WEST AUSTRALIAN SLEEP DISORDERS RESEARCH INSTITUTE (INC.)

SUMMARY OF RESEARCH ACTIVITY

July 1 2007 – June 30 2008

Level 5, G Block
Queen Elizabeth II Medical Centre
Hospital Avenue
Nedlands
Western Australia 6009
Australia
Table of Contents

PROF DAVID HILLMAN  UPPER AIRWAY RESPIRATORY MUSCLES ........................................... 3
ASSOC PROF PETER EASTWOOD ................................................................. 3
Fields of Work .................................................................................. 3
Grants ............................................................................................ 3
Research Personnel ......................................................................... 4
Collaborations ................................................................................ 4
Techniques .................................................................................... 5
Presentations and Invited Lectures .................................................. 5
Publications ..................................................................................... 7
DR STEWART CULLEN  SLEEP APNOEA ...................................................... 8
Fields of Work .............................................................................. 8
Collaborations .............................................................................. 8
Techniques .................................................................................... 8
Publications .................................................................................... 8
ASSOC PROF ALAN JAMES  AIRWAY REMODELING AND INFLAMMATION .......... 9
Fields of Work .............................................................................. 9
Grants ............................................................................................ 10
Research Personnel ........................................................................ 10
Collaborations ............................................................................... 11
Techniques .................................................................................... 12
Presentations and Invited Lectures .................................................. 12
Publications .................................................................................... 13
DR NIGEL MCARDLE  SLEEP APNOEA ....................................................... 13
Fields of Work .............................................................................. 13
Collaborations ............................................................................... 13
Presentations and Invited Lectures .................................................. 14
DR SUTAPA MUKHERJEE  EPIDEMIOLOGY ............................................... 14
Fields of Work .............................................................................. 14
Grants ............................................................................................ 14
Research Personnel ........................................................................ 14
Presentations and Invited Lectures .................................................. 15
DR BHAJAN SINGH  DIAPHRAGM CONTROL OF BREATHING ....................... 15
DR BILL FINUCANE ................................................................. 15
Fields of Work .............................................................................. 15
Grants ............................................................................................ 16
Research Personnel ........................................................................ 16
Collaborations ............................................................................... 16
Techniques .................................................................................... 16
Presentations and Invited Lectures .................................................. 16
DR JASON KIRKENSS  UPPER AIRWAY PATENCY DURING SLEEP .............. 17
Fields of Work .............................................................................. 17
Grants ............................................................................................ 17
Research Personnel ........................................................................ 17
Collaborations ............................................................................... 17
Techniques .................................................................................... 18
Presentations and Invited Lectures .................................................. 18
Publications .................................................................................... 19
SUMMARY OF RESEARCH ACTIVITIES ...................................................... 20
Fields of Work

1. Sleep-Disordered Breathing
   - Upper airway function during anaesthesia and sleep
   - Computational dynamics of the human upper airway
   - Upper airway imaging using endoscopic optical coherence tomography
   - Upper and lower oesophageal sphincter function during wakefulness and sleep
   - Non-invasive detection of gastric insufflation
   - Intramuscular recording of genioglossus myoelectric activity
   - The relationship between sleep apnoea, vascular function and erectile dysfunction
   - The relationship between travel, sleep quality and elite athletic performance

2. Chronic Lung Disease
   - The role of respiratory muscle training in chronic lung disease
   - Measuring functional capacity in chronic lung disease
   - Defining the burden of disease and benefits of exercise in moderate to severe asthma

