



ANNUAL REPORT 2023

# Centre for Urology Research (CUR)

## **ACADEMIC MEMBERS OF THE CENTRE**

- Professor Russ Chess-Williams (Pharmacologist, Centre Director)
- Dr Stephan Levonis (Medicinal Chemist)
- Dr Iris Lim (Biomedical Scientist)
- Dr Anna Lohning (Biochemist)
- Dr Catherine McDermott (Toxicologist)
- Dr Kylie Mills (Biomedical Scientist)
- Dr Christian Moro (Physiologist/Cell Biologist)
- Dr Joan Roehl (Cell Biologist)
- Dr Stephanie Schweiker (Medicinal Chemist)
- Dr Donna Sellers (Physiologist/Pharmacologist)

## **POSTGRADUATE RESEARCH STUDENTS**

### **PhD Research students**

- Hyon Jeong (Minnie) Kim
- Damien Nilsson
- Jessica Smith
- Caitlin Wunsch
- Hafsa Hersi
- Liam O'Callaghan
- Charlotte Phelps
- Vineesha Veer

### **Masters research students**

- Aidan McKeon

### **Honours research students**

- Eriq Burovksi
- Elouise Tye

## **HONORARY MEMBERS**

- [Prof Hikaru Hashitani](#) (Graduate Medical School, Nagoya City University, Japan)
- [Dr Vivien Wong](#) (Urogynaecologist, Robina, Pindara & Varsity hospitals, Gold Coast)
- [Prof David Christie](#) (Radiation Oncologist, Genesis Care, Gold Coast) Vineesha Veer

## **SUMMARY OF 2023 ACHIEVEMENTS**

- Collaborations: Academic institutions in Nagoya & Meijo (Japan), Gothenburg (Sweden), Sao Paulo (Brazil) and industry in India (Shivanka) and US (Lubris).
- Online conference organised with the Japanese Society for Smooth Muscle Research.
- Publications: 3 reviews, 12 papers, an international report ICI (ICS) and 11 abstracts.
- Successful completions: 3 PhDs, 1 Research Masters and 2 Honours students.
- External funding obtained from Bunya Care and pharmaceutical industry (Shivanka)
- New cystometry technique established.
- Best Student Presentation Prize at the ASCEPT (Pharmacology) conference.

# OVERVIEW OF EXTERNAL ACTIVITIES

## International Collaborations

**Kashiv Biosciences, Shivanka Pharmaceuticals, India** - During 2023, we successfully completed a funded study investigating a novel compound for bladder dysfunction and obtained further funding for a preclinical study to commence in 2024. This work supported research assistant positions for Dr Kylie Mills and Aidan McKeon, proving experience of drug discovery and development, enhancing their employment prospects.

**School of Medicine, Nagoya City University, Japan** - Our collaborations with Professor Hashitani have continued after a pause during covid. During 2023, Drs Iris Lim and Donna Sellers hosted two research students from Nagoya (Shiori Yamamkoto & Kotaro Takahashi), who visited Bond for 3 months performing research on ureteral physiology with relevance to the treatment of kidney stones with enzyme inhibitors. A joint manuscript of this collaborative work between our two Universities has been submitted for publication.

**School of Pharmacy, Gothenburg University, Sweden** - Drs Sellers and Lim also hosted two Masters of Pharmacy students (Emma Falk & Samantha Padeloup), who undertook 4 month long research projects (Sept-December) at the Centre's laboratories at Bond. The students investigated hypoxia in the urethra and ureter, which has relevance to the treatment of stress incontinence and urinary stones. These results will be presented at the ASCEPT conference in 2024.

**Japanese Society for Smooth Muscle Research (JSSMR)** - In August we organised the first online joint conference with the JSSMR. One of our HDR alumni Eleanor West was a guest speaker reporting on her PhD work at Bond on afferent nerve control of bladder function, and the sessions were chaired jointly by Dr Iris Lim (Bond) and Dr Tamada Hiroma (Fukui University). The meeting was a great success and similar joint meetings are planned for the future.

**School of Medicine, Meijo University, Nagoya, Japan** - Dr Anna Lohning has been developing a collaboration investigating the effects of extracts from wasabi and liquorice. These compounds will be examined for cytotoxic effects on cell cultures of oestrogen negative and triple negative breast cancer cells. We intend to expand these studies to prostate and bladder cancers.

