

## *STEM-CELL THERAPIES RESTORING VISION*

*TWO GROUND-BREAKING STUDIES SHOW VERY PROMISING RESULTS*

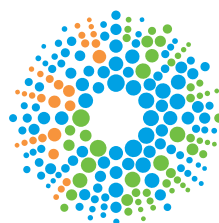
Picture: Magnified cross-section of an eye

STEM  
CELLS &  
VISION  
REPAIR

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The FOUNDATION  
FIGHTING BLINDNESS

## PROMISING RESULTS SHOW THE POTENTIAL FOR STEM-CELL THERAPIES TO RESTORE VISION

**In many blinding eye diseases, cells that are essential for vision die.** Scientists around the world, including Foundation Fighting Blindness (FFB)-funded scientists, are working to create stem-cell treatments to replace these crucially important vision cells and restore sight.

Recently, two ground-breaking clinical trials fueled our excitement about the future of stem-cell therapeutics because both trials reported incredibly promising results about different experimental stem-cell treatments for age-related macular degeneration (AMD). (To learn about AMD, see the side bar on p. 2.)

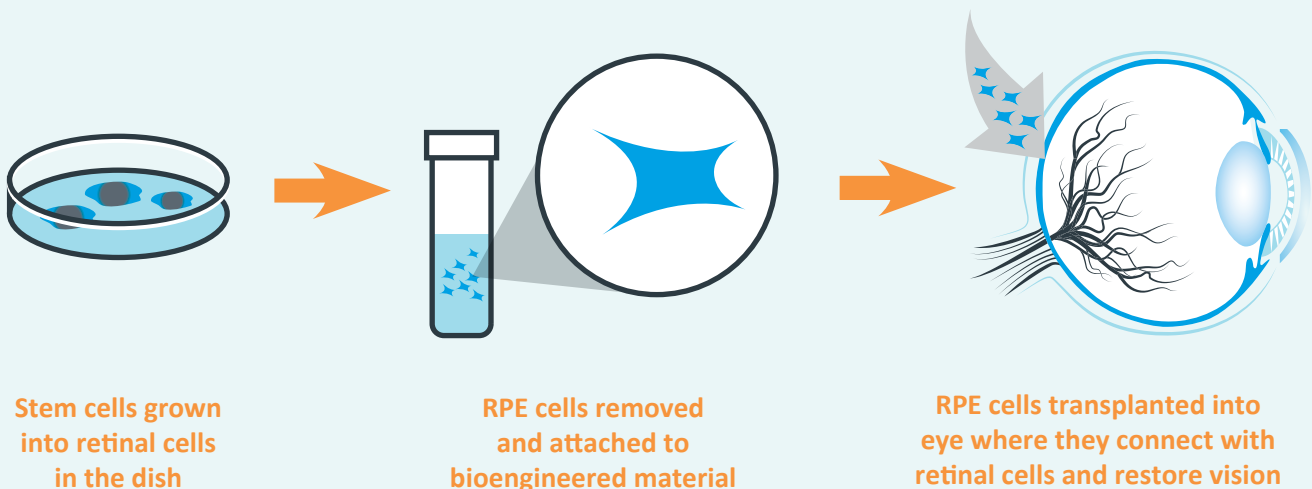
The first trial, led by Dr. Peter Coffey, aimed to restore vision to patients living with a severe form of wet AMD by replacing damaged cells with a “patch” of new cells. The transplanted patch contained a layer of **retinal pigmented epithelial (RPE) cells**. RPE cells support and nourish the eye’s light-sensitive

photoreceptor cells. These new RPE cells were created by coaxing stem cells to turn into (or “differentiate”) into RPE cells. The RPE cells were placed onto a synthetic “patch” and delivered to the eye as a fully formed and connected cell layer.

The second trial, led by Dr. Mark Humayun, also used stem cells to create a layer of RPE cells, which were attached to a special material that was bioengineered to replicate an important part of the eye (Bruch’s membrane). The RPE cells were connected to the bioengineered material to form an implant that could be transplanted into patients living with dry AMD (see photo on p. 2).

Both studies reported tremendously encouraging results. One patient who had lost his sight regained the ability to read! Both studies reported that patients’ vision improved! These positive results illustrate the tangible research progress that is being made.

