

IUPHAR Secretary General's Report

What we have achieved between WCP2014 Cape Town and WCP2018 Kyoto and future challenges for pharmacology

June 2018

The 2014 World Congress of Basic and Clinical Pharmacology in Cape Town (WCP2014) was very successful and we thank the organisers again! We wish to highlight what has been achieved as a curtain-raiser to the 2018 World Congress of Basic and Clinical Pharmacology (WCP2018) in Kyoto. This report will allow delegates to better understand what IUPHAR does, to volunteer in initiatives of interest to them and, when in Kyoto, to communicate to officers and staff those activities to prepare for a new round of progress toward the 2022 World Congress of Basic and Clinical Pharmacology (WCP2022) in Glasgow.

Defining IUPHAR

Pharmacology is the science of drugs and therapy. IUPHAR bridges preclinical and clinical research, with the possibility of making major advances for health care in developing countries.

First, IUPHAR is a global umbrella organisation for pharmacology so appreciates the many different issues, opportunities and difficulties experienced by its member societies. The main source of IUPHAR finance is the membership dues, which are critical to success, but which give limited support. Other funds must come from profitable WCPs and from raising finance through benefactors or grants. IUPHAR may be a useful partner for fund-raising with you by linking your initiative with other organisations. Please come and see us about this.

Second, IUPHAR is a Non-Governmental Organisation (NGO) in relations with the World Health Organisation (WHO). With assistance from the Clinical Pharmacology Division officers, Kalle Hoppu and Caroline Samer, we are renewing our WHO goals over the summer, but IUPHAR is already involved in many health care issues for WHO (figure 1). Members of the Paediatric Clinical Pharmacology Section, chaired by Greg Kearns, are engaged in revising the paediatric tuberculosis guidelines promulgated by WHO.

Collaboration

Nomenclature

IUPHAR is proving itself a good arbiter of research questions in the multiple areas of drug targets and therapy - what we know and don't know - with an excellent synergy between industry and academia. This is achieved without conflict of interest as only validated, reproduced, data are used by our Nomenclature Committee (NC-IUPHAR), chaired by Steve Alexander, with Adam Pawson as the executive secretary. NC-IUPHAR has over the last 30 years structured modern pharmacology.



- Promote Drug Discovery R&D, with open-source knowledge, databases, compound libraries,
- Support early-stage drug discovery and development, particularly in developing countries,
- Stimulate global cooperation in R&D
- Encourage research on mechanisms of action and PK of natural products and traditional medicines. Evidence-based medicine.
- Capacity building for clinical trials, particularly in developing countries,
- Encourage development of regulatory affairs in developing countries

Figure 1: Some relevant WHO priorities where IUPHAR is active

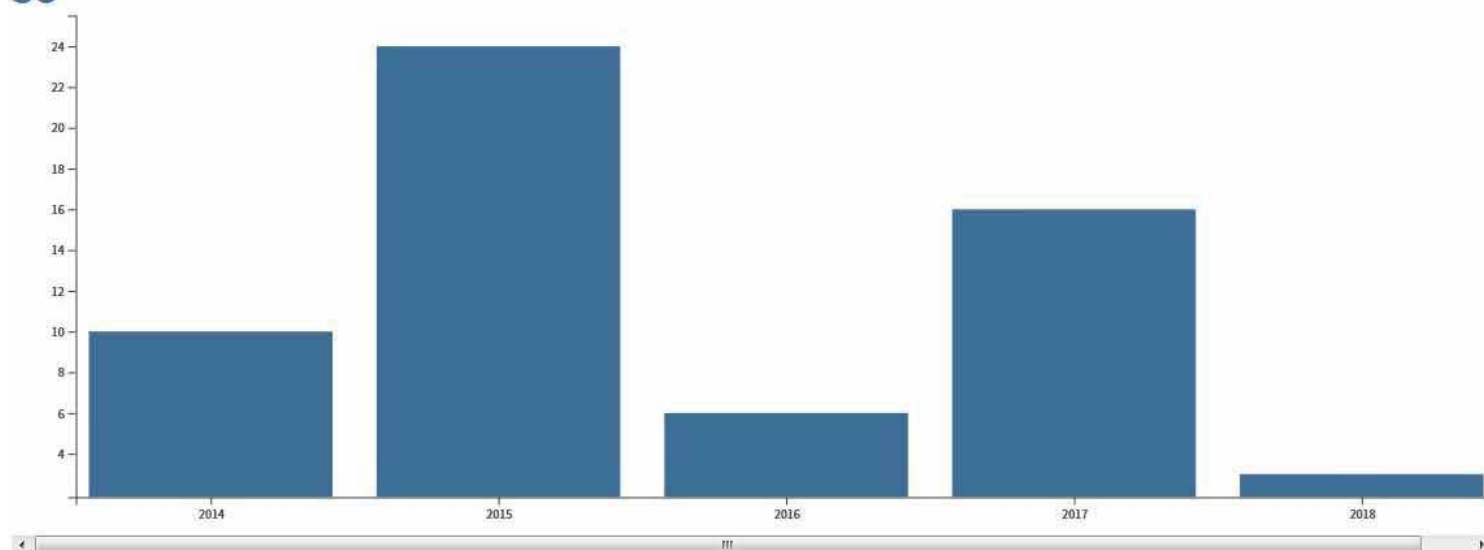
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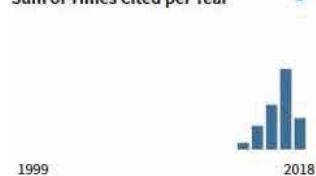
Over 90 subcommittees of about 700 expert scientists back our publicly available databases, accessed freely by scientists in 160 countries, which have resulted in more than 125 publications (h-index 80), available at <http://www.guidetopharmacology.org/nciupharPublications.jsp>. The Japanese Pharmacological Society (JPS) and a few academic institutions have generously financed the travel of their members to the NC-IUPHAR meetings. The NC-IUPHAR publications have been so successful since 2014 (figure 2) that we formed an IUPHAR Editorial Board, chaired by Eliot Ohlstein, to help coordinate the efforts. Sections and Subcommittees are encouraged to contact him when preparing their manuscripts. The full list of IUPHAR 2014-2018 publications is available in the appendix.

