



# FOCUS on NEUROSCIENCE

## NEUROSCIENCE STUDENT INFORMATION SESSION

Wednesday, 6<sup>th</sup> September 2006

Executive Lounge, Level 1 Alan Gilbert Building  
University of Melbourne

**2006  
PROJECT  
INFORMATION BOOKLET**

*Sponsored by :*



NeuroParkville : [www.neuroparkville.org.au](http://www.neuroparkville.org.au)

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For further information on projects listed within this booklet, please contact the indicated neuroscientists listed under the individual project titles.

Additional information on NeuroParkville and full overviews (where available) of potential research projects available can be found at the following link :

<http://www.neuroparkville.org.au/>

## Cognition, Behaviour & Psychiatry

### COGNITIVE NEUROPSYCHIATRY DEPARTMENT MENTAL HEALTH RESEARCH INSTITUTE

The following are proposed research opportunities:

- cognitive deficits in individuals with high schizotypy / unusual beliefs / psychosis
- belief formation in individuals with fixed 'culturally accepted' beliefs, ie. religious groups
- delusion formation in various diagnostic groups, including schizophrenia, bipolar disorder, body dysmorphic disorder, depression, anorexia, Alzheimers disease
- cognitive models of hallucinations
- cognitive models of thought disorder
- semantic memory / language disorders
- neurobiological underpinnings of semantic memory using fMRI and EEG
- awareness of self and awareness of illness (both psychiatric and neurological issues)
- cognitive and neurobiological underpinnings of affect / emotion processing using behavioural testing, fMRI and EEG, particularly affective components of language (prosody and emotional content of words)
- cognitive and neurobiological underpinnings of general perception using behavioural testing, fMRI and EEG
- remediating cognitive deficits in psychosis

Contact :

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**BEHAVIOURAL NEUROSCIENCE LABORATORY  
MENTAL HEALTH RESEARCH INSTITUTE**

Projects available :

- **Molecular mechanisms involved in cognition : behavioural studies in CREB-deficient mice**
- **Role of brain serotonin in cognition : implications for schizophrenia**

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Institute website : [www.mhri.edu.au](http://www.mhri.edu.au)

**MOLECULAR PSYCHOPHARMACOLOGY  
MENTAL HEALTH RESEARCH INSTITUTE**

Projects available :

- **Investigating how cannabis causes psychosis**
- **Interactions between psychotropic drugs and the epidermal growth factor system**

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Dr Avril Pereira  
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**STUDIES ON NOVEL G-PROTEIN COUPLED RECEPTORS.  
RELAXIN FAMILY PEPTIDES RECEPTORS, EVOLUTION, STRUCTURE,  
FUNCTION AND DRUG DEVELOPMENT**

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## HIPPOCAMPAL LONG-TERM POTENTIATION AND MEMORY

(Honours opportunity)

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## MODELLING FORMATION OF NEURAL NETWORK LOOPS

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## NEUROCHEMISTRY

### HOWARD FLOREY INSTITUTE

The following are proposed research opportunities:

- **Role of metallopeptidases in cognitive function and memory processing**  
(supervisors : Dr Siew Yeen Chai & Dr Anthony L Albiston )
- **Characterisation of the IRAP knockout mouse – Ph D project**  
(supervisors : Dr Siew Yeen Chai & Dr Anthony L Albiston)
- **Role of IRAP in regulating glucose uptake – Ph D project**  
(supervisors : Dr Anthony L Albiston & Dr Siew Yeen Chai)
- **Role of IRAP in the central nervous system – Ph D project**  
(supervisors : Dr Siew Yeen Chai & Dr Anthony L Albiston)

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**IDENTIFICATION AND INITIAL CHARACTERIZATION OF NOVEL  
TRANSCRIPTS REGULATED DURING MOTOR LEARNING**

(Honours Project)

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**REBECCA L COOPER LABORATORIES  
MENTAL HEALTH RESEARCH INSTITUTE**

The goal of the Rebecca L Cooper Research Laboratories is to understand the pathologies of schizophrenia and bipolar disorder. This is achieved primarily by studying human brain tissue, obtained post-mortem from subjects with either the psychiatric disorders or age/sex matched control subjects. Technologies available within the Laboratory include one and two dimensional electrophoresis, real-time PCR, *in situ* radioligand binding with autoradiography, *in situ* hybridisation and cell culture. It is normal for more than one technology to be utilised in determining the answer to a specific question.

Project Available :

**Studies into the neurochemical changes associated with  
psychiatric disorders using postmortem human brain**

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## MECHANISMS OF LEARNING AND MEMORY

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## MODELING GENE-ENVIRONMENT INTERACTIONS AND MECHANISMS OF EXPERIENCE-DEPENDENT PLASTICITY OF RELEVANCE TO THE PATHOGENESIS OF SCHIZOPHRENIA

Dr Laura Gray & Dr Anthony Hannan  
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Howard Florey Institute

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## RELAXIN PEPTIDES AND RECEPTORS IN BRAIN – IMPORTANCE FOR MENTAL HEALTH AND NEUROPSYCHIATRIC DISEASE?