### TRANSPLANTING RPE CELLS TO RESTORE VISION IN AMD





The tiny eye implant is composed of a single layer of stem cells attached to bioengineered material.

*(Continued from page 1)*

It's important to remember that these are experimental treatments that are being tested in clinical trials, which are a special type of study that is used to develop safe and effective therapies. These experimental stem-cell treatments are showing promising results – but more research needs to be done before safe and effective treatments are available.

The extraordinary potential for stem cells to treat a variety of different blinding eye diseases is why, thanks to incredibly generous donors, the FFB funds so many different stem-cell research projects. We are thrilled to see progress happening around the world, and right here in Canada (see sidebar, p. 2 and the centre-spread for more about FFB-funded stem-cell research). Every positive result brings us one step closer to a cure! ■



## AGE-RELATED MACULAR DEGENERATION (AMD)

AMD affects more than a million Canadians and is the most common blinding eye disease in people over the age of 50. There are two forms of AMD – dry and wet.

In AMD, important vision cells, including retinal pigmented epithelial (RPE) cells and photoreceptor cells, slowly die. As a result, the central part of the person's vision begins to appear dark, blurred or distorted. This gradual loss of central vision is called **dry AMD**. Currently, there are no treatments for dry AMD.

About 10% of people with dry AMD will develop **wet AMD**, the more severe form of the disease, which can cause rapid and severe vision loss. Thanks to incredible research progress, there are now sight-saving treatments for wet AMD called **anti-VEGF therapies**. Vascular endothelial growth factor (VEGF) is a substance that is normally produced by our bodies, which tells new blood vessels to form. However, in wet AMD, vision loss is caused by abnormal blood vessel growth; anti-VEGF therapies stop this growth and prevent vision loss.

**Scientists are developing innovative new stem-cell treatments for both dry and wet AMD.**

Thanks to FFB donors, Dr. Andras Nagy is developing a new stem-cell based treatment for wet AMD that would deliver stem cells to the eye that have been genetically engineered to release anti-VEGF therapy. His goal is to restore vision and prevent further vision loss with a “one-shot” therapy. ■

Sabiha Hacibekiroglu is studying with Dr. Nagy to develop a new stem-cell treatment for AMD. During her research, she took the photograph featured on the cover of *InVision*.

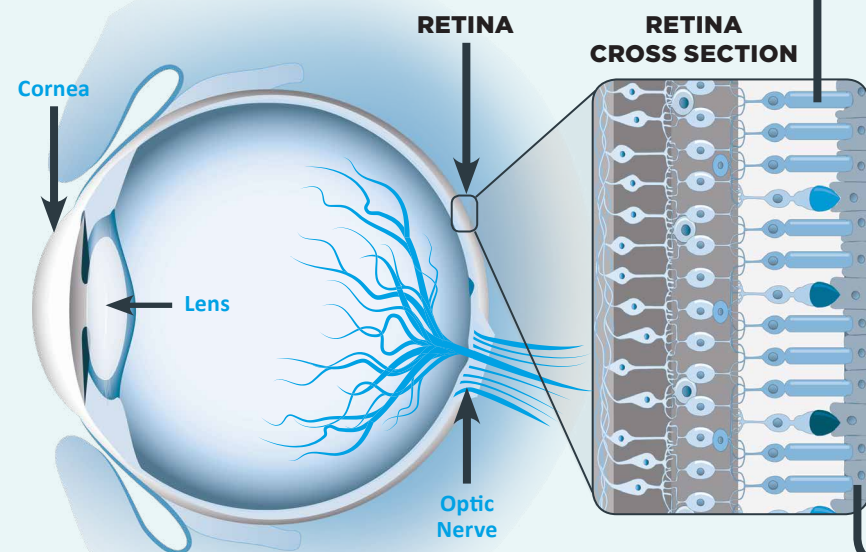


# STEM CELLS & VISION REPAIR

## CAN WE TREAT IT WITH STEM CELLS?

The eye is a complex organ, but luckily, also one that is a good target for stem-cell treatments.

It is self-contained, so requires little support from other organs or tissues and is also relatively easy to reach and to measure the effects of treatment.



## WHEN WILL TREATMENTS BE AVAILABLE?

It's difficult to predict exactly when treatments will be ready, but we know that every dollar donated accelerates the pace of research.

