RETINA REPORTER

RETINA australia

Retina Australia's Bi-Annual Newsletter

WINTER 2025

CONTENT

Latest research on inherited retinal diseases

This edition of the Retina Reporter brings you a comprehensive update of the latest research developments in inherited retinal diseases (IRDs), including a final report from one of our 2024 research grants, an extensive summary of the key presentations from the 2025 Association for Research in Vision and Ophthalmology (ARVO) meeting covering international progress on IRDs, and a list of participation opportunities open on our IRD Research Project and Clinical Trial Register.

Message from the CEO

It was great to start the year welcoming the news of the Therapeutic Goods Administration's (TGA) approval of SYFOVRE® (pegcetacoplan) for the treatment of adults with geographic atrophy (GA). This is the first and only approved treatment for GA in Australia, offering hope to the over 75,000 Australians living with the condition, by slowing vision loss and helping to preserve both quality of life and independence for those affected. With the pending application for SYFOVRE® to be listed on the Pharmaceutical Benefits Scheme (PBS) for subsidisation of treatment cost, we encourage anyone affected by GA to consider submitting their personal story of how the treatment would impact their symptoms, independence, and quality of life, so it can be appraised in the review process. This process is explained in the From Lab to Life article later in this newsletter. We will keep you posted as to when the window for consumer applications is open for this treatment.

Thank you to those who supported our Retinitis Pigmentosa Awareness Month campaign in February. Helping to spread the word and raising funds for research, progresses this important cause toward finding new treatments and improved patient outcomes. We hope you enjoyed engaging in your Do It in The Dark activities!

Our annual Research Grants Program is currently open to receive applications for projects in 2026. We look forward to reviewing new and innovative ideas for studies to advance the detection, prevention and to find new treatments and cures for inherited retinal diseases (IRDs). Applications close on 30 June 2025.

As we near the end of the financial year and the final phase of our current Strategic Plan 2023-2025, the Board recently came together to review our progress and to start planning for the next stage of growth. We have come a long way over the past three years and are keen to continue to expand and grow our reach and impact through our research funding, information and support services. But we need your assistance. Without any government support, Retina Australia relies on donations for all we do. Your generous support to our 2025 Annual Appeal will underscore our ability to keep funding, facilitating, participating, advocating and informing on research into IRDs. Thank you so much for your support.

Warmest regards,

Julia Hall
Chief Executive Officer

Pictured on the next page: Clockwise from the top: Retina Australia Board Directors at the recent Strategic Planning Day: Ian Kelly, Associate Professor Anai Gonzalez-Cordero, Dr Ceecee Britten-Jones, Dino Farronato, Josh Ginpil, Leighton Boyd AM, Rosemary Boyd OAM, Stephen Miners; Peter Vance with friends wearing DITD glasses and participating in awareness for Retinitis Pigmentosa Awareness Month; Members of the Brass Roots Live Band wearing DITD glasses while playing and participating in Retinitis Pigmentosa Awareness Month

Message from the CEO

Research into inherited retinal disease matters

Right now, there is only one treatment available in Australia for one rare type of inherited retinal disease (IRD) linked to the RPE65 gene. While this treatment helps only a very small group of people, it’s a breakthrough that opens the door to possible new therapies for many other IRDs linked to over 300 different genes.

For Peter and the over 19,000 other Australians living with IRDs, the hope this innovation has provided matters. Peter was diagnosed with Retinitis Pigmentosa after a routine visit to his local optometrist in his early 30s.

“[My optometrist] was quite excited because it was something he had never seen before,” said Peter.

Needless to say, Peter was not prepared for this conversation. Aside from experiencing some difficulties driving at night, he hadn’t noticed any issues with his sight. He was immediately referred to an ophthalmologist. After further testing, the ophthalmologist asked him who he worked for.

“Then he said, ‘I’ll have to write a letter out to them and tell them you can no longer drive.’”

2025 Annual Appeal

As an agriculturalist who spent many hours on the road for work each week, this was not the news he wanted to hear. Luckily, his ophthalmologist ultimately said Peter's peripheral vision was good enough to allow him to continue driving.

"One of the most important things is being able to accept your condition," says Peter.

"Once you accept, you can trust that the tools and things you have around you and the people will support you … then you can get on with life and enjoy life."

There are no treatments available in Australia for Peter's condition, but he is hopeful about what the future holds him and future generations, including his daughter who has the same condition.

Peter says he supports good, well-funded research into treatments for IRDs.

"That's where Retina Australia is taking the lead … We know that Retina Australia is supporting quality research, and that gives us hope that a cure may be found in the future."

Help us show our community they matter.
During this end of financial year, we hope you will help Retina Australia support emerging research by donating to the Retina Australia 2025 Annual Appeal.

While there are no cures for IRDs, the discovery of treatments matters and gives our community hope.

Donate to the Retina Australia 2025 Annual Appeal today at: retinaaustralia.com.au/help-us/annual-appeal

Thank you for standing with us.

Scan this code to watch Peter's Story

DONATE NOW

All donations $2 and above are tax deductible

www.retinaaustralia.com.au (03)9650 5088 info@retinaaustralia.com.au

Retina Australia Research Grant Impact Report

Retina Australia is delighted to provide the final report summary on a grant project awarded in 2024 that is now complete.

Virtual Reality Assessment of Functional Vision in achromatopsia

Chief Investigator
Associate Professor, Elisa Cornish, Save Sight Institute, Sydney

Co-Investigators
Professor Gregg Suaning, School of Biomedical Engineering, The University of Sydney
Professor John Grigg, Save Sight Institute, Sydney

Grant awarded - $52,639 (2024)

Background: The Need for Real-World Functional Vision Measures
Achromatopsia is a rare, inherited retinal condition that causes congenital visual impairment, photophobia (severe sensitivity and intolerance to light), and reduced visual acuity. For individuals with achromatopsia, everyday lighting, particularly bright or variable light, is often debilitating, significantly affecting mobility, social participation, and daily functioning. However, traditional clinical assessments such as best-corrected visual acuity (BCVA) and contrast sensitivity, fail to capture the full scope of these real-world challenges. This has been evident where their use in some stage 3 clinical trials have failed because they did not meet their primary endpoints.