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## MELBOURNE NEUROPSYCHIATRY CENTRE UNIVERSITY OF MELBOURNE

### Potential Post-Graduate Projects

- What constitutes abnormal adolescent brain development?
- Longitudinal changes in the brain associated with the development of mental illness.
- Examination of the relationship between indices of white matter integrity and symptoms and level of function in psychosis.
- White matter abnormalities in frontal-subcortical connectivity in first-episode psychosis and controls.
- Neuropsychological functioning and brain structures in schizophrenia

Contact :

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[www.psychiatry.unimelb.edu.au/mnc/](http://www.psychiatry.unimelb.edu.au/mnc/)

## Developmental Neurobiology & Anatomy

### MULTIPLE SCLEROSIS LABORATORY

#### HOWARD FLOREY INSTITUTE

The MS laboratory in the Howard Florey Institute, led by Professor Trevor Kilpatrick, focuses on the study of endogenous CNS repair mechanisms after loss of myelin and oligodendrocytes (demyelination). Demyelination and its repair by remyelination are key components of the human disease multiple sclerosis (MS). Remyelination also operates very efficiently in rodent models of demyelination, but its molecular and cellular biology are not understood.

In order to study potential molecular mechanisms of remyelination, we utilise whole animal models (cuprizone-induced corpus callosum demyelination and autoimmune encephalomyelitis, EAE), oligodendrocyte and astrocyte cell culture, a variety of molecular techniques and animal MRI scanning. Our laboratory has around 12-15 members (Group leaders, Postdoctoral fellows, PhD, honours and visiting students, research assistants).

#### PhD projects from 2007:

- **Identifying axonal signals promoting efficient remyelination**  
Supervisors: Dr Helmut Butzkueven & Prof Trevor Kilpatrick
- **Understanding the role of NG2-positive cells in endogenous remyelination**  
Supervisors: Dr Helmut Butzkueven & Prof Trevor Kilpatrick
- **The role of neural stem cells in repair following CNS demyelination**  
Supervisors : Dr Holly Cate & Prof Trevor Kilpatrick

#### Honours Projects – 2007 :

- **Can the cytokine LIF protect axons from inflammatory injury in murine optic neuritis?**  
Supervisors: Dr Helmut Butzkueven, Assoc Prof Gary Egan & Prof Trevor Kilpatrick
- **The role of ceruloplasmin in the CNS response to demyelination**  
Supervisors: Dr Helmut Butzkueven & Prof Trevor Kilpatrick

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Dr Holly Cate & Professor Trevor Kilpatrick  
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**NEUROTROPHIN SIGNALING LABORATORY  
CENTRE FOR NEUROSCIENCE, UNIVERSITY OF MELBOURNE**

The focus of this laboratory centres on a family of growth factors known as the neurotrophins. We are interested in the structure, biochemistry, and mechanisms of neurotrophin signaling, as well as several aspects of their biology, in particular the role they play in the myelinating process. We use a variety of molecular, cellular and biochemical techniques to investigate these events.

The laboratory is located in the Centre for Neuroscience, on the 7<sup>th</sup> floor of the Medical Building, and has close collaborative links with the Howard Florey Institute.

**Projects :**

**1. The Impact of the Neurotrophins on Modulating Myelination**

Supervisors : Dr Simon Murray, Dr Junhua Xiao & Prof Trevor Kilpatrick

**2. Mechanisms of Nerve Growth Factor Receptor Activation**

Supervisors : Dr Simon Murray & Prof Trevor Kilpatrick

Contact :

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Web : <http://www.cns.unimelb.edu.au/research/Neurotrophin/>

## Motor Systems & Autonomic Systems

### CENTRAL CARDIOVASCULAR REGULATION

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### INFLUENCE OF INSL3-LGR8 SIGNALING ON THE NEURAL CIRCUITS OF THE BASAL GANGLIA AND ASSOCIATED BEHAVIOURS

Dr Andrew Gundlach  
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### CLINICAL PHARMACOLOGY & THERAPEUTICS UNIT DEPARTMENT OF MEDICINE AUSTIN HEALTH

**Head of Research Group**  
Dr Tony Verberne

**Laboratory/Group Location**  
Level 5, Lance Townsend Building, Austin Hospital, Heidelberg VIC

**Honours projects available :**

- 1) Sympathoinhibitory responses elicited from the gastrointestinal (GI) tract  
(Supervisors: Dr Daniela Sartor, Dr Tony Verberne)
- 2) Glucagon-like peptide 1 (GLP-1) and central sympathetic vasomotor systems.

**Contact :**

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## Neural regeneration

### GLUCOCORTICOID EFFECTS ON ADULT NEURAL STEM CELL BIOLOGY

Supervisors : Dr Nancy Nichols & Dr Ann Turnley  
Centre for Neuroscience  
University of Melbourne

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### FREE RADICALS, STROKE AND ANGIOGENESIS

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### STRATEGIES FOR PROMOTING REGENERATION OF THE CENTRAL NERVOUS SYSTEM

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website: <http://www.cns.unimelb.edu.au/research/neuralregeneration/>

## REGENERATING DOPAMINE NEURONES AFTER INJURY

Supervisors :

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## USE OF STEM CELLS TO REPAIR THE DOPAMINE SYSTEM IN PARKINSON'S DISEASE

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## MAKING NEW DOPAMINE CELLS

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## EFFECT OF SPHINGOSINE-1-PHOSPHATE AND PDGF ON NEURAL STEM CELLS

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Centre for Neuroscience & Dept of Pharmacology  
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website: <http://www.cns.unimelb.edu.au/research/neuralregeneration/>

## Neurodegeneration

### **MICROARRAY-BASED PROTEOMICS: IDENTIFYING NOVEL PROTEIN CHANGES IN NEURODEGENERATION USING PROTEIN MICROARRAYS**

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### **MITOCHONDRIAL OXIDATIVE STRESS AS AN INITIAL CAUSATIVE EVENT IN ALZHEIMER'S DISEASE**

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### **MATRIX METALLOPROTEINASES IN ALZHEIMER'S DISEASE**

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### **GENE-ENVIRONMENT INTERACTIONS MEDIATING PLASTICITY IN THE HEALTHY AND DISEASED BRAIN**

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**EVALUATING NOVEL TREATMENTS FOR ALZHEIMER'S DISEASE BY  
IN VIVO-BRAIN MICRODIALYSIS**

Supervisors :

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**DOES FEEDING IRON DURING BRAIN DEVELOPMENT LEAD TO  
NEURODEGENERATION IN OLD AGE?**

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## Neurological Conditions

### TARGETED DOPAMINE D1 RECEPTOR-POSITIVE CELL ABLATION IN THE BRAIN OF ADULT MICE AS A MODEL OF PARKINSON-PLUS SYNDROMES AND HUNTINGTON'S DISEASE

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### NICOTINE-INDUCED DYSTONIC AROUSAL COMPLEX IN A MOUSE MODEL OF AUTOSOMAL DOMINANT NOCTURNAL FRONTAL LOBE EPILEPSY

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### WHY DOES $\alpha$ -SYNUCLEIN AGGREGATION CAUSE PARKINSON'S DISEASE?

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### TESTING FOR PARKINSON'S DISEASE

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## **FINDING THE UNDERLYING MECHANISM OF A HUMAN EPILEPSY**

(honours project)

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## **CAN CHANGING THE EXPRESSION OF A PROTEIN CAUSE OR STOP EPILEPSY?**

(honours project)

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## PHENOTYPIC CHARACTERIZATION OF GAERS EPILEPTIC RATS

(honours project)

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## MANGANESE-ENHANCED MAGNETIC RESONANCE IMAGING (MEMRI) IN A RAT MODEL OF EPILEPSY

(honours project)

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Assoc Prof Terence O'Brien email: [obrientj@unimelb.edu.au](mailto:obrientj@unimelb.edu.au).

## COMPARISON OF ANTI-SEIZURE EFFICACY AND CNS PENETRATION OF VALPROATE DURING INTERMITTENT VERSUS CONSTANT DELIVERY INTWO RODENT MODELS OF EPILEPSY

(honours project)

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Assoc Prof Terence O'Brien email: [obrientj@unimelb.edu.au](mailto:obrientj@unimelb.edu.au).

## POST-TRAUMATIC BRAIN INJURY AND EPILEPSY ONSET: IMAGING THE BRAIN TO INVESTIGATE NEURAL CIRCUITS AND APPROPRIATE THERAPY INTERVENTIONS

(honours project)

Dr Damian Myers<sup>1</sup>, Prof Rod Hicks<sup>2</sup> & Assoc Prof Terence O'Brien<sup>1</sup>  
1. Department of Medicine, University of Melbourne, The Royal Melbourne Hospital  
2. Centre for Molecular Imaging, The Peter MacCallum Cancer Institute

Contact: Damian Myers Tel : 61 3 8344 6449, Email [damianem@unimelb.edu.au](mailto:damianem@unimelb.edu.au)

## **CENTRE OF CLINICAL RESEARCH EXCELLENCE IN NEUROSCIENCES**

Dr Kathy Lefever-Burd  
Senior Lecturer/Course Coordinator  
and Postgraduate Coordinator  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne  
Tel : 61 3 9496 2990 (except Wednesday)  
Fax: 61 3 9496 2291  
Web: <http://www.ccre.neurosciences.unimelb.edu.au/>

Mailing address and office location:  
Epilepsy Research Centre  
Level 1, Neurosciences Building  
Austin & Repatriation Medical Centre  
Banksia Street (Gate 10)  
West Heidelberg, VIC 3081  
Australia

### **CLINICAL RELATIONSHIP BETWEEN TWO GENERALISED EPILEPSIES**

(Clinical project - would suit post-graduate student)

Prof Sam Berkovic ([s.berkovic@unimelb.edu.au](mailto:s.berkovic@unimelb.edu.au))  
& Dr Kathy Lefever ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au) ; Tel : 61 3 9496 2990)  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne

### **MATERNAL INHERITANCE OF EPILEPSY**

(Clinical project)

Prof Sam Berkovic ([s.berkovic@unimelb.edu.au](mailto:s.berkovic@unimelb.edu.au))  
& Dr Kathy Lefever ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au) ; Tel 61 3 9496 2990)  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne  
VIC 3010 AUSTRALIA

### **MRI CHANGES IN TWINS WITH EPILEPSY**

(Clinical project)

Prof Sam Berkovic ([s.berkovic@unimelb.edu.au](mailto:s.berkovic@unimelb.edu.au))  
& Dr Kathy Lefever ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au) ; Tel : 61 3 9496 2990)  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne  
VIC 3010 AUSTRALIA

## **CLINICAL PHARMACOGENETICS OF A NEW ANTI-EPILEPTIC DRUG**

(Clinical project)

Prof Ingrid Scheffer ([scheffer@unimelb.edu.au](mailto:scheffer@unimelb.edu.au))  
& Dr Kathy Lefevere ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au) ; Tel : 61 3 9496 2990)  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne, VIC 3010 AUSTRALIA

## **ANALYSIS OF AGE OF ONSET OF TWO SEVERE EPILEPSY TYPES**

(Clinical project)

Prof Ingrid Scheffer ([scheffer@unimelb.edu.au](mailto:scheffer@unimelb.edu.au) )  
& Dr Kathy Lefevere ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au) ; Tel : 61 3 9496 2990)  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne, VIC 3010 AUSTRALIA

## **PHENOTYPE-GENOTYPE CORRELATION OF SODIUM CHANNEL MUTATIONS IN SEVERE EPILEPSY**

(Clinical project)

Prof Ingrid Scheffer ([scheffer@unimelb.edu.au](mailto:scheffer@unimelb.edu.au) )  
& Dr Kathy Lefevere ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au) ; Tel : 61 3 9496 2990)  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne, VIC 3010 AUSTRALIA

## **POST STROKE COMPLICATIONS: COMPARING SEVERITY AND RATE OF COMPLICATIONS IN PATIENTS RANDOMISED TO VERY EARLY REHABILITATION VERSUS STANDARD CARE**

Dr Julie Bernhardt  
National Stroke Research Institute  
Level 1, Neurosciences Building  
Heidelberg Repatriation Hospital  
Gate 10, 300 Waterdale Rd.  
Heidelberg Heights  
Victoria 3081, Australia  
Email : [j.bernhardt@unimelb.edu.au](mailto:j.bernhardt@unimelb.edu.au)  
Tel : 61 3 9496 2783

## **RECOVERY IN THE FIRST 14 DAYS AFTER STROKE: EXPLORING THE EFFECT OF VERY EARLY REHABILITATION ON RECOVERY PATTERNS**

Dr Julie Bernhardt  
National Stroke Research Institute  
Level 1, Neurosciences Building  
Heidelberg Repatriation Hospital  
Gate 10, 300 Waterdale Rd.  
Heidelberg Heights  
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Email : [j.bernhardt@unimelb.edu.au](mailto:j.bernhardt@unimelb.edu.au)  
Tel : 61 3 9496 2783

**DOES STARTING REHABILITATION VERY EARLY AFTER STROKE  
INFLUENCE MOOD AND IMPROVE LONG TERM QUALITY OF LIFE?**

Dr Julie Bernhardt  
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Tel : 61 3 9496 2783

**CHANGES IN FITNESS IN RESPONSE TO EARLY AND FREQUENT  
MOBILISATION AFTER STROKE**

Dr Julie Bernhardt  
National Stroke Research Institute  
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Tel : 61 3 9496 2783

**DOES DIFFERENT SCHEDULING OF EXERCISE EARLY AFTER STROKE  
INFLUENCE OUTCOME?**

(This project will use a rat stroke model to explore whether how exercise is scheduled (time and frequency) influences outcome.)

Dr Julie Bernhardt  
National Stroke Research Institute  
Level 1, Neurosciences Building  
Heidelberg Repatriation Hospital  
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Tel : 61 3 9496 2783

**DOES EARLY MOBILISATION MAINTAIN LEAD BODY MASS AND IMPROVE  
NUTRITIONAL STATUS AFTER STROKE?**

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National Stroke Research Institute  
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Gate 10, 300 Waterdale Rd.  
Heidelberg Heights  
Victoria 3081, Australia  
Email : [j.bernhardt@unimelb.edu.au](mailto:j.bernhardt@unimelb.edu.au)  
Tel : 61 3 9496 2783

## **EPILEPSY SYNDROMES IN FAMILIES**

(Clinical project)

Prof Ingrid Scheffer ([scheffer@unimelb.edu.au](mailto:scheffer@unimelb.edu.au))  
& Dr Kathy Lefevere ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au)); Tel : 61 3 9496 2990  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne

## **COMPARISON OF AGE OF ONSET TO DISTINGUISH TWO SEVERE EPILEPSY SYNDROMES OF EARLY CHILDHOOD**

(Clinical project)