### EARLY/PRE-CLINICAL RESEARCH:

FFB is funding essential laboratory research to improve our understanding about how stem cells work. Discoveries by FFB-funded scientists will help ensure that future stem-cell therapies are safe and effective.

### IN CLINICAL TRIALS:

This stage of research involves testing experimental treatments in people who are living with blinding eye diseases. **Currently, there are no stem-cell clinical trials in Canada, but there are a few for AMD in the UK, Japan, and the USA. Always talk to your doctor before joining a clinical trial.**

### APPROVED CLINICAL THERAPY:

There are no approved stem-cell therapies for blinding eye diseases! Thank you to FFB-donors for funding essential research that is accelerating the development of new treatments.

## PHOTORECEPTORS

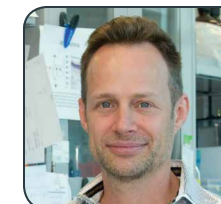
### Transplanting photoreceptors to restore vision

Restoring vision to people living with inherited retinal diseases (IRDs) or late-stage AMD will require transplanting photoreceptors, the eye's light-sensitive cells.

IRDs are the leading cause of childhood blindness. IRDs share these traits:

1. They involve the progressive loss of retinal cells, including photoreceptors, which leads to blindness.
2. They are caused by genetic mutations. The more common IRDs include: retinitis pigmentosa, Stargardt disease, choroideremia, Usher syndrome, Leber congenital amaurosis, and X-linked retinoschisis. Currently there are no stem-cell treatments for IRDs.

FFB-funded scientists are studying how stem cells make rod and cone photoreceptors. They are also developing new photoreceptor transplantation techniques to restore sight.



Dr. Gilbert Bernier

Creating cone photoreceptors to restore high-acuity vision



Dr. Michel Cayouette

How do stem cells become rods or cones?



Dr. Brian Ballios

Bioengineering solutions for cell transplantation

## RETINAL PIGMENTED EPITHELIAL (RPE) CELLS

### Transplanting RPE cells to restore vision

Restoring vision to people with wet AMD can be done by transplanting RPE cells, which provide nourishment and support to the eye's photoreceptors.

AMD is the third most common cause of blindness and is increasing in countries with aging demographics. Currently there is no cure for AMD. This is one reason why researchers are testing stem-cell methods, as possible ways to restore sight.



Dr. Andras Nagy

Combining cell and gene therapy to treat AMD



Dr. Sarah McFarlane

Movement of RPE cells in development



Dr. Stéphanie Proulx

Developing an RPE substitute

## ■ TOP 5 VISION HEALTH TIPS THIS SUMMER

### ■ 1. GET TESTED

School may be out, but there's still one more test to take. If you have an inherited retinal disease such as retinitis pigmentosa (RP), it's important to have a clear picture of your genetic history. The best way to get this is through a genetic test. Ask your ophthalmologist or optometrist for a referral and visit [ffb.ca](http://ffb.ca) to learn more.

### ■ 2. TAKE A SCREEN VACATION

Research is ongoing, but at this point there's no definitive evidence that blue light from electronic devices is harmful to vision. That's the good news. The bad news is that screen time can lead to eye strain, fatigue, and headaches. We live in a culture of screens – if you can, take a break from them and rest your eyes.

### ■ 3. GET WET SWIMMING, NOT WET-AMD

If you have dry age-related macular degeneration (AMD), it's important to ensure it isn't progressing into wet-AMD. The easiest way to do this is with an Amsler grid. If you don't have one handy, visit [ffb.ca](http://ffb.ca) to download a copy, or focus on an object or background with straight, parallel lines. If they are curved or distorted, call your ophthalmologist or optometrist.

### ■ 4. STAY HEALTHY

The eyes are an important part of the body, so they benefit from exercise and a healthy diet as well. This is particularly the case with eye diseases that are linked to other health problems, such as diabetic retinopathy. Your eyes will be grateful if you stay healthy and active.

### ■ 5. SUPPORT SCIENCE ALL SUMMER!

Things slow down in the summer, but FFB-funded scientists don't take a break. They're racing to develop cures for blindness and vision loss, and you can accelerate their work by donating to the FFB! ■



**ACCESSIBLE MEDIA INC.**

**National Partner In Accessibility**

AMI is a not for profit media company that entertains, informs and empowers Canadians who are blind or partially sighted. Operating three broadcast services, AMI tv and AMI audio in English and AMI télé in French, AMI's vision is to establish and support a voice for Canadians with disabilities, representing their interests, concerns and values through accessible media, reflection and portrayal.