Regulatory approval for therapies depends on measurable improvements in patient outcomes. For the one gene therapy available for an inherited retinal disease, Voretigene neparvovec, also known as Luxturna (AAV2-hRPE65v2) for mutations in the RPE65 gene, multi-luminance mobility testing (MLMT) was used as the end point for the clinical trial. It required a room to be set up with obstacles, such as tables, chairs and open cupboard doors that the study participant needed to walk through under different light conditions. The primary efficacy endpoint of the study, that ultimately led to the therapy's approval and use in Australia, was improvement in the participants mobility on this course. The development of this course was however, time, cost and space consuming.

This study was designed to develop a more economical and efficient way to simulate the same results of the MLMT using virtual reality.

Retina Australia Research Grant Impact Report

Project Aim
The project aimed to develop and validate a virtual reality (VR) mobility task as a surrogate outcome measure to assess functional vision in achromatopsia, and to evaluate the MonCvOne® device as an objective tool for measuring light sensitivity.

Project Summary
Participants wore a VR headset and used hand joysticks (as pictured below) to walk through a virtual room. The VR environment was looking to imitate the MLMT and the VR task involved navigating a simulated environment with obstacles and changing light conditions, designed to emulate real-world challenges faced by individuals with these conditions and the MLMT.

Key Findings
- The VR mobility task was well tolerated across age groups and skill levels, with minimal motion sickness and high usability.
- Patients with achromatopsia demonstrated significantly poorer performance in VR navigation than age-matched individuals with normal vision, especially in high-light settings.
- The MonCvOne® - a medical device designed to provide a comprehensive, objective, and quantitative assessment of vision - provided unbiased, consistent measures of photosensitivity.

Research Impact and Significance
This study demonstrated that VR-based mobility testing provides a scalable and patient-friendly approach to assessing real-world visual performance in individuals with achromatopsia. It also showed strong potential as a surrogate endpoint in future clinical trials of novel therapies. Additionally, the MonCvOne® system proved to be a reliable and repeatable measure of light sensitivity. As a standardised and effective outcome measure, this VR tool offers a practical solution for global clinical trial implementation, requiring minimal clinical infrastructure while ensuring high reproducibility across sites.

Research Grant Impact Highlight

It is with pleasure that Retina Australia highlights the impact of a previous Retina Australia Research Grants Program recipient.

Retina Australia Research Grant Awardee - Associate Professor Raymond Wong

Associate Professor Raymond Wong, from the Centre for Eye Research Australia (CERA) and University of Melbourne, received a grant from Retina Australia in 2020. This grant was critical in the early stage of his retinal gene therapy project using cellular reprogramming to treat retinitis pigmentosa.

"Development of regenerative therapy for retinitis pigmentosa using cellular reprogramming" - $40,000 grant awarded in 2020

The pilot data from this grant enabled Associated Professor Wong to subsequently obtain larger grants and enable other spin-off cell reprogramming projects to treat retinal degeneration to further its research impact. In addition, over $4.5M has been awarded to date, following the 2020 Retina Australia grant, representing a significant funding leverage of 114 times.

Research Impact of the 2020 Retina Australia Research grant

- 3 patents on the cellular reprogramming technologies developed in this project, led to the reprogrammimg of the stem cells within the retina (the Muller glia) to regenerate retinal neurons.
- To further develop this into a novel gene therapy, a spin off biotech start-up company, Mirugen, was established to commercialise and translate the research to the clinic.
    - Mirugen is focused on developing a gene therapy to stimulate retinal regeneration to treat vision loss in blind patients.
    - As a spin-out company from the Centre for Eye Research Australia, Mirugen has raised approximately $7M of funding to date, including support from Medical Research Future Fund (MRFF)'s national biotech incubator programs CUREator and CUREator+, as well as additional commercial investments.

Research Grant Impact Highlight

- The gene therapy work has received significant media attention, and the team has also presented its work in research seminars, national and international meetings including most recently:
  - 2025 - Radio interview with 2RPH radio – an Australian radio station for those with reading difficulties
  - 2025 - News coverage for gene therapy work: Mivision the ophthalmic journal - 'Grant for CERA start-up aiming to switch on sight'; Eyesmart news - 'Australian Startup Mirugen Secures Grant to Advance Gene Therapy for Vision Restoration'; Retina UK – 'Mirugen – Unlocking the Power of Retina Regeneration'; Insight news – 'Funding boost for Aussie gene therapy start-up aiming to reverse eye damage'
  - 2024 - Inspiring Leaders Seminar Series, Flinders University, Australia
  - 2024 - St Vincent's Institute seminar series, St Vincent's Institute of Medical Research
  - 2022 - Research seminar, Department of Ophthalmology, University of Bonn, Germany
  - 2022 - Research seminar, Save Sight Institute, Sydney Eye Hospital, Australia
  - 2022 - ACMD link seminar, Aikenhead Centre for Medical Discovery, Australia
  - 2021 - Research seminar, National Stem Cell Conversations, Australian Society of Stem Cell Research

<u>Funding Leverage of the 2020 Retina Australia Research grant</u>

- Following the award of the Retina Australia grant, the cell reprogramming project was subsequently awarded:
  - a NHMRC ideas grant ($979,264)
  - MRFF Stem Cell Therapies Mission grant ($587,569) and a
  - National Stem Cell Foundation of Australia ($100,000).
- The spin-off Mirugen was awarded the MRFF CUREator grant ($500,000) and the MRFF CUREator+ grant ($1.92M), as well as commercial investment to further advance our pre-clinical development program.
- In addition, Associate Professor Wong and team's findings enabled initiation of new cell reprogramming projects to treat retinal degeneration, which was awarded funding from the CASS Foundation ($62,000) and collaborative fundings with Japan (RIKEN, $119,180) and Germany (University of Bonn, $290,200).

