AN INTERVIEW WITH

Professor John Forrester

What made you choose ophthalmology as a career and how did your interest in academia develop?

During Medical School at Glasgow University, I was getting progressively disillusioned with the career options while my colleagues and friends all seemed to quickly decide what they wanted to do. Then in my fourth year I was introduced to the world of ophthalmology by Professor WS Foulds at the Tennent Institute and I was hooked. Ophthalmology seemed to offer everything from medicine to surgery, to paediatrics and genetics, and public health / world health, as well as having great potential for research into the many unanswered questions. I was determined to specialise in ophthalmology but found it difficult to land my first job. So I took an SHO post in neurosurgery, during which I persuaded one of the visiting ophthalmologists, Dr Malcolm Doig, to 'create' a locum SHO post for me at Paisley Eye Infirmary (no longer in existence). This allowed me an entry to a bona fide SHO post with Dr John Williamson at the Southern General Hospital, Glasgow, which became available shortly afterwards.

John Williamson became my mentor and friend and together we reported on the use of intravitreal urokinase for the treatment of non-resolving intravitreal blood clots in the early 1970s. We had some remarkable successes in restoring vision! However, it was this clinical problem that sparked my interest in research: Why did blood clots in the vitreous not clear in the same way that blood clots elsewhere usually cleared, usually after a few days or weeks? I was entering the world of immunology, inflammation and immune privilege but, in my innocence, I did not truly appreciate what I was getting into!

Junior doctor training in those days was much more flexible. I was able to organise my weekly duties such that I maximised my spare time infiltrating various laboratories at Glasgow University: Pathology under Bill Lee, Immunology with Peter Wilkinson, Cell Biology with Adam Curtis. It was a truly exciting time, I was learning vast amounts and I was fortunate to obtain an MRC Fellowship to work with Endre Balazs at Columbia University, New York, to study the role of hyaluronic acid (the original Healon) on inflammatory cell behaviour. My interests did not flag when I became consultant in 1979 and my colleagues, particularly John Williamson, were very understanding in allowing me to structure my week to continue my research interests. This led, in 1983, to my appointment as Cockburn Professor of Ophthalmology at University of Aberdeen.

Your current Pubmed publication count stands at 402, how did you balance work, life and academia?

I didn't. I just worked a lot. My non-work interests revolved around my family and still does now that I am retired from clinical work (2011). I had basically two jobs, and my job plan when described in full, was not accepted by the University line managers but I refused to change it. I retired from clinical work in the UK but continued some uveitis clinics at the Lions Eye Institute in Perth, Australia, until recently. I continue to hold a position at the University of Western Australia.

What are your current research interests?

Immune privilege as a concept seemed to me to be an insoluble mystery, and probably not correct. One of the main problems in ophthalmology is sight threatening uveitis and it seemed to me that the eye was not very 'privileged' if it could be so easily assailed by a wide range of inflammatory processes. So I decided to set up a model of experimental uveitis, I persuaded Waldon B Wacker in the US to gift me some of his antibody to retinal S antigen, the β arrestin of the photoreceptor which he had shown was a major uveitogenic antigen. I used Waldon's antibody to prepare S antigen with help of my first PhD student Gillian Borthwick, again supported by the MRC. I could then develop the model of S-antigen induced experimental autoimmune uveoretinitis (EAU). I still use the EAU model today to investigate immune mechanisms and to develop novel therapies such as customised T regulatory cells to control inflammatory disease.

You are involved in ophthalmic charity work around the world, what does this entail and how can trainees get involved?

Dr Frank Green, a longstanding friend who recently has died, joined me as Consultant Ophthalmologist at Aberdeen when I moved there to take up the Chair in 1984. Frank was an indispensable support during those early days in developing the clinical facility at Aberdeen where much work needed to be done to bring innovation. Frank also had an enduring interest in charity work and, with Dr Phillip Ambler, DO, set up an eye clinic with surgical facilities (cataract, glaucoma and lid surgery) in Thailand. This was for Burmese Karen refugees who were escaping the genocidal assaults of the Burmese Government by fleeing into border camps in Thailand. This has been a simmering civil war since the late 1940s / early 50s which escalated in the late 1990s with mass migrations into Thailand, similar to the more recent Rohingya refugee migration on the western border into Bangladesh. Karen State where most of the refugees came from in the east of Burma is semi-autonomous and is constantly on the receiving end of much aggression.

I took the chance to go with Frank to the refugee camps on a number of occasions and assisted in training refugee 'medics' in basic ophthalmology including training in the small incision cataract surgery (SICS) procedure. When Frank was still alive, he personally performed ~2000 surgeries himself each year towards the latter part of his career. His staff have an interest in continuing his work and carrying on his legacy. At present we are evaluating whether this is possible, by recruiting interested ophthalmologists to visit and work for short periods and by training his staff. In fact, this is an opportunity for experienced trainees and consultants to visit and take on some of this work.

