The student will develop skills in recording and interpreting data from EMG, Force platforms, dynamometry and fingertip blood samples. Additional skills in managing people throughout the exercise intervention will be developed

**Research methods to be used:**

Within-subject experimental analysis

**Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Exercise Physiology

**Other requirements (e.g. drivers' license, out-of-hours work, etc):**

**Driver's license and out of hours work**

**Funding (if available):**

**Commencement date:** February 2016.

## **2016 - Potential Research Honours Project of Paul Else.**

**Primary Supervisor:** Paul Else (41:337)

**Co-supervisor/s:** Todd Mitchell

**Academic Unit/ Research Program:** School of Medicine

**Short description (100 words maximum, no references required):**

**Project title #1 :** Is Thyroid Hormone an Antioxidant Vitamin?

Thyroid hormones are considered the major metabolic hormones associated with increasing rates of metabolism and growth. Thyroid hormones are also highly lipophilic molecules preferring to be in the company of lipids rather than water molecules (water:phospholipid partition coefficients of 1:20,000). In the distant past it has been suggested that thyroid hormones may act as antioxidant in membranes. Thyroid hormones possess large electrophilic iodine groups that could act as electron sinks removing any unpaired electrons from free radicals. Thyroid hormones are relatively simple molecules to produce (being essentially two iodinated tyrosine molecules joined together) and may have served as readily available antioxidants molecules during the evolution of endothermy with the added benefits of stimulating metabolism and growth.

The proposal is to test the idea that thyroid hormones can act as antioxidants. It involves placing thyroid hormone into liposomes (phospholipid bilayer microspheres) made of oxidisable phospholipids and then challenging these phospholipids with an oxidizing stress such as ferrous iron while measuring oxygen consumption used to detect the oxidation of these lipids. The question being does the presence of thyroid hormone at physiological concentrations protect the phospholipids from oxidising?

**What is the specific role of the Honours student?**

Prepare liposomes with phospholipid that carry polyunsaturated phospholipid (peroxidisable phospholipids) with thyroid hormone at different concentrations. Initiate peroxidation (using ferrous iron) while measuring oxygen consumption (as a measure of peroxy formation/peroxidation rate). Determine rates of peroxidation during the lag and propagation phases as well as determine the period of the lag phase during the latent phase. Use a Zetasizer® to determine liposome size and perform FOX2 lipid hydroperoxide assay where appropriate.

**How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This is an investigation driven by discovery. It challenges the conventional view of the role of thyroid hormones in the body. It tests a new idea with major ramifications for how thyroid hormones operate in living systems.

**Research methods to be used:** Liposome production and sizing (Zetasizer), oxygen consumption measurement using Clark-type microelectrodes. Peroxidation assays including the FOX2 lipid hydroperoxide method.

**Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Good lab skills, familiarity with Excel and handling of large data files, good organizational skills.

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** None

**Funding (if available):** \$2000 for purchase of phospholipids

**Commencement date:** February 2015.

## **2016 - Potential Research Honours Project of Paul Else (continued)**

**Primary Supervisor:** Paul Else (41:337)

**Co-supervisor/s:** Kylie Mansfield

**Academic Unit/ Research Program:** School of Medicine

**Short description (100 words maximum, no references required):**

**Project title #1 :** Do Lipid Hydroperoxides Stimulate Mitochondrial Biogenesis and Cell Growth?

During the evolution and development of endothermy in mammals and birds ("warm-bloodedness") there are increases in mitochondrial density and cell growth. There are also increases in the level of unsaturation (number of carbon double bonds) of the polyunsaturated fatty acids of membranes. Polyunsaturated fatty acids are highly prone to oxidation (a process commonly called peroxidation) that can produce a cascade type reaction with products such as lipid hydroperoxides and malondialdehyde. One of the jobs of antioxidants is to prevent these reactions from entering into propagation. However, some level of autoxidation and propagation invariably occur and the main theory of ageing is based on this idea. The products, and the process of peroxidation are usually viewed as damaging to cells. However, under controlled conditions it is proposed that these products may also act as a stimulus to increase mitochondrial biogenesis and cell growth

The proposal is to test this idea by growing cells in culture and creating peroxidation by using varying levels of ferrous iron stimulus plus in other experiments adding hydroperoxide (tert-butyl-hydroperoxide) to cells in culture. These cells will be then assessed for their viability, level of mitochondria (stain) and cell growth etc.