**Faculty of Medicine, Federal University of Sao Paulo, Brazil** - Prof Russ Chess- Williams has been collaborating with Prof Monica Sato (University of Sao Paulo, Brazil) and Dr Patrik Andersson (Gothenburg University, Sweden) to produce a third special edition of their popular series in "Frontiers in Physiology" covering mechanisms involved in health and disease of the lower urinary tract.

## Conferences attended.

The centre participated in several conferences.

1. **World Congress Pharmacology (WCP2024) held in Glasgow, UK.** Organised by the International Union of Basic and Clinical Pharmacologists (IUPHAR). Several presentations by Dr Donna Sellers.
2. **National Conference on Incontinence (NCOI) and Functional Urology Symposium (FUS). Held in Adelaide.** Organised by the Continence Foundation of Australia. Russ Chess-Williams invited speaker.
3. **Royal Australian Chemistry Congress (Brisbane).** Chemical Education Division, Stephanie Schweiker (Treasurer & Chair) with presentations by their HDR students.
4. **National Symposium on Recent Advances in Urogenital and Gastrointestinal Research.** Online presentations by all our research students.
5. **Australian Physiological Society (AuPS) annual scientific meeting (Hobart):** Oral presentations Iris Lim and Christian Moro. Poster presentations by HDRs Charlotte Phelps and Vineesha Veer.
6. **Royal Australian Chemistry Congress (RACI).** Oral presentation by Drs Stephan Levonis and Stephanie Schweiker and a poster by their research student Minnie Kim.
7. **Australian Society of Clinical and Experimental Pharmacologists and Toxicologists (ASCEPT, Sydney).** Science session chaired by Iris Lim. Oral and poster communications by all our PhD and Masters students.



Oral presentations by HDR students Eriq Burowski, Aidan McKeon and Liam O'Callaghan at the 2023 ASCEPT Annual meeting, Sydney.

## RESEARCH STUDENT SUPERVISION/TRAINING

During the year, three research students completed PhDs and immediately obtained post-doctoral positions of their choice. Three Masters/Honours students also successfully completed their programs and have, or will be, enrolled in PhD research within the Centre in 2024.

### PhD Completions

- **Dr Damian Nilsson** - Completed a PhD project on the vascular system to the bladder. He obtained a casual contract teaching Pharmacology at the School of Pharmacy, Central Queensland University, Darwin. Within months he had accepted a continuing, full-time lectureship in Pharmacology at CQU.
- **Dr Jessica Smith** - Completed a PhD project examining immune cells in bladder tissues. She has been appointed to a post-doctoral research position at the New York University campus located in Dubai.
- **Dr Charlotte Phelps** - Completed a PhD project on the cell biology of bladder smooth muscle. She has been appointed to a Senior Teaching Fellow position at Bond University teaching physiology into the Bond Medical program.

### Masters Completions

- **Aidan McKeon** - Successfully completed a Masters research project investigating the effects of diabetes on urinary function. He will be employed in the Centre as a research assistant working on an industry funded project before starting a PhD within the Centre investigating the influence of psychological stress on diabetes-induced bladder dysfunction.

### Honours Completions

- **Elouise Tye** - Completed an Honours research project investigating the influence of hypoxia (lack of oxygen) on bladder function. Like Aidan she will be employed as a research assistant in the Centre working on an industry funded project before starting a PhD within the Centre examining the effects of perimenopause on bladder function.
- **Eriq Burovski** - Completed an Honours project investigating enzyme (PDE) inhibitors on urethral function and has now enrolled in a PhD with Dr Iris Lim to continue that work.