Your areas of specialisation include uveitis and diabetic retinopathy – what are the current developments in ophthalmology that you are most excited about?

This question begs a long reply to deal with adequately! OK, I'll try to give some thoughts in a few words. The practice of ophthalmology has been through several revolutions during my career and it is

hard to pick any one development which is the most cutting edge. The areas of need are many: including worldwide corneal blindness (artificial cornea / biomaterials research), macular degeneration and neurodegeneration generally including Alzheimer's (anti-VEGF is only a small part of the answer for age-related macular degeneration), diabetic retinopathy (prevent diabetes and the eye problem is solved!), inflammatory diseases of the eye and central nervous system, genetic diseases and gene therapy and more besides. One of the most important developments is rather mundane, namely developments in design of high quality randomised controlled trials (RCTs). RCTs for many ophthalmological conditions and treatments are difficult to organise and require careful planning and international collaboration to achieve believable outcomes. This not only applies to new drugs but to surgical innovations such as membrane peeling, micro invasive glaucoma surgery (MIGS), laser surgery and more besides. While developments such as stem cell research, corneal re-shaping surgery, sophisticated vitreo-retinal surgical techniques, imaging for the sake of imaging, and more are the flavours of the day, I think we are losing sight of the fact much eye disease is a consequence of systemic disease, particularly ageing and inflammatory diseases, and we might do well to connect and collaborate with our medical and science colleagues in broader disciplines to tackle these problems together.

The Eye – Basic Sciences in Practice is one of the most recognisable ophthalmology textbooks today, where did the inspiration for it come from, and how long did it take to put together?

Yes, this is an interesting question; in retrospect, *The Eye* seems like a crazy project to have taken on. Indeed, when I asked Peter Wilkinson if it would be possible to summarise all of Immunology in one chapter while remaining up to date, he said I was crazy and it would be a mad thing to attempt. *The Eye* developed out of my time in the 1990s as Chairman of The Vision SubPanel of the Wellcome Trust Neurosciences Panel when I realised that there was no single textbook that synthesised the many different disciplines involved in the basic science of vision and ophthalmology. The book is aimed at three groups of individuals: nascent vision scientists who need to know the basics of the eye such as anatomy, embryology, perhaps physiology; undergraduate optometrists who need an introduction to pathology, microbiology and immunology; and trainee ophthalmologists who need to apply what they learned in medical school to the eye, the process of seeing and how it goes wrong. It's really an introductory text and other books are necessary to fill out the gaps. The value of the book is that it is updated every five years or so and can act as a vade mecum to the laboratory scientist and the ophthalmic practitioner by being readily available on the office or laboratory shelf!

You were one of the pioneers for medical ophthalmology as a separate run-through training, how do you see this route developing over the next decade?

I hinted at this in my answer to one of the questions above. Medical ophthalmologists are physicians and have come through a training route with the MRCP diploma or equivalent. Medical retina specialists, on the other hand, are usually surgically trained ophthalmologists who may perform surgery (usually cataract) but whose main interest is in retinal disease. The future development of medical retina and medical ophthalmology will depend on the clinical demand. Physician-trained medical ophthalmologists are needed to manage the many patients who are now on complex medications which have many side effects; or patients with systemic disease which affects the eye and where care of the systemic condition may lead to resolution of the eye disease (such as diabetes, neurological disease etc.); or where there may be difficulties in making the diagnosis and managing the disease such as extrapulmonary ocular tuberculosis, sarcoidosis where morbidity is restricted to visual loss, and ocular lymphoma leading to central nervous system lymphoma. Here the trained medical ophthalmologist can take the lead. Relying on opinion from non-ophthalmic physicians is problematic when the response to treatment is determined by the eye examination.

However, in terms of burden of disease the three major current clinical needs are management of age-related macular degeneration (anti-VEGF injections), the large number of patients who require monitoring of glaucoma, and addressing the long cataract waiting lists. Here, the skills of the medical retina specialist and the medical ophthalmologist are not needed and so both of these subspecialties will, in time, evolve into highly specialised clinicians, providing care for specific patients from a tertiary referral setting. In a sense, the Royal Colleges and the NHS administration are best placed to quantify the patient need nationally for such individuals, decide through Workforce Planning the numbers of specialists required, and make recommendations to NHS Trusts regarding the number and type of appropriate appointments.

What are your three top tips for today's ophthalmology trainees?

- Love your work: if you don't love your work, and what you are doing for your patients, go do something else.
- Don't think like everyone else; think that what you are being taught might not always be correct.
- Find something that becomes your question and then do something about it.

Where do you see yourself 10 years from now?

Gosh, I don't know! I have been retired from clinical work for many years and I miss it, but I don't see myself going back to it. Right now I am doing research which I greatly enjoy and I think is going somewhere, but when the money dries up, that might be it for me. I hope to help Phillip with the Karen project and see where that will go.

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