**What is the specific role of the Honours student?**

Prepare cell culture, initiate peroxidation using ferrous iron and addition of tert-butyl-hydroperoxide). Determine rates of peroxidation using a FOX2 lipid hydroperoxide assay. Develop a method to assess mitochondrial biogenesis and determine cell turnover/growth.

**How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This is an investigation, driven by discovery. It challenges the perspective that peroxidation is a damaging force in cells and alternatively proposes that this process can act to increase metabolism and growth as occurs in endotherms.

**Research methods to be used:** Cell culture, peroxidation and mitochondrial biogenesis assays.

**Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Good lab skills, familiarity with Excel, high level of organization and time management.

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** None

**Funding (if available):** This study will only go forward base on successful faculty funding to be obtained in 2015 for a start in 2016 as it will require substantial and ongoing consumable funding.

**Commencement date:** February 2015 (based on funding success in 2015 for 2016).

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Investigation into ceramide metabolism in the brain of a rat depression model

**Primary Supervisor:** Jessica Hughes

**Primary Supervisor email:** [jnealon@uow.edu.au](mailto:jnealon@uow.edu.au)

**Co-supervisor/s:** Kelly Newell

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

Depression is the most common mental illness, affecting 1 in 4 people in their lifetime. It is a complex disease and the underlying pathophysiology is still unknown. A class of lipid signaling molecules known as ceramides has recently sparked interest in the literature. Ceramides are elevated in patients with depression and it is now thought that many antidepressants may work by inhibiting ceramide synthesis in key brain regions such as the hippocampus.

The aim of this project is to investigate the changes in ceramide metabolism in the brain, specifically, in a rat depression model. This project will add to the growing body of knowledge implicating ceramides as a key player in the pathogenesis of depression .

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on ..., etc):**

Part of a larger project. May be two honours projects if other lipid classes are investigated.

### **What is the specific role of the Honours student? (50 words)**

To learn the rat brain anatomy, section brains, micropuncture regions of interest and analyse brain lipids using mass spectrometry

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This is an achievable project in the honours timeframe and is likely to produce significant results. The techniques used are well established in our laboratory and there is a good support network for the student.

### **Research methods to be used:**

Brain sectioning and micropuncture techniques; Lipid extraction/wet chemistry; Mass spectrometry

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

General biochemistry knowledge, statistics knowledge of undergraduate level student.

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** NA

**Funding (if available):** TBA

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Investigation into ceramide metabolism in the brain of a rat schizophrenia model

**Primary Supervisor:** Jessica Hughes

**Primary Supervisor email:** [jnealon@uow.edu.au](mailto:jnealon@uow.edu.au)

**Co-supervisor/s:** Katrina Green

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

Schizophrenia is a devastating chronic illness affecting over 1% of the population. It is a complex disease and the underlying pathophysiology is still unknown. A class of lipid signaling molecules known as ceramides has recently sparked interest in the literature due to their presence in skin samples of antipsychotic naïve individuals with first-episode schizophrenia. Furthermore, our laboratory determined that the antipsychotic drug clozapine significantly alters ceramide metabolism in brain regions implicated in schizophrenia. The aim of this project is to investigate the changes in ceramide metabolism in the brain, specifically, in a rat schizophrenia model. This project could help to shed some light into the pathogenesis of schizophrenia.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on ..., etc):**

Part of a larger project. May be two honours projects if other lipid classes are investigated.

