

The “International Society for Neurochemistry Symposium: Harnessing Molecular Insights to Target GPCRs for CNS Disorders” was held on Tuesday 4th December 2018 as part of the “British Pharmacological Society – 10th Molecular Pharmacology of GPCRs (BPS-MPGPCR)” meeting at Monash Institute of Pharmaceutical Sciences (Parkville, VIC, Australia). The BPS-MPGPCR meeting was co-chaired by Drs. Karen Gregory and Denise Wootten, with the ISN sponsored symposium co-chaired by Dr. Gregory and Dr. Chris Langmead. The session comprised three invited speakers and two short presentations selected from submitted abstracts. The BPS-MPGPCR meeting encouraged and facilitated presentations from junior researchers with two dedicated sessions to highlight student oral presentations and emerging research leaders (up to 10 years postdoctoral) in the field. In addition, 85 posters were presented for the entire 2.5 days of the meeting, with 50 of these presented by undergraduate, MSc or PhD students. There were 194 registered delegates (60 students, 134 full) for the meeting from around the world: 152 Australia, 16 North America, 4 China, 13 UK/Europe and 8 New Zealand. The final program is available at: <https://www.monash.edu/pharm/about/events/BPS-MPGPCR-Meeting-2018/program>

Talks from the three invited speakers (25min + 5min Q&A) who are world-leaders presented research that spanned biochemistry of receptors and molecular pharmacology through to preclinical models of disease. Steve Ferguson from University of Ottawa presented insights on “*Targeting mGluR5 for the treatment of neurodegenerative diseases*”. His presentation highlighted dissection of novel pathways that are engaged by metabotropic glutamate receptor 5 in the pathological context of neurological diseases (Huntington’s and Alzheimer’s disease) that can be influenced by small molecule allosteric modulators acting at the receptor. He also presented on the preclinical efficacy of mGlu5 modulators with chronic treatment in two Alzheimer’s disease mouse models. Graciela Pineyro (University of Montreal) presented “*Signaling phenotypes of GPCR ligands allow to infer clinically relevant responses: insights from Mu-opioid and beta2-adrenergic receptor ligands*”. Her presentation focused on Mu-opioid receptors and demonstrated novel data visualisation methods that can be used to cluster pharmacology of compounds acting at these receptors. This inspiring talk linked these robust analytical pharmacological data to known clinical adverse effect profiles. In his talk, “*Dynamics and modulation of the metabotropic glutamate receptors*” Philippe Rondard from University of Montpellier presented on novel chemical biology tools and approaches to explore the pharmacology and activity of metabotropic glutamate receptors.

From the abstracts submitted to the conference, two short talks (15min) were selected for inclusion. Simon Foster (University of Copenhagen) presented “*Identification and Pharmacological Characterization of a Novel Small Molecule Agonist and Reference Ligands for the Orphan Receptor GPR139*”. The focus of his work was an orphan GPCR that is predominately expressed in the brain in key regions for motor control and metabolism. Jianfeng Liu (Huazhong University of Science & Technology) presented his work on “*GABAB Receptor Signalling and Aging*”, which included work dissecting the molecular mechanisms of GABAB receptor activation and oligomerization as well as influencing aging processes using *C. elegans* as a model system. The question and answer period at the conclusion of each presentation was lively, promoting thoughtful and respectful discussion of the science presented.

Support from ISN was not used to fund invited speaker expenses. Each of the invited speakers is eligible to receive up to \$3000(AUD) towards travel and accommodation expenses for the meeting as well as complimentary registration and a conference dinner ticket. Total amount awarded to support the meeting from ISN: \$USD4897 (\$AUD6717; foreign currency conversion based on www.commbank.com, accessed 6th December 2018).

The ISN funds were exclusively utilised to support students attending the meeting as per the funding agreement in the form of travel awards to individuals and subsidised student registration (student registration: \$AUD88, full registration: \$AUD220). Student registration subsidies (\$132/registration for 60 student delegates): \$AUD7920 = \$USD5782. The following students were provided with travel awards, scaled by distance traveled: Mohammed Safar (University of Strathclyde – also shortlisted for student oral prize, \$AUD1000); Maxine Roberts (University of Nottingham, \$ AUD1000); Erica Hendrikse (University of Auckland, \$AUD500); Natasha Dale (University of Western Australia, \$AUD500); Michael Garelja (University of Auckland, \$AUD500); Michael Udoh (Macquarie University,

\$AUD250); Shivani Sachdev (Macquarie University, \$AUD250); Rashmi Pillai (University of New South Wales, \$AUD250). Total amount of funds used for travel awards for interstate and international students: \$AUD4250 = \$USD3099. Sponsorship from ISN was acknowledged in the physical program booklet, the online program, and the start and conclusion of the session by the Chairs.