Grants

<table>
<thead>
<tr>
<th>Year</th>
<th>Principle Invest.</th>
<th>Funding Body; Project Title</th>
<th>$ Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-2008</td>
<td>PR Eastwood</td>
<td>NHMRC (294404) R Douglas Wright Biomedical Career Development Award</td>
<td>$417 500</td>
</tr>
<tr>
<td>2005-2007</td>
<td>AD Lucey, PR Eastwood, DR Hillman, DD Sampson, T Balint</td>
<td>Australian Research Council (DP0559408) Modeling and methods of flow-obstruction dynamics in the human upper airway</td>
<td>$425 000</td>
</tr>
<tr>
<td>2005-2008</td>
<td>JP Kirkness</td>
<td>NHMRC (513716) CJ Martin Fellowship Neurohumoral and neuromuscular control of upper airway patency in obesity and sleep apnoea</td>
<td>$301 462</td>
</tr>
<tr>
<td>2006-2008</td>
<td>PR Eastwood, DD Sampson, DR Hillman</td>
<td>NHMRC (403953) Mechanisms of pharyngeal collapse in obstructive sleep apnoea defined by optical coherence tomography</td>
<td>$467 750</td>
</tr>
<tr>
<td>2007</td>
<td>PR Eastwood</td>
<td>Medical and Health Research Infrastructure Fund (WA) Department of Health, Government of Western Australia Infrastructure Grant - Round 10</td>
<td>$31 147</td>
</tr>
<tr>
<td>2007</td>
<td>JH Walsh, P Platt</td>
<td>Sir Charles Gairdner Hospital Research Foundation The efficacy of head posture modifications in the treatment of obstructive sleep apnoea</td>
<td>$10 000</td>
</tr>
<tr>
<td>2007</td>
<td>K Shepherd, PR Eastwood</td>
<td>Sir Charles Gairdner Hospital Research Foundation Mechanisms underlying gastroesophageal reflux in obstructive sleep apnoea</td>
<td>$10 000</td>
</tr>
<tr>
<td>2007</td>
<td>KF Smith, DR Hillman</td>
<td>Sir Charles Gairdner Hospital Research Foundation The effect of arm support during exercise in subjects with chronic obstructive pulmonary disease (COPD)</td>
<td>$10 000</td>
</tr>
<tr>
<td>2008</td>
<td>J Williamson, PR Eastwood</td>
<td>Sir Charles Gairdner Hospital Research Foundation Using optical imaging to investigate and manage disorders of the low airway</td>
<td>$9 980</td>
</tr>
<tr>
<td>Year</td>
<td>PI/Co-PIs</td>
<td>Funding Agency/Grant</td>
<td>Amount</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------</td>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>2008</td>
<td>J Williamson</td>
<td><em>Sir Charles Gairdner Hospital Research Foundation (PhD top-up scholarship)</em></td>
<td>$5 000</td>
</tr>
<tr>
<td></td>
<td>PR Eastwood</td>
<td>Applications of anatomical optical coherence tomography in lower airways of human</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>PR Eastwood</td>
<td><em>Medical and Health Infrastructure Fund (WA)</em></td>
<td>$37 778</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Health, Government of Western Australia Infrastructure Grant - Round 11</td>
<td></td>
</tr>
<tr>
<td>2008-2010</td>
<td>PR Eastwood</td>
<td><em>NHMRC (513854)</em></td>
<td>$395 125</td>
</tr>
<tr>
<td></td>
<td>DR Hillman</td>
<td>Bronchoscopic applications of anatomical optical coherence tomography</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DD Sampson</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M Phillips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-2012</td>
<td>PR Eastwood</td>
<td><em>NHMRC (513705)</em></td>
<td>$595 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Senior Research Fellowship</td>
<td></td>
</tr>
</tbody>
</table>

**Research Personnel**

- **Dr Jason Kirkness**
  - Postdoctoral Research Fellow
- **Dr Jennifer Walsh**
  - Postdoctoral Research Fellow
- **Ms Tanja Kuzich**
  - Research Assistant
- **Ms Kathleen Maddison**
  - Research Assistant
- **Mr Liam Coffey**
  - Research Assistant (part-time)
- **Ms Kate Godde**
  - Research Assistant (part-time)
- **Ms Laila Robertson**
  - PhD Candidate
- **Ms Kelly Shepherd**
  - PhD Candidate
- **Ms Kate Smith**
  - PhD Candidate
- **Ms Sian Turner**
  - PhD Candidate
- **Dr Jonathan Williamson**
  - PhD Candidate
- **Ms Jane Potter**
  - Honours Candidate
- **Mr Michael Woods**
  - Honours Candidate