### **What is the specific role of the Honours student? (50 words)**

To learn the rat brain anatomy, section brains, micropuncture regions of interest and analyse brain lipids using mass spectrometry

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This is an achievable project in the honours timeframe and is likely to produce significant results. The techniques used are well established in our laboratory and there is a good support network for the student.

### **Research methods to be used:**

Brain sectioning and micropuncture techniques; Lipid extraction/wet chemistry; Mass spectrometry

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

General biochemistry knowledge, statistics knowledge of undergraduate level student.

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** NA

**Funding (if available):** TBA

**Commencement date:** February 2016.



## **Potential areas of research for School of Medicine Honours program in 2016.**

*Contact details are provided on the individual projects.*

**Research Area / Project title:** Investigating neurochemical alterations in schizophrenia and/or major depression, using post-mortem human brains.

**Primary Supervisor:** Dr Kelly Newell

**Primary Supervisor email:** [knewell@uow.edu.au](mailto:knewell@uow.edu.au)

**Co-supervisor/s:** TBA

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

This project will utilize post-mortem brain cohorts to investigate protein and mRNA changes that occur in schizophrenia and depression. A major focus of this project will be on the role of the glutamatergic system in these disorders.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

This project is part of my overall research program focused on determining the pathophysiology of psychiatric disorders, in a manner that may uncover novel treatment and/or preventative targets.

### **What is the specific role of the Honours student? (50 words)**

Human brain samples have been obtained from an Australian based Brain Bank and a USA based Brain Bank. The Honours student(s) involved in this project will be required to prepare the human brain samples for analysis, perform molecular based experiments on these samples to measure proteins and mRNA, primarily associated with the glutamatergic neurotransmission system. The student(s) will then be guided through the statistical analyses and interpretation of data.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This project will provide an Honours student with expertise in common molecular biology techniques (immunoblot, qPCR) that are used extensively in laboratories throughout the world. It will also provide students with the ability to work on a translational research project; working on human brains and analyzing the associated data in light of the many human demographic and clinical variables will provide students with insight into human based research.

### **Research methods to be used:**

Immunoblotting, quantitative PCR, tissue homogenization and fractionation.

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Successful completion of MEDI311 Fundamentals of Neuroscience

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** Nil

**Funding (if available):** Nil

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** The effects of maternal fluoxetine treatment on offspring brain development

**Primary Supervisor:** Dr Kelly Newell

**Primary Supervisor email:** [knewell@uow.edu.au](mailto:knewell@uow.edu.au)

**Co-supervisor/s:** TBA

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

This project will use a rat model to determine the effects of fluoxetine (a common antidepressant drug) use during pregnancy on the brain development of the offspring. This project will focus primarily on offspring brain neurochemistry.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

This project is part of my overall research program focused on determining the pathophysiology of psychiatric disorders, in a manner that may uncover novel treatment and/or preventative targets.

### **What is the specific role of the Honours student? (50 words)**

Pregnant rats ("depressed" and control) have been treated daily with fluoxetine or a vehicle control. The exposed offspring have shown evidence of altered anxiety-like behaviours at adolescence. Brain and plasma from these offspring were collected at adolescence. The Honours student(s) involved in this project will process the rat brain samples for analysis and perform molecular based experiments on these samples to measure proteins and receptors, primarily associated with the serotonergic and glutamatergic neurotransmission systems and the HPA axis.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This project will provide an Honours student with expertise in immunoblotting and receptor binding assays, these are methods that are used extensively in laboratories throughout the world. It will also provide students with training in rat brain anatomy and neuropharmacology.