## LORNA ROSENSTEIN: A PILLAR OF HOPE, STRENGTH AND DEDICATION IN THE FFB COMMUNITY

**T**hose who donate to the Foundation Fighting Blindness (FFB) may quite luckily find themselves on the phone with our dedicated volunteer, Lorna Rosenstein.

For more than two decades, Lorna has been volunteering her time by being the voice of the FFB's donor thank you call program as well as connecting with people affected with vision loss and offering personal support.

Both she and her sister have retinitis pigmentosa (RP), a retinal disease that causes progressive vision loss, but this hasn't stopped Lorna from becoming a cherished pillar of hope, strength and dedication in the FFB community.

Along with being a generous monthly donor since 2004 and serving on the Board of Directors from 1998 to 2015, she has also been an active fundraiser for Cycle for Sight, having personally raised over \$62,000. Although not a rider herself, she instead participates by volunteering on event day and enthusiastically cheering on the cyclists.

So, what keeps Lorna motivated to raise money, give of her time and personally donate? She says: "Giving back is very important to me. It's not about what you have. What matters is what you do with what you have. If I can't access a cure in my lifetime, I feel strongly that the next generation will."

In April 2018, we were thrilled when, out of hundreds of nominations, Lorna was chosen as a recipient of the Volunteer Toronto Legacy Award. Congratulations on this very well-deserved honour, Lorna!

The FFB is grateful to continue to be the benefactor of Lorna's wonderful generosity. Her unwavering support has helped to make huge strides in vision research. Because of Lorna and donors like her, treatments and cures are truly within reach. ■



Lorna Rosenstein receiving the prestigious Volunteer Toronto Legacy Award.

### JOIN OUR MONTHLY GIVING PROGRAM TODAY >>

#### YOU CAN RESTORE HOPE & SIGHT

For as little as \$10 a month (just 33 cents a day) you can support vision research year-round and change the lives of people living with vision loss.

#### MONTHLY GIVING IS

Effective • Affordable & Flexible • Convenient

Contact Josie Koumandaros at  
1.800.461.3331 ext. 262 | [jkoumandaros@ffb.ca](mailto:jkoumandaros@ffb.ca)

### LEAVE A LEGACY >>

Support vision research by leaving the FFB in your will.

#### DONATE SECURITIES

A gift of stock can maximize the value of your donation and your tax advantage.

For more information on these or other ways to make a gift contact Ann Morrison at  
1.800.461.3331 ext. 232 | [amorrison@ffb.ca](mailto:amorrison@ffb.ca)



## GET INVOLVED

### VISION QUEST EDUCATION SERIES

Vision Quest is an educational program for individuals and families living with vision loss.

### UPCOMING VISION QUEST 2018 EVENTS

Toronto	Symposium	Sept 15
Edmonton	Lunch & Learn	Oct 12
Edmonton	Symposium	Oct 13
Victoria	Lunch & Learn	Nov 6
Toronto	Lunch & Learn	Nov 12

Not able to attend in person?  
Visit [ffb.ca](http://ffb.ca) to view or listen to presentations from these events.

### SUMMER RETREAT ANYONE?

Looking for active women, living with vision loss, who want to play, laugh, learn, cry, share, connect, eat & drink at a

### 3-DAY RETREAT ON LAKE SIMCOE

(1 hour north of Toronto)

If interested contact  
[donnagreen045@gmail.com](mailto:donnagreen045@gmail.com) | 416-461-5083

### FUNDRAISING EVENTS

#### COMIC VISION

Comic Vision is Canada's favourite comedy fundraising tour, spreading hope and humour coast-to-coast since 1999. Join us in laughter and help us restore hope and sight!

[comicvision.ca](http://comicvision.ca)



#### CYCLE FOR SIGHT

Bring your family and friends and join hundreds of sighted, low vision and non-sighted riders at one of Canada's premiere cycling fundraisers. Register today to see what you're made of.

[cycleforsight.ca](http://cycleforsight.ca)



#### RIDE FOR SIGHT

From its humble beginnings, Ride for Sight has grown from a small local fundraising event to a national initiative. Ride alongside us as we take a united stand against vision loss and continue to make history.

[rideforsight.com](http://rideforsight.com)

