



Vision Research at Bond

Supporting life-changing eye research
at the Clem Jones Centre for Regenerative Medicine



Age-related Macular Degeneration (AMD)

Age-related macular degeneration (AMD) is a progressively worsening eye condition that affects the central retina, called the macula, which is needed for vision.

The macula is particularly crucial for activities that require detailed sharp, central vision, such as reading, driving, recognizing faces, and seeing fine details. AMD patients lose the ability to read and watch TV, and can no longer recognise faces of people close to them.

AMD is not rare - it is a leading cause of irreversible vision loss and blindness in Australia. 1.5 million Australians aged over 50 are affected by AMD - 1 in 7.

There are two main types of AMD:

“Wet AMD” is very aggressive. In Wet AMD, abnormal blood vessels start growing beneath the macula. They are thin and leak blood and fluid, causing rapid and severe damage to the macula. Vision loss in Wet AMD can be more sudden and significant compared to Dry AMD. Wet AMD can be treated by injection of antibodies into the eye to prevent the growth of these abnormal blood vessels. Regular injections are required to maintain the effect. Older and less efficient treatment options are photodynamic and laser therapy.

90 per cent of AMD patients suffer from “Dry AMD”. In their macula, small deposits of proteins and fats accumulate, which leads to deterioration of the macular tissues, causing gradual central vision loss. Dry AMD typically progresses slowly. There is no cure for Dry AMD. Regular eye exams are essential for early detection and management of AMD. Lifestyle factors such as a healthy diet, not smoking, and protecting your eyes from excessive UV light may also play a role in reducing the risk of AMD and help to slow its progression.



The Clem Jones Centre for Regenerative Medicine

The Clem Jones Centre for Regenerative Medicine (the “Clem Jones Centre”) is located in the Faculty of Health Sciences & Medicine at Bond University on Queensland’s Gold Coast. It has been supported for more than a decade by the Clem Jones Foundation, the philanthropic arm of the Clem Jones Group. Their trustees are dedicated to ongoing commitments to the wishes and philosophies of the late Dr Clem Jones AO (who suffered from AMD), for the benefit of the community.

The primary focus of the Clem Jones Centre is the **development of regenerative therapies to cure retinal disease, including Dry AMD.**

We are using stem cells to create a cell sheet that can be transplanted into the eye, right into the macula, and therefore can reverse the damage caused by AMD.



“Age-related macular degeneration (AMD) impacts many older Australians, and research is critical in preventing visual impairment and blindness in our aging population. The Clem Jones Centre for Regenerative Medicine at Bond University aims to combine research excellence in stem cell science with clinical translation, and to enhance, induce or transplant stem cells for patient benefit. Since 2011, the Clem Jones Foundation has provided ongoing financial support, investing in this vital and world-class research in line with the wishes of the late Dr Clem Jones AO.”

Peter Johnston

CEO, Clem Jones Foundation

Our achievements

The Clem Jones Centre is developing a treatment approach for Dry AMD and other retinal conditions. Key to this is the large-scale production of clinical grade retinal cells, suitable in terms of number and quality for transplantation into patients, a method for transplantation of these into the eye (i.e., putting the cells on a membrane), and a way to protect them and help them to integrate into the retina (e.g., with drugs).

In the last decade, our team has made significant advances, including development of:

- Methods for rapidly creating stem cells and developing (“differentiating”) them into retinal cells - we can create human stem cells from pluripotent stem cells in weeks and then make millions of retinal cells from them.
- Cell-on-membrane construct for transplantation into the eye - we can transfer the retinal cells on to a very thin sheet, which is used to locate cells into the macula.
- Novel drugs to combat oxidative stress and inflammation in the diseased eye. These drugs can protect the cells after transplantation and allow them to survive, connect, and do their job.

We have two teams:

Dr Jason Limnios’ team has a wealth of expertise in the generation, growth, and differentiation of human stem cells and have developed core platform technologies to make critical cell types of the eye, including RPE cells and photoreceptors, to treat AMD. These methods have been specifically designed for production of clinical-grade cells for human therapies.

