

Vision News

Autumn 2019

LEI invention is saving sight and changing lives for people with glaucoma

A surgical intervention for glaucoma invented at the Lions Eye Institute (LEI) and exported to the world is transforming lives.

Developed after more than 20 years by Professor Dao-Yi Yu and the Physiology and Pharmacology research group, along with international collaborators, the Xen™ Gel Stent is now available to Australian patients.

The Xen™ Gel Stent is a microfistula tube that reduces intraocular pressure in the eye – the biggest risk factor in glaucoma. The tube is about the size of an eyelash, thinner than a human hair and almost transparent.

The surgery is minimally invasive and does not damage the conjunctiva or require scleral incisions. It involves implanting the microfistula tube using a needle-type implanter in the space between the eye's anterior chamber and the conjunctiva, the tissue covering

the white part of the eye. This allows excess fluid to drain from the eye and thus lowers intraocular pressure.

Before it was introduced in Australia last year, the stent was approved for use in the United States, Europe and other countries and has now been implanted in more than 75,000 patients across the globe.

Professor Bill Morgan, who was part of the research team, said the surgery was literally life-changing for patients, with around half no longer requiring the regular eye drops usually used to control intraocular pressure.

He said with around 300,000 Australians and more than 70 million people worldwide affected by glaucoma, the potential of the Xen™ Gel Stent to save sight was enormous.

"The stent surgery takes far less time than a traditional trabeculectomy and patients recover far more rapidly," Professor Morgan said.



Professor Dao-Yi Yu

"When compared to trabeculectomy, it also demonstrates a reduced risk of post-operative complications and improved visual recovery in patients."

Professor Morgan said LEI researchers were continuing to work on improving this surgery and a new generation of treatments that would revolutionise the therapy of diseases such as glaucoma, including the use of next generation laser technology and improvements to current surgery.

LEI would like to acknowledge the bequest of the Harry & Margaret Kerman Trust Fund to fund glaucoma research.

If you would like to learn more about how you can help our future research by leaving a gift in your Will please contact Georgie on 9381 0738.

Major milestone as LEI offers retinal surgery for the first time

The LEI Day Surgery team is offering retinal surgery for the first time following the acquisition of new specialised equipment.

A vitrectomy machine and a microscope attachment called a wide field viewing system are allowing surgeons to deal with serious eye problems including retinal detachment and scarring.

Dr Chandra Balaratnasingam, a vitreoretinal specialist, performed the surgeries in February and said it was the first time this type of procedure had been performed outside of a tertiary hospital in Western Australia.

“This is a major milestone for the LEI and great news for our patients,” Dr Balaratnasingam said.

“The ability to offer posterior vitrectomy surgery greatly enhances our capacity to treat serious vision-threatening problems.”

A vitrectomy is the surgical removal of the vitreous gel from the middle of the eye to provide better access to the retina.

With better access, the surgeon is able to treat the retina with a laser, cut or remove fibrous or scar tissue, reattach the retina where there has been a detachment, or repair tears or holes in the retina or macula.

After treating the problem the surgeon then injects silicone or gas into the eye to replace the vitreous gel and restore normal pressure.

Dr Balaratnasingam said the highly-experienced LEI Day Surgery team was delighted to add retinal surgery to the wide array of services already on offer, including cataract micro-surgery and lens implantation, plastic surgery of the eyelids, ptosis repairs, pterygia, conjunctival grafts and corneal grafts.



Dr Chandra Balaratnasingam performs the first-ever posterior vitrectomy on a patient at LEI's clinic

Corneal patients benefit from new high-precision instrument

LEI patients are benefiting from the use of a high-precision machine that improves preparation of pre-cut endothelial tissue for use in corneal surgery and transplantation.

The Lions Eye Bank purchased the new mechanical microkeratome to provide donor tissue for patients undergoing a procedure known as Descemet's stripping automated endothelial keratoplasty – or DSAEK.

DSAEK is a partial thickness cornea transplant that involves selective removal of the Descemet membrane and endothelium, followed by the transplantation of donor tissue.

The microkeratome uses a high-precision oscillating blades system to perform a precise donor dissection, with excellent results for patients.

Formed in 1986, the Lions Eye Bank has completed more than 5000 procedures. Last year, a total of 226 corneal transplants were performed (103 penetrating and 123 pre-cut) with a further 169 procedures involving sclera (the white part of the eye).

A total of 11 surgeons, including LEI clinicians Professor Graham Barrett, Professor Geoffrey Crawford, Dr Andrea Ang and Lions Eye Bank Director Dr Steven Wiffen, perform corneal grafts for both public and private patients. LEI glaucoma surgeons Professor Bill Morgan, Dr Antonio Giubilato and Dr Antony Clark also use scleral grafts in surgery to reduce intraocular pressure.