ISN symposium budget table (in USD):

	Costs	ISN funds	Other support
Student travel awards	3099	3099	
Student registration subsidies	5782	1798	3984
Invited speaker travel expenses	6560	0	6560
Complimentary registration & dinner ticket for invited speakers	787	0	787
TOTAL	16132	4897	11235

Entire MPGPCR meeting budget (in USD):

Expenses	amount	Sponsorship/Revenue	amount
Invited speakers travel & accommodation	33729	Sponsorship (incl. ISN @80%)	78451
Catering	24046	Registrations	16637
Subsidised student registrations	5782	Exhibitors	4104
Complimentary registrations (speakers/sponsors/exhibitors)	5562	Program advertising	1129
Posterboard hire & incidentals	4440		
Complimentary dinner tickets (speakers/sponsors/exhibitors)	3439	Outstanding invoices	
Student travel awards	3099	Sponsorship (incl ISN @20%)	3050
Program printing	2736		
ECR travel awards	1026		
Best oral/poster presentation awards	1026		
<i>Casual support staff costs and venue hire</i>	<i>>3496</i>	<i>In-kind support from DDB/MIPS</i>	
TOTAL EXPENSES	87235	TOTAL INCOME#	85605

includes outstanding invoices

The MPGPCR meeting is a not-for-profit initiative, the expenses associated with hosting the meeting including the gap between actual costs of the ISN symposium and ISN support, are entirely off-set through registration fees, sponsorship, exhibitors and in-kind support from the host institution (MIPS). The MPGPCR organising committee are committed to fostering the careers of junior researchers. In this respect four early career researchers were invited to present at the larger meeting (Justin English, Yi-Lynn Liang, Irina Vetter, Roshanak Irannejad), receiving complimentary registration & dinner tickets as well as support for travel. Travel awards were also granted to interstate/international early career researchers: Tony Ngo (University of California, San Diego, \$AUD1000); Liz Johnstone (University of Western Australia, \$AUD500).

Comments from attendees:

From Daniel Scott (Junior Faculty member, The Florey Institute of Neuroscience and Mental Health): *I was lucky enough to attend the ISN sponsored session at MPGPCR 2018, which comprised five excellent talks. Steve Ferguson from University of Ottawa shared his insights into targeting MGLuR5 with NAMs to treat Huntington's, Parkinson's and Alzheimer's disease. Interestingly, while the NAM was effective in male rodent models of AD, it worsened the symptoms of female mice. Such sex-specific drug effects highlight the need to include both genders in preclinical tests. Next Graciela Pineyro from The University of Montreal presented a powerful approach for clustering mu opioid receptor drugs based on their pharmacological profiles and clinical side effects. This approach can be applied to other receptors, but requires multiple signaling readouts for each drug. Philippe Rondard from The University of*

Montpellier gave a talk on using fluorescent tools to uncover conformational changes and the oligomeric interfaces that are important for mGluR function. The TM oligomeric interface rearrangements postulated to occur were striking. The session was concluded with two short talks from Simon Foster (University of Copenhagen) and Jianfeng Liu (Huazhong Uni). Simon enlightened us on the orphan receptor GPR139, which is activated by some amino acids and dipeptides. Simon identified more potent agonists that will be used to further characterize the receptor. Jianfeng wrapped things up by revealing that knocking out GABA_B receptor in *C. elegans* extends their lifespan. This could be reversed by knocking in mammalian GABA_B and thus is an *in vivo* model for testing ligands such as PAMs against mammalian GABA_B. Thanks to the organizer's and sponsors for putting on such an interesting session.

From Samantha McNeill (PhD student, Monash Institute of Pharmaceutical Sciences): *Many thanks again for all your work on organising the BPS-MPGPCR, it's been a fantastic conference and it's been amazing to be surrounded by so many vibrant amazing scientists!*

*Overview of ISN session: On Tuesday December 4th we were privileged to hear from three speakers: who discussed their extensive work in targeting neuronal GPCRs for a host of diseases and conditions with a particular focus on treating neurodegenerative diseases and pain. All speakers were exceptionally engaging and I was impressed by their extensive research portfolios, whereby they were able to translate their preclinical findings *in vitro* through to *in vivo* animal models providing compelling evidence the receptor allostery may be a way forward as a clinical strategy to treat debilitating neurological disorders. I was especially inspired by Dr. Graciela Pineyro's work in utilising *in vitro* biosensors to apply mathematical models to predict the clinical efficacy of opioid agonists. This is especially applicable to my research where I'm consistently thinking of how to relate my *in vitro* work to the clinical setting and provided me with new ways of thinking to propel my own research forward within this framework.*