Using advanced experimental techniques, specialist imaging and electrophysiology, researchers in Dr Nigel Barnett’s team work to unravel the complex steps which determine the survival or death of the critical nerve cells in the retina. They are currently testing a number of promising protective strategies to enhance the survival of retinal cells after transplantation within the hostile environment of the diseased eye. These include the delivery of enhanced antioxidant compounds and the targeting of inflammatory responses within the retina.



Our team



Professor Helen O'Neill

*Director and Cutmore Distinguished Professor of Stem Cell Research
Clem Jones Centre for Regenerative Medicine*

"Many people have been affected by AMD and are excited to support our unique line of research in stem cell replacement therapy for blindness. External engagement helps us make our research relevant to clinicians, the business world and to all people. Staff in the Centre enjoy and value connecting with the public, and their perspective grounds our work."



Dr Nigel Barnett

*Associate Professor,
Clem Jones Centre for Regenerative Medicine*

"Approximately 1.5 million older Australian's have signs of age-related macular degeneration. Unfortunately, even with today's best treatments, about 240,000 Australians tragically suffer vision impairment or blindness. The financial support we receive from generous public donors is vital in the development of an effective treatment to help each and every one of these people."



Dr Jason Limnios

*Senior Research Fellow,
Clem Jones Centre for Regenerative Medicine*

"The main idea behind stem cell therapies is to turn stem cells into the cells you need and to transplant them into the body. Our lab has established new ways to guide stem cells to become retinal cells so we can save vision in AMD patients. Everything we do has been specifically designed with the end goal in mind: to produce large numbers of high-quality retinal cells, made under clinical-grade conditions and at low cost. This is reality in the making."

Translating research into therapies

At the Clem Jones Centre we are committed to using basic research to answer a range of complex biological questions. That is where it starts. Without this fundamental research it would be impossible to make the advances necessary to discover new treatments and cures.

Standing on this solid foundation, we aim to close the gap between discovery in the laboratory and application in patients. Ultimately, our researchers aim to translate the knowledge, materials, and methods created in the laboratory into treatments that can be tested in clinical trials.

The sooner we take our laboratory-based medical discoveries and convert them into new treatments, the earlier they can be manufactured by biotech and pharmaceutical companies and used by doctors to improve the lives of patients, creating a healthier and happier future for all Australians suffering from vision loss.

Research translation requires harnessing a broad array of both scientific and non-scientific capability and capacity. We cannot do this alone and need our community to come on this journey with us - patients, doctors, companies, government, and philanthropic organisations such as the Clem Jones Foundation and the Cutmore Family.

How you can make a difference

At Bond we believe in the ability of our health and medical programs to create profound change in the quality of life for the people of the Gold Coast, Australia, and the world.

At the Clem Jones Centre we are working to reduce disadvantage from vision loss by developing new treatments and cures to significantly reduce the number of community members suffering from poor or lost vision due to retinal disease.

Professor Nick Zwar

Executive Dean, Faculty of Health Sciences and Medicine

“Research is an integral part of Bond’s success. We pride ourselves in our research excellence and our commitment and ability to innovate and produce world-class research collaborations that will deliver better health outcomes and better healthcare services to local, national and international communities.”

The Centre carries the Clem Jones name and the Clem Jones Group have laid the foundation that enabled us to get to where we are now.

Other donors like Cora Cutmore are a great example of how one person can make a huge difference. After living an exceptional career as a nurse, Cora suffered from AMD in her later years. Before her passing in 2016, she entrusted her niece and nephew, Don Cutmore and Janet Price, to find a medical research project that would benefit from her multimillion-dollar share portfolio. This bequest has enabled us to do more and to progress more quickly.

Others have joined, including Bond University’s “Chancellor Circle”, a group of donors, who support a number of activities at Bond.

We invite you to become a friend and donor of the Clem Jones Centre, someone who will join us in building our long-term sustainability by investing in our work. We need your support.

You can donate to the Centre by scanning the QR code below.

If you want to learn more about the Centre:

bond.edu.au/research/research-strengths/faculty-research-centres/clem-jones-centre-regenerative-medicine



Donate here