**Collaborations**

**Local**

- **A/Prof G Allison**
  - Centre for Musculoskeletal Studies, University of Western Australia
- **A/Prof S Jenkins**
  - Department of Physiotherapy, Sir Charles Gairdner Hospital; School of Physiotherapy, Curtin University
- **A/Prof J Pan**
  - Department of Mechanical Engineering, University of Western Australia
- **Dr P Platt**
  - Department of Anaesthetics, SCGH
- **Dr S Mukherjee**
  - West Australian Sleep Disorders Research Institute
- **Prof D Sampson**
  - Department of Electronic and Electrical Engineering, University of Western Australia
- **Prof PJ Thompson**
  - Asthma and Allergy Research Institute, Queen Elizabeth II Medical Centre
- **Prof J Hamdorf**
  - Medical Education, Faculty of Medicine, Dentistry and Health Sciences, University of Western Australia
- **Prof L Palmer**
  - Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia

**National**

- **Dr T’Amis**
  - Department of Respiratory Medicine, Westmead Hospital, NSW
- **Dr R Grunstein**
  - Sleep Disorders Centre, Royal Prince Alfred Hospital, NSW
Techniques
1. Oesophageal impedance
2. Oesophageal manometry
3. Oesophageal pH monitoring
4. Administration of non-invasive ventilation
5. Polysomnography
6. Optical coherence tomography
7. Intramuscular electrodes
8. Respiratory muscle training
9. Portable metabolic gas analyser
10. Cycle ergometry
11. Treadmill ergometry
12. Dual energy X-ray absorptiometry (DEXA)

Presentations and Invited Lectures

Local

National


**International**


8. Walsh JH, Leigh MS, Paduch A, Armstrong JJ, Maddison KJ, Sampson DD, Hillman DR & Eastwood PR. Effect of body posture on velopharyngeal shape and size in obstructive


**Publications**


**DR STEWART CULLEN SLEEP APNOEA**

**Fields of Work**

1. Predictors of sleep apnoea using questionnaires and laser measurements of oral dimensions
2. Treatment of sleep apnoea:
   - Mandibular advancement splints: new models
   - Tongue retaining devices
   - Positional therapy: new appliances
3. Validation of the radical pulse oximeter in the detection of sleep apnoea
4. Sleep studies in the Busselton Health Survey

**Collaborations**

**Local**

A/Prof A James  
Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute

Dr N McArdle  
Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute

Mr W Noffsinger  
Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute

Dr S Phung  
Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute

**Techniques**

1. Lasers
2. Radical oximeters
3. Mandibular advancement splints and tongue retaining devices

**Publications**

ASSOC PROF ALAN JAMES AIRWAY REMODELING AND INFLAMMATION

Fields of Work

1. Airway Remodeling
   - Hypertrophy and hyperplasia of airway smooth muscle in asthma
     - Stereological measurement of airway smooth muscle and extracellular matrix in asthma
     - Validation of methods – section orientation and image analysis
     - Relation of changes in airway smooth muscle and extracellular matrix to age and duration and severity of asthma
   - Comparison of airway remodeling (smooth muscle, extracellular matrix, reticular basement membrane) in biopsies and transverse sections of airways in control nonfatal and fatal asthma cases.

2. Airway Inflammation
   - Validation study of biopsy to assess airway and lung inflammation
   - Inflammation in allergen-sensitised and exposed mice
   - Mast cells in fatal asthma

3. Population Studies
   - Burden of obstructive lung disease (BOLD)
     - Multi-centre national study
     - Random sample of current Busselton adult population: questionnaires, forced oscillatory technique, exhaled nitric oxide, spirometry, allergy skin tests
   - Busselton Health Survey 2005-2007
     - Random sample of the Busselton population (adults and children)
     - Questionnaires; morphometry; blood pressure; spirometry; exhaled nitric oxide; forced oscillation technique; airway responsiveness to methacholine; allergy prick skin tests; collection of blood for full blood counts, stored serum and DNA analysis
   - Collaborative (The Netherlands; Italy; Hungary) study of bronchodilator response of forced oscillatory technique
     - Age and gender stratified
     - Sample of Busselton Survey (1994) attendees
   - Indigenous Health
     - Working Party on Aboriginal Respiratory Health
   - Epidemiology of obstructive sleep apnoea (WA SHS)
     - WASDRI Sleep database and genetics study
     - Busselton Health Survey: re-survey of current population