Total Publications

59



Sum of Times Cited per Year



h-index

27

Average citations per item

75.73

Sum of Times Cited

4,468

Without self citations

4,398

Citing articles

2,637

Without self citations

2,609

Figure 2: 2014-2018 citations for IUPHAR Nomenclature Committee publications

Receptor Databases

We benefit from a remarkable partnership with the British Pharmacological Society (BPS), which pays for two curators of the database group based in the University of Edinburgh, with Jamie Davies serving as the principal investigator. There are currently three other curators, supported by grants from the Wellcome Trust Foundation and education grants from IUPHAR member societies.

The complexities of drug-receptor interactions are such that small meetings of experts around key questions can make much more progress than massive computer-driven data trawling. Select meetings of experts can clearly and rapidly define what we know and don't know. New areas in pharmacology have been covered in the online databases, including:

- Antibodies
 - Kinases
 - Proteases and hydrolases
 - Epigenetic targets
 - Allostery
 - Alternative Splicing
- (probably substantially underestimated in drug targets in disease states)

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We are now working with the Gates-funded 'Medicines for Malaria Venture' (MMV), in order to populate an online database with all the potential sites of therapeutic intervention in combating the malaria parasite.

Immunopharmacology

Immunopharmacology is perhaps the fastest advancing branch of pharmacology. Chaired by Francesca Levi-Schaeffer and supported by treasurer, Katerina Tiligada, the IUPHAR ImmuPhar Section is organising this research. Immunological therapy for cancer has revolutionised the field, with over 800 clinical trials involving check-point inhibitors and associated therapies. Immunological protocols tend to be poorly defined in the developing world and, except for centres of excellence, support is needed to allow competitive research. There is a major need for simple, validated immunological protocols around drug targets, which can be performed in laboratories without major facilities. The International Union of Immunological Sciences (IUIS) and IUPHAR have signed a Memo of Understanding to seek funding in support of this initiative, among others.

A Wellcome Trust Foundation grant to the Edinburgh-based group financed the creation of the Guide To IMMUNOPHARMACOLOGY (www.guidetoimmunopharmacology.org), a website listing the drug targets in immunopharmacology. To launch this website, BPS is sponsoring *Immunopharmacology: Challenges, Opportunities and Research Tools* on October 1st and 2nd in Edinburgh. The speakers featured at www.bps.ac.uk/news-events/events/2018/october/immunopharmacology-challenges,-opportunities-and will cover the main therapeutic areas and drug targets in immunopharmacology allowing the meeting to bring together key IUIS and IUPHAR collaborators to develop joint strategies.

Natural products

Natural products (NPs) represent a major part of the world's chemical diversity for drug discovery: this involves traditional medicine, and also the discovery of specific NP drugs for key targets. There has been a rift between herbal mixtures, where synergies between the different components are claimed, frequently with little evidence and pure compounds. However, in the last few years, technology and legislation have revolutionised NP research via:

- High throughput metabolomics can define the molecules in complex mixtures.
- Biosynthesis can now produce single chemicals, or mixtures, from genetically engineered bacteria or yeast.
- The microbiome is highly dependent on natural products with a synergy that changes both the composition of the microbiome, and of the NPs.
- Immunopharmacology is highly dependent on NPs and NPs can change immunopharmacological profiles.
- Chemical and plant libraries are available for screening (we are publishing a list).
- The impact of the Nagoya protocol, which protects biodiversity and traditional medicine, attributes ownership of genetic and NP resources to the nation of origin,

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and scientists must follow specific guidelines in NP research. Thus, NP science has geopolitical constraints, which are already changing the face of research. Getting the balance right in the application of Nagoya is critical for world health and for finding new drugs, equitably. IUPHAR, as an international organisation, has a goal of increasing evidence-based medicine in NP research.

- These technologies can be applied to pharmaceutical research, nutraceuticals, cosmetics, food additives and food, but with different regulatory impact.

We are currently negotiating a major collaboration on natural products. The Pharmacology of Natural Products (PNP) Section, under the direction of Yongxiang Zhang, and IUPHAR leadership have participated in a series of meetings in China, India, Singapore, Brazil, Africa and Europe proposing that the potential revolutions in the field be enacted constructively, rather than being blocked by administration. This new paradigm is necessary because of the different health care issues between rich and poor and the geographical differences in health care approaches. We wish to recognize the efforts of Fred Wong, local organiser of the IUPHAR World Conference on the Pharmacology of Natural and Traditional Medicines in Singapore in 2015, and Cherry Wainwright, local organizer of the 5th International Conference on the Mechanisms of Action of Nutraceuticals in Aberdeen in 2017. We are indebted to their well-organised teams who worked with the PNP Section to make the conferences so successful. Meeting reports can be obtained from the secretary general. The resulting publications are listed in the appendix.

The Chinese Pharmacological Society has been a steadfast partner in these efforts. IUPHAR training courses and meetings organized in China have been great successes and we thank Guanhua Du and Ying Zhao in addition to Yongxiang for their tireless efforts in coordinating them. Pharmacology for Africa (Phar/A), the constellation of African pharmacological societies, is organizing informative symposia and a strategic meeting on NPs during WCP2018. The Indian Pharmacological Society (IPS) has volunteered to co-organize with the PNP Section the next IUPHAR World Conference on the Pharmacology of Natural and Traditional Medicines in late 2019.

Symposia, Training and Conferences

Limited space here allows us to highlight only a few from the very long list of symposia and meetings by the IUPHAR Sections and Subcommittees since 2014. See table 1 on the next page for the list of meetings, training and symposia underwritten by IUPHAR and the Clinical Pharmacology Division. The annual dues paid by the IUPHAR member societies have made these opportunities possible.

The IUPHAR Gastrointestinal Pharmacology Section, chaired by Duan Chen, helped the Medical Faculty University of Zagreb in Croatia celebrate their centennial in 2017. The Section, through the efforts of Arpad Somogyi, Sandor Szabo and Yvette Tache, has put together for six consecutive years the Summer School on Stress. Duan and his fellow Section member, Ludmilla Filaretova, have received a grant from the University of Oslo to develop an academic network in Norway and Russia. Their first meeting was held in St. Petersburg, Russia in 2017. The Section provided speakers and co-organizers for the Joint Symposium on Inflammation and Cancer held in Incheon, Korea during March, 2018 as part of the International Conference on Ulcer Research by the International Association of Surgeons, Gastroenterologists and Oncologists, and the Korean Society of Gastrointestinal Cancer.

The Pharmacogenetics and Pharmacogenomics (PGx) Section, under the leadership of Guilherme Suarez-Kurtz, has expanded its membership since 2014. The group has established a Memorandum of Understanding with the Golden Helix Foundation, which resulted in a symposium in Kuala Lumpur, Malaysia in 2015. They then entered a Memorandum of Understanding with the European Society of Pharmacogenetics and Personalized Medicine (ESPT), which yielded significant participation in the 2015 conference in Budapest, Hungary as well as symposia at the 2016 conference in Cape Town, Africa and the 2017 conference in Catania, Italy. A symposium entitled *Pharmacogenomics: Discovery and implementation* is planned during the 2018 International Congress of Genetics, in Foz do Iguaçu, Brazil.

IUPHAR and the International Union of Toxicology have a reciprocal symposia agreement. In partnership with the IUPHAR Drug Metabolism and Drug Transport (DMDT) Section, the PGx Section co-coordinated a

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Table 1: IUPHAR and Clinical Pharmacology Division Supported Symposia, Training and Conferences

	Organized/Presented by	Meeting	Topic Funded	Location	Support
2015	Clinical Pharmacology Division	12th European Association for Clinical Pharmacology and Therapeutics Congress	Drug induced liver injury symposium	Spain	Clinical Pharmacology Division
	Clinical Pharmacology Division / Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists / British Pharmacological Society	Joint Scientific Meeting	Clinical pharmacology symposium	Hong Kong	Clinical Pharmacology Division
	Clinical Pharmacology Division/Chinese Pharmacological Society	Symposium on Challenges in Drug Discovery & Development	CAMs, TCM lectures and panel discussions	China	IUPHAR Operations
	Pharmacogenetics and Pharmacogenomics Section	29th Scientific Meeting of Malaysian Society of Pharmacology and Physiology	Golden Helix Symposium on next generation pharmacogenomics	Malaysia	Clinical Pharmacology Division and IUPHAR Operations
	Clinical Pharmacology in Developing Countries Subcommittee	Medicines Utilization Research in Africa (MURIA) Workshop	Drug utilization research in Africa workshop	Botswana	Clinical Pharmacology Division and IUPHAR Operations
	Pharmacoepidemiology and Pharmacovigilance Subcommittee	European-Egyptian Collaboration in the Pharmacovigilance International Workshop	Pharmacovigilance symposium	Egypt	Clinical Pharmacology Division and IUPHAR Operations
	Gastrointestinal Pharmacology Section / Croatian Pharmacological Society / University of Szagreb	Drug Development and New Frontiers in Gastrointestinal Diseases	New therapeutics in gastrointestinal pharmacology symposium	Croatia	IUPHAR Operations
	Pharmacogenetics and Pharmacogenomics Section / Drug Metabolism and Drug Transport Section	Pharmacogenetics and Precision Medicine Conference	Pharmacogenetics: A focus on infectious diseases and population diversity symposium	South Africa	Clinical Pharmacology Division and IUPHAR Operations
2016	Geriatric Clinical Pharmacology Subcommittee/Clinical Division of the Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists	Joint Scientific Meeting of Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists and the Molecular Pharmacology of G Protein Coupled Receptors	Geriatric pharmacology symposium	Australia	Clinical Pharmacology Division
	Integrative and Organ Systems Pharmacology Subcommittee	Training Workshop	Animal research		
	Pharmacogenetics and Pharmacogenomics Section / Drug Metabolism and Drug Transport Section	XIV International Congress of Toxicology of the International Union of Toxicology	IUPHAR/IUTOX reciprocal symposia	Mexico	IUPHAR Operations
	Clinical Pharmacology in Developing Countries Subcommittee	Medicines Utilization Research in Africa (MURIA) Workshop	Drug utilization research in Africa workshop	Botswana	Clinical Pharmacology Division and IUPHAR Operations
	ImmuPhar Section / British Pharmacological Society	Pharmacology 2016	Study, development and rationale use of immunopharmacological agents symposium	United Kingdom	IUPHAR Operations
	Pharmacoepidemiology and Pharmacovigilance Subcommittee	Workshop co-organized with the South Asian College, an affiliate of the American College of Clinical Pharmacology	Drug side effects in the elderly workshop	India	Clinical Pharmacology Division and IUPHAR Operations
	Geriatric Pharmacology Subcommittee	21st International Association of Gerontology and Geriatrics by the Gerontological Society of America	Frail elderly symposium	United States	Clinical Pharmacology Division and IUPHAR Operations
	Clinical Pharmacology in Developing Countries Subcommittee	Medicines Utilization Research in Africa (MURIA) Workshop	Drug utilization research in Africa workshop	Namibia	Clinical Pharmacology Division and IUPHAR Operations
2018	Pharmacogenetics and Pharmacogenomics Section	International Congress of Genetics	Pharmacogenomics: Discovery and implementation symposium	Brazil	Clinical Pharmacology Division and IUPHAR Operations

Pharmacology
International

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symposium at the 2016 International Congress of Toxicology, held in Merida, Mexico. The International Union of Toxicology, president, Jun Kanno, has organized the symposium *Toxicogenomics for Accelerated and Refined Hazard Identification of Chemicals* on Friday, June 6th at WCP2018.

The DMDT Section is chaired by Ann Daly, who helped the group publish in the *Journal of Personal Medicine* on the pharmacogenomics of CYP2C9. The Section supported *Methods 2015*, an international symposium in Pretoria, South Africa, and organized additional symposia with the Indian Society for the Study of Xenobiotics during the 2nd Annual Meeting of the Xenobiotic Research in India, held in Bangalore in 2017. The Section is also contributing to WCP2018 a symposium biomarkers for drug induced liver injury.

The IUPHAR Education Section is offering the *Educating Scientists and Healthcare Professionals for 21st Century Pharmacology*, a WCP2018 satellite meeting on June 30th and July 1st. The program features the Section's General Assembly, an awards ceremony, and a dinner in addition to speakers and posters. The meeting themes include active learning and student-led education.

The IUPHAR executive committee and officers are grateful to several member societies that generously hosted meetings on our behalf and supported our initiatives. Please see figure 3 for a synopsis.

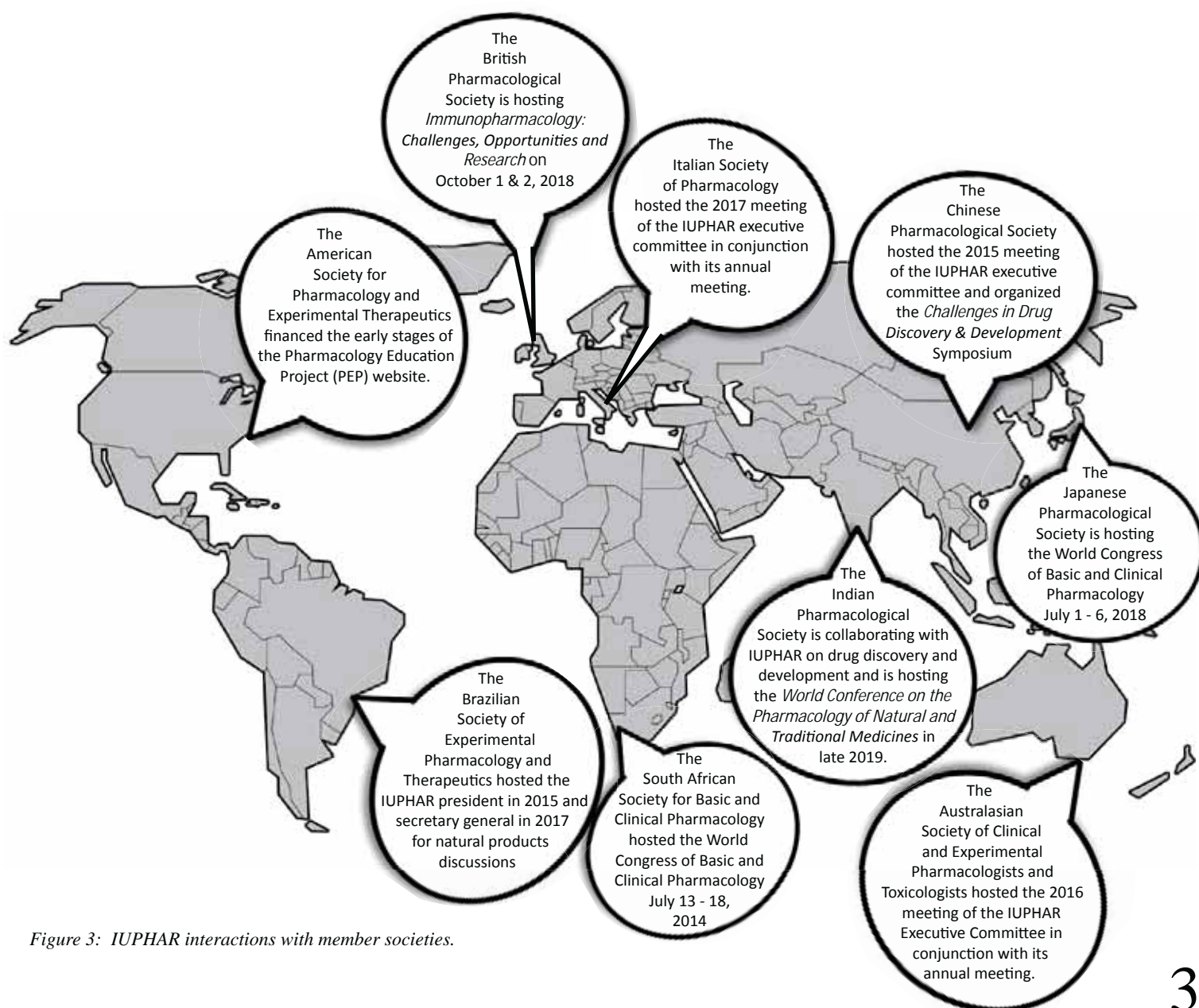


Figure 3: IUPHAR interactions with member societies.

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Resources

Our long-term strategy is to build web-based learning and research infrastructure to benefit pharmacology worldwide. Thus, in their website favourites or bookmarks every pharmacologist should have www.guidetopharmacology.org and every researcher in immuno-related fields should have www.guidetoimmunopharmacology.org! These websites will be showcased in Kyoto.

Clinical Pharmacology

The Clinical Pharmacology Division jointly published with WHO and CIOMS in 2012 a strategic document defining the practice of clinical pharmacology. The original version has been translated into Japanese, Korean and Russian. The Clinical Pharmacology Division established in 2016 a series of Mentoring Centres to support the development of research and teaching in developing areas of the world. In addition to general clinical pharmacology expertise, each Mentoring Centre offers specialisation in specific research areas (table 2).

Table 2: IUPHAR Clinical Pharmacology Mentoring Centres

Location	Available Research Expertise
Busan, Korea	Drug metabolism/drug transporters/drug interaction, pharmacokinetic and pharmacodynamics analyses, pharmacogenomics and quantitative pharmacology, and many other area of xenobiotics science, ranging from molecular to clinical implementation
Edinburgh, United Kingdom	Biomarkers, clinical toxicology, clinical trials, education, first-in-human studies, formulary development and management, health technology assessment, hypertension, prescribing skills and their assessment, acute kidney injury, chronic and end-stage kidney disease, translational research, and clinical research techniques
Malaga, Spain	Clinical trials, clinical toxicology, biomarkers, pharmacogenetics, flow cytometry assays in clinical studies, integration of OMICs through systems biology, innovative approaches to education, first-in-humans studies in oncology, idiosyncratic drug induced liver injury, clinical research protocols design, in depth phenotyping, selection of outcome measures, liver function, and validation of new drug targets in preclinical models
Stockholm, Sweden	Drug metabolism and drug-drug interactions, pharmacokinetics and pharmacogenetics, therapeutic drug monitoring, analysis of drugs of abuse and clinical toxicology, doping in sports and society, eHealth, critical drug evaluation and work in drug and therapeutics Committees, rational use of medicines, drug safety, clinical trials, pharmacoepidemiology, drug utilization, undergraduate, postgraduate and continued education
Sydney, Australia	Pre-clinical studies of ageing and geriatric pharmacology, cohort studies of ageing and pharmacoepidemiology, observational and interventional clinical studies of geriatric patients, and polypharmacy and deprescribing
Toronto, Canada	Clinical toxicology, clinical epidemiology, drug interactions, drug safety in breastfeeding, molecular pharmacology, pharmacogenetics/pharmacogenomics, paediatric pharmacology, population pharmacokinetics, reproductive toxicology (foetal drug safety), translational research

For additional information, please email clinical@iuphar.org.

Chaired by Darrell Abernethy until his sad demise in 2017, the vice chair David Webb ensured continuity within the Division by taking the helm. He is assisted by the very capable David LeCouteur and María Isabel Lucena, who are nominated to continue through 2022. We thank them. Caroline Samer and Nilima Kshirsagar have also been nominated as 2018-2022 Division officers. The Clinical Pharmacology Division General Assembly will be held on July 2nd in Kyoto.

Developing Countries

The Clinical Pharmacology Division has a special subcommittee focused on developing countries. Chaired by Lars Gustafsson and Dinesh Badyal, who will hand over leadership in July to Olayinka Ogunleye and Joseph Fadare, the Subcommittee of Clinical Pharmacology in Developing Countries has actively supported the network called Medicines Utilisation Research in Africa through the organization of workshops. Olayinka and Joseph are an example of the success of the Clinical Pharmacology Mentoring Centre in Stockholm, situated in the Karolinska Institutet, where they spent two weeks training

with Lars Gustafsson. They were subsequently instrumental in establishing the Nigerian Society for Clinical Pharmacology & Therapeutics. We would like to acknowledge Lars for his outstanding leadership.

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The Pharmacoepidemiology and Pharmacovigilance Subcommittee, led by Milou Drici, has been very successful organising informative workshops in India and Egypt. These workshops, and the other meetings supported by the Division, are listed in table 1. Nick Buckley is nominated to be the 2018-2022 chair.

At WCP2014 we pledged to keep tight contact with Pharmacology for Africa (PharfA), the constellation of African pharmacological societies. This has been accomplished through quarterly teleconferences of the PharfA management team, chaired by Douglas Oliver and administered by Makhotsa Lekhooa, with volunteers from the IUPHAR Executive Committee. In conjunction with the South African Society for Basic and Clinical Pharmacology, PharfA organised the 2016 All Africa Congress on Pharmacology and Pharmacy. PharfA is contributing to WCP2018 symposia on topics germane to all developing countries and has scheduled their General Assembly at the Congress on July 2nd.

We particularly appreciate the efforts of the IUPHAR First Vice President, Graeme Henderson, who has diligently sought free resources to assist pharmacologists in Africa and other developing regions in furthering their careers and research. As examples, <https://www.hindawi.com> delivers free access to current publications in pharmacology and <https://www.AuthorAID.info/en> provides online mentoring to help researchers in resource limited countries achieve success in designing and publishing their work.

IUPHAR promotes pharmacological training in developing countries and has supported the Integrative and Organ Systems Pharmacology training courses for animal use, emphasising the 3Rs. Under the guidance of David Lewis (<https://www.etris.leeds.ac.uk>) hands-on workshops were held in South Africa during 2014 and 2018 as well as China in 2016. Dave is currently planning 2018 and 2019 sessions in India and East Africa. These are but a few highlights from a long list of activities. Please email admin@IUPHAR.org if your society has an interest in hosting a workshop.

Education

Our education initiatives are clearly important. Chaired by John Szarek and Simon Maxwell, the Pharmacology Education Project (PEP) will be featured at WCP2018 on July 2nd. The online learning resource supports education and training in the pharmacological sciences. The materials will be of value to students of pharmacology, clinical pharmacology and anyone seeking to develop a better understanding of the pharmacological sciences. The aim is to deliver a simple, attractive, easily searchable resource that will support students of the biomedical sciences, medicine, nursing and pharmacy as well as those who teach them. The website is currently financed via the Chinese, Japanese and Hungarian pharmacology societies, to whom we express our gratitude. The website <http://www.pharmacologyeducation.org> is maintained by the Edinburgh database team, with Elena Faccenda as the curator. This is a major priority for IUPHAR so please visit <http://www.pharmacologyeducation.org/contribute-project> if you would like to contribute a bit of your time or teaching materials towards the next generation of pharmacologists.

The Neuropsychopharmacology (NPP) Section helped publish *A New Nomenclature for Classifying Psychotropic Drugs* in the *British Journal of Clinical Pharmacology*. The commentary focuses on a hot topic in the field of Neuropsychopharmacology, the new Neuroscience-based Nomenclature (NbN) and describes its potential applications and advantages for a better pharmacological treatment of psychiatric disorders. The Section chair, Filippo Drago, is an active organizer for the Catania International Summer School of Neuroscience during 2016 and 2017.

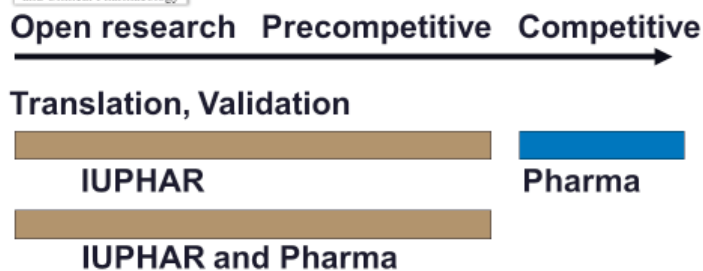
Future Actions and Challenges

Drug Discovery & Development in Academia and Industry

The world is awash with scientific data, but its interpretation for therapeutic benefit lags far behind. IUPHAR can provide a precompetitive level playing field for collaboration between pharmaceutical industry, biotechs and academics (figure 4). We are considering setting up an academic drug discovery initiative for the developing world. Jim Barrett is steering the efforts.



Figure 4: Preclinical mechanisms



An opportunity to contribute to a global initiative in clinical and preclinical healthcare and education, bridging the gap between preclinical molecular targets, translational medicine, clinical pharmacology, and aid pharmacology in developing countries.

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An alliance with the Indian Pharmacological Society has been made to develop health and pharmacology education throughout India and support drug discovery and development. The Indian Pharmacological Society has delocalised its meetings to cover regional and local centres, and the 2019 annual meeting will offer the opportunity for IUPHAR executive committee members to be speakers. We now need to develop a major grant application to support these actions.

We wish to involve the pharmacology societies around the world even more.

How will we do this?

- We have used Skype, telephone conferences, meeting dial-ins or YouTube videos in an experimental fashion during 2014-2018. It has been an overall success, so we propose to link IUPHAR scientists with member society meetings where we cannot have a direct presence because travel funds are very limited. If you would like to invite an IUPHAR representative to a pharmacology society meeting you are organising, please contact admin@IUPHAR.org so we may explore participation by Skype or teleconference.
- During July, the 2018-2022 Executive Committee will choose a Young Investigator Corresponding Member, who will be charged with linking young scientists around the world via social media. The Edinburgh database can help with this initiative.
- The IUPHAR executive committee will also initiate additional scientists as Corresponding Members to provide additional expertise beyond those areas covered by the executive committee. This initiative will be tested during the 2018-2022 term then finalised thereafter.

IUPHAR finances are very thin being composed primarily of the member societies' dues, with a few subventions and grants. We thank Servier for their ongoing support of NC-IUPHAR meetings. We have successfully obtained important Wellcome Trust Foundation grants for the Guidetopharmacology and -immunopharmacology, and MMV has financed the guide to malaria pharmacology. However, the Wellcome Trust Foundation grants expire at the end of October, representing a challenge to continue our efforts at this level.

Transition to 2018

I must thank Sam Enna, Lynn LeCount and Leigh Ann Arbuckle of the Kansas City IUPHAR Administrative Office. Sam has served two terms as secretary-general then as president for a total of 12 years. Lynn has been the principle 'on-the-ground' organiser and contact for IUPHAR during this time with Leigh Ann keeping track of the finances. Special kudos goes to Petra Thürmann for her work as the treasurer for the last term and extraordinary efforts at realigning IUPHAR to comply with the not-for-profit regulations under which it remains tax-free. They have held IUPHAR together. It is with some trepidation that a new team must take on a new era.

We very much appreciate all the work done by the Japanese Pharmacological Society and the Japanese Society of Clinical Pharmacology in the organisation of WCP2018 in Kyoto. Have a great success!

Finally, I would like to thank all the wonderful people I met during this period, and also the support from Pharmacology Societies around the world. We look forward to meeting you all in Kyoto!

Michael Spedding
IUPHAR Secretary General

With contributions from David J. Webb and Lynn LeCount *Continued on page 39...*

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Appendix: IUPHAR Publications 2014-2018

- Alexander SPH, Catterall WA, Kelly E, Marrion N, Peters JA, Benson HE, et al. (2015a). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Voltage-gated ion channels. *British Journal of Pharmacology* 172(24): 5904-5941.
- Alexander SPH, Christopoulos A, Davenport AP, Kelly E, Marrion NV, Peters JA, et al. (2017a). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: G protein-coupled receptors. *British Journal of Pharmacology* 174: S17-S129.
- Alexander SPH, Cidlowski JA, Kelly E, Marrion N, Peters JA, Benson HE, et al. (2015b). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Nuclear hormone receptors. *British Journal of Pharmacology* 172(24): 5956-5978.
- Alexander SPH, Cidlowski JA, Kelly E, Marrion NV, Peters JA, Faccenda E, et al. (2017b). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Nuclear hormone receptors. *British Journal of Pharmacology* 174: S208-S224.
- Alexander SPH, Davenport AP, Kelly E, Marrion N, Peters JA, Benson HE, et al. (2015c). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: G protein-coupled receptors. *British Journal of Pharmacology* 172(24): 5744-5869.
- Alexander SPH, Fabbro D, Kelly E, Marrion N, Peters JA, Benson HE, et al. (2015d). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Catalytic receptors. *British Journal of Pharmacology* 172(24): 5979-6023.
- Alexander SPH, Fabbro D, Kelly E, Marrion N, Peters JA, Benson HE, et al. (2015e). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Enzymes. *British Journal of Pharmacology* 172(24): 6024-6109.
- Alexander SPH, Fabbro D, Kelly E, Marrion NV, Peters JA, Faccenda E, et al. (2017c). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Catalytic receptors. *British Journal of Pharmacology* 174: S225-S271.
- Alexander SPH, Fabbro D, Kelly E, Marrion NV, Peters JA, Faccenda E, et al. (2017d). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Enzymes. *British Journal of Pharmacology* 174: S272-S359.
- Alexander SPH, Kelly E, Marrion N, Peters JA, Benson HE, Faccenda E, et al. (2015f). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Overview. *British Journal of Pharmacology* 172(24): 5729-5743.
- Alexander SPH, Kelly E, Marrion N, Peters JA, Benson HE, Faccenda E, et al. (2015g). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Other ion channels. *British Journal of Pharmacology* 172(24): 5942-5955.
- Alexander SPH, Kelly E, Marrion N, Peters JA, Benson HE, Faccenda E, et al. (2015h). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Transporters. *British Journal of Pharmacology* 172(24): 6110-6202.
- Alexander SPH, Kelly E, Marrion NV, Peters JA, Faccenda E, Harding SD, et al. (2017e). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Overview. *British Journal of Pharmacology* 174: S1-S16.
- Alexander SPH, Kelly E, Marrion NV, Peters JA, Faccenda E, Harding SD, et al. (2017f). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Other ion channels. *British Journal of Pharmacology* 174: S195-S207.
- Alexander SPH, Kelly E, Marrion NV, Peters JA, Faccenda E, Harding SD, et al. (2017g). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Transporters. *British Journal of Pharmacology* 174: S360-S446.
- Alexander SPH, Peters JA, Kelly E, Marrion N, Benson HE, Faccenda E, et al. (2015i). THE CONCISE GUIDE TO PHARMACOLOGY 2015/16: Ligand-gated ion channels. *British Journal of Pharmacology* 172(24): 5870-5903.
- Alexander SPH, Peters JA, Kelly E, Marrion NV, Faccenda E, Harding SD, et al. (2017h). THE CONCISE GUIDE TO PHARMACOLOGY 2017/18: Ligand-gated ion channels. *British Journal of Pharmacology* 174: S130-S159.
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