### **Research methods to be used:**

Immunoblotting, receptor binding, brain cryosectioning, ELISA

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Successful completion of MEDI311 Fundamentals of Neuroscience

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** Nil

**Funding (if available):** Nil

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Mechanisms of action of antidepressant drugs

**Primary Supervisor:** Dr Kelly Newell

**Primary Supervisor email:** [knewell@uow.edu.au](mailto:knewell@uow.edu.au)

**Co-supervisor/s:** TBA

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

This project will use a rat model to determine the mechanism of action of common antidepressant drugs as well as a novel preclinical drug (an mGluR5 negative allosteric modulator). Rats will be treated with these drugs for up to 4 weeks, then their blood and brains extracted, dissected and analysed to determine which proteins and molecular pathways are influenced by these drugs.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

This project is part of my overall research program focused on determining the pathophysiology of psychiatric disorders, in a manner that may uncover novel treatment and/or preventative targets. This project fits particularly well with my studies on post-mortem human brain samples from subjects with depression and these two studies are often combined to provide a complementary analysis of the pathophysiology and treatment of depression.

### **What is the specific role of the Honours student? (50 words)**

The Honours student may be involved in handling, monitoring and treating rats in this study. Brain and plasma will be extracted from these rats. The Honours student(s) involved in this project will be required to process the rat brain samples for analysis and perform molecular based experiments on these samples to measure proteins and receptors, primarily associated with the serotonergic and glutamatergic neurotransmission systems.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This project will provide an Honours student with expertise in immunoblotting and receptor binding assays, these are methods that are used extensively in laboratories throughout the world. It will also provide students with training on rat brain anatomy and an understanding of neuropharmacological processes and considerations .

### **Research methods to be used:**

Immunoblotting, receptor binding, brain cryosectioning, ELISA, and potentially rat handling, drug administration, brain dissection, blood extraction

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Successful completion of MEDI311 Fundamentals of Neuroscience

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** Nil

**Funding (if available):** Nil

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

*Contact details are provided on the individual projects.*

**Research Area / Project title:** Brain pathology of prenatal PolyI:C treated Nrg1 and DISC1 mice

**Primary Supervisor:** Professor Xu-Feng Huang (School of Medicine, Faculty of Science, Medicine and Health)

**Primary Supervisor email:** xhuang@uow.edu.au

**Co-supervisor/s:** Dr. Yinghua Yu <yinghua@uow.edu.au>; Dr Katrina Green <kweston@uow.edu.au>

**Academic Unit/ Research Program:** School of Medicine

**Short description (100 words maximum, no references required):**

This project aims to examine the brain pathology of Nrg1 or DISC1 mice having prenatal PolyIC treatment (mimic aspects of a viral infection). Genetic mutations, environmental factors, or a combination of these play a causal role in altering brain development and increasing the risk of developing psychiatric diseases including schizophrenia. This project will focus on environmental factors (prenatal viral infection) and genetic mutations (neuregulin-1, Nrg1 and disrupted-in-schizophrenia-1, DISC1) which are known risk factors. We will examine dopamine D2, serotonin 5-HT<sub>2</sub> and muscarinic M1 receptors in the post-mortem brain of Nrg1 and DISC1 mice with prenatal PolyIC infection.

**How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on, etc):**

The animal model of prenatal Nrg1 has been established in our laboratory. Two honours students can examine the brain morphology and neurotransmission, and analyze the behavior tests

**What is the specific role of the Honours student? (50 words)**

Study 1: Determine the changes in the D2 and 5-HT<sub>2A</sub> receptor bindings and their intracellular molecular signalling in the mesolimbic and mesofrontal systems of the mouse brain of the prenatal PolyI:C infection, Nrg1 gene mutations and their combinations.

Study 2: Determine the changes in the M1 receptor bindings and their intracellular molecular signalling in the mesolimbic and mesofrontal systems of the mouse brain of the prenatal PolyI:C infection, Nrg1 and DISC1 gene mutations and their combinations.

**How does this provide an appropriate research project for an Honours student? (100 words maximum)**

All the biomolecular techniques for tissue examination are well established in our lab, so the students can complete the study within one year. They will accumulate experimental techniques (autoradiography, western blot and immunochemistry) and neuroscience knowledge from this project. Furthermore, this study is a part of a large ongoing research project. Therefore, the students are able continue into a PhD study in this area if they are interested in this project.