Prof Ingrid Scheffer ([scheffer@unimelb.edu.au](mailto:scheffer@unimelb.edu.au))  
& Dr Kathy Lefevere ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au)); Tel : 61 3 9496 2990  
Centre of Clinical Research Excellence in Neurosciences  
University of Melbourne

## **ENDOPHENOTYPING OF ABSENCE EPILEPSY IN CHILDREN**

(Clinical project)

Prof Ingrid Scheffer ([scheffer@unimelb.edu.au](mailto:scheffer@unimelb.edu.au))  
& Dr Kathy Lefevere ([lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au)); Tel : 61 3 9496 2990  
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Professor of Paediatric Neurology Research  
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<http://www.brain.org.au/epilepsyresearch>

**ASSESSING THE ACCURACY OF ROUTINE MORTALITY  
STATISTICS FOR STROKE**

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National Stroke Research Institute  
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Heidelberg Repatriation Hospital  
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Heidelberg Heights  
Victoria 3081, Australia

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Tel : 61 3 9496 2862

**NEUROSONOLOGY  
DEPARTMENT OF NEUROLOGY, AUSTIN HOSPITAL**

**Head of Research Group/Hospital Dept**  
Associate Professor Brian Chambers  
National Stroke Research Institute/Austin Health)

**Laboratory/Group Location**  
Neurosonology  
Department of Neurology  
6th Floor Austin Tower  
Austin Hospital, Heidelberg VIC

**Honours projects available :**

1) Clinical utility of TCD in the diagnosis of Vasospasm secondary to SAH.  
(Retrospective and prospective study)

Supervisor: Assoc Prof Brian Chambers

2) Role of TCD and Diffusion-Perfusion Imaging (MRI) in the assessment of  
Vasospasm secondary to SAH. (Prospective study)

Supervisor: Assoc Prof Brian Chambers

**Contact:**

Assoc Prof Brian Chambers  
Tel: 61 3 9496 2274  
Email: [brc@bigpond.net.au](mailto:brc@bigpond.net.au)

## **NEUROPROTECTION AND NEUROGENERATION IN THE CENTRAL NERVOUS SYSTEM**

### **Head of Research Group**

Associate Professor David Howells

### **Laboratory/Group Location**

Department of Medicine, University of Melbourne  
Level 7, Lance Townsend Building, Austin Hospital, Heidelberg

### **Honours projects available (supervisor : Assoc Prof David Howells)**

- 1) Modification of macrophage phenotype
- 2) Using stem cells and growth factors to improve outcomes of spinal cord injury
- 3) Neuroprotection of the injured spinal cord
- 4) Supporting regeneration of nerve cells after spinal cord injury
- 5) Neuroprotection after stroke
- 6) Axonal injury and recovery after stroke
- 7) Rescuing damaged tissue after stroke
- 8) Development of epilepsy after ischemic stroke

### **Contact :**

Assoc Prof David Howells

Tel : 61 3 9496 3789

Email: [david.howells@unimelb.edu.au](mailto:david.howells@unimelb.edu.au)

## **ROLES FOR THE HIF-1 PATHWAY IN BRAIN PROTECTION AND PLASTICITY**

Dr Nicole Jones and Professor Phil Beart

Brain Injury and Repair Group

Howard Florey Institute

University of Melbourne

VIC 3010 AUSTRALIA

Tel: (Nicole) 61 3 8344 7486

email: [n.jones@hfi.unimelb.edu.au](mailto:n.jones@hfi.unimelb.edu.au)

## **Neuroinformatics / Computational Neuroscience**

### **ADVANCED IMAGING METHODS FOR MAPPING HUMAN BRAIN FUNCTION**

Dr David Abbott  
Brain Research Institute  
Ground Floor, Neurosciences Building  
Austin Health, Banksia Street  
Heidelberg Heights  
Victoria 3081

Tel : 61 3 9496 4079

Email : [d.abbott@brain.org.au](mailto:d.abbott@brain.org.au)

### **MAGNETIC RESONANCE IMAGING: PHYSICS DEVELOPMENT AND APPLICATIONS IN NEUROSCIENCE RESEARCH**

Professor Alan Connelly  
Brain Research Institute  
Ground Floor, Neurosciences Building  
Austin Health, Banksia Street  
Heidelberg Heights  
Victoria 3081

Email : [a.connelly@brain.org.au](mailto:a.connelly@brain.org.au)

## **Pain & Sensory Mechanisms**

### **PAIN RELIEF COMES OUT OF ITS SHELL**

Assoc Prof Bruce Livett  
Bio21 Institute  
Dept. Biochemistry and Molecular Biology  
University of Melbourne  
30 Flemington Rd.  
Parkville 3010  
Victoria, Australia  
Tel : 61 3 8344 2322  
Email : [b.livett@unimelb.edu.au](mailto:b.livett@unimelb.edu.au)