4. Genetic influences on airway disease and allergy
   - Single nucleotide polymorphisms
     - Collaborative studies with Canadian (AllerGen) and European (GARBRIEL; DeCODE) consortia to achieve large genome wide associations.
   - Genome screen
   - HLA-DR polymorphisms and asthma/allergy

5. SIDS
   - Influence of parental smoking on airway structure and inflammation.
   - Ethical issues in seeking parental consent.

6. Clinical Trials
Grants

<table>
<thead>
<tr>
<th>Year</th>
<th>Principle Invest.</th>
<th>Funding Body: Project Title</th>
<th>$ Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-2007</td>
<td>James, AL</td>
<td>NHMRC (26100) Practitioner Fellowship</td>
<td>$325 000</td>
</tr>
<tr>
<td>2005-2007</td>
<td>James, AL</td>
<td>NHMRC (343601) Hyperplasia and hypertrophy of airway smooth muscle in asthma</td>
<td>$281 000</td>
</tr>
<tr>
<td>2005-2007</td>
<td>Musk, AW</td>
<td>NHMRC (353532) The changing prevalence of asthma and chronic obstructive disease in Australia</td>
<td>$729 380</td>
</tr>
<tr>
<td>2007-2009</td>
<td>James, AL</td>
<td>NHMRC (446800) Assessment of airway smooth muscle hypertrophy in asthma and chronic obstructive pulmonary disease (COPD)</td>
<td>$286 325</td>
</tr>
<tr>
<td>2007-2009</td>
<td>Marks, G</td>
<td>NHMRC (457385) Burden of obstructive lung disease in Australia</td>
<td>$737 788</td>
</tr>
<tr>
<td></td>
<td>Abramson, M</td>
<td></td>
<td>$122 835 (WA)</td>
</tr>
<tr>
<td></td>
<td>James, AL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maguire, G</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toelle, B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wood-Baker, R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>Carroll, N</td>
<td>Asthma Foundation of WA Can endobronchial biopsy be used as a tool to evaluate airway smooth muscle (ASM) remodeling in patients with asthma?</td>
<td>$45 346</td>
</tr>
<tr>
<td>2007</td>
<td>James, AL</td>
<td>Sir Charles Gairdner Hospital Research Foundation (0707) Assessment of extracellular matrix deposition and smooth muscle hypertrophy in asthma and COPD</td>
<td>$10 000</td>
</tr>
<tr>
<td>2007</td>
<td>James, AL</td>
<td>Medical and Health Research Infrastructure Fund (WA) Department of Health, Government of Western Australia Infrastructure Grant - Round 11</td>
<td>$13 894</td>
</tr>
<tr>
<td>2008</td>
<td>McFawn, P</td>
<td>NHMRC (513842) Response of human airways to deep inflation in health and disease</td>
<td>$270 000</td>
</tr>
<tr>
<td>2008</td>
<td>Noble, P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>James, A</td>
<td>Sir Charles Gairdner Hospital Research Foundation (0804) Airway smooth muscle in non-eosinophilic asthma</td>
<td>$10 000</td>
</tr>
<tr>
<td>2008</td>
<td>Mitchell, H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>James, A</td>
<td>Hollywood Private Hospital Research Foundation (RF034) Airway smooth muscle in non-eosinophilic asthma</td>
<td>$10 000</td>
</tr>
<tr>
<td>2008</td>
<td>Elliot, J</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Research Personnel

- Mr John Elliot: Research Officer
- Ms Peta Maxwell: Research Officer (part-time)
- Ms Robyn Jones: Research Assistant
- Mr Mark Carroll: PhD candidate
- Dr Andreas Fiene: Respiratory Trainee

Collaborations

Local
Prof A Baddeley School of Mathematics, University of Western Australia
Dr K Finucane Department of Pulmonary Physiology, Sir Charles Gairdner Hospital
Dr G Hall Institute for Child Health Research
Dr D Hillman Department of Pulmonary Physiology, Sir Charles Gairdner Hospital
Dr A Kicic Institute for Child Health Research
Dr P McFawn Department of Physiology, University of Western Australia
Dr G Maguire WA Department of Health (Broome)
Prof H Mitchell Department of Physiology, University of Western Australia
Prof AW Musk Department of Respiratory Medicine, Sir Charles Gairdner Hospital
Dr P Noble Department of Physiology, University of Western Australia
Mr W Noffsinger Department of Pulmonary Physiology, Sir Charles Gairdner Hospital
Prof L Palmer Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia
Prof P Sly Institute for Child Health Research
A/Prof S Stick Institute for Child Health Research
Dr D Turner Institute for Child Health Research
Dr S Young Department of Pulmonary Physiology, Sir Charles Gairdner Hospital

National
A/Prof M Abramson Department of Epidemiology and Preventive Medicine, Monash Medical School, Alfred Hospital, Victoria
Dr G King Woolcock Institute of Medical Research, University of Sydney, New South Wales
A/Prof R Kumar School of Pathology, University of New South Wales
Dr K MacKay Department of Respiratory Medicine, Children’s Chest Research Centre, Children’s Hospital at Westmead, NSW
A/Prof G Marks Woolcock Institute of Medical Research, New South Wales
A/Prof P Robinson Department of Thoracic Medicine, Royal Children’s Hospital, Victoria
Dr B Toelle Woolcock Institute of Medical Research, New South Wales
Prof J Upham Princess Alexandra Hospital, Queensland
Prof H Walters School of Medicine, University of Tasmania
Dr R Wood-Baker Respiratory Medicine, University of Tasmania

International
Prof T Bai MacDonald Research Laboratory, St Paul’s Hospital, Vancouver, Canada
Prof M Bonsignore Instituto di Fisopatologia, Palermo, Italy
Prof W Cookson Imperial College London, England
Dr M Dohlnikof Department of Pathology, Sao Paulo University Medical School, Brazil
Dr F Green Faculty of Medicine, University of Calgary, Canada
Prof J Hogg James Hogg iCAPTURE Centre, University of British Columbia, Vancouver, Canada
Dr D Knight James Hogg iCAPTURE Centre, University of British Columbia, Vancouver, Canada
Dr T Mauad Department of Pathology, Sao Paulo University Medical School, Brazil
Prof P Pare MacDonald Research Laboratory, St Paul’s Hospital, Vancouver, Canada
Prof E Spindel Oregon Regional Primate Research Centre, Oregon, USA
Dr E Oostveen University Hospital, Antwerp, Belgium
Dr Z Hantos University of Szeged, Szeged, Hungary

Techniques
1. Morphometry and stereology
2. Immunohistochemistry
3. Physiology - airway responsiveness; forced oscillation technique
4. Exhaled nitric oxide
5. Atopy
6. Induced sputum
7. Population surveys

Presentations and Invited Lectures

Local

National

International
issue): A496.


**Publications**


2. James A. History of asthma in Western Australia. Jenny Gregory and Jan Gothard (eds), Historical Encyclopedia of Western Australia, University of Western Australia Press, Crawley, 2008: [In press].