Little fish is a big lure for childhood myopia researchers



Dr Livia Carvalho (left) is employing the tiny zebrafish to understand environmental and genetic factors in childhood myopia

LEI scientists are using zebrafish – a relative of the minnow – to study how environmental factors and genetics interact in the development of childhood myopia.

Dr Livia Carvalho and Dr Carla Mellough have secured a \$250,000 grant from the Telethon-Perth Children's Hospital Research Fund for the project.

Their research is, for the first time, combining genome-wide association studies, cutting-edge gene editing techniques and a

zebrafish model to specifically target the mechanisms behind early-onset myopia.

Myopia, or short-sightedness, starts in childhood and involves axial growth of the eye ball so that it becomes more egg-shaped.

"Zebrafish breed every 10 days and can produce hundreds

of eggs each time. They are also transparent so we are able to observe their growth under the microscope from fertilised egg to fully formed fish in just a matter of days," Dr Carvalho said.

The international Consortium for Refractive Error and Myopia (CREAM), which the LEI's Professor David Mackey contributes to, has identified more than 100 genes associated with myopia.

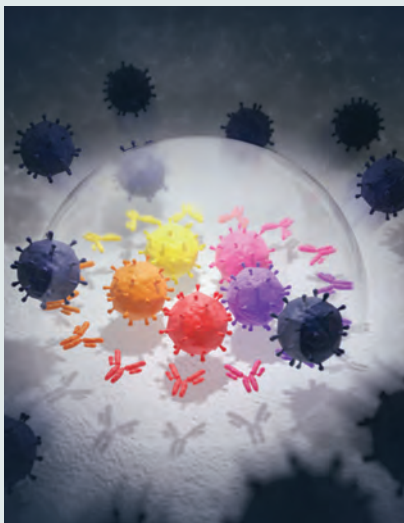
Environmental risk factors include high education levels, reading and lack of time outdoors.

The LEI study is funded for two years and also involves collaborative research with the University of Melbourne.

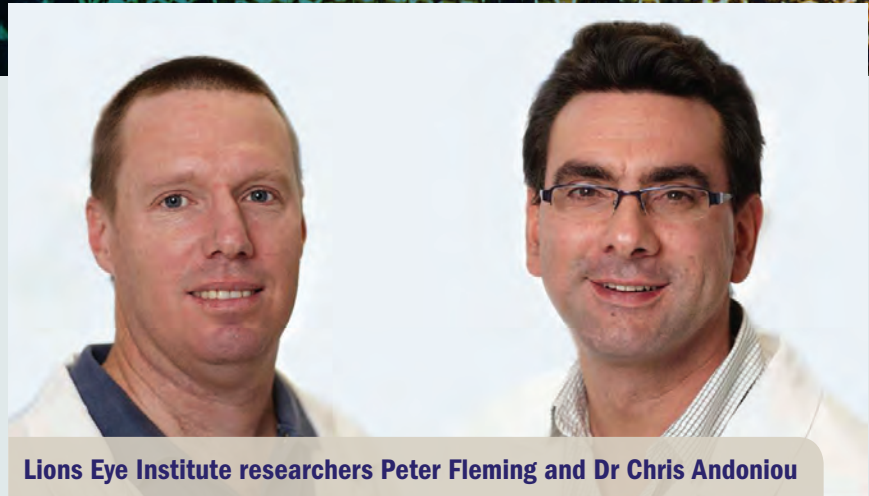
Breakthrough in controlling virus which causes infection in bone marrow and organ transplant patients

LEI researchers have helped discover a way to manage one of the most common life-threatening viral infections in bone marrow and organ transplant recipients.

Using a world-first preclinical model, they found preventing reactivation of a common virus (Human Cytomegalovirus or HCMV) using a recipient's own antibodies could be extremely effective in reducing the impact of this infection in transplant patients.



Antibodies (Y shaped) that are specific for particular CMV viral strains (antibodies are the same colour as the viruses) are able to stop them from reactivating. If the virus and the antibodies don't match up (the "black" viral strain), the virus escapes immune control and reactivates. Image supplied by Professor Degli-Esposti



Lions Eye Institute researchers Peter Fleming and Dr Chris Andoniou

Around 80 per cent of people worldwide are infected with HCMV – a virus that is seldom a problem as it usually remains dormant in healthy people. Problems arise when the immune system is compromised and the virus “reactivates” or comes out of its dormancy.