### **NEUROIMAGING AND NEUROINFORMATICS HOWARD FLOREY INSTITUTE & CENTRE FOR NEUROSCIENCE, UNIVERSITY OF MELBOURNE**

Projects available in the following areas :

1. Functional magnetic resonance imaging measures of perfusion in brain regions associated with the experience and satiation of hunger in humans
2. Investigation of brain activation associated with the urge to cough in humans using measurement of blood oxygen level-dependent signals during inhalation of capsaicin
3. Functional mapping of autonomic control centres in the human brainstem and hemispheres using magnetic resonance imaging
4. Investigation of the effects of ageing and Alzheimer's disease on blood oxygen level- dependent measures of brain responses to painful stimuli
5. Measurement of human thirst-related brain activity with perfusion-dependent functional magnetic resonance imaging
6. Blood oxygen level-dependent measurement of brain activity associated with thermal sensations during whole-body warming and cooling in humans

Supervisors :

Dr Michael Farrell  
Howard Florey Institute  
University of Melbourne  
VIC 3010 AUSTRALIA  
Tel : 61 3 8344 1941  
Email: [m.farrell@hfi.unimelb.edu.au](mailto:m.farrell@hfi.unimelb.edu.au)

Assoc Prof Gary Egan  
Centre for Neuroscience, University of Melbourne  
& Howard Florey Institute  
VIC 3010 AUSTRALIA  
Tel : 61 3 8344 1938  
Email: [g.egan@hfi.unimelb.edu.au](mailto:g.egan@hfi.unimelb.edu.au)

**AUTONOMIC NEUROBIOLOGY  
PAIN AND SENSORY MECHANISMS LABORATORIES**

**DEPARTMENT OF ANATOMY & CELL BIOLOGY  
THE UNIVERSITY OF MELBOURNE**

*(Principal contacts for each project are in bold and underlined)*

See our website at: <http://www.anatomy.unimelb.edu.au/researchlabs/furness>, or visit us in our Laboratories on Level 2 East of the Medical building, Cnr Grattan St and Royal Parade

**Contacts:**

Prof John B Furness Rm E238	T : 8344-8859 / E : <a href="mailto:j.furness@unimelb.edu.au">j.furness@unimelb.edu.au</a>
Dr Ernie Jennings Rm E236	T : 8344-5802 / E : <a href="mailto:e.jennings@unimelb.edu.au">e.jennings@unimelb.edu.au</a>
Dr Peter Kitchener Rm E722	T : 8344-6746 / E : <a href="mailto:Pkitc@unimelb.edu.au">Pkitc@unimelb.edu.au</a>
Dr Kulmira Nurgali Rm N504	T : 8344-4782 / E : <a href="mailto:K.nurgali@unimelb.edu.au">K.nurgali@unimelb.edu.au</a>
Dr Anthony Shafton Rm E510	T : 8344-3978 / E : <a href="mailto:ashafton@unimelb.edu.au">ashafton@unimelb.edu.au</a>
Dr Sebastian Jungnickel E202	T : 8344-5806 / E : <a href="mailto:s.jungnickel@unimelb.edu.au">s.jungnickel@unimelb.edu.au</a>

- **Ageing, obesity and neuronal loss**  
**Prof John Furness, Dr Peter Kitchener**, Dr Peter Crack (Pharmacology)
- **Unravelling the mechanisms of head pain**  
**Dr Ernie Jennings**, Ms Hyun-jung Cho, Ms Vicky Staikopoulos
- **A novel neuropeptide in the spinal cord**  
**Dr Sebastian Jungnickel**, Prof John Furness
- **Visceral pain: Structure and function of visceral nociceptors**  
**Dr Peter Kitchener, Dr Anthony Shafton** and Prof John Furness
- **Neuro-immune interactions: Immunohistochemical investigation of inflammatory cell types**  
**Dr Kulmira Nurgali, Dr Sebastian Jungnickel**, Ms Michelle Thacker, **Prof John Furness**
- **The development of inflammation-induced changes in neuronal excitability**  
**Dr Kulmira Nurgali**, Dr Sebastian Jungnickel, Ms Michelle Thacker, **Prof John Furness**
- **Mechanisms of pain in gastrointestinal inflammation and post-inflammatory Irritable Bowel Syndrome (IBS)**  
**Dr Kulmira Nurgali**, Dr Peter Kitchener, Prof John Furness
- **Immunohistochemical definition of neuronal phenotype change in inflammation**  
**Dr Sebastian Jungnickel**, Dr Kulmira Nurgali, Ms Michelle Thacker, Prof John Furness

## PHD SCHOLARSHIP

### MODULATION OF THE TEMPERATURE- AND PAIN-SENSING ION CHANNELS

Departments of Pharmacology & Anatomy and Cell Biology  
The University of Melbourne

A PhD scholarship is offered to study the regulation of thermal sensation by the TRP ion- channels found in sensory nerves. TRP ion channels on sensory nerves play major roles in the sensing of heat, cold, and noxious chemicals and these are involved in pain signalling-particularly TRPV1- the heat and chilli-pepper receptor. Our identification of the first cold-sensitive TRP channels in sensory nerves (1,2) as well as a novel heat-sensitive heat channel TRPV3 (3), suggested that other TRP ion channels may play a role in sensation in mammals.

The scholarship is funded at the level of an Australian Post-graduate Award, plus conference travel allowance and thesis allowance.

For further information on this project refer to the section at the end of this booklet on 'Scholarship Programs'.

Enquiries :

Prof Peter McIntyre  
Department of Pharmacology  
The University of Melbourne  
Tel: 61 3 8344 5745  
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Prof John Furness  
Department of Anatomy & Cell Biology  
The University of Melbourne  
Tel : 61 3 8344 5794  
Email : [j.furness@unimelb.edu.au](mailto:j.furness@unimelb.edu.au)

### STRUCTURAL FEATURES OF THE C-TERMINUS OF TRPM8, THE COLD AND MENTHOL-SENSING ION CHANNEL

(Honours project)

Professor Peter McIntyre  
Dept of Pharmacology  
University of Melbourne  
Telephone: 03 83445745  
Email: [pmci@unimelb.edu.au](mailto:pmci@unimelb.edu.au)

Co-Supervisor(s): Dr Michael Lew

**School of Enterprise  
University of Melbourne**

**POSTGRADUATE COURSES IN CLINICAL RESEARCH**

**SPECIALIST ELECTIVES - NEUROSCIENCE**

*(in conjunction with the Centre of Clinical Research Excellence in  
Neurosciences)*

Contact :

Dr Delyth Samuel  
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University of Melbourne  
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[Website : www.soe.unimelb.edu.au](http://www.soe.unimelb.edu.au)

Dr Kathy Lefevere  
Centre for Clinical Research Excellence in Neurosciences  
University of Melbourne  
Email : [lefevere@unimelb.edu.au](mailto:lefevere@unimelb.edu.au)

## Scholarship Opportunities

### INFORMATION SESSION FOR PROSPECTIVE RESEARCH STUDENTS

#### School of Graduate Studies & Melbourne Scholarships Office

Thursday 7 September 2006 at 5.30pm  
Prince Phillip Theatre, Architecture and Planning Building

#### THE MELBOURNE SCHOLARSHIPS PROGRAM

[www.services.unimelb.edu.au/scholarships/pgrad/](http://www.services.unimelb.edu.au/scholarships/pgrad/)

Including : Australian Postgraduate Awards (APA), Melbourne Research Scholarships (MRS) & Special Scholarships

**Closing date : 31 October 2006**

Local\* students may now apply for the main postgraduate scholarships offered as part of the Melbourne Scholarships Program (eg Australian Postgraduate Awards, Fay Marles Scholarships, Human Rights Scholarships, prestigious scholarships). The closing date for these scholarships is 31 October. Closing dates for other scholarships may vary; check the scholarship conditions at time of application. For information on how to apply, please refer to the University's Admissions Website: <http://www.futurestudents.unimelb.edu.au/>

The full range of scholarships available as part of the Melbourne Scholarships Program can be found at <http://www.services.unimelb.edu.au/scholarships/pgrad/available/index.html>.

Applicants should apply using SCHOLS, the online application service. SCHOLS and information about the above listed scholarships is available at <http://www.services.unimelb.edu.au/scholarships/pgrad/>.

Students are encouraged to submit their application and all required documents well before the 31 October closing date. Late applications will only be considered for any Melbourne Research Scholarships that remain at the time the application is assessed.

\* local = Australian and NZ citizens and Australian permanent residents.

Please contact the Postgraduate Scholarships Office if you require further information.

Postgraduate Scholarships  
Level 3, John Smyth Building, (Building 197)  
Swanston Street  
(near Grattan Street)

Tel : 8344 8747 (General Enquiries) / 1800 67 41 69 (Postgraduate Hotline)

web site address: <http://www.services.unimelb.edu.au/scholarships/pgrad/>

For all enquiries, email:

<http://www.studentadmin.unimelb.edu.au/contact/postgradschols>

**POSTGRADUATE SCHOLARSHIPS**  
**FACULTY OF MEDICINE, DENTISTRY & HEALTH SCIENCES**  
**UNIVERSITY OF MELBOURNE**

There are a number of scholarships available to international and local students applying for postgraduate research study at the Faculty of Medicine, Dentistry and Health Sciences.

[www.mdhs.unimelb.edu.au/courses/scholarships/postgrad.html](http://www.mdhs.unimelb.edu.au/courses/scholarships/postgrad.html)

**Closing Date : 31 October 2006**

For further details :

Ms Joan Vosen  
Resource & Scholarships Officer  
Faculty of Medicine, Dentistry & Health Sciences  
University of Melbourne  
Parkville VIC 3010 AUSTRALIA  
Tel : 61 3 8344 4019  
Email : [jyv@unimelb.edu.au](mailto:jyv@unimelb.edu.au)

**JASON**

**Joint Academic Scholarships Online Network**

JASON is a search engine that contains information about postgraduate scholarships. The scholarships in the database apply to Australian students wishing to study at home or abroad, and to international students wishing to study in Australia.