Associate Professor Wong comments, "The project has been a big success and we were awarded a total of >$4.5M competitive funding following the Retina Australia grant - the Retina Australia grant has certainly contributed significantly to our journey to develop this novel retinal gene therapy to treat retinitis pigmentosa!"

In Focus:
From Lab to Life

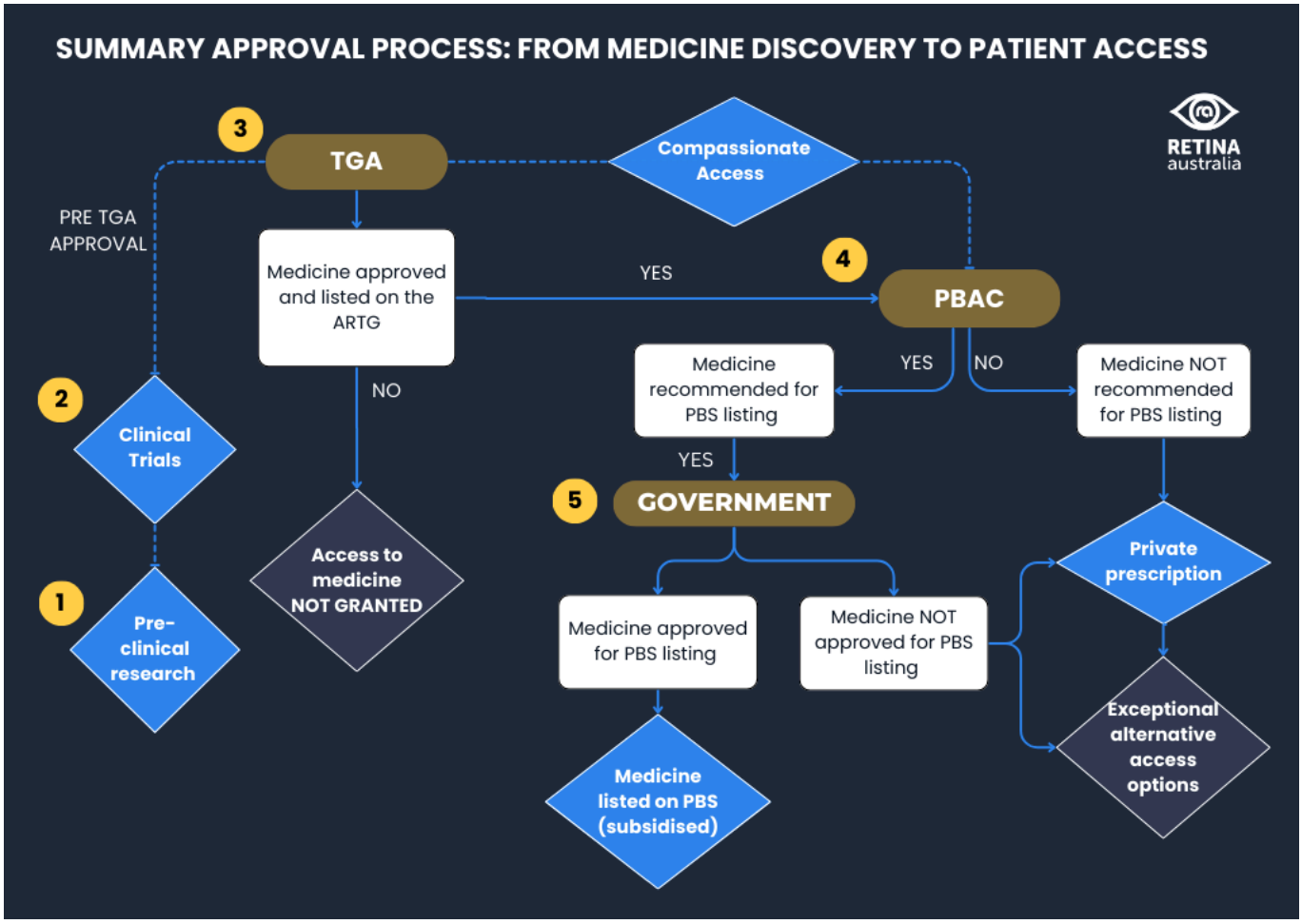
RETINA australia

Overview: The Path to New Medicines – Treatment Discovery to Patient Access

Gaining access to new medicines in Australia is a lengthy and complex process, involving multiple stages of research, testing, and evaluation from the Australian regulator and reimbursement authorities. The process from initial laboratory studies through to availability for patients to improve health outcomes and quality of life, can take years. To provide a better understanding of process, the diagram below illustrates a summary of the key processes commonly involved.

1. Pre-clinical Research

The development of new medicines begins with preclinical research, which lays the groundwork for clinical testing in humans. Before human trials can commence, extensive laboratory testing and in some cases, animal studies, are conducted to evaluate the potential safety and effectiveness of the treatment.



In Focus: From Lab to Life

RETINA australia

2. Clinical Trials

If preclinical findings are promising, the treatment progresses to clinical trials. A clinical trial studies new tests and treatments and evaluates their effects on human health outcomes. They are used to evaluate the safety and effectiveness of a new procedure, medication or device to prevent, diagnose or treat a disease or disorder. Prior to medicine approval, clinical trials are typically conducted in three phases, usually over several years:

- Phase 1: Small-scale trials are focused on evaluating safety and determining safe dosage levels.
- Phase 2: Medium-sized trials are conducted to further assess safety and begin evaluating efficacy.
- Phase 3: Large-scale trials are designed to confirm efficacy, identify side effects, and compare the new treatment to standard therapies or placebos.