**Research methods to be used:** Autoradiography, Western blot, immunochemistry and behavior tests

**Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):** NO.

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** NO.

**Funding (if available):** Yes.

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Effects of antipsychotic drugs in the developing brain

**Primary Supervisor:** A/Prof Chao Deng

**Primary Supervisor email:** chao@uow.edu.au

**Co-supervisor/s:** Dr Jiamei Lian, Mr Michael de Santis

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

Mental health problems affect at least 9% of 4.1 million (around 370,000) Australian children. Although antipsychotic drugs were developed to treat schizophrenia in adults, they have been widely and increasingly used ("off label") in children and adolescents. Unfortunately, exposure to these agents is not always medically justified for use in the young. This project aims to address this important issue by investigating the effects of antipsychotics in neural pathways of developing brains (the childhood-adolescent period). The results from this project will provide important information for psychiatrists to balance the risk/benefit ratio, before prescribing antipsychotics to children and adolescents.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on ..., etc):**

This project will be conducted in the Antipsychotic Research Laboratory in the IHMRI. It is a part of a large project on investigating the neuropharmacological mechanisms of antipsychotics. 2 PhD and 2 Master students are currently working on related projects studying the mechanisms of antipsychotics.

### **What is the specific role of the Honours student? (50 words)**

The student will conduct animal and laboratory works to analyze neurotransmitter markers. The student will be participating actively the journal clubs and weekly laboratory meetings.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This project is suitable for an Honours student to complete it in 8-9 months that will provide the student research training fully from reviewing literatures, preparing research proposal, conducting biomedical experiments, data analysis, writing thesis and oral presentations. The student will be well trained for further research such as PhD studies.

### **Research methods to be used:**

Animal model, receptor binding, western blot

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Completed Subject MEDI311 Neuroscience

### **Other requirements (e.g. drivers' license, out-of -hours work, etc): NA**

**Funding (if available):** Supported by NHMRC Project grants

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

*Contact details are provided on the individual projects.*

**Research Area / Project title:** Muscarinic receptor and antipsychotic-induced metabolic side-effects

**Primary Supervisor:** A/Prof Chao Deng

**Primary Supervisor email:** chao@uow.edu.au

**Co-supervisor/s:** Dr Jiamei Lian

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

Schizophrenia is a chronic, severe and disabling brain disease, affecting approximately one in every 100 people. Although some antipsychotic drugs, such as olanzapine and clozapine, are effective on controlling schizophrenia symptoms, they cause many side-effects. One of serious side-effects caused by antipsychotic drugs is insulin dysregulation. In this study, we will investigate the roles of muscarinic receptor in olanzapine- and clozapine-induced insulin dysregulation. The outcomes of this project will increase our understanding of the mechanisms underlying this adverse side-effect and therefore provide important information for developing prevention strategies.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

This project will be conducted in the Antipsychotic Research Laboratory in the IHMRI. It is a part of a large project on investigating the neuropharmacological mechanisms of antipsychotics. 2 PhD and 2 Master students are currently working on related projects studying the mechanisms of antipsychotics.

### **What is the specific role of the Honours student? (50 words)**

The student will conduct animal and laboratory works to analyze neurotransmitter markers. The student will be participating actively the journal clubs and weekly laboratory meetings.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This project is suitable for an Honours student to complete it in 8-9 months that will provide the student research training fully from reviewing literatures, preparing research proposal, conducting biomedical experiments, data analysis, writing thesis and oral presentations. The student will be well trained for further research such as PhD studies.

### **Research methods to be used:**

Animal model, receptor binding, western blot

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

Completed Subject MEDI311 Neuroscience

### **Other requirements (e.g. drivers' license, out-of -hours work, etc):** NA

**Funding (if available):** Supported by NHMRC Project grants

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

*Contact details are provided on the individual projects.*

**Research Area / Project title:** Improving the treatment of chronic illness.

**Primary Supervisor:** Katrina Green

**Primary Supervisor email:** [Katrina\\_green@uow.edu.au](mailto:Katrina_green@uow.edu.au)

**Co-supervisor/s:** tbc

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

There are a range of projects available for students that incorporate working in the laboratory (IHMRI) and/or animal house. Fields of research include diabetes, obesity, neuroscience, immunology, pharmacology and mental health. All projects are basic science (lab-based) projects. Please feel free to contact me to discuss your interests.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

The honours projects are a part of several larger experiments.

### **What is the specific role of the Honours student? (50 words)**

Will depend on the student's interest. Please contact me to discuss ([katrina\\_green@uow.edu.au](mailto:katrina_green@uow.edu.au)).

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

All findings from these project will be new will hopefully lead to better treatments for people with chronic illness (diabetes, obesity, severe psychiatric illness). Students may have an opportunity to present their findings at a conference. These projects are appropriate for an honours student because .. neuroendocrinology is awesome!

### **Research methods to be used:**

Depending on project, students may utilize techniques in animal modelling, behavioural testing (learning, memory, exercise), hormonal analysis, receptor autoradiography, cell culture, tissue staining, western blot protein analysis.

### **Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

All training will be provided. Only students with absolute dedication and commitment to their best performance need apply. Out of hours work likely.

**Other requirements (e.g. drivers' license, out-of –hours work, etc):** Out of hours work likely.

Sense of humor

### **Funding (if available):**

**Commencement date:** February 2016.

## **Potential areas of research for School of Medicine Honours program in 2016.**

**Research Area / Project title:** Diverse applications of Seaweed in nutrition and prevention of chronic deficiencies

**Primary Supervisor:** Barbara Meyer

**Primary Supervisor email:** bmeyer@uow.edu.au

**Co-supervisor/s:** Pia Winberg

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

The modern diet has been disarmed from a nutritional perspective in terms of diversity as well as a status of specific nutritional deficiencies that are being related to a spectrum of human health disorders. Seaweed is potentially a new and sustainable source of food that can address nutritional security and a reduction in chronic health issues such as digestive health, and is also a rich source of trace elements and is a base of production of Omega-3 fatty acids. This research area will explore the nutritional profiles of Australian seaweeds and their application in the human diet.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on, etc):**

This project extends research that is being undertaken by current Honours and Post Graduate students across the schools of Chemistry and Medicine, and is linked to industry start-up activities by Venus Shell Systems Pty Ltd. These research projects include clinical studies on digestive and gut health as well as specific disease interactions such as diabetes and wound healing.

### **What is the specific role of the Honours student? (50 words)**

The current project will explore the diversity of fatty acids present in seaweeds and how these can contribute to an Omega-3 dietary intake that is required for cardiovascular and mental health. This project will measure the range of fatty acids in different combinations of seaweeds and seafoods to deliver a complete and sustainable source of marine Omega-3.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This work will take advantage of the capacity that has been established in the Meyer laboratory for analysis of Omega-3 in biological materials including blood. Therefore it is suitable in terms of an effective project for an Honours project where there is already momentum and support for laboratory analysis. In addition the links to industry and the sources of diverse seaweeds is available through Venus Shell Systems Pty Ltd. This project is suitable to a student who has interests in applied research and new industry development in nutrition and sustainability.

### **Research methods to be used:**

The methods that will be focused on include the analysis of fatty acids in biological tissues, including seaweed biomass and potentially aquatic organisms such as yabbies' or shellfish. The student will undertake research in an analytical laboratory using Gas Chromatography for the determination and quantitation of fatty acids.

**Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):** A background in biochemistry, nutrition, biostatistics is desirable.

**Other requirements (e.g. drivers' license, out-of -hours work, etc):** A drivers license is beneficial as there may be regular visits to regional campuses in the Shoalhaven.

**Funding (if available):** There is minor funding to cover the costs of analysis and in kind support for facilities and resources such as access to experimental systems and biomass.