From Tracy Josephs (Postdoctoral Fellow, Monash Institute of Pharmaceutical Sciences): *The International Society for Neurochemistry sponsored session at the BPS-MPGPCR meeting was engaging and dynamic. I heard about the successful treatment of animal models of disease; computational methods to understand opioid side effects through comprehensive signalling profiling and; close to my heart, the generation of novel tools to understand GPCR conformational dynamics. I was not only able to hear from leaders in the field just a few steps from my work bench, but also hear the personal stories that drive these researchers. Additionally, an early career researcher, like myself, had the opportunity to present how their research piece is fitting into the great puzzle that is the GPCR. An inspiring and aspirational session.*

From Jo-Anne Baltos (Postdoctoral Fellow, Monash Institute of Pharmaceutical Sciences): *A great session showcasing high calibre and inspiring research from both established and emerging leaders in the GPCR research field. I was particularly inspired by the presentations from Dr. Ferguson and Dr. Rondard, who investigate the molecular pharmacology of mGluRs in the CNS.*

Dr. Ferguson provided detailed insights into the role of mGluR5 NAMs in Alzheimer's disease, highlighting an interaction between disease pathology and receptor activation (the binding of prion and AB42 to mGluR to induce signalling). I was also interested to learn about the role of the mGluR in the GSK3B/optineurin autophagy pathway from Dr. Ferguson, as I had not appreciated that GPCRs can have a direct effect on protein degradation in the cell. Dr. Rondard showcased his research on some of the tools he has developed to research the mGluRs, including GPCR nanobodies and FRET biosensors. I was particularly inspired by his GPCR nanobodies, which displayed selectivity for only homomeric mGlu2Rs over heteromers. These tools will play an invaluable role in deciphering the activity of the mGluRs in CNS physiology. Overall, this session highlighted the great GPCR neuroscience research being performed around the world, and it has inspired me to apply some of the methodologies to my own GPCR CNS work in the future.

From Erica Hendrikse (PhD student, University of Auckland - travel awardee): *The session sponsored by the International Society for Neurochemistry was a particular highlight. The selection of speakers was excellent, ranging from senior experts like Steve Ferguson as well as really interesting research from emerging researchers using sophisticated methods. Also, Graciela Pineyro's analysis*

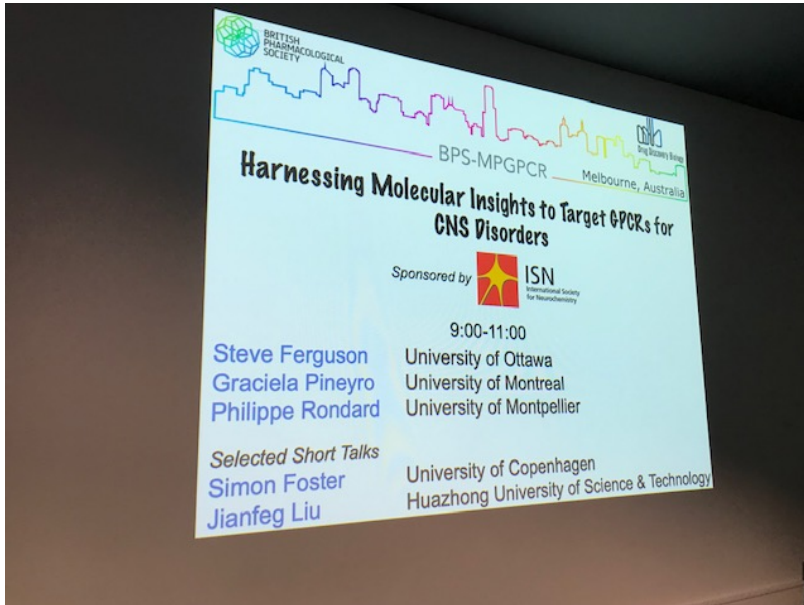
methods are directly applicable to my work and it was great to hear this described in detail. As a researcher new to the field of neurobiology, I am pleased this particular society has now been drawn to my attention. I am likely to join and think it will be really beneficial.

Tweets about the session:

https://twitter.com/gregory_kj/status/1069742057160232960
<https://twitter.com/ArisbelBGondin/status/1069744486450745345>
https://twitter.com/smith_orphans/status/1069740365844901888
https://twitter.com/gregory_kj/status/1069725469983956992
https://twitter.com/gregory_kj/status/1069723613312339969

Photos from the session:

Title slide:



Lecture Hall filling as delegates arrive (2):





Co-chairs ready to begin:



Steve Ferguson presenting:



Graciela Pineyro presenting:



Philippe Rondard presenting:

