EDITORIAL

We are particularly excited about this Special Issue of OPO in that this is the first Feature Edition specifically dedicated to glaucoma. Clinical translation in research involves turning discoveries into health and each of us, as Associate Editors, work in countries where a significant change of direction has been observed in recent years, with much more of a focus on developing measurable improvements in patient's health. Examples of the large numbers of projects and investment related to glaucoma include that the National Institute for Health Research, the research arm of the National Health Service, where there are currently (January 2015) 161 active Ophthalmology studies, 23 (14%) of which are related to glaucoma, while in the United States of America, the National Eye Institute lists 447 projects relating to glaucoma with a total funding of $172 million.

The original articles in this issue cover the full spectrum from laboratory to clinical research that includes information on community and hospital-based glaucoma care. Basic research articles include a number of 'firsts'. Of the laboratory research, two studies relate to ocular blood flow and function. O'Connell et al elevated the IOP of young human healthy volunteers to about 30 mmHg to test the autoregulatory response in terms of blood flow but also retinal function. Raising the IOP to this level did not decrease retinal blood flow, suggesting that this IOP was within the limits of autoregulation. However, the rise in IOP did reduce venous oxygen saturation and altered retinal function (reduced pattern electroretinogram), suggesting that the neurons are indeed stressed by mild IOP elevation. Using a diabetic rat model, Wong et al report that chronic IOP elevation further reduces the capacity of diabetic eyes to autoregulate ocular blood flow against IOP elevation. Relating to blood flow but within the clinical setting, Kuerten et al reported a significant and sustained increase in retrobubar blood flow velocity after trabeculectomy in 30 primary open angle glaucoma patients, where IOP had dropped by approx. 60% compared to pre-surgery values. For readers interested in blood flow, this study's discussion offers a very comprehensive review of the literature and interactions between measures of blood flow, autoregulation and perfusion pressure.

Among glaucoma patients, Pescosolido et al performed a small study on patients on maximally tolerated medical therapy for POAG by treating with a melatonin agonist, agomelatine orally, as part of their routine psychiatric treatment for mood disorders. This is the first time this has been used in humans with glaucoma despite good evidence for its use

in animal models. A 30% decrease in IOP from the enrolment pressure up to a month after treatment was observed and these findings may prompt further development of agomelatine for topical application.

Chong et al present an interesting study involving targeted spatial sampling (GOANNA) to detect visual field progression. This method tests more spatial locations (3 degree intervals rather than 6) than the standard 24-2 grid but with the same test time, and exhibited more accurate classification of progressing visual fields compared with conventional ZEST (Zippy Estimation by Sequential Testing), especially in early stages of progression. The spatial interdependency of false responses is an interesting factor to consider when developing next generation procedures like GOANNA, where locations are chosen autonomously during the test.

Stepping into the clinic, Campbell et al report on the agreement between various methods of anterior chamber angle assessment by comparing intra-observer agreement van Herick, Ocular Coherence Tomograph and gonioscopy. Despite being the ‘gold standard’, gonioscopy fared poorly in terms of repeatability. The van Herick method was shown to have good sensitivity and specificity for detection of occludable angles and the particular OCT device they evaluated had poor sensitivity yet high specificity. Jindal et al focus specifically on the van Herick technique and report inter-observer agreement between optometrists an ophthalmologists concluding that the augmented 7-point % grading scale is intuitive and potentially offers greater accuracy for grading narrow angles than the traditional 4-point scale for grading limbal anterior chamber depth.

Nowomiejska et al challenge us to think ‘outside the box’ whether that box be a 24 or 30 degree visual field! They present a fascinating study involving semi-automated kinetic perimetry that provides additional information to static automated perimetry in the assessment of the remaining visual field in end-stage glaucoma. Two further studies shine a light on the burden of glaucoma in different age groups affected by glaucoma. Gupta et al report a 10% lifetime risk of perimetric blindness in juvenile open-angle glaucoma patients aged 10-40 years. This subgroup of our glaucoma population presents important challenges to us, such as the tendency to present with higher intraocular pressures and the impact of the disease on the social and economic productivity of this age group. Boodhna et al note that in predominantly adult-onset glaucoma, severity of vision loss at the point of glaucoma detection is improving over time in England. Taking a gigantic dataset of visual fields (almost half a million VF from almost 100,000 patients!), average visual field loss became less severe over 13 year follow-up period. The study emphasises the fact that many patients with

glaucoma continue to present to eyecare specialists when disease is at an advanced stage (a fifth had advanced visual field loss in at least one eye). The authors recommend that incentivising the use of available visual field technology and using it more appropriately in primary care is more important than chasing ‘preperimetric’ glaucoma with newer technologies.

To conclude, we hope the readership will be inspired by the breadth of articles in this special Feature Edition which demonstrate the drive to better understand the causes and effects of glaucoma. These reports demonstrate that the detection and treatment of glaucoma, the Worlds leading cause of irreversible blindness, is improving and we hope that this issue will continue and accelerate this improvement.

Biographies

Rupert Bourne is a Consultant Ophthalmic Surgeon at Hinchingbrooke Hospital and Honorary Consultant at Addenbrookes and Moorfields Eye Hospital. In addition he is Co-Director and Professor of Ophthalmology at the Vision and Eye Research Unit at Anglia Ruskin University, Cambridge, Vice-Chair of the National NIHR Ophthalmology Specialty Group and Eastern Region Co-Regional Lead for Ophthalmology. He has a keen clinical research interest mainly in glaucoma (in particular epidemiology, angle closure, and imaging) and expedition medicine. He has written in excess of 100 research papers in peer-reviewed journals, and has co-authored several books. He is Chief Investigator for several UK and non-UK studies, some involving major national population-based studies of eye disease ranging from Greenland to Trinidad, and co-ordinates the Vision Loss Expert Group of the Global Burden of Disease Study. Additionally he has been site Principal Investigator for several large UK NIHR trials.

Chris A. Johnson is a Professor in the Department of Ophthalmology and Visual Sciences at the University of Iowa Hospitals and Clinics, Iowa City, Iowa, USA. His primary research interests are related to the development and evaluation of non-invasive diagnostic test procedures (perimetry, photography, imaging) for glaucoma and other ocular and neurologic disorders, with secondary interests in occupational vision requirements, vision and transportation safety, and oculomotor adjustments. He has also been involved in many multicentre clinical trials and the development and maintenance of visual field reading centres for quality control, evaluation and interpretation of perimetric outcome measures. Dr. Johnson has received many honours from Ophthalmologic, Optometric and institutional sources, has received a considerable amount of research funding, and has authored more than 400 journal publications and book chapters throughout his career.

John Lawrenson studied optometry at Aston University, graduating with a first class honours degree. After a pre-registration year at Moorfields Eye Hospital he undertook postgraduate research at City University London, receiving his PhD in 1992. He then carried out a post-doctoral research fellowship in neuroscience at University College London. He then returned to join the academic staff at City University where he currently holds a chair in Clinical Visual Science and is also an Honorary Professor at University College London. He has recently completed a Master's degree in Evidence-based Healthcare at the University of Oxford. Professor Lawrenson has an active research interest in age-related eyed diseases; particularly glaucoma and age-related macular degeneration (AMD). He is an Editor for the Cochrane Eyes and Vision Group and has authored three Cochrane Systematic Reviews on nutrition and AMD.

Bang V Bui Upon qualifying as an optometrist from the University of Melbourne in 1993, Bang pursued Masters (1998) and PhD degrees (2003). He undertook postdoctoral research at the Devers Eye Institute (Portland, Oregon, USA) supported by an Australian National Health and Medical Research Council fellowship. From 2005 to 2010 he was an NHMRC Research Fellow. In 2010 Bang accepted a teaching and research position in the University of Melbourne. Bang currently holds an Australian Research Council Future Fellowship to develop novel functional and imaging assays for studying age-related neurodegeneration in small rodent models.