## CURRENT FUNDING

### FUNDING

- Shivanka Biosciences (2023-24) \$42,700
- Kashiv Biosciences (2022-23) \$32,000
- Bunya Care (2023) \$1,000
- Bond Infrastructure Award (2023) \$18,194  
Support for animal facilities
- Faculty Research Committee support \$10,000

## CENTRE PUBLICATIONS 2023

### Reports

- Russ Chess-Williams - Report of the Neural Control & Cell Biology Panel of the International Consultation on Incontinence: Fry et al. (2023) "The lower gastrointestinal tract (anus and rectum) as relevant to faecal incontinence". Published in INCONTINENCE: 7<sup>th</sup> International Consultation on Incontinence (Melbourne, 2021): Editors: P. Abrams, L. Cardozo L, S. Khoury, & A. Wein. ISBN: 978-0-9569607-4-0. Report available at: <https://www.ics.org/ici>

### Reviews

- Chess-Williams R & Sellers DJ (2023) Pathophysiological mechanisms involved in overactive bladder/detrusor overactivity. Current Bladder Dysfunction Reports <http://doi.org/10.1007/s11884-023-00690-x>
- Chess-Williams R, Mansfield K, Exintaris B, Lim I, Sellers D (2023) Natural products for the treatment of urinary incontinence. Continence 7, Article number 100714. <http://doi.org/10.1016/j.cont.2023.100714>
- Lottering N , Lim I & Gough S. (2023) Re-imagining health and medicine education: Implementing a mobile-based gamification app for improved affective learner





engagement. Supporting Self-regulated learning and student success in online courses 180-208. [HTTP://doi.org/10.4018/978-1-6684-6500-4.ch009](http://doi.org/10.4018/978-1-6684-6500-4.ch009)

## Peer-reviewed original papers

- Phelps C, Chess-Williams R & Moro C. (2023) Ageing influences detrusor contractions to prostaglandin, angiotensin, histamine and 5-HT (serotonin), independent to the rho kinase and extracellular calcium pathways. *Scientific Reports* 13(1), Article number 18062. <http://doi.org/10.1038/s41598-023-44916-8>
- Nilsson D, Chess-Williams R & Sellers DJ (2023) Phosphodiesterase-5 inhibitors tadalafil and sildenafil potentiate nitrenergic-nerve mediated relaxations in the bladder vasculature. *Eur J Pharmacol* EJP\_176152. <http://doi.org/10.1016/j.ejphar.2023.176152>
- Smith J, Toto R & Moro C. (2023) The effects of radiation on myeloid lineage immune cells within the rodent urinary bladder: a systematic review. *International Urology and Nephrology* 55(12), 3005-3014. <http://DOI.org/10.1007/s11255-023-03748-1>
- Phelps C, Chess-Williams R, & Moro C. (2023) The role of intracellular calcium and Rho kinase pathways in G protein-coupled receptor-mediated contractions of urinary bladder urothelium and lamina propria. *American Journal of Physiology - Cell Physiology*, 324(3), C787-C797. <https://doi.org/10.1152/ajpcell.00441.2022>
- Tauber AL, Schweiker SS & Levonis SM. (2023) The connection between PARP14 and SARA-Cov-2. *Future Medicinal Chemistry* 15(3), 225-227. <http://DOI10.4155/fmc-2023-0013>
- Veer V, Chess-Williams R & Moro C. (2023) Antimuscarinic actions on bladder urothelium and lamina propria contractions are similar to those observed in detrusor smooth muscle preparations. *Neurourology and Urodynamics* 42(5), 1080-1087. <http://doi.org/10.1002/nau.25176>
- Moro C & Phelps C. (2023) Urothelium removal does not impact mucosal activity in response to muscarinic or adrenergic receptor stimulation. *Tissue Barriers* 11(3), Article number 2099214. <http://DOI10.1080/21688370.2022.2099214>
- Moro C, Mills KA, Phelps C & Birt J. (2023) The Triple-S framework: ensuring scalable, sustainable, and serviceable practices in educational technology. *International Journal of Educational Technology in Higher Education* 20(1), Article number 7. <http://doi.org/10.1186/s41239-022-00378-y>
- Moro C, Bu D, Gadgil A, Wright G & Jones CJ. (2023) Virtual Models Using Augmented Reality May Provide a Suitable Supplement, Although Not a Physical Specimen Replacement, in Pathology Education. *Medical Science Educator* 33(4), 879-885. <http://doi.org/10.1007/s40670-023-01809-9>

- Moro C. (2023) Utilizing the metaverse in anatomy and physiology. *Anatomical Sciences Education* 16(4), 574-581. <http://doi.org>

## Articles not listed in SCOPUS

- Moro C & Phelps C. (2023) Does it matter if you sit or stand to pee? And what about peeing in the shower? *The Conversation*.
- Phelps C & Moro C. (2023) Ageing and the bladder mucosa: A scoping review of recent animal model studies. *Australian and New Zealand Continence Journal* 28(4), 77-83.