**DR NIGEL MCARDLE SLEEP APNOEA**

**Fields of Work**

1. Sleep apnoea and vascular disease
2. Treatment of sleep apnoea
3. Diagnostic strategies for sleep apnoea

**Collaborations**

**Local**

- Prof L Beilin Royal Perth Hospital
- Dr K Gain Royal Perth Hospital
- Dr S Mukherjee West Australian Sleep Disorders Research Institute
- Prof L Palmer Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia

Dr S Phung  
West Australian Sleep Disorders Research Institute  
Prof G Watts  
Royal Perth Hospital  

Presentations and Invited Lectures  

Local  

DR SUTAPA MUKHERJEE  
EPIDEMIOLOGY  

Fields of Work  
1. Establishment of the WA Sleep Disorders Cohort, a population-based resource, to investigate the epidemiology of obstructive sleep apnoea in WA;  
2. Occupational exposures and health effects- with particular interest in asbestos and diesel exposure;  
3. Malignant mesothelioma.  

Grants  

<table>
<thead>
<tr>
<th>Year</th>
<th>Principle Invest.</th>
<th>Funding Body: Project Title</th>
<th>$ Awarded</th>
</tr>
</thead>
</table>
| 2007 | S Mukherjee       | Hollywood Private Hospital Research Foundation  
Establishment of a population-based database for sleep apnoea | $10 000 |
| 2007 | S Mukherjee       | Sir Charles Gairdner Hospital Research Foundation  
Establishment of a population-based database for sleep apnoea | $10 000 |
|      | S Mukherjee       | Department of Health, State Health Advisory Council  
Development of a triage questionnaire for rural sleep apnoea patients | $154 554 |

Research Personnel  
Ms Jess Lee  
Mr Greg Love  
Ms Annette Fedson  
Ms Laila Robertson  
Ms Kim Ward  
Mr Anand Venkataraman  
4th Year Medical Student Collaboration  

Local  
Dr P Eastwood  
West Australian Sleep Disorders Research Institute  
Dr J Kirkness  
West Australian Sleep Disorders Research Institute
Prof N de Klerk
Department of Biostatistics, Telethon Institute for Child Health Research

Clin Prof AW Musk
Department of Respiratory Medicine, Sir Charles Gairdner Hospital

Prof L Palmer
Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia

International
Prof D Christiani
Harvard School of Public Health, USA

Presentations and Invited Lectures

National

International


DR BHAJAN SINGH
DIAPHRAGM CONTROL OF BREATHING

DR BILL FINUCANE

Fields of Work
1. Neuro-mechanical efficiency of the diaphragm
2. Respiratory failure and the chemical control of breathing in chronic obstructive lung disease
3. Lung volume reduction surgery in emphysema
4. Atrial fibrillation and obstructive sleep apnoea
5. The effect of positive end-expiratory pressure
Grants

<table>
<thead>
<tr>
<th>Year</th>
<th>Principle Invest.</th>
<th>Funding Body: Project Title</th>
<th>$ Awarded</th>
</tr>
</thead>
</table>
| 2005-2007  | B Singh           | *Boehringer Ingelheim Pty Ltd*  
*Pfizer Pharmaceuticals*  
Lung volume reduction with tiotropium in chronic obstructive pulmonary disease (COPD): Improved dyspnoea: Mechanisms and clinical implications | $214 000    |

Research Personnel

Collaborations

Local

Dr Martin Phillips  
Department of Respiratory Medicine, Sir Charles Gairdner Hospital

Dr Pradyot Saklani  
Department of Cardiology, Sir Charles Gairdner Hospital

Dr Adrian Regli  
Intensive Care Unit, Sir Charles Gairdner Hospital

Dr Vernon van Heerden  
Intensive Care Unit, Sir Charles Gairdner Hospital

Techniques

1. Measurement of diaphragm displacement by radiography, fluoroscopy and ultrasound;
2. Measurement of diaphragm electromyography;
3. Transthoracic pneumonostomy.

