CENTRE FOR
Eye Research
Australia

visionary

Saving sight. Changing lives.

AUTUMN 2019

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THE UNIVERSITY OF MELBOURNE

the royal victorian eye and ear hospital

Managing Director's Message

Welcome to the autumn edition of Visionary.

It's been a whirlwind since I joined Centre for Eye Research Australia (CERA), especially in March when the spotlight was firmly on glaucoma.

In World Glaucoma Week, CERA launched its Glaucoma Appeal to support our vital research. Thank you to our donors who have generously contributed to the appeal.

Many of our researchers also took part in the World Glaucoma Congress in Melbourne, where more than 2000 experts discussed the latest in glaucoma care and treatment.

As president of the World Glaucoma Association, I am passionate about the importance of research.

It's my dream that our work at CERA will revolutionise the care of people with glaucoma and other blinding diseases, and greatly improve their quality of life.

In this edition of Visionary, you can read about new research by Associate Professor Ian Trounce into the genetic causes of glaucoma (page 3) and find out more about my work (pages 6&7).

You can also find out about our upcoming Ageing Eye Disease forum in May (back page). I'm excited to be one of the speakers at the event and look forward to seeing you there!

Keith Martin

Professor Keith Martin
Managing Director
Centre for Eye Research Australia

Meet our new Head of Philanthrophy and Fundraising

Sarah Rainbird

Our new Head of Philanthropy and Fundraising, Sarah Rainbird, has a passion for making a difference and a wealth of experience building relationships with donors and philanthropic supporters.

Sarah, a former lawyer, joins us from Save the Children Australia where she was National Manager, Individual and Family Philanthropy.

Since joining the Centre for Eye Research Australia (CERA), she has relished meeting our committed supporters and seeing the impact of their generosity.

Sarah's interest in eye research is also deeply personal. "My son has strabismus, a failure of the two eyes to maintain proper alignment and work together. Through his condition I have directly witnessed the impact debilitating eye diseases can have.

"In my short time at CERA, I've been privileged to meet scientists involved in ground-breaking projects – from genetic research to creating an eye test to diagnose Alzheimer's disease."

Sarah is excited about the power of philanthropy to fund innovative research.

"I'm looking forward to working with our donors and other supporters to ensure our scientists can develop new research that improves the lives of people experiencing vision loss."

Genetic links: Associate Professor Ian Trounce is studying the impact of faulty mitochondria in glaucoma. Photo: Anna Carlile

Just like your mum? Study investigates maternal genetic links in glaucoma

New research will study 1000 Australian patients with glaucoma over four years.

You may have your mum's blue eyes, or your grandma's nose, but new research from the Centre for Eye Research Australia's (CERA) Neurodegeneration and Mitochondria team is looking at the link between changes in the mitochondrial DNA – inherited from your maternal line – and optic nerve diseases such as glaucoma.

Associate Professor Ian Trounce is investigating the impact of faulty mitochondria, which provide energy for the cell, on the health of the optic nerve.

His research shows that faulty mitochondria play a key role in the development of diseases such as glaucoma and other diseases where the optic nerve is damaged, causing vision loss.

"Existing treatments for glaucoma aim to lower eye pressure but in many patients this does not slow vision loss," says Associate Professor Trounce."We have new evidence that the energy-generating cellular power-packs, the mitochondria, are defective in glaucoma."

Mitochondria have a small but vital set of genes which are inherited from our mothers, separate to the nuclear genes that come from both mother and father.

Associate Professor Trounce has received funding from the National Health and Medical Research Council (NHMRC) which will allow him to conduct a four-year study to determine if mitochondrial gene changes contribute to impaired mitochondrial function in 1000 Australian patients with glaucoma.

"If true, we may define a sub-group of glaucoma subjects where entirely new approaches to slowing vision loss can be developed," he says.

Glaucoma Appeal

In World Glaucoma Week (March 10-16) we launched our Glaucoma Appeal to encourage donors to support our vital research into the disease that affects more than 60 million people worldwide.

If you want to find out more about how you can support our work visit:

www.cera.org.au/glaucoma-appeal

Glaucoma study provides new evidence on laser treatment

New study finds preventative laser treatment for primary angle closure glaucoma has only modest benefits.

One of the world's largest studies into using laser treatment to prevent vision loss among people at risk of developing a severe form of glaucoma has cast new light on treating the disease.

The study of almost 900 people in China, led by Professor Mingguang He from the Centre for Eye Research Australia (CERA) and University of Melbourne, was published in leading medical journal *The Lancet.*

It finds laser peripheral iridotomy treatment – which is commonly used as a preventative measure for people at risk of developing primary angle closure glaucoma – has only modest benefits.