The eyes of people who undergo bone marrow transplants can also be affected, with between 40 to 60 per cent at risk of developing ocular graft versus host disease (oGVHD).

oGVHD can cause severe dry eye symptoms and damage the ocular surface – compromising vision and impacting on quality of life.

The team of WA researchers, including Professor Mariapia Degli-Esposti, Dr Chris Andoniou and Peter Fleming, along with Professor Geoff Hill's group from QIMR

Berghofer in Brisbane, created a new mouse model to examine the reactivation of CMV during transplantation.

They discovered that antibodies are key to limiting reactivation and injecting mice with their own anti-viral antibodies – a form of serotherapy – protected them from CMV reactivation. The researchers believe the results will translate to humans in future clinical trials.

“HCMV reactivation is particularly problematic in the setting of transplantation, and affects the successes of both solid organ and stem cell transplants,” Professor Degli-Esposti said.

She said the research, published in the prestigious journal *Science*, could form the basis of a new therapeutic strategy that would not only be extremely effective in preventing reactivation but posed little risk to the patient.



Professor Bill Morgan has taken over the leadership of the LEI

LEI appoints Professor Bill Morgan to leadership role

The LEI has appointed renowned ophthalmologist and medical researcher Professor Bill Morgan as Acting Managing Director.

Professor Morgan has been a leading ophthalmologist at the LEI for 25 years and also serves on the Board.

He is a glaucoma specialist and his research interests include studying the response of the optic nerve to pressure and the epidemiology of blinding eye disease.

“I’m deeply honoured to take on the role and I very much look forward to working closely with the Board and all LEI staff during my tenure,” he said.

Professor Morgan has taken over the role from Professor David Mackey, who stepped down after almost 10 years as Managing Director to focus on five funded research projects into the genetics of eye disease.

Professor Mackey is continuing his association with the LEI, leading the Genetics and Epidemiology research group as well as mentoring students and early- and mid-career researchers.

Thank you for your support

The LEI Christmas Appeal highlighted the story of brothers Eamon and Kealan Doak and the battle to save their sight.

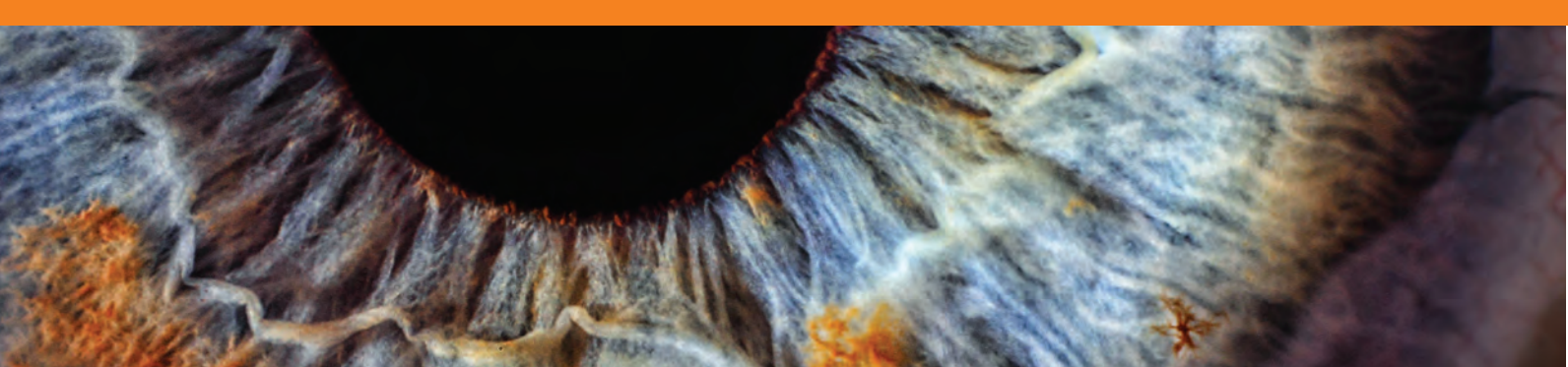
Both boys have Usher Syndrome Type 1D. They were born deaf and as they reach adolescence, will develop retinitis pigmentosa, which starts with poor night vision, progressing to tunnel vision and eventually blindness.

The appeal talked about the research work of Dr Fred Chen and his collaborators to facilitate genetic diagnosis of Usher Syndrome, understand why retinitis pigmentosa and nerve deafness occur in the disease, develop personalised treatments for patients and prepare patients for new treatment trials in the near future.

Dr Chen and the Doak family thank the supporters who donated to the Christmas Appeal and future LEI research into Usher Syndrome.