<http://www.jason.edu.au/>

## PhD SCHOLARSHIP

### DEPARTMENTS OF PHARMACOLOGY & ANATOMY AND CELL BIOLOGY UNIVERSITY OF MELBOURNE

#### MODULATION OF THE TEMPERATURE- AND PAIN-SENSING ION CHANNELS

A PhD scholarship is offered to study the regulation of thermal sensation by the TRP ion-channels found in sensory nerves. TRP ion channels on sensory nerves play major roles in the sensing of heat, cold, and noxious chemicals and these are involved in pain signalling-particularly TRPV1- the heat and chilli-pepper receptor. Our identification of the first cold-sensitive TRP channels in sensory nerves (1,2) as well as a novel heat-sensitive heat channel TRPV3 (3), suggested that other TRP ion channels may play a role in sensation in mammals.

The agonist binding sites and the thermal activations sites of these ion channels appear to reside in different parts of the ion channel structure. Whereas ligands tend to bind within membrane penetrating domains of the protein, the C-terminal regions of the thermo-TRP channels TRPV1 (heat-activated) and TRPM8 (cold-activated) are responsible for temperature signalling. Thus, swapping C-termini between these channels results in opposite temperature sensing behaviour (4). We aim to further study the mechanism of thermal activation of the TRP channels and the mechanisms of temperature sensation in animals using modern molecular pharmacological approaches. You will investigate if temperature can modulate the conformation of the C-terminal tail of the ion channels and if other post-translational modifications are responsible for setting of the threshold of activation of the channels to identify key structural regions of the C-terminus of TRP ion channels responsible for thermal sensing. TRPV1, which is sensitive to temperatures above 42°C will be used and regions of the heat-sensitive TRPV4 and the cold-sensitive TRPM8 and TRPA1 will be substituted in chimeric constructs to determine key structural regions responsible of thermal signal transduction.

The scholarship is funded at the level of an Australian Post-graduate Award, plus conference travel allowance and thesis allowance.

Enquiries :

Prof Peter McIntyre  
Department of Pharmacology  
The University of Melbourne  
Tel: 61 3 8344 5745  
Email: [pmci@unimelb.edu.au](mailto:pmci@unimelb.edu.au)

Prof John Furness  
Department of Anatomy & Cell Biology  
The University of Melbourne  
Tel : 61 3 8344 5794  
Email : [j.furness@unimelb.edu.au](mailto:j.furness@unimelb.edu.au)

1. Peier, A. M., Moqrich, A., Hergarden, A. C., Reeve, A. J., Andersson, D. A., Story, G. M., Earley, T. J., Dragoni, I., McIntyre, P., Bevan, S., and Patapoutian, A. (2002) *Cell* **108**, 705-715
2. Story, G. M., Peier, A. M., Reeve, A. J., Eid, S. R., Mosbacher, J., Hricik, T. R., Earley, T. J., Hergarden, A. C., Andersson, D. A., Hwang, S. W., McIntyre, P., Jegla, T., Bevan, S., and Patapoutian, A. (2003) *Cell* **112**, 819-829
3. Peier, A. M., Reeve, A. J., Andersson, D. A., Moqrich, A., Earley, T. J., Hergarden, A. C., Story, G. M., Colley, S., Hogenesch, J. B., McIntyre, P., Bevan, S., and Patapoutian, A. (2002) *Science* **296**, 2046-2049
4. Brauchi, S., Orta, G., Salazar, M., Rosenmann, E., and Latorre, R. (2006) *J Neurosci* **26**, 4835-4840

## **ARC APAI PhD SCHOLARSHIP – DATA MANAGEMENT TECHNOLOGIES**

Two Australian Research Council (ARC) funded PhD scholarships are available for work on the following project: "Data management technologies for a Magnetic Resonance Imaging e-Research Grid". The aim of the project is to develop and implement techniques to enhance storage, use and management of large amounts of Magnetic Resonance (MR) Imaging data.

The Australian Postgraduate Award (Industry) will be offered for 3 years commencing by mid-December 2006. The candidates will receive an annual tax-free stipend of \$24 650 per annum and access to state of the art equipment in an intellectually stimulating and supportive environment. Candidates must be Australian or New Zealand citizens, or permanent residents of Australia and should possess an outstanding undergraduate degree in a relevant area accompanied by first class Honours. Candidates must not already have a PhD or have previously held an APA or APAI (unless terminated within the first 6 months).

The project will be conducted in collaboration with Neurosciences Victoria and Silicon Graphics Inc – a leading Australian information technology company. The students will receive excellent support from supervisors within these organizations, as well as from University supervisors. The students will be based jointly at the Centre for Neuroscience and the Department of Electrical Engineering, both located at the University of Melbourne.

Please apply directly to [i.bohanna@hfi.unimelb.edu.au](mailto:i.bohanna@hfi.unimelb.edu.au) with curriculum vitae, covering letter, and academic transcript.

Closing date for Applications: 5pm, Tuesday 31<sup>st</sup> October, 2006

For further information contact :

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