It recommends against the widespread treatment of all people at risk of developing the condition as a public health measure.

20 million people in China are at risk of primary angle closure glaucoma

3/4 of the world's 20 million primary angle closure cases occur in Asia

And it says there should instead be a focus on providing more intensive treatment to those most at risk of losing their sight, and on detecting glaucoma earlier.

The study tracked patients at an eye clinic in Guangzhou, China, over six years. Patients received laser treatment in one eye while the other was left untreated. Researchers then monitored both eyes over six years to determine the impact the treatment had on preventing further disease development.

Final results showed that although there was a small, statistically significant improvement in eyes that were treated – overall the benefits were limited, and the vast majority of patients did not develop any glaucoma symptoms in their untreated eye.

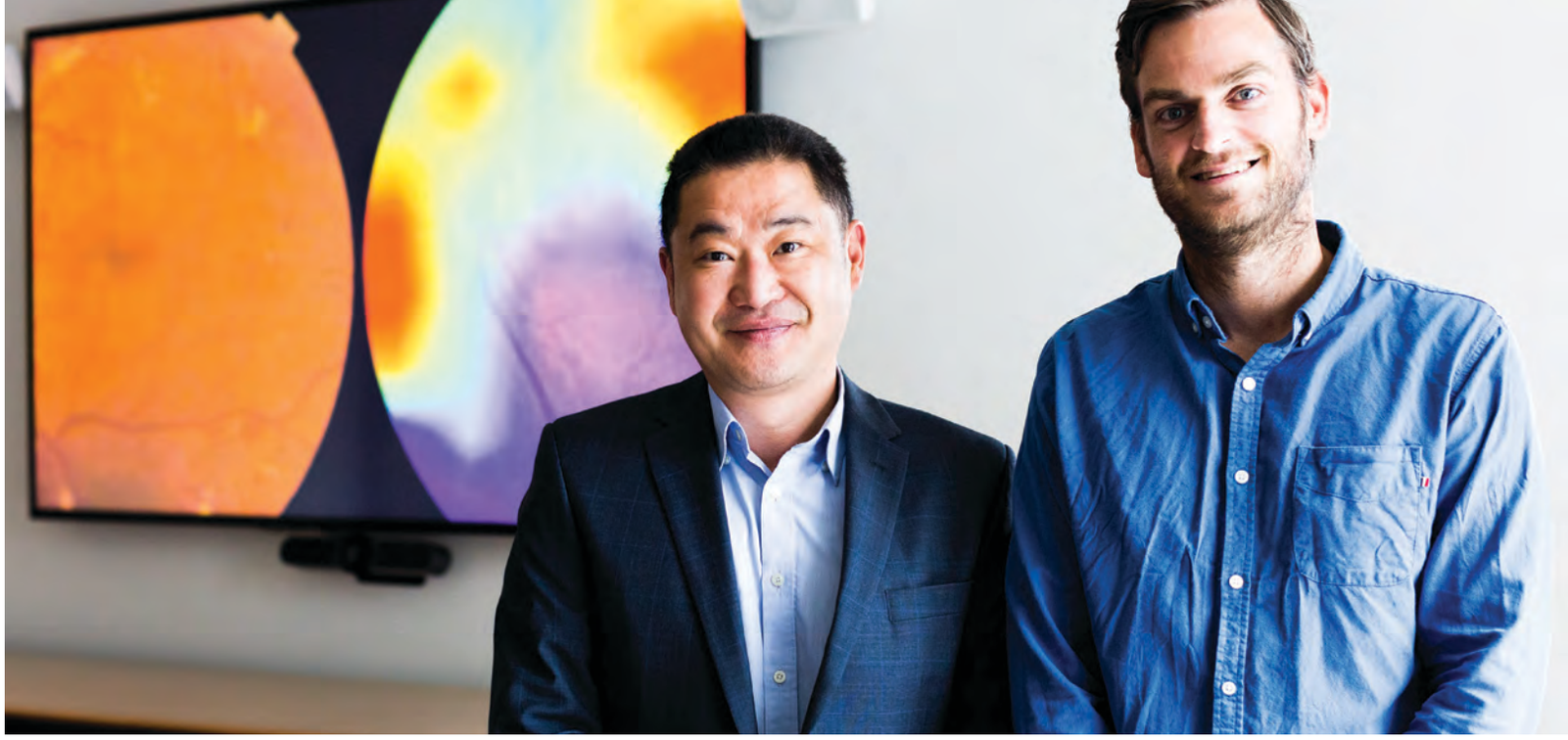
Professor He says the findings have major public health implications for China.