## PUBLISHED CONFERENCE ABSTRACTS

### Joint meeting of National Conference on Incontinence (NCOI) and Functional Urology Symposium (FUS), Adelaide.

Abstracts for podium presentation available at:

<https://journals.cambridgemedica.com.au/application/files/8716/8568/1167/abstracts.pdf>

- Moro C, Veer V, Phelps C. (2023) Are muscarinic agonists and acetylcholinesterase inhibitors effective for the treatment of underactive bladder? *Australian and New Zealand Continence Journal*. 29(2), 35-35 1
- Moro C, Veer V, & Phelps C. (2023) Are muscarinic agonists and acetylcholinesterase inhibitors effective for the treatment of underactive bladder? *Australian and New Zealand Continence Journal*. 29(2), 35-35.

### Federation of Asian and Oceania Physiological Societies (FAOPS, Daegu, Korea)

- Veer, V., Chess-Williams, R. & Moro, C. (2023) Detrusor responses to antimuscarinics medications is consistent between juvenile and adult urinary bladders in porcine tissue. Abstract available at: <https://aps49.wildapricot.org/2023-AuPS-Melbourne>

### Australian Society of Clinical & Experimental Pharmacologists and Toxicologists (ASCEPT, Sydney)

*Oral presentations - Abstracts available at:* <https://www.asceptasm.com/wp-content/uploads/2023/11/ASCEPT-2023-Abstract-Book-Oral-presentations-1-1.pdf>

- Eriq Burovski & Iris Lim. (2023) The Functional Role of Phosphodiesterase Isoenzymes in the Isolated Porcine Urethra. Abstract number 420.
- Aidan S McKeon, Catherine McDermott, Russ Chess-Williams, Donna J Sellers. (2023)

Comparison of diabetes-induced bladder dysfunction in vitro and in vivo. Abstract number 422.

- Liam O'Callaghan, Russ Chess-Williams, Katie Powell, Catherine McDermott (2023) Assessing alpha-1 antagonist prazosin cytotoxicity on bladder cancer cells and bladder function. Abstract number 418.
- Veer, V., Chess-Williams, R. & Moro, C. (2023) Consistencies between carbachol-induced contractions to clinical antimuscarinics in differently aged porcine bladders. Poster number P645.
- Elouise Tye, McDermott, Chess-Williams & Sellers (2023) Contractile response of the urothelium/lamina propria depressed by acute hypoxia in vitro. Poster number P647.



Elouise Tye receives her Prize for Best Poster presentation in Urogenital/Gastrointestinal field.

## Australian Physiological Society (AuPS, Melbourne)

*Abstracts available at:*

[https://pure.bond.edu.au/ws/portalfiles/portal/225498438/AuPS\\_Conference\\_Handbook.pdf](https://pure.bond.edu.au/ws/portalfiles/portal/225498438/AuPS_Conference_Handbook.pdf)

- Charlotte Phelps, Russ Chess-Williams, Christian Moro (2023) Smooth muscle contractions in the urinary bladder: Alterations between juvenile and adult detrusor and the influences of G protein-coupled receptor stimulation.
- Vineesha Veer (2023) Detrusor responses to antimuscarinic medications is consistent between juvenile and adult urinary bladders in porcine tissue.
- Christian Moro (2023) Utilising the metaverse in biomedical teaching.

## ADVISORY BOARD MEETINGS

There was an informal in-person meeting on the 17<sup>th</sup> June 2023 with some of the Centre staff (Prof Chess-Williams and Dr Sellers) and external members of the Advisory Board, Rowan Cockerell (CEO, Continence Foundation of Australia) and Dr Vincent Tse (Consultant Urologist, Concorde Hospital, Sydney) in Adelaide during the joint meeting of the National Conference on Incontinence and Functional Urology Group. Later a more formal meeting was held via zoom in December.

### Contact our Centre

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In the spirit of reconciliation, Bond University acknowledges the Kombumerri people, the traditional Owners and Custodians of the land on which the University now stands. We pay respect to Elders past, present and emerging.

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