3. Regulatory Approval by the TGA

Once clinical trials are successfully completed, the treatment developer, also known as the sponsor, will use its scientifically robust data regarding the medicine's quality, safety and efficacy, to apply for registration from the Therapeutic Goods Administration (TGA), Australia's regulatory authority for therapeutic goods.

A formal application, such as a New Drug Application (NDA) or Biologicals License Application (BLA), is submitted to the TGA. The TGA reviews the application to undertake thorough assessment of the quality of the clinical data, efficacy and safety of the treatment based on the results of clinical trials, the manufacturing process, facilities, and quality control measures, risk management plan, proposed labelling and packaging, and compliance with all relevant regulatory requirements. This evaluation is conducted by a team of scientists and clinicians with expertise in relevant fields.

The timeline for TGA approval can vary widely depending on factors such as the complexity of the drug treatment, the quality of the submitted data, and the workload of the TGA at the time of submission. Therefore, the approval process can range from several months to a few years, depending on the submission and priority.

Based on the review, if the treatment meets the necessary standards for safety, quality, and efficacy, the TGA will approve it for marketing and use in Australia, and it will be included on the Australian Register of Therapeutic Goods (ARTG). If not approved, the medicine is not available for general use in Australia.

In Focus:
From Lab to Life

RETINA australia

4. PBAC evaluation for medicine subsidy on the PBS

If a medicine receives TGA approval, an independent expert group called the Pharmaceutical Benefits Advisory Committee (PBAC) conducts a Health Technology Assessment (HTA), which is the process of evaluating the medicine for consideration of government subsidy eligibility. The PBAC independently reviews:

- The medicine's clinical effectiveness - how well it works compared to existing treatments
- Cost-effectiveness - if the health benefits justify the cost
- The potential impact on the healthcare system and patients.

Based on this comprehensive HTA, the PBAC makes recommendations to the Australian Government as to which medicines should be subsidised by the Government by adding them to the Pharmaceutical Benefits Scheme (PBS).

5. Government approval for PBS listing

The PBAC makes recommendations to the Minister for Health for funding of medicines via the PBS. If a medicine is approved, it means the Australian Government has agreed to subsidise its cost, recognising that it provides meaningful health benefits and value for money for Australian tax payers. PBS listing means:

- Lower Cost for Patients. Patients only pay a reduced co-payment at the pharmacy (as of 2025: up to $31.60 for general patients or $7.70 for concession card holders). The government covers the rest of the cost, which could be hundreds or thousands of dollars.
- Wider and More Equitable Access. Medicines listed on the PBS are available nationwide through pharmacies.

If a medicine has NOT YET been approved for PBS listing, it can still be accessed by:

- private prescription where the patient pays the full cost of the medicine
- or in some cases, through compassionate access pathways, particularly while the PBAC application is still pending.

If a medicine is NOT APPROVED for PBS listing, it can still be accessed by private prescription. There may also be some exceptional circumstances for access.

In Focus: From Lab to Life

RETINA australia

How patients can help advance treatment discovery and have their say in the medicine approval processes

Patients are critical to the treatment discovery process from the outset, starting from pre-clinical research through to each stage of clinical trials, all the way through to influencing the approvals processes for subsidised access to new medicines.

Treatment discovery

Without patient participation in research, there would be no treatment discovery. There are many ways that patients and their family members can contribute to research:

Pre-clinical research stage

Pre-clinical research, usually conducted on animal models, is a crucial first step before clinical trial testing. However, due to fundamental differences between animals and humans, many promising treatments fail to translate to human use. This has driven growing interest in patient-derived models, which enable drug testing on human tissues in a laboratory setting, offering a more relevant alternative for pre-clinical evaluation.

The development of patient-derived models, such as retinal organoids, requires the donation of blood or skin samples. These models carry the same genetic mutation as the donor and can be used safely and efficiently to study disease mechanisms and test potential treatments for IRDs before proceeding to human trials.

Natural history studies

Natural history studies track the progression of a disease over time without intervention, providing critical data on how a condition develops, varies, and impacts patients. They are essential for understanding disease mechanisms, identifying biomarkers, and designing effective clinical trials, especially for rare diseases such as IRDs. These studies help define baseline progression, select trial participants, and determine meaningful treatment outcomes.

Participants can include diagnosed individuals, those at risk, caregivers, and sometimes healthy controls.

In Focus: From Lab to Life

Clinical trials
New treatment discovery for IRDs is dependent on patient participation in clinical trials also. Clinical trials are used to evaluate the safety and effectiveness of a new procedure, medication or device to prevent, diagnose or treat a disease or disorder.

Taking part in a clinical trial is a meaningful way to contribute to science, so that new treatments can be developed. It is also a way to access potential new treatments at an earlier stage than you otherwise would. However, it is important to remember that clinical trials are experimental, and so the treatment may not necessarily help you. There are also risks associated in being involved in clinical trials. Retina Australia recommends discussion about the pros and cons of participation with your ophthalmologist and the clinical trial research team before you make a decision.

If you are interested in participating in research, you can sign up to an IRD registry (listed on the last page), a research centre, or check for projects on the Australian Clinical Trials website, or Retina Australia's IRD Research and Clinical Trial Register (summary provided in this newsletter).

Approvals process

The consumer view is incredibly important in the medicine approval process because it ensures that regulatory decisions reflect the real-world experiences and the needs of those who will be using the medicine. Including the patient perspective in decision-making helps ensure that medicines not only meet clinical standards but also genuinely improve patients' lives in terms of effectiveness, quality of life, and accessibility. Consumers include patients, care givers, family members, potential patients, patient advocacy groups, and the general public. You can have your say!