"In the past these patients could have been considered eligible candidates for laser treatment, but this new evidence shows that many do not need treatment," he says.

"Widespread use of preventative laser treatment is not the best use of health care resources."

Professor He's study was carried out with Zhongshan Ophthalmic Centre, Sun Yat-Sen University, China; the National Institute for Health Research and Biomedical Research Centre, Moorfields Eye Health Hospital, London; UCL Institute of Ophthalmology, London; Dana Centre for Preventative Ophthalmology, Wilmer Eye Institute and Department of International Health, Johns Hopkins School Bloomberg School of Public Health, US and National University of Singapore.

New evidence: Professor Mingguang He has led one of the world's largest studies into preventative laser treatment for glaucoma.



Screening trial: Professor Mingguang He and Dr Stuart Keel are leading the clinical trial Photo: Anna Carlile

A.I. trial to close eye care gap in remote and regional Australia

New technology could bring eye screening to more Australians and increase early detection of disease.

New research led by the Centre for Eye Research Australia (CERA) will test the effectiveness of an artificial intelligence-based technology in providing much-needed eye screening services in remote and regional Australia.

The project, funded by the National Health and Medical Research Council (NHMRC) Partnership Projects Scheme, aims to increase access to eye checks for people who are currently missing out, including Indigenous Australians and people in remote and regional communities.

Led by CERA's Professor Mingguang He and Research Fellow Dr Stuart Keel, in partnership with the Brien Holden Vision Institute (BHVI), the project will test the clinical effectiveness of the new technology.

They will also evaluate how it is accepted by patients and health professionals compared to current standard care.

Primary care services in regional and remote Australia will take part, using an algorithm developed by researchers to test for signs of diabetic retinopathy, glaucoma, age-related macular degeneration (AMD) and cataracts, when applied to standard retinal photographs.

Seconds after taking a photo of the eye, a report will be generated from the artificial intelligence system indicating whether the patient needs to be referred to a specialist for further assessment and treatment.

"Vision impairment and blindness are major public health problems in Australia, with up to half of major eye diseases remaining undiagnosed," says Professor He.

"An active screening program is needed to identify these cases, particularly in regional and remote areas which lack eye health services."

Up to 500,000 Australian adults suffer from vision impairment or blindness. Indigenous Australians are at particular risk, experiencing up to three times higher rates of vision impairment and blindness and much higher rates of late-stage diabetic retinopathy compared to non-Indigenous Australians.

Gene therapy a new frontier in glaucoma treatment

Our new Managing Director Professor Keith Martin has developed an international reputation for his ground-breaking research to develop new treatments for glaucoma using gene and stem cell therapy.

He joins the Centre for Eye Research Australia (CERA) from the University of Cambridge where he was Head of Ophthalmology, Deputy Director of the John van Geest Centre for Brain Repair and an Affiliate Principal Investigator at the Wellcome Trust – MRC Cambridge Stem Cell Institute.

In addition to his role at CERA, Professor Martin is also Ringland Anderson Chair of Ophthalmology at the University of Melbourne. He is the current President of the World Glaucoma Association.

Away from the world of research, he is an avid cyclist, windsurfer and pianist. This winter he is looking forward to supporting his newly adopted AFL club, the Tigers – chosen because they have the same colours as the Cambridge United strip.

Q. You joined CERA in February, what have been your early impressions?

CERA is such a dynamic environment with so much innovative work going on – from the development of the bionic eye, led by Associate Professor Penny Allen; to ground-breaking work on using artificial intelligence to detect eye disease and make screening programs more widely available from Professor Mingguang He and his team, to pioneering research from Associate Professor Peter van Wijngaarden to develop an eye test to identify people at risk of Alzheimer's disease.

There is so much collaborative work happening with other institutes, industry and our partners at the University of Melbourne and the Royal Victorian Eye and Ear Hospital.

Q. What are CERA's strengths?

We have people with such a broad range of skills in biotechnology and industry and great leadership from our Board, which helps us to be responsive and work with new partners in exciting and innovative ways.

Looking to the future: Professor Keith Martin is excited by the potential of gene therapy. Photo: Anna Carlile

CERA covers all bases, from understanding the basic, fundamental science of what causes eye disease through to developing new treatments.

We also have a lot of clinician-scientists and that helps to focus our questions on what will really make a difference to patients' lives.

We are also very fortunate to have the support of generous donors and people who take part in our clinical trials. I have already had the pleasure of meeting some of our donors and look forward to meeting more at our events this year.