Presentations and Invited Lectures

Local

1. Singh B. Respiratory Physiology. FRACP Tutorial, Department of Medicine, Sir Charles Gairdner Hospital. July 2007.

National

DR JASON KIRKENSS  UPPER AIRWAY PATENCY DURING SLEEP

Fields of Work
1. Upper airway collapsibility during sleep
2. Upper airway surface forces
3. Effect of obesity on upper airway control
4. Novel diagnostic and treatment approaches in obstructive sleep apnoea

Grants

<table>
<thead>
<tr>
<th>Year</th>
<th>Principle Invest.</th>
<th>Funding Body; Project Title</th>
<th>$ Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-2008</td>
<td>JP Kirkness</td>
<td>NHMRC (513716) CJ Martin Fellowship Neurohumoral and neuromuscular control of upper airway patency in obesity and sleep apnoea</td>
<td>$301 462</td>
</tr>
<tr>
<td>2008-2009</td>
<td>JP Kirkness</td>
<td>Raine Medical Foundation Priming Grant Dynamic modulation of airflow and upper airway properties during polysomnography</td>
<td>$171 270</td>
</tr>
</tbody>
</table>

Research Personnel
Ms Kate Godde  Sleep Technologist/Part-time Research Assistant (Apr 2008)
Ms Marie-Therese Hunter  Sleep Technologist (June 2008)
Ms Bernadett Szegner  Research Associate (Jun 2008)
Ms Jane Potter  Honours Candidate
Mr Michael Woods  Honours Candidate

Collaborations

Local
Prof J Hamdorf  Department of Surgery, The University of Western Australia
Mr N McLean  School of Psychology, The University of Western Australia
Dr S Mukherjee  West Australian Sleep Disorders Research Institute
Prof L Palmer  Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia
Ms L Simpson  Centre for Genetic Epidemiology and Biostatistics, The University of Western Australia

National
Dr T Amis  Ludwig Engel Centre for Respiratory Research, Westmead, NSW
Prof P Cistulli  Woolcock Institute, Sydney, NSW
Mrs M Verma  Ludwig Engel Centre for Respiratory Research, Westmead, NSW
A/Prof JR Wheatley  Ludwig Engel Centre for Respiratory Research, Westmead, NSW

International
A/Prof T Ayuse  Nagasaki School of Dentistry, Nagasaki, Japan
Mr M Erlaker  University of Technology Munich, Germany
A/Prof B McGinley  Johns Hopkins Sleep Disorders Centre, Baltimore, USA
A/Prof S Patil  Johns Hopkins Sleep Disorders Centre, Baltimore, USA
A/Prof H Schneider  Johns Hopkins Sleep Disorders Centre, Baltimore, USA
Prof A Schwartz  Johns Hopkins Sleep Disorders Centre, Baltimore, USA
Prof F Smith  Johns Hopkins Sleep Disorders Centre, Baltimore, USA
Dr R Stoohs  Dortmund Sleep Disorders Centre, Dortmund, Germany
Techniques
1. Upper airway critical collapsing pressure
2. Neuromuscular responses to upper airway obstruction
3. Quantitative pneumography utilisation
4. Polysomnography
5. Dual energy X-ray absorptiometry
6. Nasal insufflation

Presentations and Invited Lectures

Local
2. Biomechanics of obesity and upper airway patency in obstructive sleep apnoea. School of Physiology, Faculty of Life and Physical Sciences, The University of Western Australia. September 2007.

National

International
3. Session Co-Chair. Cranio-facial issues in sleep apnoea. 5th Congress of the World Federation of Sleep Research and Sleep Medicine Societies (WFSRS), Cairns Australia.
4. Session Chair. Respiratory, neurobiology and sleep oral session. 12th Congress of the Asia


Publications

1. Kirkness JP; Schwartz AR; Schneider H; Punjabi N; Maly JJ; Laffan AM; McGinley BM; Magnuson T; Schweitzer M; Smith PL; Patil SP. Contribution of male sex, age, and obesity to mechanical instability of the upper airway during sleep. *J Appl Physiol* 2008; 104(6): 1618-1624.


## SUMMARY OF RESEARCH ACTIVITIES

Number of research staff
- Full-time: 9
- Part-time: 5
- Total: 14

Number of students
- Honours: 4
- PhD: 9
- Total: 13

Number of publications 2007/08: 23

Number of presentations
- Local: 13
- National: 24
- International: 27
- Total: 64

Grants awarded to WASDRI Researchers:
- Total of all current grants: $5,379,346
- Total for 2007/2008: $1,237,760