1. Participate on a TGA Advisory Committee
The TGA does not seek public comment on individual medicine approvals, as its role focuses on assessing safety, quality, and efficacy. Consumer input instead occurs through representation on advisory committees like the Advisory Committee on Medicines (ACM) or TGA Consumer Consultative Committee (CCC).

2. Submit personal evidence to PBAC

Consumers can however, have their say when a medicine is being considered by PBAC for listing on the PBS for medicine cost subsidisation. These comments help decision-makers understand the real-life impact of a condition and the potential benefit of a new treatment, and these are considered during the HTA review process.

- PBAC has 3 main cycles per year where it considers applications for funding of new medicines. This is usually March, July and November. It publishes its main meeting agenda 14 weeks before each meeting, which includes the list of applications for new medicines that it will consider at the upcoming meeting.
- Consultation is open for 8 weeks. During this period, the current process is for consumers to submit their views via an online survey. Where consumers are unable to access the website, they can write a letter and post it to the Office of Health Technology Assessment, Department of Health Disability and Ageing.

Providing specific details about the reality of living with your condition and how the medicine will positively impact you personally, especially in terms of quality of life, symptom relief, or daily functioning, will provide valuable information for consideration by PBAC.

3. Serve on a PBAC Advisory Committee

Consumers can be involved in the PBAC process as representatives on the PBAC itself, through working groups, or as part of subcommittees. This participation ensures that the patient voice is integrated into decisions regarding medicine approvals and PBS listings. If you are interested in becoming a consumer representative, keep in touch with organisations like the Consumers Health Forum of Australia, which often manages these nominations and advocacy efforts.

4. Collaborate with or join a Consumer Advocacy Group

The Consumers Health Forum of Australia, Rare Voices Australia, and the Patient Voice Initiative actively represent consumers by facilitating, informing, and strengthening patient involvement in HTA and related decision-making processes. These organisations collaborate with consumers and contribute detailed submissions and reports that reflect the patient experience. They also provide guidance and resources to support individuals in contributing directly to the medicine approval and reimbursement process.

Research Update

Recent Research Updates on Inherited Retinal Diseases: ARVO 2025 Summary

By Professor Lauren Ayton and Professor Erica Fletcher, Retina Australia Scientific and Medical Advisory Committee Members , and Dr Ceecee Britten-Jones, Retina Australia Board Member

For those living with inherited retinal diseases (IRDs), and those who research them, staying informed can be challenging with the rapid progress in the field. International conferences are an important opportunity for the world-leading scientists and clinicians to meet and share their findings, build new collaborations, and speed up translation of science to practice.

At the start of May 2025, our Scientific and Medical Advisory Committee (SMAC) members, Professor Lauren Ayton, Professor Erica Fletcher and Professor Michael Kalloniatis, and Board Member, Dr Ceecee Britten-Jones, attended the annual Association for Research in Vision and Ophthalmology (ARVO) meeting. ARVO is the world's largest and most respected eye and vision research organisation. Founded in 1928, ARVO hosts an annual meeting that attracts over 11,000 researchers from more than 75 countries, providing a forum for the latest breakthroughs in vision science. The meeting this year was held in Salt Lake City, Utah, USA.

The biggest news of the conference, which has already been shared with Retina Australia members, was that sadly the Janssen Pharmaceuticals RPGR gene therapy trial did not meet its primary endpoints, although there was some positive news. Janssen, a division of Johnson & Johnson, recently completed clinical trials for their gene therapy targeting X-linked retinitis pigmentosa (XLRP) caused by mutations in the RPGR gene. The therapy, known as botaretigene sparoparvovec (formerly JNJ-81201887), aimed to deliver a functional copy of the RPGR gene to retinal cells. Despite initial promise, the Phase 3 LUMEOS trial failed to meet its primary endpoint – an assessment of vision-guided mobility. The study involved 95 patients treated over a 52 week period. However, there were signs of efficacy in other vision measures, and some of the patients did very well after the treatment. As such, Janssen will continue to analyse the data and determine their next steps.

Despite this disappointing news, many exciting advances were reported at the meetings. Lauren, Ceecee and Erica have provided the following update from the conference, including summaries on gene editing, RNA therapies, cell therapies, and drug treatments, all aimed at preserving or restoring vision in people with IRDs.

Research update

Gene Replacement Approaches

RPGR-Associated X-Linked Retinitis Pigmentosa

Separate to the Janssen trial mentioned previously, another treatment for RPGR-related X-linked retinitis pigmentosa (XLRP) is being evaluated in a clinical trial by Beacon therapeutics (VISTA clinical trial). The therapy, known as laruparetigene zovaparvovec, aims to deliver a functional copy of the RPGR gene to retinal cells. The main difference between the Janssen and Beacon treatments is the size of the protein that is produced by the therapy.