Eamon and Kealan Doak



“Founding father” finds new way to support the Lions Eye Institute

A lifetime saving sight and pioneering medical research into eye disease has culminated in the appointment of Professor Ian Constable as Patron of the Lions Eye Institute (LEI).

Professor Constable is an internationally renowned ophthalmologist who became the Foundation Lions Chair of Ophthalmology at The University of Western Australia in 1975 and founded the LEI in 1983.

Just last year, he celebrated 50 years in ophthalmology although he has barely slowed down. He still works as one of the LEI’s leading ophthalmologists and continues active involvement in research.

Board Chairman Peter Forbes said Professor Constable was just the LEI’s fourth Patron and followed in the footsteps of eminent Western Australians Sir James McCusker, Mr Bill Wyllie and Sir James Cruthers.

“As one of our true founding fathers, there can be no-one better suited to the role of Patron than Ian,” Mr Forbes said.

Significant research breakthroughs during his stewardship include a new surgical procedure for glaucoma, the artificial cornea, laser shunts for vein blockage, new insights into oxygen consumption in the retina and the immune basis for complex inflammatory diseases of the eye.



Professor Ian Constable will promote the achievements of the LEI in his new role as Patron

Professor Constable said he was honoured to assume the role of Patron.

> Thank you for saving sight

Privacy policy

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Lounge initiative celebrates enduring partnership between Lions and the LEI

The Lions Lounge recognises the extraordinary contribution of the Lions movement over many decades to the cause of saving sight in Western Australia.

In 2017, the LEI renamed one of the clinic waiting rooms the Lions Lounge as a way to honour the contribution of individual clubs and raise funds for vital medical equipment and new eye treatments.

For example, Lions club support for the Lions Lounge has resulted in the purchase of a microplate reader, which allows LEI researchers to process large numbers of experimental samples and measure RNA, DNA or proteins in these samples – a vital tool in eye research.

Lions who are interested in supporting the Lions Lounge are invited to make a financial contribution of either \$500 or \$1000 per year over three years.

Recent supporters include the Lions clubs of Dardenup, Moora, Kojonup, Morley, Perth Eye Institute, Ballajura, Dunsborough, Margaret River, Busselton, Claremont/Nedlands, Kwinana, Ellenbrook, East Fremantle, Canning City and City of Perth (Host).



Researchers working with the new microplate reader

If you would like to know more about the Lions Lounge initiative, phone Georgie on (08) 9381 0738.

Science on the Swan coming soon

The LEI is delighted to be Co-Chairing Western Australia's pre-eminent health science event, Science on the Swan, at the Westin Hotel from 5 – 7 June this year.

The conference, themed 'Neuroscience and the Senses – Healthy Ageing Across the Life Course' – will feature, among other notable speakers, science presenter, writer and executive producer Dr Michael Mosley.

Science on the Swan is designed for health and medical professionals, scientists, researchers and interested members of the public as a forum to discuss and showcase innovations that promise to improve the health and quality of life outcomes for Western Australian communities.

To book your ticket for this important event or find out more, go to www.scienceontheswan.com.au

What is a Visionary?

**For I dipped into the future, far as human eye could see,
Saw the vision of the world, and all the wonder that would be ...**

Alfred Lord Tennyson

Leaving a gift in your Will to the Lions Eye Institute is a reflection of both your generosity and vision.

At the Lions Eye Institute, our Visionaries are people who believe the world is worth seeing and want to be part of the scientific quest to prevent and cure blindness.

Eye disease and blindness are ruining the quality of life for millions of people around the world. The Lions Eye Institute is a global leader in medical research, committed to the enhanced understanding of eye disease and research that can be translated to treatments and cures that will make a difference for people today, and for future generations.

Through bequests in Wills, the Lions Eye Institute is able to invest in the brightest minds, who are working to solve some of the world's most intractable vision challenges. As a not-for-profit organisation, we use our donated funds carefully and strategically in pursuit of our goals.

Join us in being Visionary. For a personal, confidential discussion about leaving a gift in your will, please call Georgie at the Lions Eye Institute on (08) 9381 0738.

Yes I want to save sight

Please accept my donation of: \$.....(Donations over \$2 are tax deductible)

Please find enclosed my ☐ Cheque ☐ Money Order OR, please debit my ☐ Mastercard ☐ American Express ☐ Visa

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- ☐ I would be interested to learn more about how I can include the Lions Eye Institute in my Will.
- ☐ I have already provided for the Lions Eye Institute in my Will.
- ☐ Your donation saves sight. We recognise the generosity of our donors on our donor recognition board, on our website and in our annual report. Please tick here if you would like to be included in such recognition.

**Your donation
helps eradicate
blindness**

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