Q. You're a glaucoma specialist. What are some of the challenges and opportunities in treating the disease?

There are many effective treatments for glaucoma but they do not work for everybody.

Many glaucoma treatments focus on lowering the pressure on the optic nerve – but about 10 to 15 per cent of people continue to have severe vision loss. Also, there is currently no way of restoring vision once it is lost.

I'm interested in how we can repair the optic nerve and restore vision, particularly using new therapies such as gene and stem cell therapy.

Q. What excites you most about your work?

I'm really excited to build on the great work that has been done at CERA. We have very strong expertise in ocular genetics and there's great potential to develop treatments to make a real difference for patients.

Gene therapy has advanced further in the eye than in any other organ. In the next decade we'll see it established for a range of rare genetic disorders and later will move into more common diseases like glaucoma, diabetic retinopathy and possibly also age-macular degeneration.

At Cambridge I was involved in developing a treatment which is progressing towards human clinical trial. My dream is that over the next 10 years we can start to use gene therapies and stem cell technologies not just to slow the decline of vision but to restore vision in patients with glaucoma.

Research partnership sets sights on diabetes and pregnancy

It's critical for women with pre-existing diabetes to have their eyes checked regularly during pregnancy.

New recommendations to protect the sight of women with pre-existing diabetes during pregnancy are being developed by researchers from Australia and Indonesia.

During pregnancy, women with Type 1 and Type 2 diabetes are at particular risk of diabetic retinopathy, which can lead to severe vision loss or blindness if left untreated.

Often people with diabetic retinopathy do not notice any problems until it is too late, which is why routine eye checks are critical to prevent vision loss.

Centre for Eye Research Australia (CERA) researchers Dr Felicia Widyaputri and Associate Professor Lyndell Lim are working with colleagues from the Universitas Gadjah Mada, Indonesia, to develop advice on when and how often women with diabetes should have their eyes checked during pregnancy.

Their research, funded by the Alfred Felton Bequest in Australia and the Australian Indonesia Institute in Indonesia, will inform a major public health initiative for pregnant women with diabetes in both countries.

Indonesia ranks No. 6 in the world for the prevalance of Type 2 diabetes

The number of Indonesians with diabetes will rise from 10 to 21 million over the next decade

Diabetes is a major public health issue in Indonesia.

The Indonesian study will determine the prevalence of diabetes in Jogjakarta's pregnant women and their access to eye care.

It will then utilise findings from Dr Widyaputri's current PhD research at CERA, which is monitoring the eye health of 150 women with pre-existing diabetes before and during pregnancy.

Dr Widyaputri's study, which aims to determine the prevalence of diabetic retinopathy in pregnancy and its progression, follows the women throughout pregnancy, examining their eyes each trimester and when their baby is three months old.

Working with women at Melbourne's Royal Women's and Mercy hospitals, Dr Widyaputri is also monitoring their eyes for the earliest signs of diabetic retinopathy changes using a non-invasive imaging technique that can visualise the blood vessels in the retina.

Dr Widyaputri's research will be used to inform Indonesian health protocols for the care of pregnant women with diabetes, and will also provide valuable information which could contribute to an update of current Australian guidelines.

"Although it is largely agreed that diabetic retinopathy is worsened by pregnancy, there is still more we can do to protect women's sight," says Dr Widyaputri.

"Current Australian guidelines recommend that pregnant women with diabetes undertake a comprehensive eye check in their

Better eye care: Dr Felicia Widyaputri and Associate Professor Lyndell Lim's research highlights the importance of regular eye checks for women with diabetes during pregnancy.

Photo: Anna Carlile

first trimester, but less than 50 per cent have their eyes checked.

"With our study we hope to get a clearer perspective of how far diabetic retinopathy can progress during pregnancy and when are the best points of time for patients to have their eyes checked.

"We know that a patient with diabetic retinopathy will not have symptoms in the early stages and by the time they are experiencing changes it can be too late to treat – that's why screening is so critical.

"I have seen how hard pregnancy is for women who have diabetes, as they have a number of appointments on top of the everyday responsibility of blood glucose monitoring.

"Getting a routine diabetic eye screen is very important during pregnancy. Because nothing is better than seeing your baby grow."

‘We have in mind the future’

Long-time supporters Judith and Brian Gilpin hope that our research will find a cure for – and ultimately a way to prevent – many eye diseases such as glaucoma and age-related macular degeneration.

Judith and Brian Gilpin regularly travel into Melbourne’s CBD from their outer eastern home to hear about the Centre for Eye Research Australia’s (CERA) latest breakthroughs and developments in eye health research.