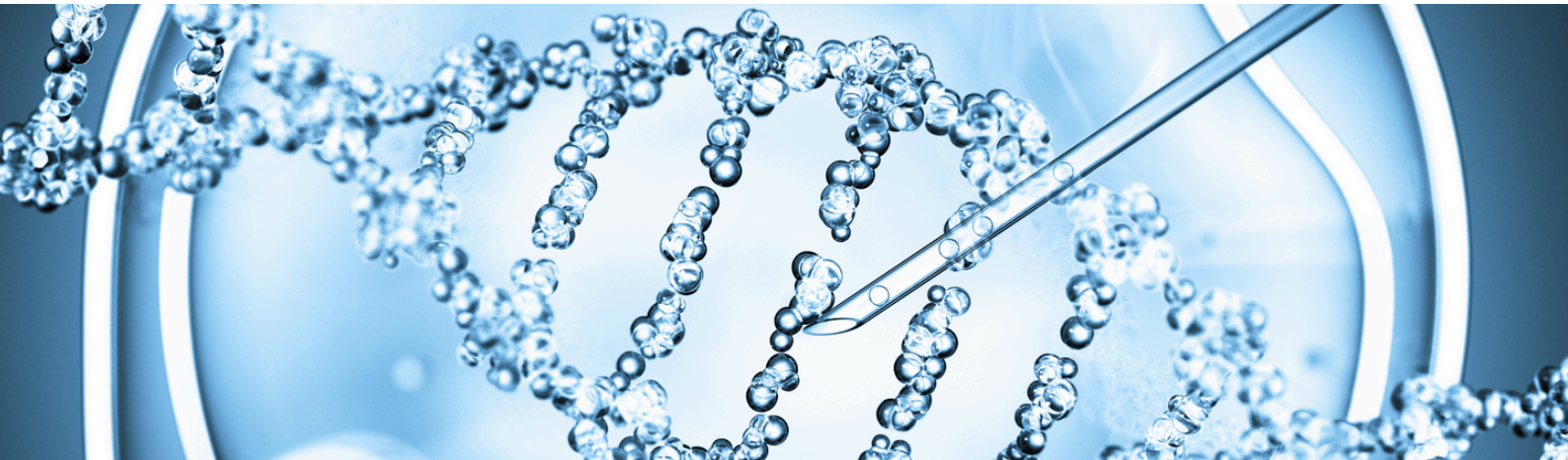
The VISTA trial is a Phase 2/3 study designed to assess the safety and potential efficacy of laruparetigene zovaparvovec. It's currently enrolling patients across multiple sites, including Melbourne and Sydney. The trial is expected to complete enrolment in the coming months. At the conference, Dr Mark Pennesi from the Retina Foundation of the Southwest presented data on the previous Phase 2 DAWN study of this treatment, showing it is safe, and supporting the expansion into the VISTA study.

Gene Editing Approaches

CEP290-Associated Retinitis Pigmentosa

Dr Mark Pennesi also presented promising results for a gene editing treatment targeting CEP290-related retinal dystrophy, which includes conditions like Leber congenital amaurosis (LCA).

The treatment, called Edit-101, showed functional improvement in 11 out of 14 patients. It was well-tolerated, with only some cases of mild inflammation. Importantly, both patients with two copies of the mutation (homozygous) and those with one copy (heterozygous) responded to the treatment. This is significant because it expands the potential patient population who could benefit. The editing is confined to the photoreceptors (light-sensing cells in the retina) due to the design of the treatment. While these results are encouraging, Dr Pennesi notes that it is only suitable for people who have specific genetic variants, and so is not widely available for all individuals with CEP-290 associated disease.



Research Update

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Stargardt Disease

Dr Bence György from the Institute of Molecular & Clinical Ophthalmology Basel (IOB) discussed a new approach for treating Stargardt disease using precision base editing. This technique corrects a single DNA base without breaking the DNA strand, which is different from the CRISPR gene-editing method. The treatment targets a specific mutation that affects about 15% of Stargardt disease patients.

In laboratory studies using human retinal tissue, they achieved about 70% successful editing. Initial tests in non-human primates had some toxicity issues, but changing the delivery method resolved these problems. Their goal is to preserve 15-20% of the cone cells in the central retina (fovea), which could help maintain vision above the legal blindness threshold. This work is still in preclinical development, with no human trials underway.

PRPH2-Associated Retinitis Pigmentosa

Dr Renee Ryals from the Casey Eye Institute at Oregon Health and Science University is working on optimising a technique called prime editing for mutations in the PRPH2 gene, which can cause various forms of retinal degeneration. This research is still in the preclinical testing phase.

RNA-Based Therapies

Leber Congenital Amaurosis (LCA10)

Sepul Bio are developing a drug called Sepofarsen for a specific form of Leber congenital amaurosis (LCA10), caused by a mutation in the CEP290 gene. It has been in development for over 7 years, and 67 patients have been treated so far. While earlier trials showed promising results, with some patients experiencing significant vision improvements, a larger Phase 3 trial didn't show statistically significant benefits overall. However, individual responses varied greatly, with some patients reporting life-changing improvements.

A new trial called Hyperion is now underway in the USA, which will treat one eye with the drug and use the other eye as a control. This design may help better understand the drug's effects.

Usher Syndrome Type 2A (USH2A)

Another RNA-based therapy called ultevursen is being developed by Sepul Bio for patients with mutations in exon 13 of the USH2A gene, which can cause Usher syndrome type 2 and non-syndromic retinitis pigmentosa. An ongoing USA & UK clinical trial, called LUNA, will enrol 81 patients (adults and children over eight years of age) and follow them for the next two years. The first person was treated in late 2024 in Texas, USA, and the trial is progressing well to date.

Research Update

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Cell Therapies

Several research groups are exploring the use of cell therapies to treat various retinal diseases. Presentations at the ARVO conference included the following.

iPSC-Derived Photoreceptor Precursor Cells

Dr Byron L. Lam from the Bascom Palmer Eye Institute at the University of Miami is leading a clinical trial called CLARICO, supported by Bluerock Therapeutics. This is the first clinical trial to evaluate photoreceptor precursor cells derived from induced pluripotent stem cells (iPSCs) for treating primary photoreceptor diseases. The trial is currently enrolling patients in the USA.

hESC-Derived RPE Cells for Geographic Atrophy

Astellas Pharmaceuticals has completed a trial using human embryonic stem cell (hESC)-derived retinal pigment epithelium (RPE) cells to treat geographic atrophy, a late stage of dry age-related macular degeneration. The treatment, called ASP7317, was found to be safe. There were some early signs that it might be effective, but more research is needed.

RPE Patch for Retinitis Pigmentosa

Dr Christelle Monville from I-Stem, University of Evry Paris-Saclay, presented results from a trial using an RPE patch derived from human embryonic stem cells to treat retinitis pigmentosa. The patch is encapsulated in gelatin, allowing the cells to survive for 48 hours during transplantation. Seven patients were treated, including five with MERTK mutations and two with LRAT mutations. The treatment showed good safety and tolerance. Some patients reported improvements, and there was evidence of preserved retinal anatomy and function.