**Commencement date:** February 2016.



## **Potential areas of research for School of Medicine Honours program in 2016.**

*Contact details are provided on the individual projects.*

**Research Area / Project title:** Engaging a community in their medical history: creating a virtual museum

**Primary Supervisor:** Dr Kathryn Weston

**Primary Supervisor email:** kathw@uow.edu.au

**Co-supervisor/s:** A/Prof Louella McCarthy

**Academic Unit/ Research Program:** School of Medicine

### **Short description (100 words maximum, no references required):**

The researchers are undertaking a pilot project to engage a rural community (Forbes, NSW) in the development of a rural health virtual museum. The student project will evaluate the initiation of the project which will involve liaison with local media and historical society members, a site visit, and discussions with community and civic organisations representing older residents. The project will involve evaluation of the process of community engagement (e.g. impact of invitations to contribute artefacts for photography during the site visit, or for images to be sent electronically), and be involved in engagement of the community in oral history narratives.

### **How fits with other research activities (eg part of a larger project on XXX, one of two Honours projects on .., etc):**

It will contribute evaluation of the process of community engagement, and will provide information to inform larger roll out of the virtual museum project across NSW.

### **What is the specific role of the Honours student? (50 words)**

The student will attend the site visit in Forbes and evaluate the level of interest and community engagement, and the type of information submitted. Depending on the response the student may select some of the oral history narratives as case studies to show the long term impact of rural health issues.

### **How does this provide an appropriate research project for an Honours student? (100 words maximum)**

This project can develop in several ways that will yield rich data for medical history or community engagement research. The student may choose some of the oral history narratives as case studies to show the long term impact of rural health issues. Alternatively, the student may be interested in selecting some of the items submitted to the virtual museum and look further into the impact of that issue on the rural community. For instance, particular emphasis on long term impact of pandemic influenza, or health impacts of flooding, may yield important information about how communities engage in their health history.

### **Research methods to be used:**

Qualitative research, documentary and picture archive investigation, literature review, oral history.

**Required skills/ knowledge (e.g. level of stats, assumed knowledge areas, specific subjects etc):**

**Other requirements (e.g. driver's license, out-of-hours work, etc):**

Out of hours at one site visit to Forbes.

**Funding (if available):**

To be confirmed: funding for essential travel will be provided.

**Commencement date:** February 2016.



# MEDI400 Honours Supervisor 2016 Conditional Offer to Candidate

I am familiar with the University of Wollongong Code of Practice – Honours

<http://www.uow.edu.au/about/policy/UOW058661.html>

I agree to supervise this student for their Honours degree in 2015 in the event they meet acceptance requirements.

I note that:-

- there may be limited financial support available
- an individual desk is at the discretion of the Faculty and no individual desk is guaranteed
- tea room and mail facilities available on Level 3
- a School Desk computer is not guaranteed; access to a computer is not guaranteed

As supervisor I accept that I can cover any financial needs associated with this project and can provide the student with access to the necessary resources and expertise required to complete the proposed project.

The proposed project is suitable for Honours noting the time for submission, scope expected and thesis length. The proposed project will involve the student making a substantial intellectual contribution to the planning, conduct, and analysis of the study, the supervised preparation of the thesis, and participation in the scientific/scholarly write-up of the study.

**Will you be absent for any time within the Honours year?    Yes / No**

**Please provide details**

Primary Supervisor:	Signature:	Date:	Number of Honours students:
Co-Supervisor (if applicable)	Signature:	Date:	Number of Honours students:

## SHS OFFICE USE: Honours Coordinator

Recommendation statement:

Honours Coordinator Signature:

Date:

## HEAD OF SCHOOL:

I note this project and student supervision will be part of the supervisor/ co-supervisor's workload for 2016 in the event the student is eligible for admission

Signed:

## Offer confirmed and student instructed to submit application for admission

WAM5:

Other conditions satisfied?

Email advise to student to submit application for admission to UG Studies form sent on:

Signed (Honours Coordinator or Head of School)