For Judith, a former kindergarten teacher, and Brian, a retired engineer, now great-grandparents 14 times over, the community information forums are deeply personal.

Six years ago, Judith was diagnosed with age-related macular degeneration (AMD). Now 86, Judith no longer drives, as distance is hard to gauge, and she has had to give up a beloved, but visually demanding, hobby of single-thread needlework. But she is otherwise well and able to read, “with a good light”. Standard AMD treatment is keeping the disease at bay.

“I’ve been having injections. Just the left eye to begin with, and both eyes now for a couple of years,” she says.

Brian, aged 93, was diagnosed with glaucoma some years ago but still enjoys good eyesight and is able to drive.

For the Gilpins the future is on their mind. “Both AMD and glaucoma are hereditary,” says Judith. “We’re really interested in what’s going to happen to our grandchildren, and our great-grandchildren. Are they going to inherit our eye disease?”

They both value that CERA is at the frontier of eye disease research and is recognised as one of the top four research centres in the world. “This is an incredible achievement,” says Brian. “We are just so fortunate.”

The Gilpins have donated to CERA since 2003 and urge others to do the same, no matter the amount.

“We’re quite fascinated by the work they’re doing,” says Brian. “We have in mind the future. Hopefully, lots of things will be preventable by then.”

And back home, the Gilpins encourage the family to test their eyesight regularly using a simple Amsler grid that hangs on a door.

“This little grid gives you warning if there’s a problem,” says Brian. “It’s important.”

Thinking of the future: Long term CERA supporters Brian and Judith Gilpin.
Photo: Anna Carlile

Gearing up for a challenge: CERA's RIde for Sight team Tanya Pejnovic and Dr Elaine Chong. Photo: Timothy Liew

Moving into top gear for eye research

Sixty cyclists are gearing up to test their fitness and endurance and raise vital funds for eye research in the 2019 Lions Ride for Sight.

Centre for Eye Research Australia (CERA) Senior Research Fellow Dr Elaine Chong and HR adviser Tanya Pejnovic are among the riders who will tackle the 350km course which begins in Orbost on 11 April and follows a demanding, hilly terrain before ending in Sale on 14 April.

"I've completed two previous rides with the Lions and they have been among the best experiences ever," says Dr Chong.

"Riding along with the vision-impaired riders who participate with tandem riders is very inspiring and I am happy to be involved to help fundraise for eye research."

CERA appreciates the great support of all of the riders and Lions District 201V3 over the history of the event, which has raised more than $1 million for our vital research.

Lions Ride for Sight organiser Nina Blythe said Lions District 201V3 is proud to have supported CERA, giving more people a chance to save their sight.

"Since the ride began, we have cycled more than 9000 km for eye research – that's like travelling from Melbourne to Broome and back!"

You can support this year's ride by donating through our Everyday Hero page - https://give.everydayhero.com/au/cera

Why include CERA in your Will?

Including a gift in your will to the Centre for Eye Research Australia (CERA), a world-leading eye research institute, can change the lives of future generations and ensure the research you care about and value can continue.

Your gift will help CERA to:

- unravel the causes of eye diseases, prevent vision impairment and blindness through earlier diagnosis and better treatments
- pioneer vision regeneration programs to give hope to people who have lost their sight
- conduct clinical trials to evaluate new treatments for vision impairment and
- purchase new technology and equipment for medical research and clinical trials.

If you have any questions about leaving a gift in your will to CERA, please contact Elaine Levine, Donor Relations Adviser, on 03 9929 8424 for a confidential chat.

What's on at CERA?

Thursday 16 May

Scientific Exchange

Meet Australia's top experts and rising stars in eye research and hear about the latest treatments for patients.

5:30pm - 7:30pm, with light refreshments.

Wednesday 29 May

Ageing Eye Disease Community Forum

Learn about research to improve diagnosis and treatment of AMD and glaucoma.

10:30 am - 2:00 pm

- 11:00am - 12:00pm age-related macular degeneration

- 12:00pm - 1:00pm light lunch

- 1:00pm - 2:00pm glaucoma

Thursday 10 October

Looking to the Future Community Forum

Learn about the latest developments in stem cells, diabetic retinopathy and the use of artificial intelligence in eye research.

10:30am - 2:00pm

Thursday 21 November

Annual Gerard Crock Lecture

A public lecture celebrating Australia's first Professor of Ophthalmology, the late Professor Gerard Crock AO.

5:15pm - 7:30pm

2019

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Everyone is welcome at our events, aimed at a general audience.

Check out our website for updates and more information. Contact us to book your seat now:

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