EyeCyte-RPE for Geographic Atrophy

Another cell therapy approach using a cell suspension called EyeCyte-RPE is being developed for geographic atrophy. Nine patients have been implanted so far. Early results show vision improvements of 7 to 15 letters on eye charts. The treatment is awaiting approval to move to a Phase 2 clinical trial.

Research Update

RETINA australia

Small Molecule or Pharmaceutical Treatments

Several pharmaceutical companies are developing oral medications for various retinal conditions.

Tinlarebant for Stargardt Disease and Age-Related Macular Degeneration

Dr Hendrik Scholl from Germany presented updates on tinlarebant, an oral medication being developed by Belite Bio. The DRAGON study is testing the drug in young Stargardt disease patients (average age 15 years). DRAGON is a global study, which includes sites in Sydney and Melbourne. Another study called PHOENIX is testing the drug for age-related macular degeneration.

To date, the studies have shown that the oral tablet is safe and has evidence of slowing down progression of the diseases. Visual acuity was stabilised in the majority of subjects, with mean change from baseline of less than three letter scores under both standard and low luminance, throughout the two-year study. It is expected that DRAGON will be completed by the end of this year.

Gildeuretinol for Stargardt Disease

Michel Dahan from Alkeus Pharmaceuticals discussed their drug gildeuretinol – an oral, once-daily medication designed to replace natural vitamin A in the visual cycle without causing harmful byproducts. In clinical trials, it has shown promise in slowing the growth of retinal lesions in Stargardt disease patients. Some patients with early-stage disease have had stable vision for up to 7 years on the treatment. Unlike some other treatments, it doesn't seem to cause problems with night vision or color perception.

NAC (N-Acetylcysteine) for Retinitis Pigmentosa

Dr Peter Campochiaro presented updates on using NAC, an antioxidant supplement, to treat retinitis pigmentosa. A Phase 2 study showed statistically significant improvements in visual acuity, though the changes were gradual and slow. A larger Phase 3 trial called NAC Attack is now underway, primarily in the USA. The dosage being used is 1800mg twice daily. Some patients experience mild gastrointestinal side effects, but these are manageable with conservative treatment.

NACA (N-Acetylcysteine Amide) for Usher Syndrome

The other current antioxidant trial underway for IRD has built from the work of Dr Campochiaro, and developed a different version of NAC, called NACA. Due to the different composition of the drug, previous work has shown that NACA has greater cell permeability than NAC, and so its proponents claim it could be up to three times more effective than oral NAC.

Research Update

Halden Conner, from the company Nacuity, presented on the current trial for their drug NPI-001, which is being run in Australia. The results from this study are expected in the second half of 2025. Of interest, the drug is also being tested for the prevention of cataracts after eye surgery, and in a rare genetic kidney disease called nephropathic cystinosis.

Disulfiram for Retinal Degeneration
Dr Michael Telias discussed the potential use of disulfiram, a drug typically used to treat alcohol dependence, for retinal degeneration. The drug aims to reduce abnormal electrical signalling in the retina after photoreceptor loss. This could potentially improve the effectiveness of retinal prostheses and optogenetic therapies. It might also be a treatment option for Charles Bonnet syndrome, a condition where people with vision loss experience visual hallucinations. Two clinical trials are now active, but long-term safety of the drug for this use is not yet known.

Avacincaptad Pegol for Stargardt Disease
Astellas Pharmaceuticals has completed a trial of avacincaptad pegol, a complement inhibitor, in Stargardt disease patients. This drug has been approved in the USA for treatment of geographic atrophy secondary to age-related macular degeneration, and is under review with the Australian Therapeutic Goods Administration. Data analysis of the clinical trial in Stargardt Disease is just beginning, so results are not yet available.

Conclusion

While many of these treatments are still in various stages of research and development, they represent significant progress in the field of inherited retinal diseases.

We are pleased that the Australian research on inherited retinal diseases at the ARVO conference was also very well received, with presentations from many Retina Australia Committee/Board members, including A/Prof Fred Chen, Prof Erica Fletcher, Dr Ceecee Britten-Jones, and others.

Special mention to Retina Australia SMAC member, Prof Alex Hewitt (as pictured on the right), who leads several important IRD research programs, and was awarded ARVO's prestigious Cogan Award at the conference. The Cogan Award, recognises a young researcher who has made substantial contributions to research in ophthalmology or visual science and shows great promise for future contributions. Congratulations Alex!

Research Project and Clinical Trial Register

Summary of Projects and Trials Currently Recruiting Participants

The IRD Research Project and Clinical Trial Register aims to provide information about research projects and clinical trials in inherited retinal diseases. This Register is for informational purposes only, and further details can be sought via the email contacts. The following listing summaries some key projects currently open for participant recruitment. For more detail on each project, refer to our website at: retinaaustralia.com.au/inherited-retinal-disease/ird-research-project-and-clinical-trial-register/

Sponsored post
A phase I/II dose-escalating study of the safety, tolerability and efficacy of KIO-301 administered intravitreally to patients with retinitis pigmentosa and choroideremia (ABACUS) – Substudy - Sponsor: Kiora Pharmaceuticals Pty Ltd
Disease: Retinitis Pigmentosa (RP) or Choroideremia (CHM) **Participants:** Patients
This study aims to evaluate the use of specialised tasks to assess vision in individuals with profound vision loss due to RP or CHM.
Recruiting: South Australia Contact: Melanie.Willoughby@sa.gov.au

Sponsored post
SUNDEW: ADOA Interventional Clinical Trial - Sponsor: PYC Therapeutics
Disease: Autosomal dominant optic atrophy (ADOA) **Participants:** Patients
This study is a first step to test a new treatment for individuals with a confirmed mutation in the OPA1 gene, which causes a condition called autosomal dominant optic atrophy (ADOA) that affects vision. It targets the root cause of the genetic mutation and involves giving a single, increasing dose of the treatment directly into the eye to see how safe it is and how well people can tolerate it to find the safest and most effective dose of PYC-001 for treating ADOA.
Recruiting: Centre for Eye Research Australia, East Melbourne, Victoria and Lion's Eye Institute, Western Australia. Contact: Sundew@pyctx.com

Sponsored post
An Observational Clinical Trial of PRPF31 (RP11) - Sponsor: PYC Therapeutics
Disease: Retinitis Pigmentosa **Participants:** Patients, Carriers
This study aims to observe the progression in patients with the inherited retinal disease (IRD) retinitis pigmentosa 11 (PRPF31 or RP11) over the period of four years.
Recruiting: Australia-wide Contact: quokka@lexitas.com

Research Project and Clinical Trial Register

RETINA australia

Summary of Projects and Trials Currently Recruiting Participants

Understanding rod function changes in choroideremia and retinitis pigmentosa
- Sponsor: University of Melbourne and Centre for Eye Research Australia
Disease: choroideremia, and retinitis pigmentosa related to the RPGR and USH2A genes
Participants: Patients, Carriers
This study is looking to validate new clinical trial outcomes, and involves standard imaging and vision tests as well as a light detection task. You would be required to come to Melbourne University in Carlton for one 3-hr session, with a $50 travel reimbursement available.
Recruiting: Melbourne Contact: IRD@groups.unimelb.edu.au

Exploring Barriers and Facilitators to Social Participation in Blind or Vision Impaired Australian Young Adults - Sponsor: Griffith University
Disease: All Inherited Retinal Diseases **Participants:** Patients
This research aims to understand the barriers and facilitators influencing social participation, with the goal of identifying strategies to foster inclusion and accessibility in educational, social, and community settings.
Recruiting: Australia-wide Contact: chrisy.mowbray@griffithuni.edu.au

Perspectives of stem cell therapies for retinal conditions - Sponsor: University of New South Wales and Children's Medical Research Institute
Disease: All Inherited Retinal Diseases and Age-Related Macular Degeneration
Participants: Patients
By completing a survey, we are seeking your perspectives of stem cell therapy, a novel therapy being researched in the laboratory as a potential option for these eye conditions.
Recruiting: Australia-wide Contact: visionlossPSP@unsw.edu.au

Exploring therapies for those who have none - Sponsor: Perron Institute for Neurological and Translational Science
Disease: All rare genetic retinal diseases with no current treatments
Participants: Family Members, Patients
The study will provide a genetic diagnosis by identifying specific changes in the patient's DNA, confirm that is causing the disease, and explore new treatments using our three decades of experience with a type of drug called Antisense oligomers. These drugs could help to restore normal gene function.
Recruiting: Tasmania, WA, Victoria, NSW Contact: MolecularTherapy@murdoch.edu.au

Enabling Accessible and Inclusive Playgrounds for Children and Carers with Vision Impairment - Sponsor: University of Sydney
Disease: All IRDs **Participants:** Parents, Guardians, Health Professionals, Patients
If you are a parent, carer or professional who supervises children with vision impairment in playgrounds, your experiences and feedback will help us focus our work on what matters in playgrounds for children and their families.
Recruiting: Australia wide Contact: sue.silveira@nextsense.org.au

Research Project and Clinical Trial Register

RETINA australia

Summary of Projects and Trials Currently Recruiting Participants

Investigating the genetic basis of undiagnosed inherited retinal diseases - Sponsor: Centre for Eye Research Australia and the University of Melbourne
Disease: All Inherited Retinal Diseases **Participants:** Patients
This research aims to uncover new genetic causes of inherited retinal diseases (IRDs) by studying people with a confirmed IRD but inconclusive previous genetic results. Participants will have a research eye examination and provide a blood sample for genomic sequencing. The goal is to improve diagnosis and future treatment options.
Recruiting: Victoria. Contact: IRD@groups.unimelb.edu.au

The Victorian Evolution of Inherited Retinal Diseases Natural History Registry (VENTURE) Study - Sponsor: Centre for Eye Research Australia, University of Melbourne
Disease: All inherited retinal diseases **Participants:** Carriers, Patients, Family
The VENTURE registry collects retrospective and prospective clinical and genetic information from people living with an inherited retinal disease.
Recruiting: Victoria. Contact: IRD@groups.unimelb.edu.au

The Australian Inherited Retinal Disease Register (AIRDR) and DNA Bank
- Sponsor: Sir Charles Gairdner Hospital, Perth, Western Australia
Disease: All inherited retinal diseases **Participants:** Carriers, Patients, Family
The primary aim of the AIRDR is to characterise the genetic spectrum of IRDs in the Australian population in order to guide research into treatments and cures for IRDs.
Recruiting: Australia wide. Contact: SCGHMTP@health.wa.gov.au

Save Sight Institute IRD Registry - Sponsor: The University of Sydney, NSW
Disease: All inherited retinal diseases **Participants:** Carriers, Patients, Family
IRD management involves detailed ophthalmic structural and functional assessment.
Recruiting: New South Wales. Contact: ssi.operations@sydney.edu.au

Western Australia Retinal Disease (WARD) study - Sponsor: Lions Eye Institute, Perth WA
Disease: All inherited retinal diseases **Participants:** Carriers, Patients, Family
Based at the Lions Eye Institute, this study tracks people with inherited retinal diseases (IRDs) through 6-monthly eye assessments. It also collects blood and skin samples to support disease modelling and the development of personalised treatments.
Recruiting: Western Australia. Contact: fcreceptionist@lei.org.au